

**WINTER
2024-25**

THE BRIDGE

**News from the
School of Ocean Sciences
and the
School of Ocean Sciences Alumni Association**



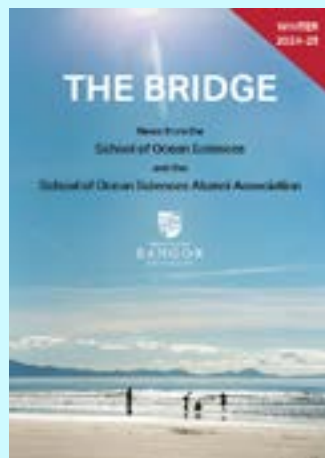
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THE BRIDGE Winter 2024-25



Please send your news to:
t.p.rippeth@bangor.ac.uk

THE BRIDGE

The newsletter of the School of Ocean Sciences and our alumni.

Keeping you informed of developments both in the School in Menai Bridge and globally through our vast network of alumni. Linking past, present and future students into a network of marine scientists to further explore our science and provide a bridge between academic research and the offshore industry.

Edited by Tom Rippeth



Remember you can catch up with previous editions of "The Bridge" online:

<https://www.bangor.ac.uk/oceansciences/newsletter.php.en>

2025 OPEN DAYS

Saturday, 05 July
Sunday, 17 August
Sunday, 12 October
Saturday, 1 November
Saturday, 22 November

Welcome to the Winter 2024/25 edition of "The Bridge" newsletter. As you will see we have had a busy six months here in Menai Bridge.



In July we were delighted to celebrate the graduation of our finalist students, whilst in October we welcomed our next cohort to Bangor. We are also very grateful to our alumni for their support in our regular careers events, which aim at ensuring our students are able to take full advantage of their time here in Bangor, in developing their future career plans.

Once again we are delighted to report that staff members have been recognised through external prizes. **Dr Laura Richardson** received the 2024 Learned Society of Wales Dillwyn medal (STEMM), which is awarded annually to an early career scientist who shows great promise. Also, **Dr Iestyn Woolway** received the 2024 Philip Leverhulme Prize in recognition of his "*significant international contributions and demonstrating exceptional promise for the future.*"

We also celebrated the promotion of several staff members. Both **Gareth Williams** and **Pete Robins** became professors, and **Margot Saher** and **Jenny Shepperson** were promoted to senior lecturers.

As you will see our students have also been very busy over the past six months. They have attended various conferences to present their own research work. We must congratulate **Maya Harries**, who despite her early career stage, won the award for the best student presentation at the International Pectinid conference.

Over the summer many of our undergraduate students undertook internships, and we are delighted to include reports of some of their internship activities.

Best Wishes
John

Professor John Turner (Head of School)

Thank You for Staying Connected!

We're incredibly grateful to all our Twitter/X followers for their support. We have now moved on from that platform and the exciting news is that we're growing an active community on Bluesky Social! You can now find us at [@sosbangor.bsky.social](https://sosbangor.bsky.social) - we'd love for you to join us there.

Don't forget, you can also stay connected with us on:

Facebook: facebook.com/sosbangor
Instagram: instagram.com/bangor.sos

Stay updated and engaged with our latest news and activities - see you online!

CONGRATULATIONS



Dr Laura Richardson, 2024 Dillwyn Medal for STEMM

We are delighted to report that **Dr Laura Richardson**, a research fellow at the School of Ocean Sciences has received this year's Dillwyn medal (STEMM) from the Learned Society of Wales.

The three Dillwyn Medals are awarded annually in recognition of outstanding early career research in three different academic fields: STEMM (science, technology, engineering, mathematics and medicine); social sciences, education and business; and the creative arts and humanities.

Dr Richardson is a marine scientist who researches how coral reefs are affected by human impacts and biophysical processes occurring across space and time. This work is invaluable for helping decision-makers who work to preserve these vulnerable ecosystems.

Dr Richardson said, *"I am honoured and delighted to have received this medal. It means a great deal to me. My heartfelt thanks go to my collaborators, mentors, and friends, who have contributed along the way."*

Laura is originally from Salisbury and studied for a BA Hons in Social Anthropology and Development Studies at the University of Sussex and an MSc in Marine Environmental Protection here at the School of Ocean Sciences before undertaking a PhD in Marine Ecology at The Australian Research Council's Centre of Excellence for Coral Reef Studies at James Cook University.

This is the second year in a row that this medal has been awarded to an Ocean Sciences early career researcher (see Winter 2023/24 Bridge) further highlighting the School of Ocean Sciences as a leading STEMM research centre in Wales.



Dr Iestyn Woolway, 2024 Philip Leverhulme Prize

Dr Iestyn Woolway, a climate scientist in the School of Ocean Sciences, has been honoured with the 2024 Philip Leverhulme Prize in recognition of his research on the effects of climate change on global lakes and freshwater ecosystems.

This prestigious award, granted by the Leverhulme Trust, is given to scholars whose work has already made significant international

contributions and demonstrates exceptional promise for the future. It recognises original, impactful research that has shaped understanding across disciplines. Only 30 prizes are awarded each year across the UK, with the 2024 awards spanning several academic fields.

Iestyn's research focuses on how lakes and other inland waters are responding to rapid global warming. His work has provided critical insights into the effects of climate change on these ecosystems, with serious implications for biodiversity, water quality, and overall ecosystem health. Using advanced techniques that integrate satellite remote sensing and climate modelling, Dr Woolway has offered a global perspective on the vulnerability of lakes to rising temperatures. His innovative studies, especially those on how increasing air temperatures and shifting weather patterns affect lake temperatures, stratification, and ice cover, have been instrumental in shaping scientific understanding and informing climate policy discussions.

The award also underscores Iestyn's growing role as a key voice in global discussions on how to mitigate and adapt to the impacts of climate change.



Maya Harries, best student presentation award

Maya Harries (3rd year BSc Marine Biology) presented her work on the ageing of Queen Scallops at the International Pectinid conference in Douglas, Isle of Man.

Although still an undergraduate Maya won the award for the best student presentation. The title of Maya's talk was *"Using alternative hard parts to age Queen Scallops Aequipecten opercularis"*.



Dr Martyn Kurr, Senior Fellowship of the Higher Education Academy

Senior Fellowship of the Higher Education Academy (SFHEA) is an advanced level of professional standing that evidences expertise in teaching and learning in higher education

Commenting on his achievement, Martyn said: *"I've been extremely lucky to have had some amazing role models throughout my life, and I try to use what they taught me to inspire the next generation of marine scientists and conservationists. The more I reflected on role models and sources of inspiration, the more I realised that these days the people I'm most inspired by are our students."*

Congratulations to all our Graduates!









CONGRATULATIONS



Gareth Williams on his promotion to Professor

Gareth graduated in Marine Biology (University of Liverpool) in 2004 and completed an MSc in Marine Environmental Protection (Bangor University) in 2006.

He began a PhD in Marine Biology (Victoria University of Wellington, New Zealand) in 2007 in coral disease ecology, combining macroecology, experimental ecology, and histopathology to identify disease baselines and drivers of disease prevalence on Pacific coral reefs. A focus study site of his was Palmyra Atoll, an uninhabited atoll in the Northern Line Islands. After obtaining his PhD in 2011, he was awarded a post-doctoral scholarship at Scripps Institution of Oceanography, University of California San Diego (UCSD), where he continued to work on the macroecology of Pacific coral reefs. This role at Scripps transitioned into an Assistant Project Scientist position within the Center for Marine Biodiversity and Conservation in 2013. He left Scripps in late 2015 to return to the UK and took up his full-time role within the School of Ocean Sciences at Bangor University.

Gareth is a marine ecologist specialising in coral reef ecology. His work focuses on the interaction of organisms with their environment, often taking a macroecological approach. His team are particularly interested in how human activities and natural biophysical gradients interact to drive community patterns across multiple trophic levels (microbes to sharks) and scales (individual reefs to entire ocean basins). Much of his work incorporates remote coral reefs free from direct human impact, providing key replication at the unimpacted end of an intact-to-degraded ecosystem spectrum. By extensive surveying his research team address broad questions pertaining to: 1. the human, climatic and oceanographic drivers of coral reef ecosystem structure and function, 2. climate change impacts to coral reef ecosystems, 3. the spatial ecology of coral reefs, and 4. disease dynamics on coral reefs.

Pete Robins on his promotion to Professor



Pete gained his Degree in Mathematics and Physical Oceanography from Bangor University in 2003, whereby his interests in coastal physical processes led him to study a Ph.D on internal tidal dynamics in Scottish fjords, which he completed in 2008.

Pete's interests in coastal and estuarine physics have continued throughout his academic career at Bangor. He has investigated a wide range of environmental, social, and economic applications, such as characterising coastal hazard risks from estuary flooding, morphological changes, and water quality degradation.

Pete has contributed to the development of the marine renewable energy sector in the UK and globally through resource and environmental impact assessments. Working closely with the UK Met Office, his research is often framed in the context of climate change, where future impacts are expected to be exacerbated at the coast due to compounding climate stressors impacting complex and interconnected environmental and socio-economic receptors.

Pete also works closely with coastal regulatory bodies in the UK, such as the Environment Agency, Natural Resources Wales, Cefas, and Defra, to ensure the research has real world applications and impact. Pete teaches coastal physical processes, coding, and ocean modelling across the school's undergraduate and postgraduate programmes, leading a vibrant group of postdoctoral and Ph.D researchers. With estuaries often 'falling between the gaps' of ocean and terrestrial disciplines and, in the context of coastal climate change and land use change, Pete recognises that there is still much to discover in this field, with his current research focussing on improving our understanding and prediction of coastal hazards to inform management and adaptation strategies for the coming decades.

Margot Saher on her promotion to Senior Lecturer.



Margot has been working at the School of Ocean Sciences since 2014, when she joined as a postdoc on the NERC funded BRITICE-CHRONO project with Prof James Scourse.

She had been working with foraminifera since her PhD work at the Vrije Universiteit in Amsterdam, using them to assess the timing of the Indian monsoon in glacial-interglacial transitions, and as a signature of global warming on the floor of the Barents

Sea. On arriving in Bangor she applied this knowledge to using foraminifera to help establish the retreat of the (marine terminating) British-Irish Ice Sheet.

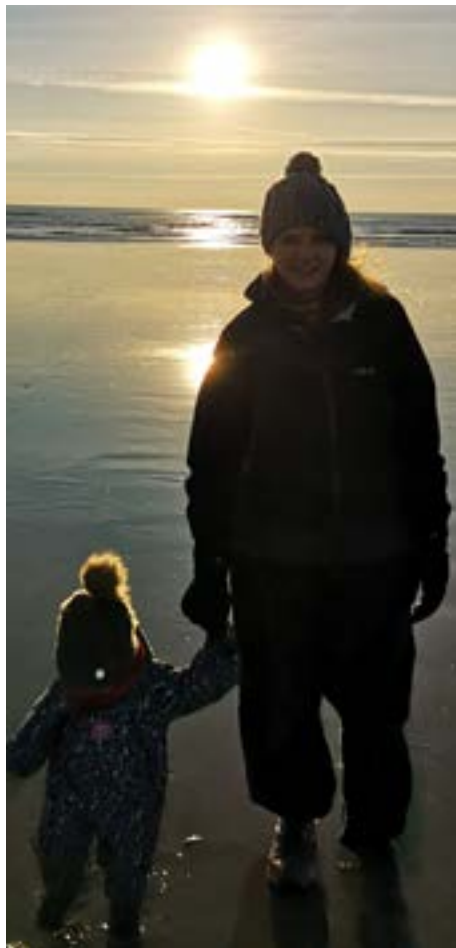
In 2018, she became a lecturer. This widened her focus, but foraminifera are still important in many modules she teaches, as they are such powerful proxy carriers documenting many aspects of climate, such as temperature, ice volume, and pollution levels especially over longer (Milankovitch) timescales. Many things, including climate change, only come in proper focus with a historical context.

Having started learning Welsh straight on arrival, she acquired her Welsh teaching qualification, after which her teaching became bilingual.

In addition, Margot has taken on a variety of roles throughout the years; including organising Open Days and Welcome Week, and serving as the Academic Integrity Officer. In her role as EDI lead, Margot led the successful application for SOS Athena Swan accreditation.

Fortunately, almost all her working days are bookended by a beautiful bicycle commute from Bethesda, which, in addition to regular runs, keep her fit and mentally well, ready for continued responsibilities within the School as a senior lecturer.

Jennifer Shepperson on her promotion to Senior Lecturer



Jenny's teaching has a strong focus on innovative teaching and student support.

She is passionate about helping students build confidence in data analysis and coding, using interactive and inclusive teaching methods to make these challenging skills more accessible. Jenny's subject research focuses on the environmental impacts of fishing, and her teaching-focused research explores student anxiety and discomfort when learning statistics and data analysis.

Jenny uses data-driven methods to create a more informed and responsive approach to teaching and learning, particularly to improve assessment practices and enhance the student experience. Jenny is also committed to supporting staff and postgraduate researchers in developing their teaching skills. She mentors early career academics, providing them with opportunities to gain valuable teaching experience and build confidence in the classroom.



STUDENT NEWS

UK Challenger Society Conference

The UK's leading marine science conference, the Challenger Society Conference, took place this September in Oban.



Bangor SuMMER Doctoral Training Partnership PhD students **Lorna McKellar**, **Kassie Stewart** and **Soizic Garnier** reported:

"The biennial Challenger Society Conference took place from the 2nd to the 6th of September 2024 and attended by around 300 scientists. Following the 2020 cancellation due to the covid pandemic, this year's conference was finally hosted by SAMS in Oban. We were welcomed to the conference by a live performance of Scotland's traditional instrument, the bagpipes, but not Scotland's traditional weather as we had clear blue skies. Despite being two years after the official 150th anniversary we were reminded that this year's Challenger conference (2024) was still technically within the anniversary as the voyage lasted well beyond 1874. The sessions provided an excellent mix of topics, covering the smallest up to the largest scales, spanning polar, deep-sea, temperate, tropical systems with themes ranging from physical oceanography and biogeochemistry to ecology and marine management solutions.

This year we had several Bangor staff and students take the stage including a keynote from **Professor Yueng-Djern Lenn** on mixing in the Arctic Ocean and beyond, as well as a presentation from **Dr Ben Lincoln** on the impact of floating wind turbines on ocean mixing in the shelf seas. In the solutions for marine management session, **Soizic Garnier** presented her work on the impact of climate change on heatwaves in the Northwest European shelf seas and lobster larval dispersal patterns in the Irish Sea and **Lorna McKellar** spoke about her PhD on estimating thresholds for good status in marine ecosystem management. **Kassie Stewart's** poster detailing her PhD work on tracing the heat signature and impacts of Atlantic water had plenty of interest in Tuesday's poster session and was followed by a performance from the local choir in Oban.

In keeping with the major theme of sustainability, Kassie and Lorna were among the group that enjoyed Wednesday's screenings of 'Rocking the Boat: Making Fishing More Sustainable', a showing of films which told the stories of how local marine stakeholders are working to improve fishing practices to change 'the norm' into something more sustainable for the future. Among these was a film following a local fishing group making the case for converting their lines to weighted versions, discussing the various advantages and difficulties facing the implementation of new practices,

and another particularly memorable film following Hans Unkles, a local Scottish fisherman, as he strived to turn his gas-powered creel fishing boat into an entirely electric system powered by solar and wind, and the trials and tribulations he faced along the way. For Soizic, who works remotely from Scotland, this was a great opportunity to meet more colleagues from Bangor, reconnect with former Scottish coworkers, and finally visit the laboratories at the Scottish Association for Marine Science."

We are delighted to report that the Challenger Conference is due to return to Bangor in 2026. This conference will take place exactly 42 years after the first modern Challenger Conference, which was also held in Bangor. But will it hold the answers to life, the universe and everything?

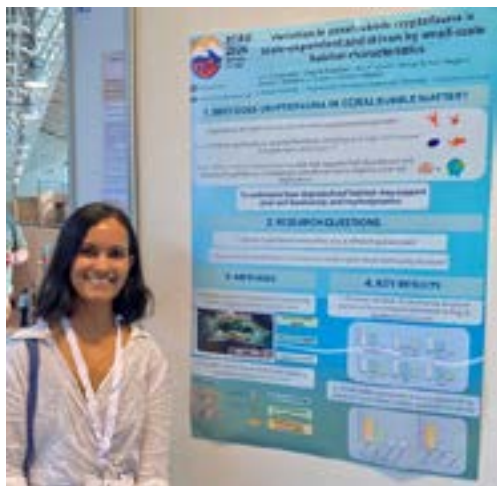
European Coral Reef Symposium

In July, members of the Bangor University Reef Systems lab group travelled to Naples, Italy, to present their research at the European Coral Reef Symposium (ECRS) 2024.



ECRS is held every four years by the European Chapter of the International Coral Reef Society (ICRS). ECRS 2024 took place in Naples at the Città della Scienza and at the Anton Dohrn Zoological Station and the theme was 'Bridging knowledge gaps between tropical, temperate, and cold-water coral reefs.' The symposium brings together coral reef scientists, researchers, conservationists, policymakers and reef managers to present their latest research and exchange knowledge which is crucial for coral reef conservation.

PhD student **Danielle Spring** delivered a ten-minute presentation on her PhD research titled *Oceanographic and atmospheric drivers of localised upwelling on remote coral reefs*. **Bex Turner**, who received both the Challenger Society's Stepping Stones bursary and the ECSA Charles Boyden grant to attend, also presented a ten-minute talk on *Local human impacts interact with geography to drive benthic community depth zonation on contemporary coral reefs*. Marie Curie research fellow **Dr Laura Richardson** shared her poster *Responses of reef fish assemblages to thermal stress in the absence of local human impacts are depth-dependent*, while PhD student **Lisa Goberdhan** presented her poster, *Variation in coral rubble Cryptofauna is scale-dependent and driven by small-scale habitat characteristics*. **Congratulations to Lisa**, who won the Best Poster award in her session, *Beyond Corals and Fishes - Evolution and Biodiversity of Neglected Reef Taxa*.



Summer Internships

Summer internships provide an important opportunity for our students to expand their skills and build their research experience.

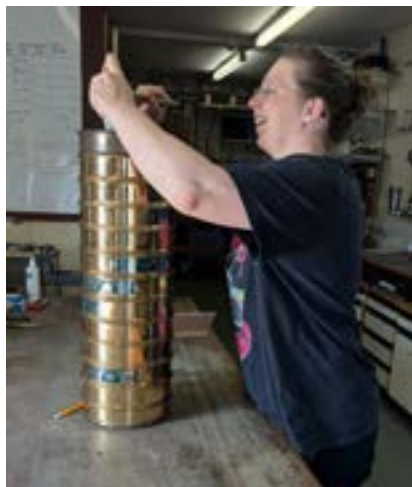
They are funded from a variety of sources including generous donations by our alumni (see Summer 24 edition of the Bridge). Here we have asked some of this year's intern students to tell us about their experiences.



Summer intern **Ruth Flynn** (Third year BSc Marine Biology student) describes her project

"This summer I undertook a UKRI NERC funded Research Experience Placement via Envision entitled "Frolicking in the meadows: the impact of seagrass on seabird and cetacean activity". The project was to compare marine mammal and seabird activity across two locations approximately 15km apart, one with a large seagrass meadow and one with no seagrass present but where it is hoped to plant seagrass in the future.

*The aim was to determine whether seagrass is an influencing factor in species richness or behaviour. Over a two month period, with volunteers and fellow interns, **Laney Laws-Randall** and **Alex Norman** (both BSc Marine Vertebrate Zoology students), we conducted simultaneous surveys at both sites for marine mammal and bird activity. In addition, we took water and sediment samples from both locations for analysis and comparison back in the lab.*



The experience gave me the opportunity to participate in a research project that has the potential to have real world impact. I had the opportunity to shape the project direction and be involved in the project planning and co-ordination of resources. By conducting research in the field I've gained skills in bird and marine mammal identification, plus experience of different data recording methods and the challenges of how to record behavioral information. In the lab I have been able to conduct particle size analysis, suspended particulate matter analysis and water property analysis. I've used new equipment and techniques and gained greater familiarity with others that have been taught on past modules.

Despite gathering only a small data set, early analysis shows that environmental conditions may be suitable for seagrass planting at our research location. There was however little evidence to suggest the presence or absence of seagrass has a pivotal role to play in marine mammal abundance or behaviour in close proximity to seagrass meadows. Perhaps this opens the door to future research regarding the sphere of influence of seagrass meadows for other marine life."



Nick Corley (2nd year BSc Marine Biology and Oceanography student) describes his summer internship experience

*"After a brief informal interview with **Professor Mattias Green** together with PhD student **Jennifer Hewitt** and **Miranda Hutchinson-Hartley** (BSc Marine Biology and Oceanography), I was accepted onto an 80-hour internship to be carried out at any time over the month of July. Based around geological reconstruction of the earth throughout history and gathering evidence to better support and tweak models of the earth through*

time, the internship was open ended and allowed me to explore my own interests, with support from Mattias the whole way via email communications and weekly check in sessions.

I choose the Cambrian period focusing on the biological indicators for the presence of water bodies. e.g. if black shale a type of rock that is derived from anoxic (oxygen deprived) water conditions was found at a specific location, for example central China, by cross referencing the current location with the location of the reconstruction. If that location was submerged in the years 540 mya then we could say that the evidence used in the model reconstruction was supported by evidence.

This has already given me a head start for my 2nd year of university, by being familiar with MATLAB means that the learning curve has been greatly reduced, and with an insight into certain programming languages that maybe useful later in my career. Exposure to the Python language and a meeting with a former student that Mattias put me in contact with has allowed me to troubleshoot common problems and has given me a connection that I can reach out to in future. Post-internship I 'am now part of a support network, through the Deep-time Tides and Earth Systems (DETEST) research group that meet once a fortnight which gives me an insight into how to for example 'defend a thesis during a viva' or keeps me up to date on other students research, areas I can begin to think about my own interests and own career trajectory."



April Bishop (2nd year Marine Biology and Oceanography student) on her time with Minesto

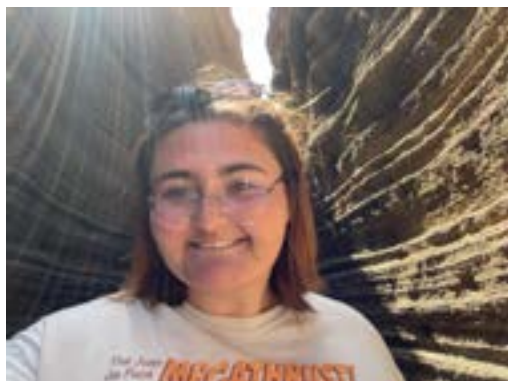
"In June, I had the opportunity to do a work experience at Minesto UK Ltd based at Ynys Môn (Anglesey) in Holyhead. Minesto UK Ltd is an international tidal renewable energy company, with other operations in different parts of the globe. It has unique marine energy technology that harnesses low-flow tidal streams through its pioneering Deep Green technology.

In my role at Minesto UK Ltd, I helped determine whether specific impacts, such as marine mammals, offshore birds, the seabed, and ocean conditions, might be affected by a new project, Holyhead Deep, that the company wanted to pursue. To do this, I reviewed government rules and guidelines, researched by reading papers and used my judgment to decide whether there was a potential impact. My work ensured everything complied with regulations to help Minesto Ltd UK obtain a marine licence.



Working at Minesto had a significant influence on my professional and personal growth. Taking part in the project gave me a clear vision of how I want to contribute to the renewable energy sector. The experience broadened my environmental impact assessment and regulatory compliance skills and deepened my understanding of sustainable technologies. I gained valuable insights into the complexities of obtaining a marine licence for renewable projects, particularly the regulatory challenges and environmental considerations that these projects must navigate. This experience sharpened my career focus and confidence to pursue further opportunities to make an impact in the fight against climate change."

Ellen Kew (3rd year Geological Oceanography) on her time with Sand Geophysics.



"Last Easter I LinkedIn 'stalked' the employer lists of geophysics for any interesting-looking companies whom I then emailed. I found Sand Geophysics, based outside Southampton, and one of the Directors who interviewed me and offered me an internship over the summer.

To begin with I learnt the skills required to assist in some of their upcoming projects. These skills included them sending me to Newhaven to get my sea survival skills qualification and giving me access to their training databases to teach myself about their systems.

When the main project I helped on started, I was given the surface contacts to work with in QGIS. This involved removing duplications of measured, listed and mapped the boulder fields in the area of a proposed wind farm. I then took on the magnetometer data where I was reinterpreting the topology, checking areas of varying density polygon fields. I explored downloading and handling processes of the Norbit systems as well as soldering together cables for extension boxes and level tripods in precision practice exercises.

Working for Sand has enabled me to apply some of the knowledge I'd learnt through my degree, as well as providing me opportunities to experience industry software not available, further building my transferable skills for my future career."

Exploring Marine Biology and Oceanography through Summer Internships and Volunteering by **Charlotte Maloney** (Second year Marine Biology and Oceanography student)



"Having completing my foundation and first years, I decided to strengthen my confidence as an ocean scientist by gaining practical experience over the summer. I was able to achieve this through a series of volunteering roles in the university and wider community and a paid internship based in Marine Centre Wales.

Within the School of Ocean Sciences (SOS) I became a peer guide, looking after new students and taking them on tours during open days, I had expressed to a few of my lecturers I was very anxious about public speaking and was eventually offered the role of a demonstrator on open days talking to small groups of

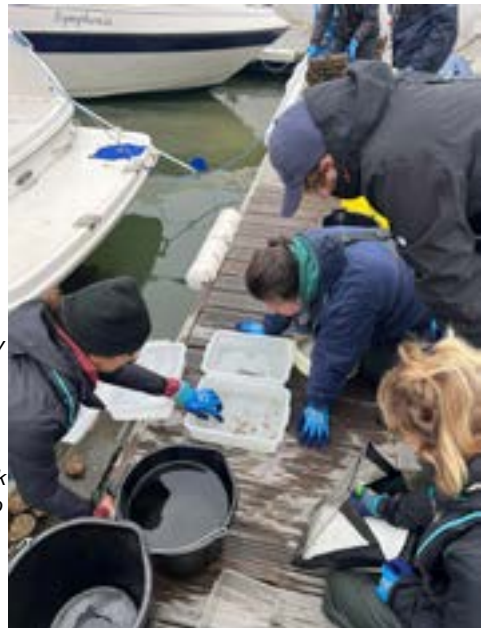
prospective students, this has helped build my confidence (after about 30 talks!) but also shown me how supportive the lecturers can be in helping students outside of lectures.

*I was also able to volunteer for opportunities as they were offered over the summer. One of these was assisting fellow students **Alex Norman** (BSc Marine Vertebrate Zoology) and **Ruth Flynn** (BSc Marine Biology) on their project titled "Frolicking through the meadows: the impact of seagrass meadows on cetacean and seabird activity and seagrass abundance". This project aimed to see if there was any correlation between cetacean and seabird activity and seagrass abundance and involved undertaking marine mammal and seabird surveys and water sampling at locations identified by the project.*

Since starting Bangor University, I have been a member of the Endeavour Society. It is the university's ocean science-based society, and organises social and educational meetings weekly, holding informative talks from students, lecturers and organisations focused on marine science. During these talks, I was introduced to The Wild Oysters Project in Conwy Bay and the North Wales Rivers Trust (NWRT) and decided to volunteer. The Wild Oysters Project focuses on restoring European native oysters, which play an important role in cleaning British seas and creating habitats for other species.

As a volunteer, I helped monitor the oysters at the Conwy and Deganwy marinas, where we assessed biodiversity and the oysters' health in the nursery sites. This project allowed me to build on my identification skills and interact with species whilst also contributing to marine conservation. The NWRT's focus is on creating a network of local volunteers and businesses that are committed to ensuring a sustainable future for North Wales rivers and the communities that rely on them.

I initially volunteered for their project Living Seawalls to help monitor local living seawalls establishing an initial baseline from which to measure any increase in biodiversity. I then became a River Champion and was trained on how to undertake water quality checks with





the Menai Strait Partnership Forum with my focus being the area surrounding Bangor Pier.

The NWRT also trained me as a BSAC Snorkel Diver and Underwater Surveyor as part of Project Swimways so that I can partake in freshwater snorkel surveying and provided freshwater invertebrate identification training to monitor the ecosystems in local rivers. Volunteering with the NWRT helped me to build on practical skills taught on the first year Marine Biology Practical 1 module. It also helped me build my knowledge of the interactions between fresh and marine water and water chemistry taught in the first year Fundamentals of Oceanography module.

Finally, I was offered a paid internship by **Dr Charlotte Colvin** alongside **Adriana Lipinska** (MSc by Research), **Evy Mansat** (BSc Marine Vertebrate Zoology) and **Josh Horn** (MSc by Research). The internship focused on the impact of the late effects of climate change on whelk behaviour and mortality and involved working in the temperate aquarium in the university fish laboratories. Daily work included maintaining the aquaria, feeding the whelks, partaking in behaviour trials, sustaining water quality levels, taking photographs of the whelks and conducting image analysis. This internship not only

allowed me to gain experience in animal husbandry and data analysis, but also gave me an appreciation for the hard work that goes into experimental design which is hard to fully comprehend from lectures alone.

Overall, I achieved my aims in building my confidence and gaining practical experience. I met new people, forged new friendships and was also able to enhance my academic CV. This summer's experience has also fueled my excitement for the opportunities and experiences that await during the remainder of my degree."

Our Journey to the Centre of the Marsh: Sampling Fisheries Species Across the UK

With **Maria Mercedes Lopez** (SuMMer Doctoral Training Centre PhD student) and **Giulia Leanza** (MSci Marine Biology and Oceanography student).

"In transitional environments, where sea and land meet, herbaceous peninsulas emerge at the water's surface. These are the saltmarshes, periodically submerged by the tide, which, when it recedes, gives way to a mosaic of halophytic vegetation, interrupted by creeks and ponds. A variety of marine species co-exist in these creeks, some residential, spending most of their life cycle there, and others migratory, such as Sea Bass, Cod and Flounders, which take advantage of tidal transport to use these environments occasionally or in certain life stages, usually the juvenile ones. What drives these species to travel miles to go inshore is poorly understood in the UK, with most studies being conducted in the USA, where marshes have different biophysical characteristics.

To find out more, we immersed ourselves in these intertidal environments, spending the summer on a road trip, sampling fish and crustaceans in marshes along the coasts of the UK. From Cromarty firth in Scotland, to the Blackwater estuary, via the Humber estuary, we sampled ten



sites in five locations, comparing natural and restored saltmarshes. The winter and spring months were crucial in planning access to sites, materials, and volunteers. Our summer was punctuated by week-long trips in spring tide, alternated with a week's break in which we sorted out the organisational details for the next trip.

The first day was for travelling and patrolling, we would leave at dawn from Menai Bridge, after loading the pick-up with the last equipment, and reach our destination at midday or early afternoon. A different reality welcomed us at each site; we had a few hours to observe the tide, assess the access points and the creeks in which to sample. The challenge was to figure out where to place the fyke nets and crab traps, considering the characteristics of the site, the time, and the people available.

These methods did not allow us much flexibility; we had to utilise the first high tide of the day so that we did not end up working in the dark; and we had our days numbered. The actual sampling would begin the following

day. The alarm clock often rang at one or two o'clock in the morning, and even when it rang later, the hours slept were still few, because thoughts turned to the next day.

The goal was to place the nets and get out of the marsh before the high tide submerged and blocked the exit routes. It is incredible how fast and silently the water takes over the creeks and transforms the landscape. At this point, depending on the time of day, we would proceed with the use of the seine nets and push nets; or we would wait, while watching the sunrise, for the water level to drop, in order to retrieve the catch. This phase was easy at some sites, while at others it was a race against time, because the channels emptied quickly, and we wanted to reach the nets while they were still flooded, so as to measure, count and release the catch before the water had gone.

We sampled the restored marsh on two consecutive days, after which we repeated the whole process in the natural one. In addition to fish and crustacean abundance, we collected insect and sediment samples and data on vegetation, morphology, environmental variables, and tidal regime. The aim was to identify factors influencing the abundance of fisheries species in UK saltmarshes.

Now that the summer campaign is over, grateful to have been able to take part in this experience, we are preparing for the second phase, the year-long sampling of two saltmarshes in north Wales. which we face with the wish to pass on this passion and to contribute as much as we can to help protect these delicate, mutable and beautiful ecosystems.



Special thanks to the Wildfowl and Wetland Trust, partner association of the PhD project, who funded part of the trips; to the volunteers, who worked tirelessly and with passion; and to the SOS staff for help with administration and equipment."

Undergraduate Students **Carys Lock** (BSc Physical Geography and Oceanography) and **Miranda Reid** (BSc Ocean and Geophysics) Publish Scientific Paper on *Sedimentary Structures Produced by Landslides in the Deep Ocean*



Carys Lock (now on the Marine Environmental Protection MSc course) and **Miranda Reid** (now applying for a Masters degree in North America) have published a paper in the Wiley journal *The Depositional Record* this autumn, based on data collected during a Bangor University undergraduate internship.

They conducted experiments in the SOS Hydrodynamics Laboratory that focussed on the role of armour sediment size and ocean bed density on the preservation of striations in tool marks. Striated tool marks are sedimentary structures formed by gravel-sized mud clasts surrounded by sand particles that scrape the seabed below subaqueous debris flows.

Carys' and Miranda's research revealed that seabed erodibility and armour sediment size can be predicted from the geometrical properties of striated tool marks on the modern ocean floor and in deep-marine deposits in the geological record. This project was supervised by **Dr Jaco Baas** (SOS) and Prof. Jeff Peakall (Leeds).

Paper: Lock, C., Reid, M., Baas, J. & Peakall, J. (2024). Preservation of groove mark striae formed by armoured mud clasts: the role of armour sediment size and bed yield stress. *The Depositional Record*, 10(4), pp. 426-440



BBC Countryfile

TV Nature Programmes regular visit the Menai Strait and Anglesey because of its amazing marine biodiversity (the same reason the School of Ocean Sciences was setup on the shores of the Menai Strait nearly 80 years ago!).



Countryfile fans will recently have seen MSc Marine Biology student **Nadia Langford**, along with alumni **Elan Jones** and **Jenny Bond**, appear on Countryfile, talking about their great work at Sea Watch Foundation.

The programme toured Anglesey looking at marine life with presenter Joe Crowley and focused on Point Lynas - a hotspot for Cetacean viewings.

Climate Change and Rhyl



Physical Geography and Oceanography students **Lily Shaw**, **James Abbat** and **Danny Lipatovs** pay tribute to the statue of **Sir John Houghton** in Rhyl, during the Natural Hazards coastal flooding field trip.

The field trip visits the town as part of a case study of the 1990 flooding along the North Wales coast.

Sir John was originally from Rhyl and was a founder and co-chair of the Intergovernmental Panel on Climate Change's (IPCC) scientific assessment working group, which shared the Nobel Peace Prize in 2007 with Al Gore. He was the lead editor of the first three IPCC reports.

Sir John was a Professor in Atmospheric Physics at the University of Oxford and a former Director General at the Met Office. Upon retirement he moved back to North Wales, occasionally giving public lectures at Bangor University.

Naming Honours

Many were saddened to read of the untimely passing of recent Marine Vertebrate Zoology graduate **Tallie Brazier** ([Summer 2024 edition of the Bridge](#)).

Tallie had been a summer intern at The Sea Watch Foundation in New Quay, Ceredigion, where she spotted and logged dolphins. Sea Watch named a dolphin after Tallie, and when this dolphin was spotted with a calf, Tallie's family were contacted to name it. They chose Summer - Tallie's middle name.



Tallie has also been remembered by the TNS Football Club in Oswestry. She had played for TNS as a goalie when she was younger and they have set up The Tallie Brazier Cup, which has raised more than £6,000. The money was donated to Sea Watch who have set up the Tallie Brazier Scholarship, which will fund an intern next year.



UPCOMING EVENTS



24th February: **Professor Yueng Djern-Lenn** is due to give a prestigious Monday night lecture to the Royal Geographic Society in London.

The lecture is entitled: *Warmth from below where ice and ocean meet.*

This lecture will also be available online.

For more information please visit:

<https://www.rgs.org/events/upcoming-events>



19th March: **Professor Ed Hill CBE** is due to give a University 140th anniversary "Distinguished alumni" lecture in Bangor where he will explore the evolution of marine science in UK.

This lecture will be recorded. For further details please visit:

<https://www.bangor.ac.uk/our-public-lectures>



19th March **Dr Winnie Courtene-Jones** will be giving an online presentation on her world leading research into micro-plastic pollution.

For further information please visit:

<https://epwales.org.uk/events/insights-wales-microplastic-pollution-and-solutions-a-journey-from-agricultural-soils-to-the-deep-ocean-winne-courtene-jones/>



SCHOOL NEWS

Prince Madog Top of the Ranking!

A new international league table, the Professor Boaty McBoatface League Table, which ranks academic research vessels globally has ranked the *Prince Madog* as no. 1!



The Madog beat off competition from as far afield as the US, New Zealand and Qatar to take the top spot. The only other UK based research vessel to make the top five, was the UK Natural Environmental Research (NERC) ship, *RRS Discovery*.

For the full list, see

<https://wonderfulhighered.com/2024/09/24/the-professor-boaty-mcboatface-league-table>



Dr Laura Grange has recently been appointed as the CELT Reward and Recognition for Teaching and Learning Lead.

CELT (Center for Education, Learning and Teaching) Supports teaching excellence and innovation across Bangor University.

This leadership role has an institutional remit for recognising and rewarding scholarship and excellence in teaching.

Trinity Foundation visit



The School of Ocean Sciences once again hosted visiting students from Japan as part of the Trinity Foundation Programme.

The Trinity Foundation Programme provides invaluable support in allowing students to quickly get up to speed in both the language and culture of the English speaking world.

Professor **Yueng-Djern Lenn** spent time in the laboratory and out in the field with the group.

Model of *Prince Madog's* Hull Goes to Local School

In August this year, a 1/8th scale model of the *Prince Madog's* hull was delivered to our local secondary school, Ysgol David Hughes.

The model was commissioned by OS Energy, who run the Prince Madog in partnership with Bangor University. It was used in tank experiments at Strathclyde University to test a new propellor and rudder design which aims to increase the efficiency of the Prince Madog.



The model is 4 m long, 1 m wide and weighs around 200 kg. Martin Nürnberg of OS Energy facilitated the transport of the model to the school in Menai Bridge, with **Tim Whitton** of Ocean Sciences initiating the donation. Tom Williams of Ysgol David Hughes, pictured, has yet to finalize the model's new purpose, but the school's students will play a key role in its future, hopefully it may inspire some future marine scientists, engineers, and seafarers. We will keep you posted on any updates.

New Tropical Reef Aquarium

Thanks to a generous grant from the Bangor Fund, the School of Ocean Sciences now has a community coral reef display aquarium.

The aim of this is to highlight our leading research in the fields of sustainable coral reef fish aquaculture, and reef conservation and ecology, to staff, students and visitors.



The aquarium is primarily home to coral reef fish species reared within the school as part of the SustainNable Aquariums Project (SNAP), an industry led collaborative research project between Bangor University, The Deep, SEA LIFE and the Zoological Society of London. The aim of SNAP was to increase the availability and number of sustainably produced coral reef fish species for the aquarium industry. The marine ornamental fish trade draws many of its specimens from Southeast Asia and the Pacific Islands, including the Philippines, Indonesia, and Fiji. These regions are celebrated for their biodiversity-rich reefs, which are vital to global conservation efforts, demand for ornamental fish poses risks to reef ecosystems, increasing the pressure to find sustainable sourcing methods (Biondo et al., 2021; Rhyne et al., 2017).

This display will showcase SOS's commitment to sustainable research, inviting students to engage with the school's reef conservation and sustainable aquaculture work. Student ambassadors are hands-on in maintaining the reef display, which provides them with practical skills in aquarium husbandry—a boost for future employability.

In recent weeks, the team successfully installed and cycled the reef system and welcomed its first SOS cultured reef fishes, setting a promising example of sustainability in marine sciences. In the future we look forward to developing the reef through the introduction of coral and other invertebrate species cultured by our student body.

Beyond its educational purpose, the reef display is set to become an important communal and wellbeing space, encouraging relaxation and connection. It's hoped that this vibrant hub will foster appreciation for reef ecosystems and inspire new marine science advocates among staff and students alike.

References:

- Biondo, M. V., & Calado, R. (2021). The European Union is still unable to find Nemo and Dorytime for a reliable traceability system for the marine aquarium trade. *Animals*, 11(6), 1–5.
- Rhyne, A. L., Tlusty, M. F., & Szczebak, J. T. (2017). *Early Culture Trials and an Overview on U.S. Marine Ornamental Species Trade*. John Wiley & Sons Ltd.



SOS Native Oyster Hatchery Provides Welcome Support for Oyster Restoration Efforts in Wales



The European native or flat oyster (*Ostrea edulis*) has historically been a commercially and culturally important species in Wales, and across Europe.

However, the species is now functionally extinct in many areas having declined by over 90%. This is due to several factors including habitat loss, pollution, over-fishing, competition from non-native species and disease, and this dramatic loss has significant implications for the health of our marine environment. Native oysters form complex structures that provide shelter and food for

a wide range of species and enhance local biodiversity, as well as acting as feeding and nursery grounds for fish and other animals. Oysters also play an important role in the removal of pollutants and excess nutrients from the water column and assist in stabilising sediments.

There are numerous initiatives underway across Europe to enhance existing populations or restore reefs in areas where the species were once abundant. However, a major limitation to this is the limited supply of oysters. One solution is the production of juvenile oysters in hatcheries, although traditionally this has been a challenging species to successfully produce.

Aquaculture researchers in SOS have been working hard to address some of these challenges. This work started with the Native Oyster Aquaculture Research (NOAR) project in 2021, a project funded by the European Maritime and Fisheries Fund through the Welsh Government. The team's objective was to optimise aspects of the culture of the species such as broodstock conditioning, reproductive output, larval rearing, and settlement on cultch. All of this involved setting up a pilot-scale research hatchery from scratch, drawing on the experience and expertise of a team led by **Dr Nick Jones** and **Dr Tom Galley**, together with **Professor Shelagh Malham**. This project proved to be highly successful, with thousands



of spat settled onto shell and other natural materials by the time the project finished in late 2023.

The team are now delighted to be supporting an exciting project to restore the once-abundant population of native oysters within the Milford Haven Waterway, Pembrokeshire. Their work forms part of the Blue Carbon Strand of the Pembrokeshire Coast National Park Authority's Wild Coast! Sustainable Landscapes Sustainable Places Programme, funded by the Welsh Government. It is being carried out in partnership with the Pembrokeshire Marine Special Area of Conservation and Andy Woolmer of Tethys

Oysters. The team's original plan was to settle up to 200,000 spat on whole bivalve shells from broodstock originating from the Milford Haven Waterway. Following several successful spawning events, which resulted in millions of larvae and a high survival to the settlement stage, this number is looking to be significantly higher. The spat are being carefully tended for the rest of the year and will then be returned to the Milford Haven Waterway in 2025, where they will boost ongoing restoration efforts. The growth and survival of these hatchery produced oyster clusters will be closely monitored by Marine SAC Officer, Sue Burton, as part of the Natur am Byth! Native Oyster Project.

Research 'Hyper-Network' Identifies Lost British Warship Sunk in WWI

Researchers are confident they have identified the wreck site of *HMS Stephen Furness*, sunk in 1917, after over a century at the bottom of the Irish Sea.



Photo postcard by Gibson featuring the steamer *Stephen Furness* (1910-1917), cat no. 669301

www.Shipping-Postcards.com

Towards a National Collection, an £18.9m investment from the UKRI Arts & Humanities Research Council (AHRC) has been set up to connect separate collections in a digital 'hyper network' across the UK's museums, galleries, libraries and archives.

Its Unpath'd Waters project has adopted new approaches to investigate shipwreck sites. A team from Bangor University's School of Ocean Sciences, believe they have finally identified the remains of *HMS Stephen Furness*, which has been missing since December 1917 after being torpedoed with the loss of 100 lives. This discovery has only been made possible by combining existing documentary resources with new scientific datasets and innovative digital techniques.

The team analysed high-resolution multibeam sonar data collected from our research vessel, Prince Madog, to examine the dimensions of all known wreck sites in the region. Combining this information with other resources, including an account of an attack position contained in a U-boat *Kriegstagebuch* (war diary), meant that identifying the likely resting place of *HMS Stephen Furness* and several other vessels became a comparatively straightforward exercise, one that could easily be replicated elsewhere.

Sir Roly Keating, Chair of the Steering Committee, Towards a National Collection, and CEO of the British Library, said, *"It's exciting to see such a tangible example of what happens when disparate historic collections and datasets are brought together in pursuit of new knowledge and scientific innovation. That's exactly the vision at the heart of Towards a National Collection. All too often, through lack of investment in digitisation, skills and common infrastructure, the UK's collections have remained fragmented and, in many cases, hard to access, even for dedicated researchers. But their untapped potential – for society, innovation and economic growth – is colossal."*

Dr Mike Roberts, Research & Development Manager at Bangor University's School of Ocean Sciences, said, *"Overall, the research highlights our significant lack of understanding as to what most shipwrecks in UK waters actually represent, which is also a problem at the global scale. However, this project clearly demonstrates the incredible potential our disparate and different collections of information and material have when adopting a collective multidisciplinary approach."*

Phoebe Wild, Research Officer at Bangor University, said, *"The multibeam data is what clinched it for us; the data showed that the British position was inaccurate and allowed us to validate the German position. The sonar data was also key for refuting that this wreck was the remains of SS Maja, furthering our case that it is in fact the remains of HMS Stephen Furness. This investigation really illustrates one of the goals of the Unpath'd Waters project - to demonstrate the potential of UK maritime collections."*

Ynys Môn Mollusc Meetup

During the week of the 16th of September, the Conchological Society of Great Britain & Ireland (ConchSoc) held a field meeting based on Anglesey.

This coincided with surprisingly fantastic weather, and less surprising big spring tides. They visited nine shore sites during their week, along with other naturalist activities. They noted the presence of invasive species such as *Ensis leei*, *Ruditapes philippinarum* and *Crepidula fornicata* from their finds during the week.



They were also joined by a number of our Bangor undergraduates and reported back that they "*showed great enthusiasm, ability and knowledge on the shore*", encouraging news for current staff.

Tim Whitton had the pleasure of showing the ConchSoc members around the *Prince Madog* during their visit and relayed to them some of the mollusc research being undertaken in Ocean Sciences.

For information on ConchSoc and how to join please see

<http://www.conchsoc.org>.



NEW GRANTS

Converting historical knowledge into sustainable ocean management



Ocean Sciences **Dr Alec Moore** will bring together historians and marine scientists to convert historical observations of fishers, past and present, into knowledge that will inform marine ecosystem management.

The project will focus on historical data about the Atlantic herring, a fundamentally important component of the marine ecosystem in the northeast Atlantic which collapsed in the mid-20th century. It will use historical sources mostly from the 17th to the early 20th centuries, including:

- the writings of early modern naturalists and travellers
- newspaper archives
- government inquiries
- the memory of living fishers

The findings will help to identify ecologically important herring spawning areas and understand the long-term variations in spawning activity in response to changing climates. This new project is funded by a UKRI Cross-council grant.



Reviewing micro-plastics pollution

Marine pollution lecturer **Dr Winnie Courtene-Jones** has contributed to a major new review on microplastics pollution.

The new review marks the 20th anniversary of the first publication using the term microplastics, and reviews the current understanding and considers future prospects. Microplastics are widely distributed throughout the natural environment, harming ecosystems. The paper argues there is more than sufficient evidence to inform a collective and global approach to tackle the continued spread of plastic pollution. Moving forward they estimate that the microplastic contamination could double by 2040.

The paper argues that existing national legislation alone is insufficient to address the challenge, however, the United Nations' Plastic Pollution Treaty – which will undergo its fifth round of deliberations in November 2024 – presents a “tangible opportunity” for joined-up international action.

For such a treaty to be truly effective it needs to commit to an overall reduction in plastic production alongside measures to reduce the emission and release of microplastic particles along the entire plastics life cycle. Failing to do so, the researchers add, could bring “a high risk of irreversible environmental damage”.

PAPER: R C. THOMPSON, WINNIE COURTENE-JONES ET AL (2024). Twenty years of microplastics pollution research—what have we learned? Science, DOI: 10.1126/science.adl2746

UNIVERSITY NEWS

Bangor University Partners With Verily to Expand Wastewater Testing Services Across Europe



Bangor University has announced an exclusive partnership with Verily, a precision health technology company, to expand its wastewater surveillance program into the United Kingdom and Europe.

This collaboration will leverage the University's wastewater-based public health surveillance program capabilities and main testing lab. Bangor University's wastewater monitoring capabilities are market leading in the UK for environmental bio-surveillance and the University's lab serves as one of the research and development hubs for the United Kingdom Health Security Agency (UKHSA) and Welsh Government.

Since its inception in 2020, in response to the COVID-19 pandemic, Bangor University's wastewater lab has become a leader in environmental bio-surveillance in the UK.

Bangor University is One of the Leading Organisations Calling For More Action in Reducing Pollution in the UK's Rivers



Former punk singer, and now river health campaigner, Feargal Sharkey, praised Bangor University for being the first university to support the March for Clean Water.

A group of Bangor University staff and students, dressed in branded lab coats, attended the march with Professor Christian Dunn, Associate Pro-Vice-Chancellor for Sustainability. They joined a crowd of thousands in London calling for more action to reduce the levels of pollution entering rivers and coasts.

"Bangor University has been doing some fantastic research looking at the health of our rivers and how we can improve them," Mr Sharkey said. "It's great to have Bangor University supporting the march – it's a credit to the university that its staff and students are so proactive in trying to do something about the crisis our rivers are facing."

Renewing Research Collaborations: ECW+ Initiative which Connects Bangor University and UKCEH

Scientists from Bangor University (BU) and UK Centre for Ecology and Hydrology (UKCEH) convened at Marine Centre Wales for a three-hour workshop, designed to spark innovative research collaborations between the two institutions.



The ECW+ Team hosted the workshop, which focused on three marine-related research themes: Seascape Restoration and Management, Human Health and Blue Spaces, and Land-Sea Connectivity and Hydrology. More than 30 attendees, representing various career-levels, engaged in dynamic, structured, break-out sessions based on each research theme. During the discussions, groups filled flip charts with creative

ideas and strategies to address key challenges in each theme from a multi-disciplinary perspective.

Professor Paul Spencer, Pro-vice Chancellor of Research at Bangor and a workshop participant, remarked that *"The inclusive and diverse nature of the discussion increased people's awareness of the knowledge and capabilities available across UK-CEH and BU"*.

The workshop concluded with break-out groups sharing preliminary research ideas and questions. For the Seascape Restoration theme, one group explored the relationships between biodiversity, habitat connectivity, and the resilience of ecosystem functioning to global environmental change. In the Human Health theme, group discussion centred around what aspects of marine ecosystems confer mental health benefits and why there is often greater socio-economic deprivation in coastal communities. To conclude the workshop, Dr. Markus Gellesch, Research and Development Manager for the Integrated Research and Impact Support Service at BU, presented future funding opportunities for these and related research ideas.

Spencer adds that *"We need to ensure we find time for these types of activities as they are an essential component of a vibrant research culture and are great fun. I'm looking forward to the next one!"* ECW+ is currently co-organizing another workshop, which will take place at Bangor University's Henfaes Research Centre in November. Jointly organized by ECW+ and faculty from BU's College of Science and Engineering, the workshop will focus on two key research areas: Conservation and Restoration of Resilient Ecosystems, and Sustainable Food Production. The event aims to foster networking across institutions and help attendees discover available skills, datasets, and funding opportunities at each institution.

ECW+ is a new initiative focused on connecting land, sea, and people through renewed collaboration between the UK Centre for Ecology & Hydrology and Bangor University. The initiative strives to enhance existing strengths and build on the close relationships fostered by co-location of both institutions at Environment Centre Wales in Bangor. As ECW+ continues to strengthen the connections between UKCEH and BU, it invites researchers, students, and collaborators to join in driving forward meaningful and impactful research. If you would like to learn more about the ECW+ initiative, please contact:

Dr Katie Dubois (k.dubois@bangor.ac.uk).

Careers Fair

The annual **My Graduate Career Week** took place on campus in mid-October and featured a variety of events aimed at empowering our students as they take their first steps into the professional world.

These included a careers fair with many exhibitors relevant to Ocean Sciences students including The Crown Estates, Welsh Water, wind farm developer RWE and international marine survey companies Fugro and SEP Hydrographic.



There was also a series of presentations aimed at helping our students identify potential careers. These included a presentation from SOS alumni **Daniel Lambley** (2021, BSc Marine Biology & Oceanography), a responder with Oil Spill Response talking about "Tackling an Environmental Crisis?"

Commenting Dan said: *"Industry outreach is something I thoroughly enjoy. During my talks, I showcase the capabilities of OSRL and the environmental rationale behind response strategies. This industry outreach is crucial to increasing awareness of the industry, inspiring research to enhance response strategies, and inspiring future responders to the industry."*

"I'm always looking to make the talks more interactive. For one of my talks, I was able to demonstrate the effects of spreading oil relating to the Bonn Agreement. I also conducted an oleophilic skimmer and absorbent material demonstration."

Once again, we would like to thank our alumni for their support in helping our current generation of students in their career paths. In February we will be holding our annual Ocean Sciences careers fair. If you would like to get involved please get in touch with **Professor**



Katrien van Landeghem: k.v.landeghem@bangor.ac.uk.

ALUMNI NEWS

From Menai Bridge to the World – an Oceanographic Voyage.

John Gould (Physical Oceanography 1964-67)

This is the story of a lifelong global voyage. My ocean science voyage started at Menai Bridge 60 years ago, in August 1964. I had been reading physics and maths at Kings College London and had no idea where my degree might take me – until in spring that year the College's physics society (the Maxwell Society) invited Prof Michael Longuet-Higgins FRS, to talk about the physics of the oceans. (The name Longuet-Higgins is one that is not easily forgotten, but I had actually met his brother Christopher, a theoretical chemist and also an FRS, the previous year). Michael L-H talked about how you could calculate the flow through the Dover Strait by measuring the voltage difference between England and France (~1V), about the generation and prediction of ocean waves and about how waves produced mini earthquakes (microseisms). I immediately saw a way forward for my physics studies.

I visited the National Institute of Oceanography (NIO) where Michael L-H held a joint position with Cambridge University. The Institute was in the Surrey stockbroker belt and they advised me to do an MSc in Physical Oceanography at Menai Bridge under its new Professor, **Jack Darbyshire**. (During WWII, he and Longuet-Higgins had worked under NIO Director, George Deacon, in Group W at the Admiralty Research Laboratory, Teddington. Jack and his wife Mollie had then both done wave research at NIO). (Ref 1)

The Marine Science Labs recommended that I should first join their two week oceanography and limnology summer vacation course. (See "The Bridge" Summer, 2024). There were about a dozen of us on the course. Most were total novices to marine science but there were a couple of people from the Navy's Hydrographic Department, someone from Plessey Electronics and Bob Dickson from the Fisheries Lab at Lowestoft with whom I shared "digs".



John Harvey ran the course (see The Bridge, No 5, 2010) with **Peter Spencer, Eifion Jones, Sinclair Buchan, George Floodgate** and **Mr Stannard** the lab technician. The course was fascinating and must have taken a great deal of organisation for the fieldwork trips to the Snowdonia lakes, to the River Conwy and off Holyhead. We became familiar with water bottles, reversing thermometers, bathythermographs, thermoclines and current meters and we got cold and wet. We students introduced ourselves to the warmer welcome of the Liverpool Arms and the Mostyn Arms.



Then in September the MSc course started. My fellow new students were **Barry Armour, Ezekiel Okeke** and **David Dixey** (on secondment from the Hydrographic Dept). **Peter Liss** and **Vic Truesdale** were starting chemistry PhDs. We met Jack Darbyshire whose strong Blaenau Ffestiniog accent baffled us as much as did his mathematics. However, we learned that helping our fellow marine biology students with their fieldwork gave ample opportunities to visit Anglesey's beautiful beaches on sunny days.

MSc limnology fieldwork (Llyn Llydaw) featuring Mr Jack Stannard (porkpie hat), Jack Darbyshire (flat cap) and students Barry Armour (anorak) and Ezekiel Okeke (dark duffel coat). No 35 lifejackets provided or worn!

It was an exciting time as the lab grew with a new building. The expansion was not without hiccups. The new building had a wave tank on the top floor. One day there was a frantic call from the architect "*Don't fill it yet, we realise we haven't allowed for the weight of the water!*"



The Insula alongside in Fishguard

My masters dissertation focussed on measuring currents in Liverpool Bay using Woodhead drifters and parachute drogues. At that time the lab did not have a substantial research ship so the work was done from the University of Liverpool's *William Herdman* and from the *Insula*, a Danish seine netter chartered from the Commonwealth Islands Expedition. It had a 2-cylinder diesel engine that blew smoke rings from its funnel. Our sleeping accommodation was in the fish hold with an aroma reminding us of its former life.

My longest expedition on *Insula* was with Peter Liss and Vic Truesdale collecting samples for Peter's marine chemistry PhD. We worked sections starting in Fishguard via Rosslare, Bardsey Island, Dun Laoghaire and ending in Holyhead. We arrived in Holyhead just in time for us to attend the lab's annual dinner dance at the Trearddur Bay Hotel. We were still wearing our seagoing gear and had not had a decent wash for a week. People were advised to stay upwind of us.



JG heading to some fieldwork at Newborough.

With my MSc completed, I started a PhD with a conveniently vague title, "Measurement and Analysis of Ocean Currents". What I chose to do harked back to Michael L-H's talk. I would lay a submarine cable across the Menai Strait and measure the changes in voltage between the two shores so as to monitor the flow for a full year. The site I chose was at Plas Newydd, which was then the home of the merchant navy training school, HMS Conway. I bought the cable, the electrodes, the data recorder (paper strip chart) and went through the lengthy process of getting permission from The Crown Estate Commissioners, The Board of Trade, the Vaynol Estate, Lord Anglesey and HMS Conway. For a donation of 10 guineas, the Conway cadets laid the cable. It was good practice for their rowing boat handling skills. Jack Darbyshire filmed the exercise on the lab's 16mm Bolex camera. It looked a bit like the antics of a couple of drunken, drowning centipedes. The recorder was housed on the end of the HMS Conway dock and showed typical tidal fluctuations of $\pm 5\text{mV}$. (Ref 2). My monthly trip to collect the meteorology records from the control tower at RAF Valley also added a degree of excitement. The records showed that the residual flow towards the southwest could be reversed by southwesterly gales.



With my equipment for the Menai Strait cable - cable, electrodes and oil drums to buoy the cable during deployment and the lab's Land Rover (EJC 98).

While this was going on, I was concerned that my seagoing experience was limited to the shallow Irish Sea. To try to rectify this, I wrote to the NIO late in 1965 asking if I could be a student helper on a cruise of the relatively new RRS *Discovery* (launched 1962). I was offered a place on Cruise 10, led by Dr John Swallow FRS, the famous inventor of the neutrally buoyant float.



John Swallow with one of his floats



RRS Discovery Cruise 10 (L) J.N. Carruthers chatting to Bob Smith (Oregon State University) and David Pugh (one of four Cambridge Geodesy and Geophysics students on board). In the background Dick Dobson drives the steam hydro winch.

The cruise would last two months, starting from Plymouth in February 1966 and calling into Madeira; it was described as "Instrument trials and Oceanographic Observations". At that time there were very few commercial companies making oceanographic equipment, so many instruments were designed and built in-house by NIO and they had to be tested. I was assigned to look after some new commercially built recording current meters (Aanderaa, Braincon, Geodyne and Plessey) and to analyse the data they would, we hoped, produce. Also onboard was Dr J.N. (Jack) Carruthers from NIO who was arguably the "father" of UK post-WWII oceanography who was testing some of his simple low-cost measuring devices.

That cruise taught me many things:

- the enormous challenge of trying to understand how a seemingly limitless ocean works – the Irish sea seemed more like a puddle.
- the need for meticulous preparation and for improvisation at sea
- the magical healing powers of a spray of WD40 on wet electronics
- the awesome power of a raging storm
- that I wasn't seasick – even after a tot of rum that was then issued on Royal Research Ships.
- that I really enjoyed the 4-8 watch and seeing the sun rise with the prospect of breakfast afterwards.
- friendships made at sea, and a beard grown there, last a lifetime.

In retrospect, much of the equipment used on Cruise 10 (water bottles, reversing thermometers, steam-driven winches) would have been recognised by scientists on HMS Challenger a century earlier. However, other devices, like the current meters, were forerunners of the age of micro-electronics. (See Cruise report).

Back in Plymouth, I tried but failed to find John Swallow to thank him for the opportunity he had given me and so I headed off to catch the train home. It turned out that while I was looking for him, he was looking for me to thank me. He found me at the station and his parting words were, "*When you are looking for a job, let me know*".

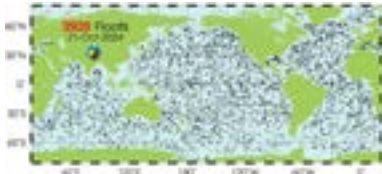


Jack Darbyshire's secretary, Hilary Bushell, using hi-tech IBM golf ball typewriter.

Having had 3 years of funding from NERC (formed in 1965) for my MSc and my PhD I took up his offer and joined the NIO in September 1967, working for John Swallow as a Scientific Officer in the Royal Naval Scientific Service. The writing up of my PhD work on the Menai Straits was however uncompleted.

In April 1968 **Hilary Bushell**, Jack Darbyshire's secretary, and I were married. and set up our home in Surrey. My last association with the Menai Bridge labs was when I spent the day before our wedding aboard the new "*Prince Madog*" at Plas Newydd using current meters to calibrate the cable measurements. Much later I was external examiner to the physical oceanography MSc course.

From then on, my research and interests became increasingly global. Now well established at NIO, in 1971 the advantages of having a vague topic for my PhD came to fruition. It allowed me to submit the work on moored current meter data I was doing at NIO. This focussed on variability and had a particular emphasis on the internal wave spectra which had global significance. In January 1972 Hilary and I headed off for my year as a post-doc in the world-leading Buoy Group at Woods Hole Oceanographic Institution. From then until the early 1990s I did seagoing research at NIO and its successor the Institute of Oceanographic Sciences, on ocean currents in the Northeast Atlantic and further afield with international experiments such as Polygon (with the USSR) and the Mid-Ocean Dynamics Experiment (MODE, US/UK). My last cruise was in 1993 on RRS *Discovery* to the Southern Ocean with Bob Dickson as part of the World Ocean Circulation Experiment (WOCE). These were the last of almost 1000 days spent on research ships. (Ref 3)



The Argo profiling float array delivering round the clock temperature and salinity profiles.

(<https://argo.ucsd.edu/about/status>)

My career then changed as I became project director, first for WOCE (1994-2002) and then for CLIVAR (1998-2002) (both projects of the World Climate Research programme). Finally, I was invited to be Director of the Argo profiling float programme at Scripps Institution of Oceanography in California (2003-5). Argo uses technology with its roots in Swallow's floats with which I had worked on *Discovery* Cruise 10 35 years earlier. (Ref 4).

My marine science horizons have expanded enormously since I joined the vacation course. (Ref 4). I now focus on documenting how marine science has developed (Ref 5) and have also founded

a group called Café Scientifique in our hometown of Romsey, so as to interest the wider community in the wonders of science.

I count myself incredibly fortunate to have been part of the revolution in our ability to observe and understand the oceans and to have collaborated with talented scientists and engineers around the world.

Thank you, Menai Bridge, for helping me set sail!

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Harriet Rushton (BSc Marine Biology and Oceanography, MSc Marine Environmental Protection).

I was lucky enough to secure a job as a Scientific Fisheries Observer for the Falkland Islands Government, whilst still finishing my MSc in 2014 (which I now realise is 10 years ago and care not to dwell upon).

After a year collecting and collating data for catch quota analysis for finfish and squid populations, amongst albatross, cetaceans

and terrible sea states, I came back to the UK (via 4 months in South America) to work for Jacobs Engineering as a marine ecologist. This role involved surveying for EIAs. I became the ichthyoplankton subject matter expert which was undoubtedly my favourite project; juvenile fish can be stunning!



I then joined the Civil Service, advising the Royal Navy on maritime environmental protection. The RN have a layered environmental protection process which ensures their activities are conducted in an environmentally considerate manner. I managed this process and advised on a wide variety of other maritime environmental matters from biofouling to protecting cetaceans. I established and managed a groundbreaking, hitherto unresearched biofouling project which was my proudest achievement in this role.

I'm still in the Civil Service, after a brief stint undertaking environmental assessments

for various maritime platforms and equipment, I am now the Salvage and Marine Operation's Wrecks Environmental Manager, wherein I have found my ideal role!

The MOD manages an inventory of around 5,700 shipwrecks which belonged to MOD when they sank and pose an ever-increasing environmental risk in terms of oil and chemical pollution. My team and I assess the risks this inventory poses, with the overall aim of preventing pollution from occurring. I am exposed to SMEs who have been in the industry for decades, which includes both historical expertise, environmental, industry, political and much more. This job combines my passion for the marine environment and history, with exploration, international engagement, promoting the work we do, breaking through boundaries, finding innovative solutions, engaging with industry, academia, and MOD and a team I feel valued in.

I also manage the Whale Island Native Oyster Restoration project in my spare time with the volunteering days I am entitled to in the Civil Service.

Bangor Alumna named one of the UK's top 100 most influential environmentalists 2024

Bangor Alumna Emily Cunningham (MMBIol Master of Marine Biology, 2012) has been named on the ENDS Power List 2024.



This list recognises the 100 most influential environmentalists across the UK.

Emily was recognised as a result of her work on the Motion for the Ocean: Local Government Ocean Recovery Declaration, which she co-founded with fellow ocean experts, Dr Pamela Buchan and Nicola Bridge. The declaration has been passed by 30 councils, collectively representing over 4 million people, which are now taking evidence-based action towards ocean recovery across England and Wales.

Ocean conservation expert Emily was nominated for being the "relentless driving force" behind the Motion for the Ocean. In 2023, as a result of Emily's influence, the first Midlands council made an Ocean Recovery Declaration. This is paradigm-shifting in terms of

where the responsibility for ocean care lies, with a council 60 miles inland recognising that its decision-making impacts the ocean and committing to better source-to-sea stewardship. Four Midlands Councils have now made Ocean Recovery Declarations, including Nottingham City.

Efforts are now underway to expand the Motion for the Ocean internationally. In April 2024, Emily presented the Motion for the Ocean at the UN Ocean Decade Conference in Barcelona and new country-specific versions are in development.

Emily has worked at the frontline of ocean conservation since completing her studies at Bangor. She currently works for WWF International leading their global river dolphin conservation initiative and is writing her first book.

You can find Emily on social media (please connect!):

LinkedIn: [Emily G Cunningham](#)

Instagram: [@marinebiologylife](#)

Facebook: [Marine Biology Life](#)



Credit: Nico Marin / Ocean Image Bank

Lynn Sorrentino (MSc in Marine Environmental Protection, 2018)



Update on my work at International Union for Conservation of Nature (IUCN) on plastic pollution.

The fifth meeting of the Intergovernmental Negotiating Committee (INC 5) to develop an international legally binding instrument on plastic pollution, including in the marine environment (INC-5), took place from 25 November to 1 December 2024 at the Busan Exhibition and Convention Center in Busan, Republic of Korea.

My main role at IUCN since 2020 has been to manage plastic pollution projects globally. I am a part of the IUCN Delegation for the INC meetings, working on a project in five countries in West Africa with IUCN's partners, GRID-Arendal, to build capacity of countries to meet their global commitments to end plastic pollution and facilitate national action plans and strengthen policies.

The concerns over the triple planetary crisis (biodiversity loss, pollution, and the climate crisis) as linked to problematic plastics have converged in these negotiations. In order to advance science and policy for a future Plastics Treaty, governments must come together to develop a binding agreement that will address the full life cycle of plastics, promote circular economic models, and improve waste management and trade challenges.



I took the photo attached on Pantelleria Island, Italy, in 2023, showing the issue of poor waste management and pollution.

Lee Cooper (Marine Biology & Biochem Soil Science, 1978)



L-R: Lee Cooper, Andrew the Prime Warden of the Worshipful Company of Fishmongers, and Julie the MFS manager. The award was made at Fishmongers Hall on 18/11/24.

"I've recently retired from the Sea Fish Industry Authority (Seafish) where I was National Learning and Standards Manager, covering all aspects of training delivery and development for the UK onshore seafood industry.

During my time at Seafish I have been responsible for creating qualifications, developing apprenticeships, making training videos, writing training programmes and supporting a UK wide network of self-employed expert trainers.

I was instrumental in creating Seafood Training Networks for Wales, Northern Ireland, Scotland and Yorkshire & Lincolnshire, Networks that brought together disparate organisations including government agencies, private providers, and trade bodies to collaborate and cooperate to deliver much needed training.



During my time at Seafish I was able to continue my personal development, becoming a Chartered Fellow of the Institute of Personnel Development, undertaking a Business Management diploma to add to my Fisheries Management diploma and Marine Biology degree. I was lucky enough to win a Gold Medal of Excellence from City and Guilds of London, be granted lifelong membership of the National Federation of Fishmongers and most recently to be recognised as the 11th Companion Fishmonger under the Master Fishmonger Standard (see photo).

Now that I am retired, I'm able to look back on my early career as a Tuna Biologist and later University technical officer in Papua New Guinea, and as a Fisheries Officer in Honduras.

In all of this time Bangor and the University has never been far from my thoughts. I have been a frequent visitor back to the city, including informal reunions in 2022, 2023, 2024 and if plans work out again in August 2025.

In many ways I've been lucky to be able to directly apply my degree to my entire career path, but even if my career had taken me away from the sea, I'm confident that the School of Ocean Sciences/Menai Strait would still flow through my veins."

Dr Daniel M Moore (MMBiol Marine Biology, 2010)



Bangor Alumnus joins University of Exeter as a Lecturer in Marine Biology

Daniel is module convenor for the marine biology module for first-year students as well as a contributor to various other modules at undergraduate and postgraduate level, sharing the wonders of our ocean - from coral reefs to the deep sea - brought to life with his extensive field experience over the past decade.

Following his PhD research at Durham University into the population genetics of bottlenose dolphins, Daniel spent two years as Chief Scientist aboard an expedition vessel in Antarctica and the Americas, before working for Ocean Census as Expedition Science Manager for their world-first species discovery missions.

Daniel brings extensive global partnerships to the University of Exeter, offering diverse opportunities for student projects and placements. These include the Natural History Museum, International Seakeepers Society, Te Papa, The Rock Pool Project and Viking

Expeditions. A focus on global partnerships are a core component of his teaching style, with his students taking part in the Marine Biology Global Classroom in collaboration with the University of Melbourne and Hong Kong University.

Daniel has always enjoyed teaching, starting as a Dive Instructor for the Bangor University Sub-Aqua Club and as a demonstrator for practicals and field trips. He became a Fellow of the Higher Education Academy whilst studying for his PhD.

Alongside his teaching, Daniel is leading research on the evolutionary biology and ecology of cetaceans and deep-sea megafauna.

Learn more and connect:

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Instagram: [@marinebiologylife](#)

Facebook: [Marine Biology Life](#)



Academic and Alumni Contribute to New Netflix Series, *Our Oceans*



Tom Rippeth, Professor of Physical Oceanography, has served as a scientific advisor for the Netflix documentary series *Our Oceans*, narrated by President Barack Obama.

He worked alongside SOS alumni **Professor Bob Marsh** (MSc Physical Oceanography, 1986), who was the senior scientific advisor and **Katy Moorhead** (MSc Marine Environmental Protection, 2014) who was the assistant producer for the Indian Ocean episode.

The five-part series, produced by the Emmy Award-winning team behind *Our Great National Parks*, explores the interconnected ecosystems of the planet's oceans, emphasising the vital role of the 'Global Ocean Current'. Tom's expertise contributed to episode four, focusing on the Arctic Ocean, where the current's influence sustains life in one of Earth's most challenging environments.



With groundbreaking underwater filmmaking and insights from cutting-edge research, *Our Oceans* illuminates the complex, often surprising lives of marine species as they navigate the challenges of a rapidly changing world.

[Watch *Our Oceans* on Netflix.](#)



Calling Time on Marine Science in New Zealand

It started in 1969 after he completed a 52-page MSc thesis entitled "*A histological study of metamorphosis in the larva of *Ostrea edulis**", at the then Menai Bridge Marine Science Laboratories of the University College of North Wales.

It has ended in September this year with a 6-minute presentation on "Kaitaia spat – fifty years of seed supply for New Zealand's farmed mussel production", at the joint AMSA/NZMSS 2024 conference in Hobart, Tasmania.

Immediately after completing his MSc, Bob Hickman was offered a job in New Zealand working for the Fisheries Research Division of the Ministry of Transport, soon to become the Marine Department. Over the following forty years, Bob worked as a fisheries research scientist focusing on the aquaculture development potential of marine species as diverse as brine shrimp and butterfish, rock lobsters and rock oysters. Most of Bob's work targeted New Zealand's unique green-lipped mussel, *Perna canaliculus*, its native flat oyster, *Tiostrea lutaria*, and abalone (or paua), *Haliotis iris*, and the two large flatfish species, turbot *Colistium nudipinnis* and brill *Colistium guntheri*. Bob's research took him all over the length and breadth of New Zealand, from Ninety Mile Beach in the far north to Foveaux Strait in the deep south, and also to many places around the world for research and conferences.

Bob retired from the NIWA, the National Institute of Water and Atmosphere, in early 2009 but has maintained his interest in fisheries, aquaculture and research, by continuing to participate in the activities of the New Zealand Marine Sciences Society, which he joined in 1969. He has attended most of its annual conferences ever since – as well as being a Council Member, Secretary, Treasurer, President and now Life Member of NZMSS.

Bob decided that the 2024 joint meeting of NZMSS with its sister organization AMSA (Australian Marine Sciences Association) would provide an appropriate opportunity for a valedictory conference presentation. "At 80 it is time for me to give this sort of thing over to the younger generation of marine scientists".

Bob's offer of a paper entitled *Kaitaia Spat – Fifty Years of Seed Supply for New Zealand's Farmed Mussel Production, but is it Sustainable for Another Fifty? Environmental Considerations and Alternatives* was accepted for oral presentation. Bob managed to cover 50+ years of the history and future of New Zealand mussel farming in exactly the allocated six minutes!

Although calling time on publications and conference presentations, Bob is still anticipating being at future annual NZMSS conferences, since his attendance tally is currently only 47!



Robert W Hickman

Email oysmusturbut.man@xtra.co.nz

See also:

Hickman Bob 2016. A job for life. p 12 in *The Bridge*, School of Ocean Sciences Association, Bangor University, UK, August 2016.

www.bangor.ac.uk/oceansciences/news-archive/alumni-newsletters/the_bridge_2016.pdf

NZMSS Presidents past and present in discussion at AMSA/NZMSS 2024 in Hobart, Tasmania, 15-19th September 2024 – Dr Pete Wilson (left) and Bob Hickman (right).

RESEARCH AND IMPACT HIGHLIGHTS

Using Ancient Records to Assess Changes in Fisheries Around Wales



Alec Moore and team gathered centuries old written records to show the seas around Wales once teemed with life.

Vast schools of baitfish once stretched for miles in Welsh waters, pursued by thousands of seabirds, dolphins, sharks, and cod. Enormous sturgeon and skate cruised near the seabed, while catches of fish so large nearly capsized boats.

This abundance was a reality in north Wales, however, such scenes have faded into memory, leaving behind the dangerous “shifting baseline syndrome,” where each generation accepts declining ocean health as normal. Systematic fish surveys only began in the 1980s, but marine historical ecology helps fill the gaps through sources like medieval records, archaeological finds, and Victorian accounts. Recent research highlights a stark contrast between the once-rich fisheries of species like herring, cod, and skate and today’s reliance on a few shellfish species.

This historical perspective reveals the loss of species like the angelshark and sturgeon, now regionally extinct, their disappearance forgotten by most. By studying the past, we understand the potential for ecosystem restoration during the UN Decade of Ecosystem Restoration. Many modern Welsh fisheries, like those for whelk and bass, emerged only in the late 20th century but are already impacted by overfishing and climate change. This history underscores the urgency to preserve marine ecosystems and avoid repeating the mistakes of the past. Ignoring history risks further extinctions and an increasingly impoverished ocean future.

<https://theconversation.com/we-gathered-centuries-old-written-records-to-show-the-seas-around-wales-once-teemed-with-life-238139>

Paper: Alec B. M. Moore, Keith Brander, Poul Holm, Jan Geert Hiddink (2024). Century-scale loss and change in the fishes and fisheries of a temperate marine ecosystem revealed by qualitative historical sources. Fish and Fisheries, <https://doi.org/10.1111/faf.12852>



Scribbled notes reveal a huge herring catch on October 5, 1745. National Library of Wales



Marine Heatwaves in the North Sea

Recent papers by **Luis Gimenez** on marine heatwaves has been highlighted by the editors in *Limnology and Oceanography Bulletin*:

<https://www.awi.de/ueber-uns/service/presse/presse-detailansicht/temperaturrekord-in-der-nordsee-auch-die-deutsche-bucht-ist-so-warm-wie-noch-nie.html>



Scientists of the Alfred Wegener Institute's Biological Institute Helgoland in Germany and Bangor University have recently quantified long-term changes in the average temperature and the frequency and amplitude of marine heatwaves in the German Bight, in the North Sea.

Based on the Helgoland Roads time series of temperatures registered since 1962 they have shown an important increase in the frequency of marine heatwaves after 1990, as compared to the historical temperature record from 1962 to 1991. There has been an important increase in temperature since 1990; for example, between 1962 and 1990 there were 24 months with temperatures below 3°C, but since 1990 there have been only five months with such low temperatures. The year 2023, was record-breaking since the start of measurements in 1962.

"We are now in the process of identifying the drivers of marine heatwaves and their effects on marine organisms. The most important marine heatwaves recorded in our data base coincide the European scale atmospheric heatwave events, which make sense given the shallow nature of the German Bight. These include long summer atmospheric heatwaves such as those of 2003 and 2018. We have found, especially in Spring, changes in the abundance of planktonic organisms associated to those marine heatwaves. In the next years, we expect to get a better understanding of the effects of marine heatwaves on organisms through laboratory and outdoor mesocosm experiments".

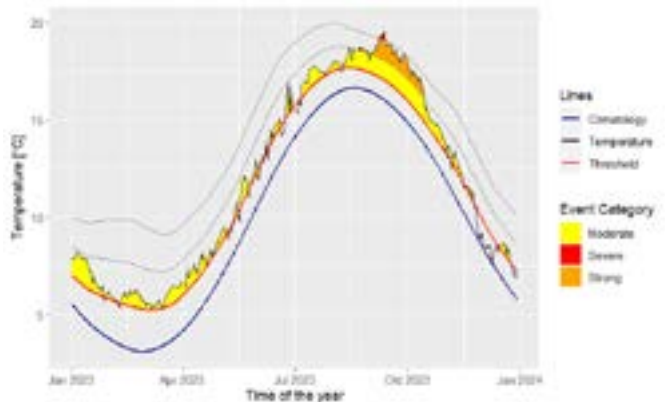
Luis Giménez

Papers:

Luis Giménez, Maarten Boersma, and Karen H. Wiltshire. (2024) *A multiple baseline approach for marine heatwaves*. *Limnology and Oceanography*. doi.org/10.1002/Ino.12521

Margot M. Deschamps, Maarten Boersma, Luis Giménez (2024) *Responses of the mesozooplankton community to marine heatwaves: Challenges and solutions based on a long-term time series*. *Journal of Animal Ecology* 93:1524-1540. doi.org/10.1111/1365-2656.14165

Felipe de Luca Lopes de Amorim, Karen Helen Wiltshire, Peter Lemke, Kristine Carstens, Silvia Peters, Johannes Rick, Luis Gimenez, Mirco Scharfe (2023). *Investigation of marine temperature changes across temporal and spatial Gradients: Providing a fundament for studies on the effects of warming on marine ecosystem function and biodiversity*. *Progress in Oceanography* 216: 103080. doi.org/10.1016/j.pcean.2023.103080



The Subpolar North Atlantic is Becoming More 'Springy'

At a time when scientists are becoming increasingly concerned about dramatic impacts of changing Atlantic Ocean circulation on European weather, a new paper published by alumnus and Southampton University **Professor Bob Marsh** (1988, MSc Physical Oceanography) with **Professor Yueng-Djern Lenn, Dr Dipanjan Dey** and **Dr Martyn Roberts** identifies a potential mechanism.



The new paper considers how stratification changes in the subpolar North Atlantic in several high-resolution ocean models. The stronger the stratification, i.e. differences in density between the ocean layers, the more stable the water column is and the more resistant to the deep convection that contributes to global ocean overturning circulation. Ocean warming will lower density while the addition of salt raises density such that at most latitudes, these impacts compensate each other with warm salty ("spicy") and cold fresh ("minty") waters existing within a single density layer.

The new study found that as more freshwater leaks from the Arctic into the North Atlantic over the next two decades, the North Atlantic will transition from a spicy-minty compensated paradigm to one in which the surface ocean is both fresher and warmer, i.e. a "springy" state. This will strengthen stratification, making it increasingly dependant on salinity in a process we are calling Arctification. This process will shallow the surface mixed layer allowing it to warm up more quickly in summer and cool down more rapidly in winter with potential implications for European weather.

Paper: Marsh, R., Dey, D., Lenn, Y.-D. & Roberts, E. M. (2024). Shifts from surface density compensation to projected warming, freshening and stronger stratification in the subpolar North Atlantic. *Climate Dynamics*, 62(8), p. 8227-8253 <https://doi.org/10.1007/s00382-024-07336-6>

Seagrass and Oysters: A Complicated Relationship in a Changing World

New research reveals that climate change could disrupt the beneficial relationship between two important coastal species: seagrass and oysters.

The findings, published in the *Journal of Ecology*, shed light on how these species work together to grow and thrive under normal conditions but may struggle as ocean temperatures rise and acidity increases.



The study, conducted by a team of international marine scientists led by Ocean Sciences **Katie DuBois**, explored the interactions between seagrass and oysters in a controlled experiment. By simulating warmer and more acidic ocean conditions, they observed the effects on both species. Under normal conditions, the study found that oysters significantly boost seagrass growth, increasing both leaf growth and plant size by about 30%, whilst seagrass helps oysters by improving shell growth. In other words, oysters use more energy to grow their shells when seagrass is around.

However, when the water became warmer and more acidic, the relationship between the seagrass and oysters became less predictable, indicating that future ocean conditions could disrupt their beneficial relationship. Despite this, one clear benefit under future ocean climates of warmer and more acidic conditions persisted: seagrass improved oyster body condition by 36%, reversing the negative effect of warming and acidification on oyster body condition.

Katie explains, *"This study highlights the importance of species interactions in understanding ecological responses to climate change. It's not just the individual effects of warming and acidification on seagrass and oysters that matter, but also how their relationship evolves. This knowledge is vital for the conservation and management of coastal ecosystems. By understanding these complex relationships, we can better preserve and protect our coastal ecosystems."*

"These findings are particularly relevant for restoration projects and aquaculture, where it's essential to consider how environmental changes impact species interactions. This understanding will aid in developing strategies to support the resilience and productivity of these key species."



Credit: Michiel Vos / Ocean Image Bank

Paper: K. DuBois et al (2024). Shifting seagrass-oyster interactions alter species response to ocean warming and acidification. *Ecology*, <https://doi.org/10.1111/1365-2745.14406>.

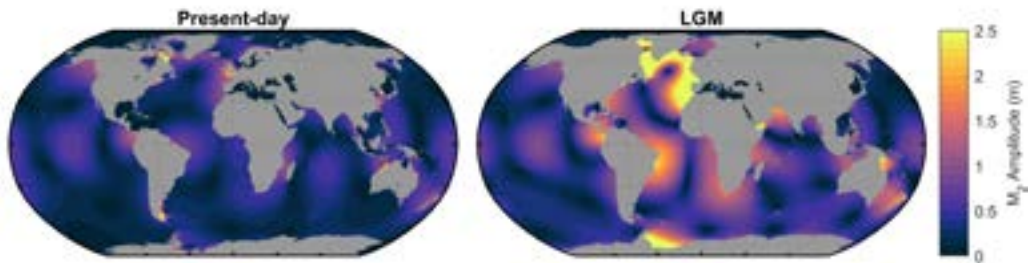
Tides and Ocean Circulation During the Last Glacial Maximum



Sophie-Berenice Wilmes, a postdoctoral researcher at the School of Ocean Sciences, investigating tides and ocean circulation of the past, wrote an article for Ocean Challenge.

Throughout the Pleistocene (2.58 million to 11 700 years before present), Earth's climate fluctuated between cold glacial periods and warm interglacial periods. During the Last Glacial Maximum (26 500–19 000 years BP) – the period when ice caps were at their greatest extent during the most recent glacial period – global mean surface temperatures were on average 4–8 °C lower than at present, and vast ice sheets covered the Northern Hemisphere.

The enormous volumes of fresh water locked up in these ice sheets meant that global mean sea level was approximately 120–130 m lower than today, so that continental shelves, which today are covered by shallow seas, were exposed if they were not covered by ice. It is thought that this lack of shelf seas affected tides and the strength of tidal currents in the ocean, and in turn the meridional overturning ocean circulation.



With colleagues I set out to explore how changes in tidally driven ocean mixing may have affected the Atlantic meridional overturning circulation and whether sediment cores could provide information to help determine the strength of tidal mixing in the past.



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(June - December 2024)

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