NOVEMBER
2019

THE BRIDGE

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

PRIFYSGOL
BANGOR
UNIVERSITY

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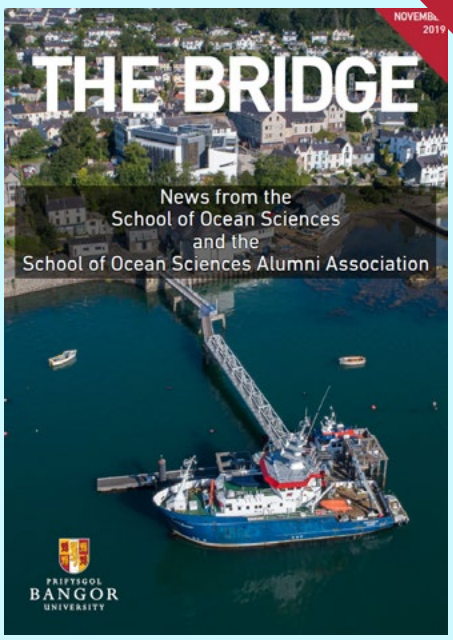
THE BRIDGE November 2019



Please send your School of Ocean Sciences news to:
sos-newsletter@bangor.ac.uk

Please send your School of Ocean Sciences Alumni Association (SOSA) news to:
alumni@bangor.ac.uk

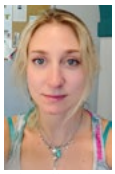
TEF Gold
Teaching Excellence

Welcome to our School of Ocean Sciences (SOS) newsletter incorporating the Alumni newsletter "The Bridge". I am excited to share with you a vast array of our achievements over the past 6 months within the School, ranging from successful student and staff fieldtrips, newly obtained grants and research projects launched within SOS, and our progress towards equality. "The Bridge" aims to promote news sharing between students and staff, both present and past.
Gareth Williams, Editor

2019
OPEN DAYS

Sunday 27 October 2019
Saturday 9 November 2019

SCHOOL OF OCEAN SCIENCES STAFF


Jenna Alexander
Researcher


Susan Allender
Laboratory Manager


David Assinder
Lecturer


Vallen Astley
Technician


Martin Austin
Senior Lecturer


Jaco Baas
Reader


Robin Bater
Researcher


Philippa Bayford
Researcher


Cathy Blakey
Data Librarian


Jenny Bond
Researcher


Leo Clarke
Post-doctoral
Ecologist


Line Cordes
Lecturer


Tomas Cornwell
Graduate Teaching
Assistant


Tim D'Urban-Jackson
Researcher


Alan Davies
Professor


Judy Davies
Senior clerical officer


Thomas Davies
Researcher


Adam Delargy
Researcher


Lowri Evans
Post-doctoral
Ecologist


Rob Evans
Workshop Supervisor


Kata Farkas
Researcher


Stella Farrar
Welsh Medium


Tom Galley
Researcher


Luis Gimenez
Senior Lecturer


Laura Grange
Lecturer


Mattias Green
Reader


Emily Groves
Researcher


Maria Hayden-
Hughes
Researcher


Adel Heenan
Lecturer


Jan Hiddink
Professor


Natalie Hold
Researcher


Esther Howie
Bluefish Operation
Manager


Gwyn Hughes
Technician


Peter Hughes
Technician


Dei Huws
Senior Lecturer


Suzanna Jackson
Lecturer


Stuart Jenkins
Professor


Mandy Jones
Domestic


Nick Jones
Researcher


Jonathan King
Reader


Nathan King
Researcher


Stefanie Krafft
Technician


Cai Ladd
Researcher


Peter Lawrence
Researcher


Yueng-Djern Lenn
Senior Lecturer


Lewis LeVay
Professor,
Director of CAMS


Matthew Lewis
Researcher


Ben Lincoln
Researcher


Wenna Lloyd-Jones
Administrative
Assistant


Natasha Lucas
Researcher


Jonathan Malarkey
Researcher


Shelagh Malham
Reader


Finn Mannion
Researcher


Ian McCarthy
Reader


David Mills
Researcher


Alec Moore
Researcher


Simon Neill
Reader

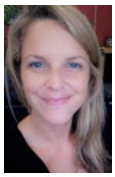

Steven Newstead
Researcher


Aled Owen
Technician


Ben Powell
Technician


Thomas Prebble
Software Developer


Ian Pritchard
Chief Technician


Laura Richardson
Researcher


Tom Rippeth
Professor


Berwyn Roberts
Technician


David Roberts
Multimedia
Technician


Gwyn Roberts
Computer Manager


Jennifer Roberts
Senior clerical officer


Lynne Roberts
Domestic


Michael Roberts
Researcher


Wendy Roberts
Technician


Craig Robertson
Lecturer in Marine
Biology


Peter Robins
Lecturer


Ronan Roche
Researcher


Steven Rowlands
SEACAMS Fieldwork
Technician


Margot Saher
Lecturer


Jennifer Shepperson
Lecturer


Samantha Simpson
Researcher


Martin Skov
Senior Lecturer


David Smyth
Science Officer


Rees Sorby
Researcher


Lucy Southworth
Researcher


Claire Szostek
Researcher


David Thomas
Professor


Jamie Thorpe
Researcher


Svenja Tidau
Researcher


John Turner
Professor,
Head of School


Karen Tuson
Researcher


Katrien Van
Landeghem
Senior Lecturer


Gemma Veneruso
Researcher


James Waggitt
Lecturer


Guy Walker-Springett
Researcher


Nicola Wallis
Recruitment


Sophie Ward
Researcher


Julie Webb
Researcher


Chris White
Teaching
Administrator


Timothy Whitton
Researcher


Gareth Williams
Reader


Sophie-Berenice
Wilmes
Researcher


Sarah Zylinski
Lecturer

PROMOTIONS

Our Head of School and Chair of Marine Biology, Professor David Thomas, has been promoted to Pro Vice-Chancellor (Research and Impact).

Congratulations David! We will be sad to see him leave, but wish him all the best in his new role and thank him for all he has done for SOS as Head of School during his post.

David Thomas has also been appointed as the new Chair of the National Oceanography Centre Association (NOCA) of Marine National Capability Beneficiaries.

This will also give a seat on the main NOC Board as an observer.

The NOCA is a strategic platform that brings together the NERC funded marine science community to enhance its influence on funders, policy makers and the impact that science has on society. The Association's current activities include: Focusing effort on strategic matters affecting UK marine science in the national and international context; Developing and targeting inputs to consultations and other marine science briefings; Showcasing UK marine science capabilities and achievements to policy makers, industry, learned and professional societies, and the public, and International engagement in UK, European and International forums, to inform new funding programmes. More information at: https://noc.ac.uk/about-us/our-national-role/noc-association.

Congratulations to David on this influential strategic role in marine science!

Professor John Turner is our new Head of School (from 1st November 2019)

I graduated in Joint Honours Botany and Zoology at the University of Bristol in 1981, and then progressed to doctorate research at the University of Oxford (St John's College), investigating the 'Ecology of Temperate Symbiotic Anthozoa'. In 1985 I moved to a NERC funded postdoctoral position at Bangor University, School of Animal Biology, where I investigated the 'Behavioural Ecology of Shoaling Fish' and specifically the 'Twilight Hypothesis'. In 1987, I transferred to the School of Ocean Sciences to take up a 5 year Research Demonstratorship in Marine Biology. I was Course Director of the MSc in Marine Environmental Protection for 22 years between 1989 and 2011. I developed research interests in mapping coral reef biotopes, Environmental Impact Assessment, Marine Protected Areas and Coastal Zone Management. I became a permanent member of staff in 1990, Lecturer in 1993 during which I held a Visiting Lectureship at the University of Mauritius, and was appointed to a Senior Lecturer in 2000. I was awarded a University Teaching Fellowship at the Graduation ceremony in 2007, and won a Bangor University Research Impact Award 2015 and received a personal Chair in 2016, and became Dean of Postgraduate Research, heading the Doctoral School in November 2016. I am a Trustee of the Chagos Conservation Trust, and a Trustee of the Seawatch Foundation.

STUDENT PRACTICAL CLASSES

Porpoise postmortem – by Line Cordes

The CSIP team from the Zoological Society of London visited Ocean Sciences in October and performed post-mortem demonstrations of two stranded marine mammals (one harbour porpoise and one common dolphin) for third year undergraduate students on the Marine Mammal Science module (OSX3023).

The CSIP team explained their research using strandings data, and took the students through the morphological and physiological adaptations of porpoises and dolphins as well as any evidence they found along the way relating to why they may have stranded.

Student quotes:

I loved seeing all the different organs in detail and being able to see the dissection process, it was invaluable and one of the best experiences I've had in my life

I found this much more useful than seeing this kind of content on a PowerPoint or video as it was much more hands on and we had the chance to look at individual organs in much greater detail.

Really useful to watch the dissection process from start to finish in real-time, whilst the demonstrators explained what they were doing and what each organ does. It was also great to properly visualise the difference between a Harbour Porpoise and a Common Dolphin - up until now I have struggled to differentiate between the two!

It made understanding the internal biology and adaptations of cetaceans much more clear than just reading about it and trying to figure out how everything is connected based on fuzzy low resolution pictures.

The CSIP team went into extreme detail, which was a very valuable hands on learning tool

Often difficult to understand the internal anatomy and physiology of animals without seeing it for ourselves. Post mortems are the only way of truly doing this with marine mammals due to their nature.

Fascinating to see real world application of marine mammal science. Did not lose interest for the whole 4 hours, csip were very good at explaining the process.

Really great to get a proper feel for the anatomy (internal and external) throughout the demo, especially with the running commentary-like explanations throughout.

Extremely interesting, and an important exercise and resource. Thoroughly enjoyed every minute of it. It was definitely a memorable experience.

It was a pleasure to get the chance to see these animals in the flesh (often difficult with their nature) and then to get talked through the internal anatomy by a country-leading organisation like CSIP was an honour.

Really enjoyed being able to ask questions and be shown feedback using the animals from the demonstration.

This activity highly enriched what is already turning out to be a great module. I particularly liked the ability to listen to answers to multiple questions throughout the demonstration.

RESEARCH IMPACT

HRH Prince of Wales notes shining example of best practice in sustainable management on expansion of the Cayman Islands Marine Protected Areas – by John Turner

Bangor University working in collaboration with The Nature Conservancy have assisted the Department of the Environment to expand the Marine Parks system in the Cayman Islands, a British Overseas Territory in the Caribbean, through projects funded by the DEFRA Darwin Initiative*.

The expansion of Cayman's existing marine parks was approved by the Cabinet and announced during the visit of His Royal Highness, Prince of Wales, on 28th March. The Environment Minister indicated that "This expansion will serve to protect our local marine stocks, as well as the crucially important coral reef network surrounding our Islands for generations to come."

The Prince of Wales highlighted that 'The Cayman Islands could become a shining example of best practice in integrated and genuinely sustainable management of its land-based and ocean resources. Such an integrated approach is not only essential to protect our eco-systems, but also particularly in the Cayman Islands case to protect the long term viability of economic sectors."

Department of the Environment (DoE) Director, Gina Ebanks Petrie explained 'These enhanced marine parks areas came about as the result of years-long research by the Department of Environment and Darwin Initiative partners, Bangor University, followed by discussions between successive governments, the Department of Environment, the National Conservation Council (NCC), non-governmental organisations, other local stakeholders – including fishermen – and the general public"

Cayman's marine parks were originally established in 1986, but an increasing population, tourism, and coastal development, and awareness of wider Caribbean issues such as fishing pressure, nutrient run off from land and climate change has stimulated the need for action and their enhancement. The expansion increased the area of 'no-take' strict areas of protection from a national average of 14% of coastal waters to 48%, and the shelf area managed up to 54.6%.

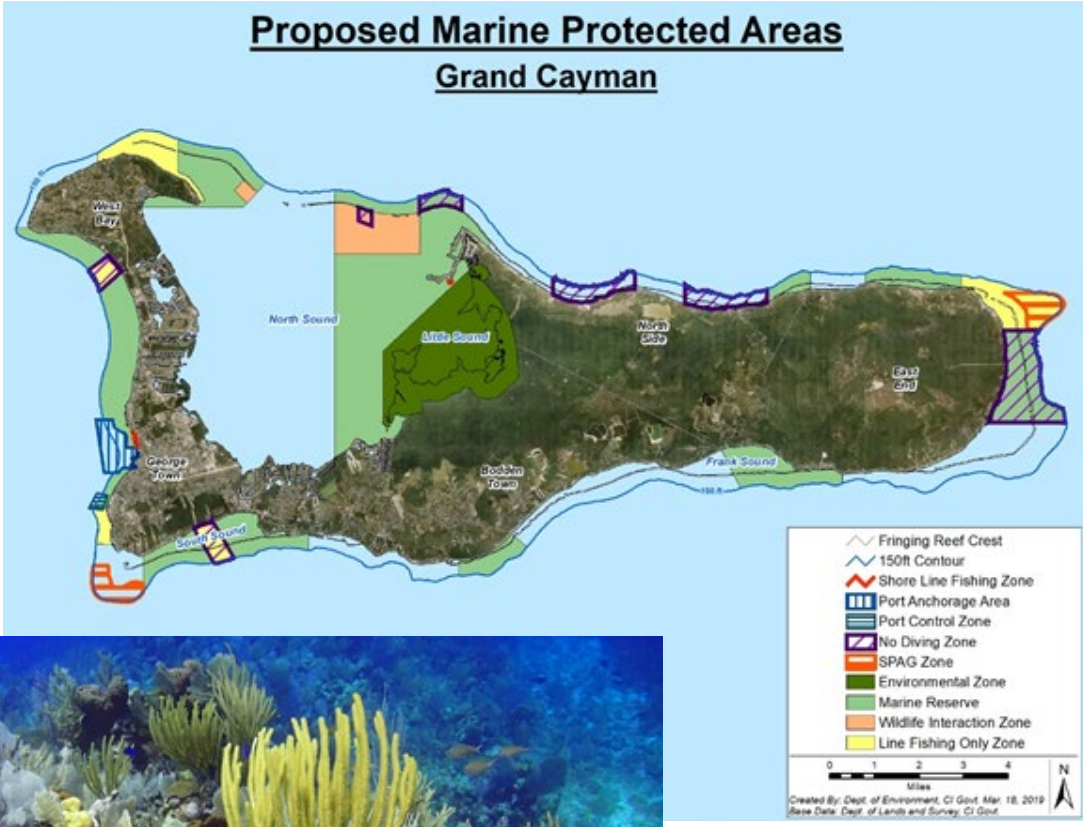
Croy McCoy, DoE Marine Research Officer, coordinated the field surveys and recently submitted his PhD to Bangor University on the effectiveness of the marine protected areas. He said "Should these proposals for enhanced marine reserves not have been implemented, we ran the risk of further coral reef degradation and, eventually, ecosystem collapse.''
The zoned system of marine protected areas reduces conflict and damage by regulating boat anchoring, diving, fishing, fishing at Grouper spawning aggregation sites, taking of marine life, and tourism wildlife interactions. As well as providing boat mooring buoys around each of the islands, a phone app called SIREN (System for Incident Reporting and Enforcement) provides maps of zones, an immediate regulation reference, and access to data. The next step is for the Cayman Islands Government to draft new regulations, signage, and flyers to inform the public.

Professor John Turner of the School of Ocean Sciences, who lead the DEFRA Darwin Initiative research project that provided the scientific evidence for the enhanced marine parks design was delighted to see that the collaborative research effort has had such significant impact at last. 'Field research included Masters students from the MSc programmes in Marine Environmental Protection and Marine Biology on placements with the Department of the Environment who worked with Croy and the Cayman Research Officers to undertake the surveys to build the underlying data about reefs systems and their use. The Darwin Initiative team were engaged in a series of consultations and events to ensure that the need for the enhanced Marine Parks System was supported by local communities under the banner, 'Save our Tomorrow - Today'.

He went on to say 'Cayman has continued to be a world leader in protecting the marine environment, and has in local waters at least, exceeded the call made by the UK at the UN General Assembly 2018 for governments to designate 30% of oceans as Marine Protected Areas by 2030. What's more, this work has practically met the advanced target of achieving 50% protection by 2050 likely to be proposed at the Convention on Biological Diversity in China 2020'.

*Department for Environment Food & Rural Affairs (Defra) Darwin Initiative grant 18-016: To Enhance an Established Marine Protected Area System, Cayman islands and grant EIDPO045: Assuring Engagement in Cayman's Enhanced

Marine Protected Area System to Prof John Turner, Bangor University with The Nature Conservancy, USA and Cayman Islands Government Department of Environment.



New zoned Marine Protected Area System for Grand Cayman, protecting parts of the shelf to a depth of 46m (150 ft).

Cayman islands coral reef (J.Turner)

Bangor team surveyed the reefs of Cayman (J.Turner)

AWARDS AND PRIZES

Rajkumari Jones Student Bursaries

With thanks to the Rajkumari Jones Student Bursaries for enabling three of the top performing students, commencing their 4th year of study within the MSci Degree Programmes, to progress their career development.

Below are the short reports from each student from the 2018 cohort on how receiving the bursary has helped them.

Jiayue Chen (MSci Physical Oceanography)

I am really grateful to be awarded a Rajkumari Jones Student Bursary at the end of my first year in Bangor University (the third year of MSci degree).

This Bursary has mostly helped me to build my confidence which just recognized my efforts in the first year of studying abroad. As an international student, I was worried about whether I could adapt to the foreign education system, but the bursary really helped me overcome my lack of self-confidence. The Rajkumari Jones Bursary helped me successfully complete my MSci degree and earn my first class degree. The financial support has also helped my PhD application.

It has also provided me with a personal financial support for living cost in Bangor, and support for my self-funded graduation trip with my mother in European countries. This made me more aware of European culture and enriched my study life in Bangor.

I am very grateful to be awarded this bursary, which allowed me to get the first on my MSci degree and contribute to my further study in my research field.

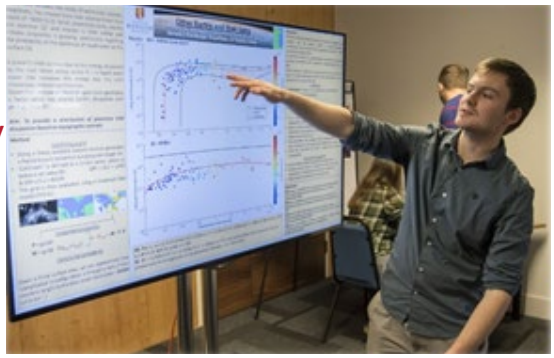
Lauren Aylward (MSci Marine Biology)

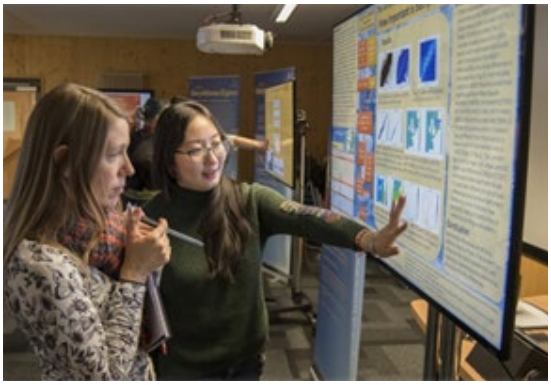
When I received this bursary, it lifted a huge weight off my shoulders. I always knew that I wanted to study a PhD but the interview travel and accommodation costs, and moving to a new city after graduation but before PhD funding arrived was an ominous prospect.

This Bursary allowed me to travel to my interviews without financial anxieties, which helped me secure multiple offers to study PhDs. Ultimately, I accepted an offer for a competitive Natural Environment Research Council funded PhD at the University of Liverpool to study marine metabolic ecology. I have not lived with my family in over 7 years and do not receive financial support, so moving to a flat in Liverpool after my degree finished and before the NERC funding arrived would have been almost impossible without the Rajkumari Jones Student Bursary.
The Rajkumari Jones Student Bursary has allowed me peace of mind and support that was vital to the start of this next stage in my career as a research scientist. It is this support that makes this bursary so useful to the MSci students who receive it as they prepare to start their postgraduate careers in science.

Benedict Blackledge (MSci Physical Oceanography)

The primary benefit I received by gaining this bursary was a much greater degree of financial independence, giving me more time to focus solely on a 4th year research project that really caught my interest.





Instead of concerning myself with whether a project would be manageable alongside part-time work, I could opt for one which held real academic interest for me.

As a result, I have had to the opportunity to work with, and receive valuable guidance from, an engaging group of international collaborators around the area of ocean tides and their place in the Geo-sciences. We are currently preparing to submit the work from my thesis for publication.

Additionally, by having that extra finance, I am able to travel to Uppsala, Sweden, to take part in a workshop run by the group later this month. The overall outcome of this is that I have managed to find a possible focus to pursue further within academia, hopefully through a related PhD.

There has clearly been a positive impact of the Rajkumari Jones Student Bursary on recipients. We are delighted to see that these students have put this opportunity to good use in terms of supporting their personal and professional development.

Rajkumari Jones Student Bursary Recipients for 2019 are:

Victoria Burfield (MSci Marine Biology & Oceanography)
Joanna Rogers (MSci Marine Biology & Oceanography)
Chenyi Zhang (MSci Physical Oceanography)

Many thanks for this great opportunity on behalf of the MSci students, the Programme Director (Dr Sarah Zylinski), the previous Head of School (Professor David Thomas), the School of Ocean Sciences and Bangor University.

Cai Ladd was awarded a travel grant through the Prof Wynn Humphrey Davies Fund to spend 2 weeks out in the United States.

His plan is to investigate the impact of Acute Marsh Dieback (AMD)

(AMD: a phenomenon where areas as large as 100,000 ha suffer near-total vegetation die-off linked to climate change stressors) on the delivery of various ecosystem services sustained by saltmarshes, including coastal flood protection, carbon sequestration, and water filtering. By investigating marshes that have been affected by AMD at different points in the past, Cai is hoping to determine recovery rates of ecosystem services, to help understand the long-term consequences of disturbance events for coastal communities. These funds will allow Cai to meet with potential collaborators in the U.S.A to kick-start his research idea.

Student prize for best poster award at the Western Indian Ocean Marine Science Association (WIOMSA)

Ada Barbanera, SOS undergraduate, presented a poster at the 11th WIOMSA symposium in July 2019 in Mauritius under the theme critical habitats with the title "The variation of mangrove forest invertebrate biodiversity along a gradient of degradation in East coast of Africa".

Ada presented preliminary results of her recently finished field work in Kenya after 5 months of data collection, documenting how mangroves provide habitat for marine and terrestrial organisms, including providing ecosystem services for humans. Ada said:

"Mangrove degradation and deforestation has risen by 35% in the past 20 years in Kenya due to overexploitation, coastal pollution and land conversion for coastal agriculture. While the effects of complete mangrove destruction and conversion are well studied, there is little knowledge of patterns of degradation and its consequences upon marine biodiversity. My study aimed at assessing mangrove ecosystem functioning along a forest degradation gradient by focusing on the capacity of forest to deliver habitat for biodiversity."

The student posters were daily assessed by a Scientific committee and Ada won best poster among her selected theme. Ada's travel to Mauritius was provided by the Santander University Research & Study Mobility Award.

Ada Barbanera with the WIOMSA Executive segretary Dr Julius Francis and WIOMSA Vice President and Chair of the Local Organizing Committee, Professor Ranjeet Bhagooli.

Higher Education Authority (HEA) fellowships

Congratulations to Laura Grange and to Dei Huws for being awarded their Higher Education Authority Senior Fellowships.

Also Congratulations to Line Cordes, Mattias Green, Yueng Lenn and Ian McCarthy for being awarded their Higher Education Authority Fellowships.

HEA Fellowships demonstrate a personal and institutional commitment to professionalism in learning and teaching in higher education.

EQUALITY AND DIVERSITY

MENTORING SCHEME

The SOS mentoring scheme for all staff is no up and running, coordinated by David Assinder. HR delivered a mentoring training session on the 4th of September. This scheme will link with the annual PDR.

WORKING GROUP (WG) UPDATE

The Self Assessment Team (SAT) now has several working groups: Part-time and flexible work, Representing Women in Science, Induction, Personal Development and Well-being, Staff Surveying, Forum for (new) parents and an ECO-group. You can still join any of these groups by emailing Katrien (k.v.landeghem@bangor.ac.uk).
The ECO WG wants to develop a green space at SOS: If you are keen to develop this and take ownership of sustainable plans to create a healthier and greener working environment, please email Katrien to join the Green Space group. We have invited Natalie Chivers from Treborth for advice. The ECO WG also discussed waste management and how to better communicate about the choices we make at Bangor University. SOS strives to avoid problematic plastics, but also works to comply with the Equality Act whilst considering eco-friendly measures. E.g.: plastic straws are an auxiliary aid for people with a disability and will now be made available on demand during Open Days.
The Staff surveying Group has advised Human Resources about which questions should be put to SOS staff in the next Organisational Survey early 2020.
The Induction WG will re-invigorate and harmonise the SOS Induction scheme. The WG will facilitate continuous staff support and updated information during lunch-time sessions in matters like Health and Safety, lab policies, field trip procedures etc.

POLICY OF THE MONTH

Via this Newsletter we will signpost to policies relevant to Equality and Diversity. In this edition, we focus on “dignity at work”:
General policy:
https://www.bangor.ac.uk/humanresources/policies/employment/dignity_at_work_EN.pdf
What constitutes Harassment, Bullying, Victimisation and Discrimination?:
https://www.bangor.ac.uk/humanresources/policies/employment/Dignity_Appendix1_EN.pdf
What if you feel you have been harassed, bullied, victimised or discriminated against?:
https://www.bangor.ac.uk/humanresources/policies/employment/Dignity_Appendix2_EN.pdf
Flow diagram for staff:
https://www.bangor.ac.uk/humanresources/policies/employment/Dignity_Appendix3_EN.pdf

GENDER EQUALITY SCHOLARSHIPS

The School of Ocean Sciences is hosting two out of three Gender Equality Scholarships 2019/20 awarded by the University’s Athena SWAN Task Group. These scholarships are a continuation and extension of the “Women in Science scholarships” awarded in previous years. The 2019/20 recipients joining SOS are: Claire Carrington (MSc Marine Environmental Protection) and Victoria Chinery (MSc Marine Environmental Protection). Many congratulations to both and welcome to SOS!

STAFF SUPPORT

The employee assistance programme for staff is now provided by Care First. More information can be found via
https://www.bangor.ac.uk/humanresources/eap/index.php.en

EARLY CAREER RESEARCHERS AT SOS

Who we are

The School of Ocean sciences researcher community has really come together recently to form a supportive, cohesive and inclusive Early Career Researcher (ECR) network. The group is open to anyone who self-identifies as an ECR, a term which is notoriously difficult to define. At the university level, there is a conscious effort to not have an overarching definition of what an ECR is (e.g. a certain number of years PhD), because the definition is so variable between different networks, conferences, institutions, and funding bodies.

What we're doing

The group have agreed to meet informally at Thursday lunchtimes (1-1.30 pm), in Marine Centre Wales. Some weeks this slot is used for activities such as for presentation practice prior to conference attendance, or for discussing results and figures for a manuscript in preparation. A writing group has also been initiated (called "Shut up and Write"), whereby a group of researchers shut themselves in a room together for a couple of hours, having timed bursts of writing (away from the distractions of their desks), interjected with short periods of chatting and reflection on how their writing is going. There is an appetite amongst the ECRs for running short sessions on topics such as: good publication practice; how to embark on grant writing; as well as for a presentation skills workshop. For these sessions, more senior academic staff members have offered (or will hopefully offer!) to contribute their time and expertise.

Lunchtime Mindfulness sessions

The group have also restarted lunchtime Mindfulness sessions in the School of Ocean Sciences (Wednesdays, 1.30-2pm), which are informally led, using online resources from Bangor University's Centre for Mindfulness Research and Practice.

How we communicate – get in touch

The group communicate through Yammer, which is an Enterprise Social Network. What this means is that page is open and inclusive, since it is visible to anyone within the Bangor University network who wishes to engage with it.
The Yammer page, called "Early Career Researchers (ECR) - SOS", allows members to post ideas, links to resources, to ask questions and to initiate discussions. For more information, please feel free to have a look at our Yammer page, or if you would like to offer your expertise during a lunchtime session (or at any time!), please contact Sophie Ward (sophie.ward@bangor.ac.uk).

RESEARCH

Eco-village approach to enhance socio-ecological resilience in Cabo Verde – by Ronan Roche

In September of 2019 I travelled to Cabo Verde (an archipelagic nation off the west coast of Africa approximately 660 miles into the Atlantic, from the coastlines of Senegal, The Gambia and Mauritania) as part of a Darwin Initiative funded project in which the School of Ocean Sciences have partnered with the University of Cabo Verde, and a local NGO called ECO-CV.

The project aims to work with several communities in which 80–90% of households are highly dependent on income from fishing, generally with men fishing and women selling fish, but with many households existing on less than 1 GBP/pp/day. Over the next three years the project will engage communities in monitoring local marine ecosystems, establishing recycling facilities and trialing local eco-tourism ventures. The project also aims to facilitate establishment of the first marine protected area on the island of Santiago, in an area called Baía do Inferno (Hell's Bay).

My role in the project is the development of practical indicators that give insight into the current status of the artisanal fishery and aspects of the social resilience of the focal communities. The goal of this field trip was to test a series of indicators on which data could be collected prior to implementation of the project activities, and prior to the potential establishment of the MPA within Baía do Inferno.

The willingness to participate amongst local fishers within the communities visited was high. Fishers appeared comfortable in providing answers to the questions and were keen to share information on their fishing practices and their opinions on the status of the fishery. Following a workshop on the 24th of September at the University of Cabo Verde, a questionnaire aimed at women who sell fish (Peixeira) was also developed. This was tested in the communities of Rincão and Porto Mosquito over the following days.

This project will continue over the next two and a half years, and much of the on-going indicator collection work will be carried out by colleagues at the University of Cabo Verde. Both the University and the NGO are keen to explore additional collaborations with the School of Ocean Sciences, and would be happy to host masters or PhD students if appropriate. I encourage anyone who is interested in collaboration or who has specific research ideas to get in touch with me to discuss them.

Gaining Undergraduate Research Experience – by Thea Moule (2nd year Marine Biology student)

During your undergraduate degree it is important to gain experience outside your formal course as the marine industry is becoming an ever-increasingly competitive field.

Not only does experience provide you with hands on practical skills and develops on already gained knowledge, it also enhances your employability. This summer, Holly and myself were both fortunate enough to be provided the opportunity to work as research assistants at SOS.
Holly graduated this summer in BSc Marine Biology while I have just completed my first year in BSc Marine Biology. We were employed for 4 and 2 months respectively on the Ecostructure project. This project aims to raise awareness of the 'challenge of coastal adaptation to climate change' and we were involved in the ecology section exploring the environmental tolerance of the invasive species, *Didemnum vexillium*.

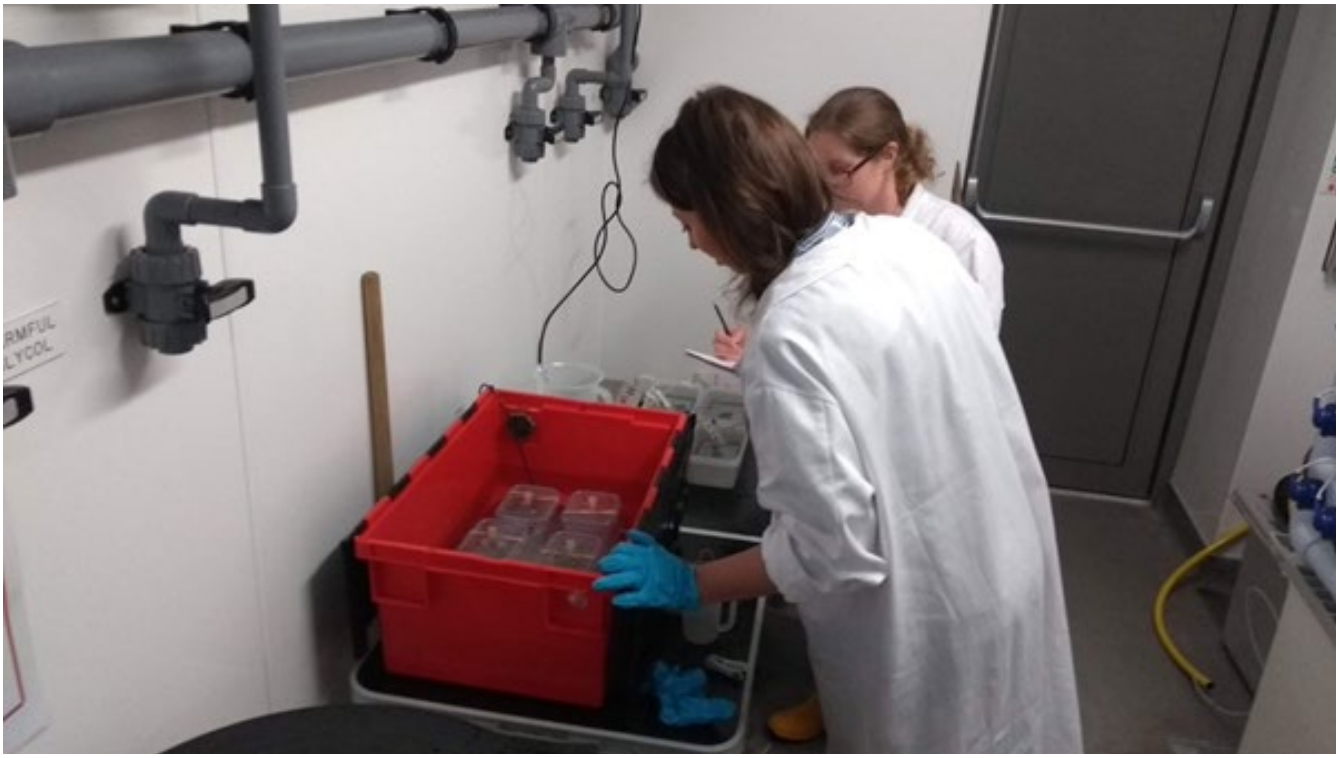
We assisted on field trips to Kent, Holyhead and Malahide gaining experience in invasive species ID, and RNA and DNA sampling. To me the best part of marine biology is being immersed in the field and on this project, we went out snorkelling to collect the samples – it was great fun! Upon the collection of the samples we became accustomed to working in a biosecurity environment. Here we assisted in gathering physiological data and conducted respiratory experiments collecting data on respiration, temperature and salinity. This provided us with the opportunity to use a variety of scientific equipment. Throughout the whole experience we gained skills in animal husbandry, calculated plankton densities for feed, and gained a better understanding of experimental design. Towards the end of the experimental period Holly took sole responsibility for running the experiments and started analysing the data, including processing images of the *D.vexillium* through image-J to record their growth.

I then had the opportunity to help with the ALICE project – investigating the impacts of light pollution on the marine environment. At the start I collated relevant research papers which meant I researched and read lots of papers regarding LEDs and light pollution which I found fascinating! Before the experiment began, I assisted with the collection of the common shore crab (*Carcinus maenas*), gaining experience in animal handling skills. The daily observation of the crab larvae meant I was able to physically observe the changes of the larvae from zoea to megalopa whilst implementing animal husbandry skills in artemia culturing, water changes and artemia counts for the crab larvae feed. It was extremely

interesting, and the knowledge gained in crab development shall come in handy for my second year. Furthermore, I also assisted with experimental preparation in the construction of the treatment boxes. This meant learning new skills using a variety of equipment and painting, which is always great fun!

I also helped on a PhD project exploring the 'bouncing boulder' theories to 'calculate the effects of drag and buoyancy of algae on intertidal boulders'. This involved undertaking experimental work both in the field and the hydroflume tank. Before experimentation could begin, I was back out in the field collecting boulders with either *Ascophyllum nodosum* or *Fucus serratus* using skills gained from the current academic year. Then for each sample I recorded numerical data on weight, circumference, number of frond/bladders, and length of seaweed. The experiment enabled me to gain experience in running a hydroflume tank, opportunity to write a risk assessment and develop on observational techniques whilst observing the boulders movement. Whilst out in the field we were extremely lucky to have been able to observe bottled nosed dolphins in the Menai Strait – it's not every day you are able to witness this!

Last but not least, the final project I helped out on this summer was exploring the impacts of heatwaves on rocky shore organisms. Once again, I ventured to the shore to put my ID skills into practice to collect *Nucella lapillus, Littorina littorea*, *Ascophyllum nodossum* and *Fucus vesiculosus*. This provided me with opportunity to run timed experiments, the further use of scientific equipment to record respiration rates and observing the health of each species after undergoing the treatments. Overall, we both found the research assistant experience invaluable as we gained a huge variety of skills to put us in good stead for future careers.



Monitoring the coral reefs of the remote Indian Ocean – by John Turner

The Bertarelli Programme in Marine Science Coral Reef Expedition to the British Indian Ocean Territory on Coral Reef Condition took place in April 2019, and involved Bangor University, Oxford University, University College of London, and Woods Hole Oceanographic Institution, USA.

The team joined the British Patrol Vessel Grampian Frontier in Male, Maldives on 6th April and travelled south, arriving Diego Garcia on 27th April 2019. Exceptionally calm seas were experienced until 17th April, and then rough conditions which progressively worsened until 27th April. Thirteen experienced scientific divers including a Medical Officer conducted a total of 113 dives, equating to 301 person dives and 318 hours underwater over the period.

The coral reefs of the Archipelago are still in an erosional state with very low coral cover 3 years after the back to back bleaching events of 2015/2016. Little improvement can be expected until dead material is either washed off the reef or consolidates into a substrate suitable for longer term recolonization. Surviving corals are recovering, and coral larvae have settled though in lower numbers than previously. Recruits that survived the warming events do appear to have grown into small colonies in shallow waters on some reef rims. Structural loss is apparent, and this will be affecting both available habitat and food resources for reef fish and other organisms. There seems little, additional, local management action that can improve the reefs at this time; they need time to recover without any further warming events, as was observed after the 1997/98 event. However, the severity of impact of recent back-to-back warming events on BIOT reefs and modest signs of recovery in the absence of synergistic and cumulative impacts from local anthropogenic activity convey an important message - to strengthen the global response to climate change by reaching and sustaining net zero global CO2 emissions. Coral reefs are projected to decline by a further 70–90% at 1.5°C with even greater losses (>99%) at 2°C, and therefore current global policies are unlikely to be sufficient to protect coral reefs from climate change.

Science boats deploy from the BPV Grampian Frontier

New investigations by our team have focussed on whether internal waves can provide cooling on some seaward reefs and whether nutrients are being delivered to these areas, conferring resilience on some corals and reef communities. Current and future genetic studies are also attempting to reveal whether some corals and their algal symbionts are more resistant to warming, bleaching and disease. There may be limited direct management action, but a greater understanding of the connectivity and resilience of reef systems should become apparent. We will return to the Archipelago to continue the work in April 2020.

Reef 2 Team 2019: Back row –L-R: Dr Michael Fox, Dr Andy Mogg, Dr Gareth Williams, Prof John Turner, Anne Sheppard, Dr Dan Bayley, Jyodee Sannassy Pilly, Dr Bry Wilson, Prof Charles Sheppard, Dr Adel Heenan. Front-row L-R: Dr Katie Sellens, Amelia Rose, Dr Ronan Roche

Gareth Williams, School of Ocean Sciences, swimming a plankton net at 25 m depth on Peros Banhos Atoll during an exploratory dive to collect a sample of the deep reef plankton communities. (M.Fox)

Dr Giulia Cambiè worked for Bangor University for 3 years, before moving to CEFAS in 2016.

Giulia had been working on a manuscript about her sea turtle research in Calabria when she fell ill. She continued working on it steadily during her illness because she felt it was in important piece of work, but she hadn't managed to complete it when she died in January 2018. Because Giulia was a very organised person, it was possible for her long-term collaborator Dr Paolo Casale from Pisa University to pick up and finish the manuscript, and 1.5 years later the paper has been published. Giulia would have been proud and very pleased.

Cambiè, G., Jribi, I., Cambera, I., Vagnoli, G., Freggi, D. & Casale, P. (2020) Intra-gear variation in sea turtle bycatch: Implications for fisheries management. Fisheries Research, 221, 105405.

A loggerhead turtle that has been caught on a long-line in Calabria (photo Giulia Cambiè)

Giulia recording a nesting trail of a logger head turtle in Calabria

NEW PROJECTS LAUNCHED

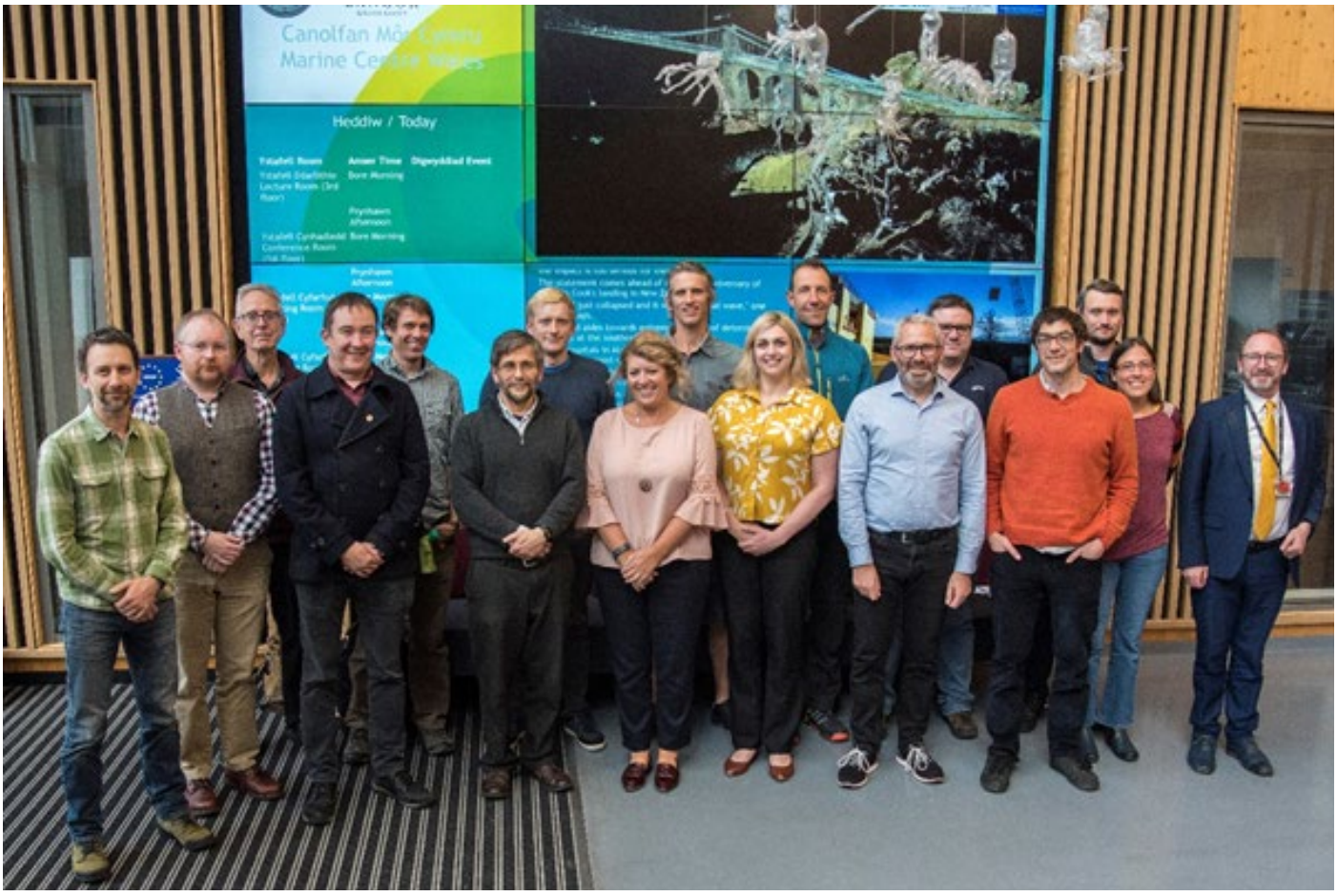
SEEC – Smart Efficient Energy Centre – By Simon Neil

Staff across the College of Environmental Sciences and Engineering have secured funding for a £7M research centre working across three low carbon energy sectors: ocean energy, nuclear energy, and energy efficient structures. These three low carbon energy themes are interconnected by a common cyberinfrastructure hub. SEEC has received £4.6M in funding support from the Welsh European Funding Office (WEFO).

Within the School of Ocean Sciences, SEEC will work on research that will help reduce the costs of ocean renewable energy. Through a combined modelling and observational approach, and building on the success of the NRN-LCEE Quotient cluster, the ocean energy theme of SEEC has specific objectives of:

1. Improved resource characterization.
2. Improved understanding of multiple resource interactions.
3. Exploring future grid integration of marine renewable energy.
4. Improved methods of quantifying environmental impacts.

With a target of £9M of additional grant capture over the four years of SEEC, researchers in SOS will be collaborating with the US Department of Energy, SIMEC Atlantis, the AUSTEn project (Australia), Fundy Ocean Research Center for Energy (FORCE) in Canada, and other organizations across a range of projects. The project also has sustainability goals such as female participation in STEM, and activities supporting speakers of the Welsh language. Simon Neill (SOS) is the PI of SEEC and leads the ocean renewable energy workpackage. Dave Mills (SOS) leads the cyberinfrastructure workpackage. For further information, see the project website: www.seec.bangor.ac.uk



Members of the SEEC project at the kickoff meeting in Marine Centre Wales

WORKSHOPS AND CONFERENCES

Horizons in STEM higher education conference by Laura Grange

Laura Grange and Jenny Shepperson attended the fourth Horizons in STEM Higher Education Conference at Kingston University, Kingston upon Thames on 3-4 July.

Delegates from a wide spectrum of STEM discipline areas gathered to discuss pedagogic themes and subject-specific innovations, with the aim of "Making Connections, Innovating and Sharing Pedagogy". The conference was opened and chaired by Dr Neil Williams, Director of Undergraduate Studies at Kingston University. This introduction was followed by the conference plenary from the Director of Student Achievement at Kingston University, Nona McDuff. Nona discussed the challenges faced by BME students and the initiatives she has led to address the attainment gap in student outcomes. She explained the approach adopted at Kingston University to address this issue and described interim measures of success, which have included institutional changes to policy and procedure, staff engagement in relevant training and investment in initiatives that that have had high impact on student success. After this presentation 98 delegates attended talks scheduled in four breakout sessions, where the key themes discussed included assessment feedback, technology enhanced learning, employability skills, active learning and innovations around equality, diversity and inclusion. Laura Grange presented on two HEFCE-funded teaching innovations she has recently led in themed sessions on assessment and feedback. The conference concluded after a second day of talks and was brought to a close by National Teaching Fellow and Associate Professor in STEM Education, Samantha Pugh. Samantha talked to understanding educators' experience of assessment and how we might establish the scope for change with respect to programme design and assessment practices. She advocated a programme level approach and the use of formative assessment for learning. The conference certainly delivered in making connections, innovating and sharing pedagogy, and it was inspiring to meet so many dedicated educators from the STEM community.

ICES Annual Science Conference, 9-12th September 2019, Gothenburg, Sweden – by Claire Szostek

Myself and three colleagues from SOS arrived in the City of Gothenburg, Sweden, on a quiet Sunday afternoon. You quickly realise that Gothenburg has a laid back vibe – the city has attractive buildings, spacious roads, green spaces and café culture in abundance. We should have completed a risk assessment prior to arriving though; remember to look the other way when crossing the road and regularly check through 360° whilst walking around town to avoid the cars, buses, trams and multiple cyclists who appear from all directions without warning!

ICES, or the International Council for the Exploration of the Seas, is an inter-governmental organisation that links marine science and scientists from around the world to provide impartial evidence on the state and sustainable use of our oceans.

Hence, the annual science conference covered a broad range of research topics from many geographic locations over the four days. The four parallel sessions meant some difficult choices about which talks to attend, with themes such as machine learning in marine science, considerations for aquaculture and fish adaptations in the face of global climate change, and indicators and reference points for assessing ecosystem vulnerability and fishing impacts, amongst numerous others.
There was a notable contribution from SOS. Lowri Evans presented her web-based app (using R shiny) that quantifies the 'Relative Benthic Status' (RBS) of habitats exposed to fishing impacts, for use in sustainability assessments (project funded by the Marine Stewardship Council, MSC) and Jan Hiddink described how he determined that change in benthic community biomass is a strong indicator for the impacts of bottom-trawling (BENTHIS Project, www.benthis.eu). Marija Sciberras (now of IMEDEA, Spain) presented a meta-analytical assessment of the effects of bottom fishing based on species biological traits, that she completed while at SOS. One of our recent MSc students, Goncalo Jorge Lourenco, who has completed his thesis with Lowri this summer, was also able to attend the conference, funded by the MSC. A conference provides opportunities for everyone, from students and early career scientists to senior scientists and leaders of research institutes, to engage with fellow researchers and discuss cutting edge science in a relaxed, yet creative environment. I would encourage students to attend conferences whenever the opportunity arises.

There were plenty of opportunities to network with the 600+ other delegates from all corners of the globe, including representatives from many UK universities and organisations such as Defra, Cefas and Natural England. A chance to engage in in-depth discussions came at the poster and drinks reception on the second evening. My favourite (most attention-grabbing) poster title was 'My supervisor says that no-one cares about zooplankton...here's why you should". Needless to say, it caught the eye of everyone that walked past.

Inspiring keynote talks were scheduled to get our brains fired up at the start of each day. Manuel Barange (Director FAO Fisheries and Aquaculture) and Prof. Greta Pecl (pronounced 'Petzl' – don't get it wrong!) of the University of Tasmania did not disappoint. Barange provided much food for thought, focussing on the future of seafood in food security for an ever-increasing global population. While global population growth has been around 1.5% over the last 50 years, the increase in fish consumption is double that, at 3%. With many capture fisheries at or near capacity, future growth in seafood production will need to come from aquaculture. India and Indonesia are currently the World's largest producers of aquaculture products, but there is plenty of scope for development closer to home. Increasing aquaculture production in Wales is the focus of a new EU funded project at Bangor University – The Shellfish Centre (www.shellfish.wales).

Pecl focussed on another 'hot' topic – the adaptation and range-shifts of ocean life to climate change, which she referred to as 'species on the move' or 'Redistribution Ecology', and how research needs to transition from producing explanatory ecology to predictive ecology, to aid in future management of our marine resources. One of our current research projects at SOS – BLUEFISH (www.bluefish.com) is tackling climate change impacts on commercially important species across the Irish and Celtic Seas (funded by the EU Ireland-Wales 2014-2020 Programme) in collaboration with five other Welsh and Irish research institutions.
I learnt many things during the conference, so will highlight just a few. Machine learning for image analysis is a rapidly developing field and will be essential in the future to increase the speed, and decrease the cost, of underwater video survey and monitoring data. In future marine planning, there are many data gaps and considerations fisheries managers need to account for due to rises in global sea temperature and the resulting adaptations, alterations of life-history or range shifts of marine species. Finally, I learnt that the 'Pikachu' nudibranch exists (for the non-biologists a nudibranch is a sea slug, and the Pikachu reference may only make sense to 90's teenagers) and it is now on my scuba-diving bucket list.

My trip to the ICES Annual Science Conference 2019 was funded by The Shellfish Centre.

OTHER NEWS

3d Mapping Of The RV Prince Madog In Dry Dock – by Tim D'Urban Jackson

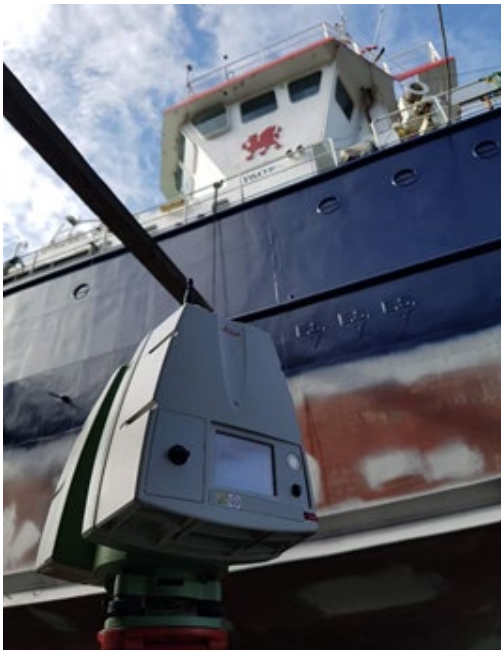
In September 2019 the RV Prince Madog went in to dry dock in Milford Haven for repainting and maintenance.

The vessel works hard for many multidisciplinary marine science research activities at Bangor University, teaching School of Ocean Sciences students and commercial charters, so regular maintenance is essential.

Among other parts of the ship undergoing maintenance, some of the sensors mounted on the underside of the hull were serviced including the acoustic doppler current profiler (ADCP) used to measure current speed and direction, and the multibeam echo sounder used to map the sea bed.

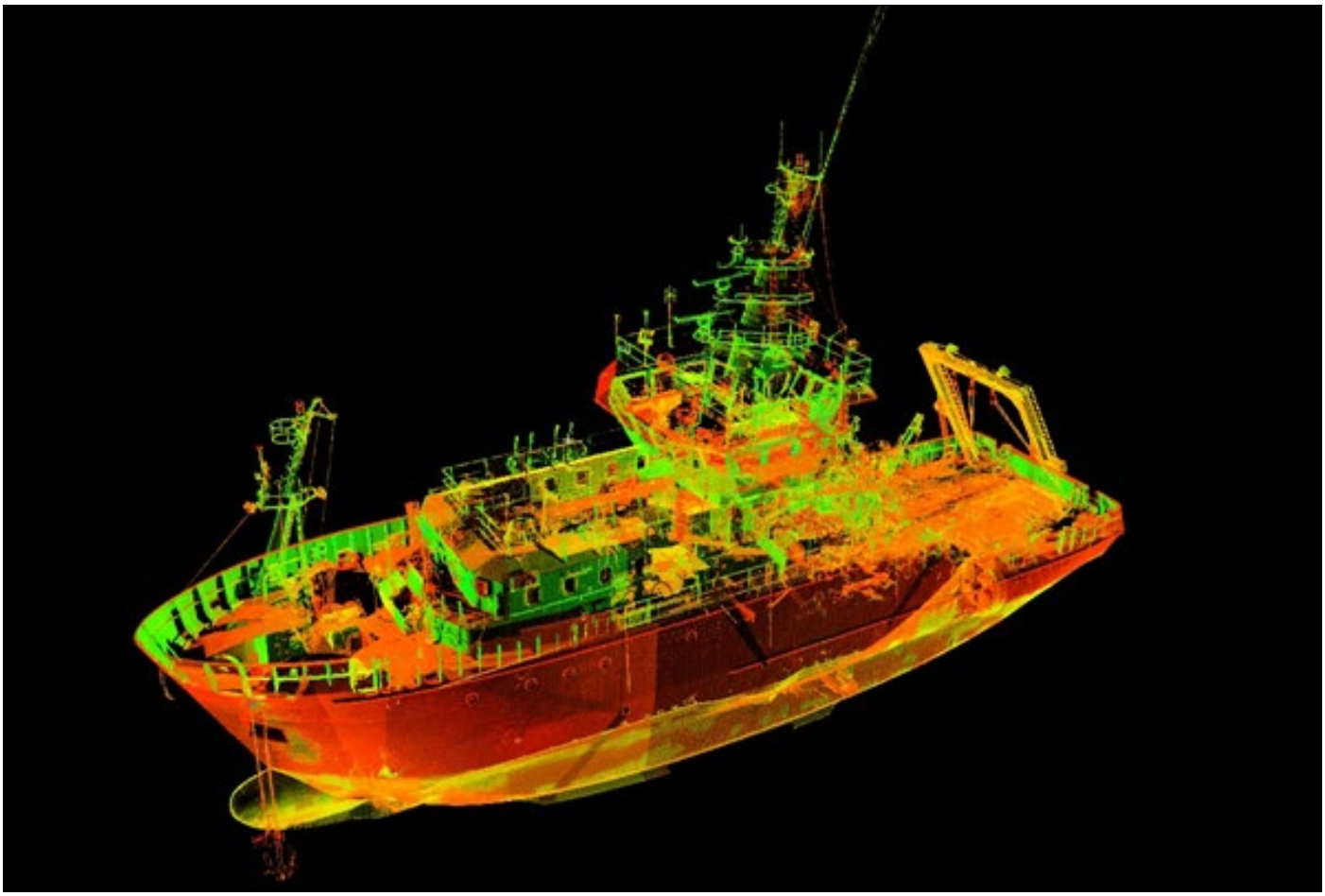
For the sensors on the ship to produce accurate data, their positions, or "offsets", relative to the ship's positioning and motion sensing systems need to be measured precisely.

To check these measurements, SEACAMS2 took the opportunity while the vessel was in dry dock to conduct a 3D survey using a terrestrial laser scanner, normally used by researchers in the department to map and monitor topographic changes in intertidal habitats and geomorphology.



The laser scanner generates a 3D model of the surroundings by emitting millions of laser pulses and calculating the points at which they are reflected by surfaces.

By combining scans from multiple positions, a comprehensive high-resolution 3D model of a scene can be produced, with millimetre accuracy. The 3D model of the ship will be used to measure offsets for sensors and equipment already installed and will be valuable for installing new instruments in the future.



New School of Ocean Sciences Undergraduate Hang-Out Space Created

The old electronics workshop in Craig Mair has received a make-over so that undergraduates now have a place to call their own during their visits to the School of Ocean Sciences.

David Thomas, Head of School, said:

"The old electronics workshop in Craig Mair has been transformed to create this space. Much credit has to go to Ian Pritchard for managing the project."

The MSc space has also been improved. This has always been a room with a view but now has comfort to match.

New Two-Year Contract for the Prince Madog

The First Minister and the Minister for Environment, Energy & Rural Affairs visited the Prince Madog on August 14th 2019 and subsequently announced a new two-year contract between SOS and Welsh Government.

The latter have committed to 100 days ship time over the next couple of years, as well as a new fixed-term post in SOS to act as liaison between SOS Fisheries work and the Welsh Government Fisheries team.

David Thomas, Head of School, said:

"This is a massive development for the School & our partners in P&O Maritime, not just in terms of the ship revenue, but even more for the opportunities that this new relationship opens up. It is also strategically important in the discussions about the future role of the Prince Madog for a sustainable marine research in Wales. To come to this stage has involved considerable work by many in Welsh Government, P&O Maritime and SOS. I am so pleased that this effort has been rewarded in such a positive way."

First Bangor Physics graduates in over 30 years

Bangor University graduated its first undergraduate physics students in over 30 years this summer. These students had completed the BSc Ocean and Geophysics degree, which combined long established expertise SOS in Physical Oceanography and Marine Geophysics. Of the 7 students graduating 4 have moved onto to study MScs whilst the others have all secured jobs.

Life on an ancient Venus?

Whilst today our neighbour Venus is a very inhospitable place, with surface temperatures hot enough to melt lead, geological evidence, supported by computer model simulations, indicate it may have been much cooler billions of years ago and had an ocean, and so have been very similar to Earth. It is not only the temperature and highly corrosive atmosphere of the present day Venus that makes it different from the Earth. Venus also rotates very slowly, taking 243 Earth days to complete a Venusian day. However, billions of years in the past it may have spun faster, which would have helped make the planet more habitable.Tides in Venus' ancient ocean would act as a brake on the planets rotation rate, due to friction between the tidal currents and the sea floor. On Earth today, this braking changes the length of a day by about 20 seconds per million years.

A new study by SOS's Mattias Green and colleagues at NASA and University of Washington have quantified this braking effect on ancient Venus for the first time. They show that the tides in a Venusian ocean would have been large enough to slow the rotation rate of Venus by tens of Earth days per million years if Venus was spinning more like the Earth does today. This suggests that the tidal brake could have slowed down Venus to its current rotation state in 10-50 million years. Mattias said:

"This work shows how important tides can be to remodel the rotation of a planet, even if that ocean only exists for a few 100 million years, and how key the tides are for making a planet habitable."

Reference: Green JAM, Way MJ, Barnes R (2019) Consequences of tidal dissipation in a putative Venusian Ocean. The Astrophysical Journal Letters 876: L22.

MSci student publishes thesis work

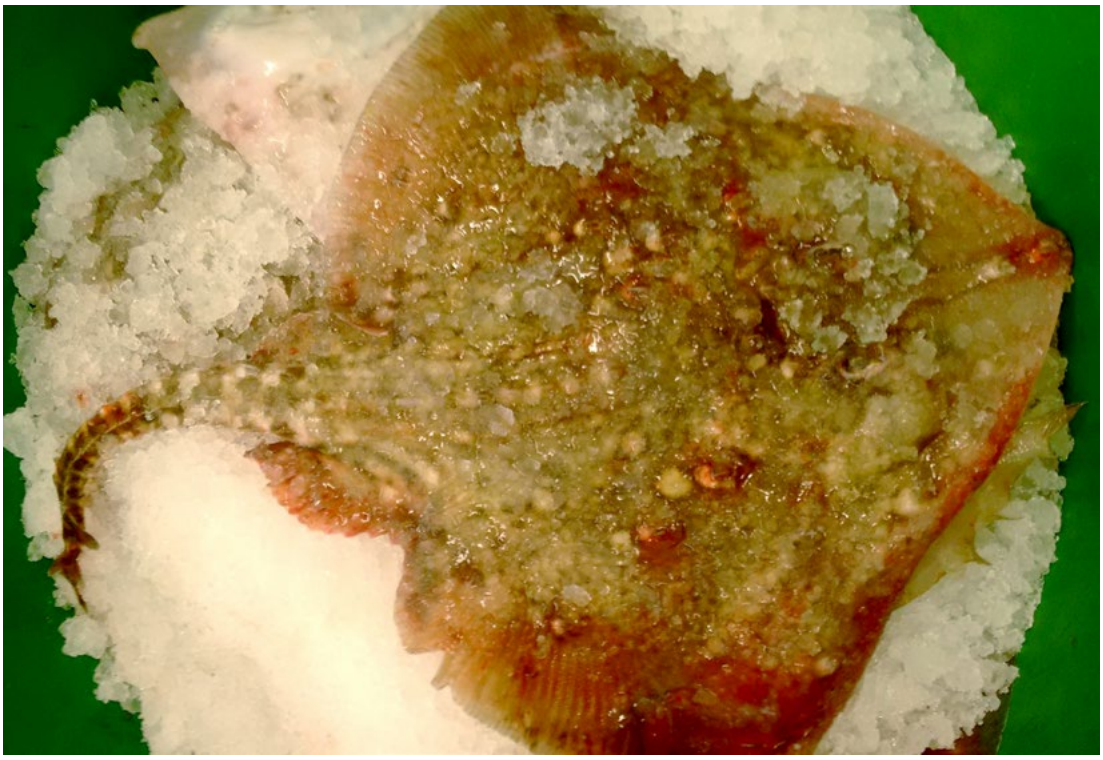
SOS MSci student Eoghan Aston published his thesis work in the journal Ecography. Eoghan's research asked whether there are predictable scaling patterns in benthic communities around tropical coral reef islands. By applying theory from terrestrial landscape ecology and using a remote uninhabited island in the central Pacific as a case study system, he showed for the first time that different benthic groups have contrasting and predictable spatial scaling properties across the seascape. His supervisor Gareth Williams commented:

"Eoghan's mature approach to his research has paid off and I am delighted to see the work published. As a result of this achievement, Eoghan has successfully enrolled as a PhD student at James Cook University in Australia, one of the top marine science schools in the world."

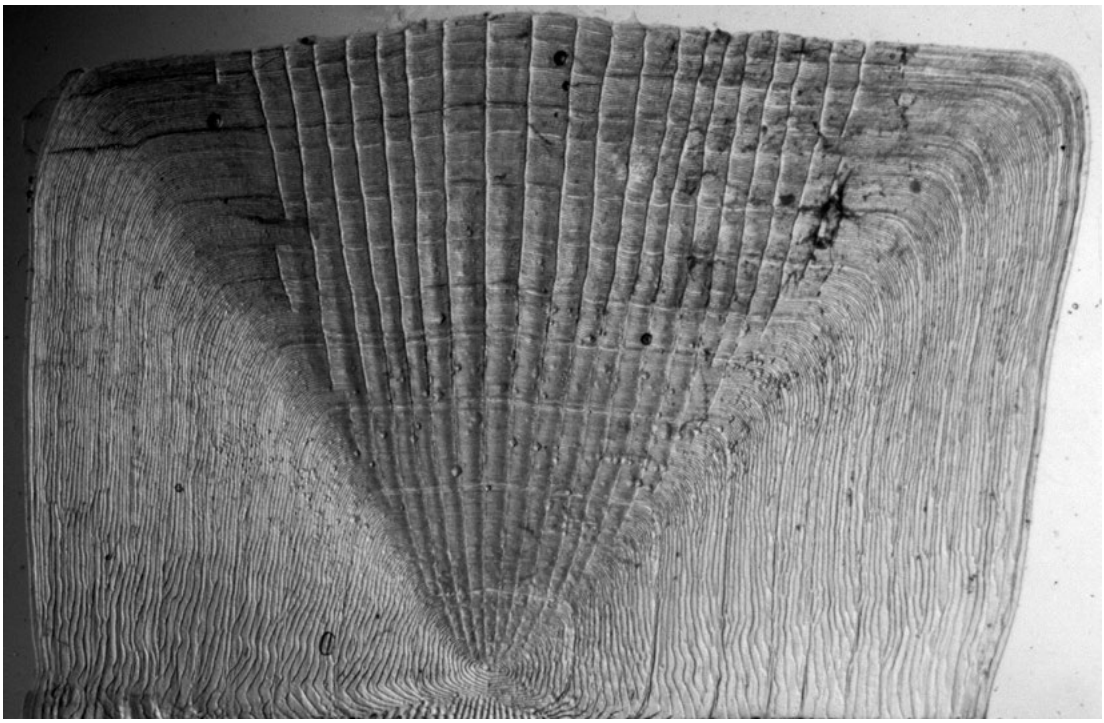
Reference: Aston EA, Williams GJ, Green JAM, Davies AJ, Wedding LM, Gove JM, Jouffray J-B, Jones TT, Clark J (2019) Scale-dependent spatial patterns in benthic communities around a tropical island seascape. Ecography 42:578-590

New Grant to Look at Bass and Ray Ecology in Liverpool Bay

Congratulations to Natalie Hold on winning £83K from EMFF England to run the project "Bass and Ray Ecology in Liverpool Bay". The project (including Alec Moore & Robin Bater) will extend the bass and ray population biology and stable isotope ecology work being carried out in Welsh waters across the border into English waters. They will be estimating population parameters such as size at maturity and looking at stock mixing and movement.



Thornback Ray



Bass scale

SCIENCE OUTREACH

Carbon Quest – by Cai Ladd

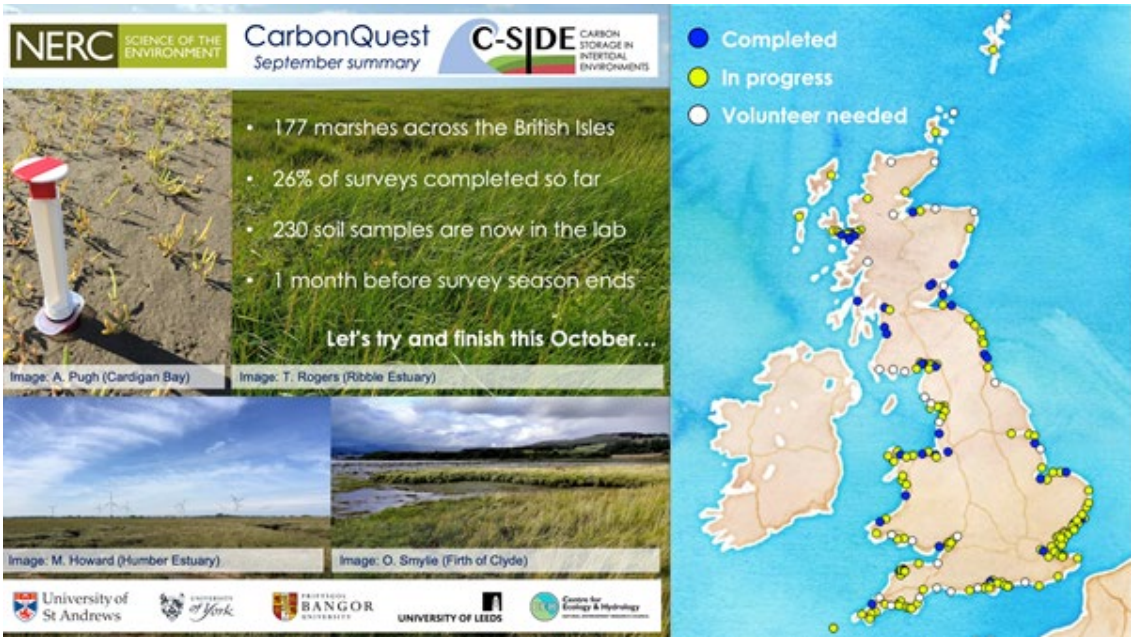
Cai Ladd is a coastal scientist at Bangor University in North Wales, and is currently working with a team of researchers looking into the importance of salt marshes in absorbing CO2 to combat climate change.

Their research project is called 'Carbon Storage in Intertidal Environments' (C-SIDE).

C-SIDE is collecting soil cores from thirteen salt marshes across England, Scotland and Wales. In the lab, they are measuring how much of this soil is organic carbon (made up of things like roots and dead leaves) and are then using the samples to go back in time - 12,000 years in fact - to see how carbon storage has changed since the Last Ice Age. You can find out more about the C-SIDE project at https://www.c-side.org.

In addition to the detailed work being carried out by the C-SIDE team, Cai has also led a national citizen science campaign called CarbonQuest, which asks volunteers to visit their local salt marsh to gather soil samples and take photographs of the surrounding vegetation. The data will be used to identify carbon hotspots and understand why some marshes store more carbon than others. It is also hoped that, by covering as many marshes around the UK as possible, C-SIDE will build the biggest inventory on organic carbon trapped in salt marsh soils in the world.

The project has been a big success – there are currently 177 marshes in the survey covering the length and breadth of the British Isles. 26% of the marshes have already been sampled, and the C-SIDE lab is filling up with soil – since each volunteer is asked to collect 5 samples, there should be nearly 900 measures of soil and plant properties by the end of the project! You can find out more about CarbonQuest at https://www.c-side.org/citzen-science-1.



The Festival of Discovery at Mona Show Ground

A team from the School of Ocean Sciences spent three days at the inaugural Festival of Discovery - the first of an annual event that's likely to grow and grow.

The Hidden world of Science with Bangor University offered hands-on activities and demonstrations in the Science pavilion.

There was "science for all and something for everyone during the three day festival, where families learnt more about the world around them, and how Science is involved in every aspect of life."

A diverse set of STEM displays and the numbers of visitors (~4500) were IMPRESSIVE by any standard. This was a big undertaking for The School of Ocean Sciences and Bangor University and only possible because of the dedication and hard work of a team of enthusiasts, most of whom took time out from their normal activities/projects to engage with the activity. SEACAMS2, Ecostructure, Bluefish, The Shellfish Centre projects all deserve special mention, and Karen Tuson expended a noteworthy amount of energy and creativity to make this happen.

MEDIA COVERAGE

Ocean Tides May Have Made Venus Inhabitable, Study Suggests TechnoBleak 10/9/19

A recent study conducted by scientists from Bangor University and the University of Washington, ocean tides on Venus may have caused the planet's rotation to slow down, and ultimately rendered it inhabitable.
https://technobleak.com/ocean-tides-may-have-made-venus-inhabitable-study-suggests/

Back-to-back heatwaves kill more than two-thirds of coral PhysOrg 15/7/19

By comparing reefs before and after two extreme heatwaves only 12 months apart, a collaborative team of researchers including scientists from Bangor's School of Ocean Sciences found that living hard corals in the central Indian Ocean reduced by 70 percent.
https://phys.org/news/2019-07-back-to-back-heatwaves-two-thirds-coral.html

First textbook in marine renewable energy explores harnessing ocean power
Phys Org 22/3/19

"Fundamentals of Ocean Renewable Energy: Generating Electricity from the Sea," written by M. Reza Hashemi, (University of Rhode Island), in collaboration with Simon Neill, a reader in physical oceanography in the School of Ocean Sciences at Bangor University in Wales, U.K., is the first textbook of its kind on ocean energy
https://phys.org/news/2019-03-textbook-marine-renewable-energy-explores.html

NASA Says 2019 Arctic Sea Ice Minimum Ties for Second Lowest on Record: 'There Is No Sign That the Sea Ice Cover Is Rebounding'

Prof Tom Rippeth: "The decline in summer sea ice extent is something we have been observing for well over a decade,"
https://www.newsweek.com/arctic-sea-ice-second-lowest-record-1460940

Russia Discovers Five New Islands After Arctic Glacier Melts Away

Prof Tom Rippeth: "This is yet another symptom of the enhanced warming being experienced in the Arctic—in this region the average temperature is some 5 to 6 C warmer in response to climate change."
https://www.newsweek.com/russia-finds-five-islands-arctic-glacier-1456749

Sperm whale washes up on Hell's Mouth beach, Gwynedd

SOS scientists from the EMFF fisheries group (Charlie Heney and Alec Moore) were the first people to find & identify the sperm whale stranded on a Welsh beach.
https://www.bbc.co.uk/news/uk-wales-50241611

A Chance to Save the 'Rhinos of the Sea'

Alec Moore, a conservation biologist at Bangor University, participated in a symposium focusing on sawfishes, which were then considered the most endangered marine fish in the world. His talk, however, focused on emerging threats to a similar group of fishes called guitarfishes, a type of ray related to sharks.
https://therevelator.org/rhino-rays-cites/

A MESSAGE FROM THE CHAIR

I quoted in a previous Chairman's letter that "time and tide waiteth for no-one." And while it seems it was only yesterday that I was penning my last note to you, a lot has happened since then, particularly on the world stage.

"In March, alumni contributed towards a successful SOS careers' day and we're all looking forward to the Dennis Crisp Memorial Lecture on 15th November."

The world, well some of it, seems to have woken up to climate change and its potentially devastating impacts on our planet and its flora and fauna. We in marine science have known this for some time. Indeed, I can recall courses on climate change as an undergraduate at London University over 40 years ago. We were taught then that climate change had occurred throughout the earth's history, but only touched on the impact of increasing CO2, amongst other things. Little did I know how important the concept would become.

Interestingly, a major part of the problem has been the increasing consumption of fossil fuels since the Industrial Revolution. You may recall me pontificating on the price of oil and its impact on jobs in the offshore sector of industry. But the price of oil, remarkably steady at around US$ 50-60 over the past few years, has led to increased development in the renewable energy sector. Offshore wind has developed to such an extent in the UK that it has rapidly become competitive with electricity generation from more traditional and polluting sources. This is great news for our efforts to arrest climate change and is, and will continue to be, a source of employment for those with a marine science background.

At the School of Ocean Sciences Alumni Association (SOSA), things are ticking over. In March, alumni contributed towards a successful SOS careers' day and we're all looking forward to the Dennis Crisp Memorial Lecture on 15th November. (You should have already received your invitation to attend.) Professor Sandra (Sandy) Shumway (Marine Biology PhD, 1977), Research Professor at the University of Connecticut, and one of the world's leading authorities on shellfish biology, will share her memories of Prof. Crisp and the academic journey she's taken through his influence, followed by a presentation of some of her current work. All alumni are invited to attend both the lecture and drinks and canapes afterwards. Regrettably, the lecture is scheduled on my 65th birthday and I have family events elsewhere to attend and will miss this important occasion.

Please let me close by encouraging you to watch this inspiring SOS video https://www.youtube.com/watch?v=GMm4pf690PU and by thanking all of the alumni contributors to this issue of The Bridge."

Mick Cook

Chairman School of Ocean Sciences Alumni Association (SOSA)

NEWS FROM OUR ALUMNI AROUND THE WORLD

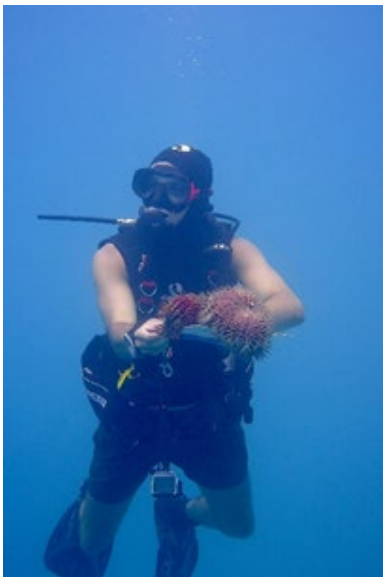
"I was very lucky, getting what most people would call a dream job, even before graduating."

Nico Fassbender
(Marine Biology / Zoology MSci, 2018)

The last year and a bit since graduating from Bangor has been a mix of big experiences and even bigger fish!

I have to say I was very lucky, getting what most people would call a dream job, even before graduating. After sending out applications all around the world from January onwards, I got accepted as Science Officer for GVI Seychelles; a volunteer organisation monitoring coral reefs all around Mahé's North-western coast.

In the 16 months since then, I have managed to log another 350 dives, seen almost everything the Indian Ocean has to offer underwater, have given an interview on Seychelles TV and Radio, named a Manta Ray and met the president. But the best thing was diving in a submersible off the coast of an uninhabited island – something I will never forget!



Whilst being here at GVI, we have conducted an incredible amount of surveys with the help of our volunteers, but we also see daily how much the reefs are suffering from coral bleaching especially from the 2016 event. I volunteered in the Seychelles back in 2013 and dived amongst the most healthy and diverse reefs I have ever seen. When I returned last year, almost 80% of the coral cover was gone and the reefs looked more like a graveyard than the once healthy coral reef system. Fish species showed little to no change, but it is still hard to see and to understand how something can change that much in so little time.

In April this year (with a lot of luck and random coincidences!), I found myself aboard the Nekton Mission's Ocean Zephyr, a research vessel exploring the deep ocean surrounding the Seychelles Outer Islands. Before I knew it, I was sitting on-board a 2-person submersible headed for the ocean floor with manta rays and schools of sailfish swimming overhead. We did multiple video transects at around 60m depth, just on the very bottom edge of the reef. Nekton's aim is to assist countries that want to put MPA's in place with deep ocean research, something that has never been done in the Indian Ocean. We mapped and researched the seafloor surrounding those islands all the way down to 500m depth from the surface, conducting video transects, photogrammetry quadrats, multibeam mapping and specimen collection.

The things I saw and learnt aboard the vessel were incredible and led me to apply for a job at Nekton, where I will now start my new role as Scientific Assistant in October. Whilst being extremely anxious of what it will be like to go from a field job back to a desk job, I'm excited about the impact our data collections and reports will have to give more countries advice on how to effectively protect their oceans and preserve them for the next generation.

Stephen Kavanagh
(Marine Biology, 1992)

"My experience at Bangor made some of my fondest memories. What a place to study!"

I graduated in 1992, the first single honours Marine Biology degree course class at Menai Bridge. There were 12 of us. Disciples or Jurors, the deadly dozen either way!

After graduating I worked in the shellfish industry, taking time out early to work in the Pacific North West doing habitat surveys with the USDA's Forest Service. It was an incredible experience working in Oregon, Washington and Alaska. On returning to Ireland, I started my own company processing shellfish and basically trying to make a living from the humble oyster. My company, Marine Healthfoods Ltd. is a dietary supplement manufacturer now, small and very specialized with a very select client base. Our core product is an oyster extract powder used by integrative doctors worldwide to treat a range of health conditions.

I recently partnered with a professor from Croatia in setting up Native Oyster Reef Restoration Ireland, norri.ie, which aims to try and re-establish the extensive oyster reefs in the Irish sea and beyond. Oyster reef restoration is now a growing scientific endeavor worldwide. I hope to work with Bangor University in the near future on this and we are also looking at other Blue Carbon ideas. My experience at Bangor made some of my fondest memories, what a place to study and I was back recently when Bangor hosted the 7th World Oyster Symposium.

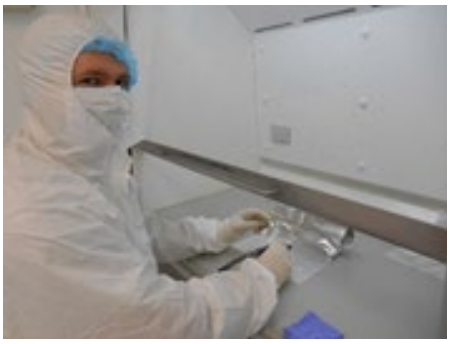
I currently live in Arklow, Co. Wicklow, just across the pond from Anglesey with my partner Mary and our two teenage children, Caimin and Freja. Not sure yet if one or both or any will follow the oceans' call. Behind me in the picture is the Nineteen Arches Bridge across the Avoca River in Arklow, the longest handmade stone bridge in Ireland, which is considered a famous landmark. Love to hear from any Bangorians for chat, craic and cooperation.
info@marinehealthfoods.com

Grant Fulton
(Ocean Science, 1996)

After graduating in Ocean Science in 1996 I worked as a scientific observer in NAFO and CCAMLR for a few years. I continued in fisheries in the Republic of Ireland and then spent 8 years in Spain working for the European Fisheries Control Agency.

"My bridge is Scalpay Bridge, which joins the Isle of Harris and the Island of Scalpay."

I returned to the British Isles running the Fisheries Control department in the Isle of Man before setting up my own fisheries consultancy this year back home on the Isle of Harris, www.fultonfisheries.com. I have gained contracts with the IOM government primarily looking at legislation largely as a result of BREXIT. I'm developing a catch-tag-release fishery for Bluefin Tuna based in the Outer Hebrides, working in partnership with various academic bodies, and I am also running a food ordering business, Lorna's Larder www.lornaslarder.net



Joshua Garcia Herranz
(Marine Vertebrate Zoology, 2017)

After my Bachelor degree I did a Masters degree in Spain in Marine Conservation. Right after this, I obtained a scholarship to do a project in the department of Evolution and Genomics at the University of Copenhagen (Denmark) on a project called North Atlantic Gray Whale, and I've been here since then. I have recently applied for a PhD at the same University and waiting for the response of the committee.

Tom Anderson (Marine Biology and Zoology, 2011 & MSc Marine Biology, 2012)

"My studies provided a perfect foundation for a rewarding career contributing to renewable energy targets"

After two months on the Isle of Man for my Masters dissertation investigating intertidal distributions of juvenile edible crab (Cancer pagurus), I had no idea my studies at Bangor would lead to a career in the renewables industry.

Soon after completing my MSc I was offered a job at CMACS Ltd, a small consultancy based on the Wirral where I had the opportunity to work on several offshore energy projects. I took part in offshore environmental surveys, analysing data, report writing and worked on offshore construction vessels. I learnt a huge amount during this period and this role proved to be a perfect introduction to how marine science is applied to offshore industry activities.

In 2015 I relocated to Aberdeen to work as a marine noise mitigation advisor for JNCC, where I coordinated a review of UK marine noise mitigation guidelines and collaborated with SCRIPPS Institute of Oceanography in California to establish standards for acoustic monitoring equipment. As well as a trip to sunny San Diego, this role allowed me to gain an understanding of the UK regulatory regime and provided an insight into the thinking of UK statutory nature conservation bodies.

Between 2016 and 2019 I worked as an offshore Environmental Manager for ScottishPower Renewables, where I worked across several projects in the UK, France, Germany and America helping to achieve development consent and ensuring key environmental legislation was taken into account.

I have recently moved to Bristol (home to the Clifton Suspension Bridge below) where I am looking forward to helping further develop offshore wind farm projects around the UK, working as a Senior Consent Manager on the Galloper Extension project for Innogy Renewables UK.

Looking back over 7 years ago, I was undecided what I wanted to do after my masters or even what types of jobs where available. Fortunately, my studies provided a perfect foundation for a rewarding career contributing to renewable energy targets and one which has allowed me to live and work in great locations.

Paul Sterlini
(Ocean Science,1995)

"The global sea level has also increased dramatically in twenty years - by some 6 cm!"

My undergraduate study at Bangor set me up well for my PhD in Satellite Oceanography. My mission was to intercalibrate two satellite altimeters (Geosat and TOPEX / Poseidon) to derive a long-term data set of global sea surface heights.

Geosat was launched in 1985 when satellite altimetry was a relatively new technology but it wasn't the best data to be working with. Today, many consider the quality of Geosat data to be too inaccurate for meaningful sea level studies and the limited data from the later TOPEX / Poseidon mission was dominated by an El Nino event. Still, it's what there was and I learned some valuable skills!

Twenty years later I found myself working with altimeter data again. The twist was that this time instead of preparing sea surface height data, I was going to use it!

Things change in two decades! The data which had taken me four years to prepare has now been surpassed with data not just from just two satellites with ground-track data every 7 km every 10 days, but from up to twelve satellites with data interpolated to daily resolution at 1/4-degree spatial resolution. And it only takes a few minutes to download! It's a phenomenal improvement!

As well as the quality of the data, the global sea level has also increased dramatically in twenty years - by some 6 cm! That's easily visible on the average shoreline because even disregarding increased coastal erosion this rise equates to the sea encroaching onto the beach by about an extra 70 cm.

Whilst the sea level has been busy rising, I've also been busy. Of note, working as a sediment transport scientist and presenting my results in Barcelona at a conference in 2005. This is noteworthy because my take home 'message' at "Coastal Dynamics 2005" ended up being my future wife!

She's Dutch, and even though she speaks excellent English we ended up living in the Netherlands. As you can imagine, sea level - or "zeespiegel" - is pretty important here (hence my post-doc!)

I looked at the spatial variation of sea level change in the North Sea. Even along the relatively short Dutch coastline the rate of sea level rise varies with location by more than 1 mm/year. (By way of comparison, the global mean rate is about 3 mm/year). The spatial variation and understanding why it occurs is important because it means that regional coastal impacts can be better assessed. Ironically, it is the coastal areas which are the most difficult for satellite altimeters to monitor.

What does the future hold? Global sea level, the mean of all of its regional components, is set to continue its upward journey, as too the technology behind the satellite altimeters which will be monitoring it closely.

Here in the Netherlands the rate of my daughters' upward growth will be faster than the current rate of sea level rise by approximately factor 20, and I'll be watching them closely as well!

My bridge is across a local canal near our home. It's a simple bridge and I've had simple pleasures on it with my daughters playing pooh sticks. Maybe in another 20 years they'll be playing pooh sticks with their children. I wonder if by then this bridge will be over salt water?

Lydia Tabrizi
(BSc Marine Biology & MSc Marine Environmental Protection, 2017)

"We have been looking at diversifying the fishing methods for Nephrops to a more sustainable, low impact method – creeling"

"At the moment I am the Marine Futures Intern at Cumbria Wildlife Trust. The internship is funded by The Crown Estate and is in partnership with Cumbria Wildlife Trust, Natural England and Ørsted (windfarm operators).

The internship involves working with and for the different partner organisations (from running Beach Schools one week to surveying seagrass the next). Part of the internship involves a research project and I have just produced a report which assessed the feasibility of creel fishing for Nephrops norvegicus within Walney Marine Conservation Zone (MCZ). This is a unique MCZ as it is also collocated with 5 offshore windfarms.

At present, the predominant fishing method for Nephrops is trawling. Trawling destroys, or at least disturbs, everything in its path and has high levels of bycatch. We have been looking at diversifying the fishing methods for Nephrops to a more sustainable, low impact method – creeling. Creels can coexist with both offshore windfarms and MCZs and has very low bycatch rate (and any bycatch that is caught can be returned to the sea alive). We are hoping to expand this pilot study, undertake more research on the fishery and monitor its success so that information can be distributed to fisherman that may be interested in diversifying their fishing methods and switching to creeling.
If anyone would like access to the report please get in contact: lydiat@cumbriawildlifetrust.org.uk "

Three SOS Alumni reunite to study humpback whales in British waters

10 years after their studies at Bangor University, three marine biology graduates have reunited to study the sudden reappearance of humpback whales in Scotland's Firth of Forth, culminating in a recent publication in the journal Marine Biodiversity Records. One of the team, Kate O'Neil (Marine Vertebrate Zoology, 2009) tells their story.

Their recent publication shows UK seas act as a "service station" for migrating humpback whales

Kate O'Neil © Niven Ranchhod

Myself, Emily Cunningham and Daniel Moore all attended Bangor University as undergraduates in the mid to late 2000s, meeting under the wise watch of Dr Andy Beaumont as our personal tutor. All three of us have fond memories of our time in the small city; exploring the coastline, revelling in the nightlife, and forging lifelong friendships based on a shared passion for the environment and learning how to better protect it.

I opted to graduate after 3 years with a BSc in order to join my newly emigrated family in New Zealand, whilst Emily and Daniel both continued on for a further year of study to complete the "M-Degree", later graduating with MMBiol Master of Marine Biology. By then a couple, Emily and Daniel enjoyed stints monitoring sea turtles in Sri Lanka and on Ascension Island before settling back into UK life with jobs at The Wildlife Trusts and Edge Hill University respectively. Daniel is now in the latter stages of a PhD at Durham University studying population genetics of marine predators whilst Emily works as a specialist marine conservation consultant across the UK. I also couldn't resist the call of the UK after nearly 9 years in New Zealand, where I had attended whale strandings and worked closely with Dr Ingrid Visser researching the New Zealand resident orca. Having unexpectedly fallen back into my artistic roots, I was now spending most of my days developing my new business, Moana Matron Designs, making jewellery tailored to the naturalists of the world, putting my in-depth zoological knowledge into practice making jewellery pieces that are both accurate and beautiful. Being able to do this anywhere, I returned in 2017 to make a new life in Edinburgh after falling in love with Scotland's rolling hills and rugged coastline on a brief visit the year before.

Emily Cunningham and Daniel Moore

In January 2018, as I settled into my new city and Emily and Daniel were trucking along with their respective work in North East England, a humpback whale appeared in the Firth of Forth on Scotland's East Coast for the second winter in a row. Thrilled, I headed to the shore on every occasion that I could, armed with my camera (and several layers of warm clothing!) sitting for hours each time, taking fluke ID photos and noting the whale's behaviour and location.

Having lost touch a little in the busy years after graduation, Emily and Daniel were unaware that I was now living in Edinburgh and having seen the news of the whale on Twitter, drove up to the Forth and were lucky enough to spot the leviathan visitor. Although we didn't bump into each other on the shore, when they posted the news of their sighting on Facebook I got in touch and the conversations started to flow about using all of the sightings being shared on the Forth Marine Mammals Facebook group to try and understand why the whales were making extended visits to the Firth of Forth.

Working closely with the local volunteers from the Forth Marine Mammals community, I collated and verified all the sightings and photographs that had been taken whilst Emily and Daniel checked any high quality fluke photographs shots against existing North Atlantic humpback whale catalogues and local volunteers searched social media for photos of any non-catalogued individuals in order to try and find the origin of our Scottish visitor.

Humpback Whale Fluke Svalbard 2017
© Iain Rudkin Photography

Through this process, we confirmed that there were (at least) three humpback whales present in the Firth of Forth during our study period and we were thrilled when one of the local volunteers, Lyndsay McNeill, found a photo of our whale in Svalbard, a Norwegian archipelago in the high Arctic. This, being the first match of a UK humpback whale to their Arctic feeding grounds, was exciting news and we came together online to write up this work for publication.

Our publication adds to our understanding of the migration habits of the eastern North Atlantic humpback whale population, suggesting that UK waters provide a "service station" – a place for whales to rest and feed – on their long migration. More work needs to be done, but with humpback sightings increasing year-on-year in British waters, we must manage our seas to ensure the best possible stopover for these ocean wanderers.

After publication, we received excellent media coverage of our work, with Emily chatting live to the nation on Sky News and myself interviewed live on BBC Scotland Radio. We were also featured in the Metro, the i newspaper, The Scotsman and The Herald as well as over 80 online outlets. We are thrilled to have contributed to the scientific literature on humpback whales are well as raising awareness across the UK that humpback whales visit our seas.

We're grateful to all the staff at the School of Ocean Sciences for such fantastic scientific training but would like to particularly thank Dr Andy Beaumont for cultivating our scientific curiosity in our undergraduate tutorials. 10 years on we're proud to be putting our degree training to good use and hope to continue our work on UK humpback whales for the next decade and beyond.

Get in touch, we'd love to hear from fellow alumni.
Email us on forthwhale@gmail.com

or find us on social media:
Kate - @Moana_Matron_Designs (Instagram)
Emily - @EG_Cunningham (Twitter)
Daniel - @DanielMMoore (Twitter)

ALUMNA FOUNDS CHARITY TO HELP REFUGEE CHILDREN

Freya White (MSc Marine Environmental Protection)

I graduated from Marine Environmental Protection in 2011.

The year before doing my masters I had done a PGCE at Exeter University. After graduating, I was so desperate to start paying off my student debts that I took the first job that was offered to me, which happened to be a teaching job at a boys' school in Winchester. I planned to complete my Newly Qualified Teacher year (necessary to become fully qualified) and then go back to trying to find a job in the environmental sector.

Teaching science and geography to primary aged children was great fun - staging a village meeting to debate a proposed development and its potential environmental impacts had all the children in fits of giggles - and it made me realise how much I'd missed being creative. One year led to another, and then another... Before I knew it, I'd been teaching for four years. There were aspects of the job I loved but ultimately, I resented working so hard on something when I knew it wasn't really what I wanted to do.

Since my masters in 2011 I'd been following the Arab Spring uprisings across the middle east and watched with horror the tragic unfolding of events in Syria. I was desperate to do something to help and in 2016 I left my job to look for work in the charity sector. I decided to start by volunteering at a refugee camp in Dunkirk, France.

I was astonished to find how utterly unprepared the French government were for supporting the refugees in Dunkirk. Despite them creating a legally recognized camp, the services were almost entirely run by volunteers and it was a mess. I ended up staying for almost a year, over which time I helped to set up and run a children's centre in the camp. Despite being aware of the horrors of war that the children had suffered, I had underestimated the myriad stresses they were exposed to on a daily basis in the camps.

There is an increasingly large body of evidence that shows stress in early childhood is severely detrimental to development. Exposure to Adverse Childhood Experiences (ACEs) such as prolonged fear or neglect, exposure to violence and maternal depression can affect neurological, immunological, and hormonal system development, and may result in problems with physical and mental health, emotional regulation, cognitive response, memory and learning throughout life. Not only do these experiences damage the child's life, they throw up developmental and psychological barriers that can perpetuate a cycle of ill health and social disadvantage.

I ended up founding a charity which aims to promote the healthy development of refugee children through offering play-based interventions. I do still think about trying to get back into environmental work in the charity sector, but for now I feel like I'm doing what I'm supposed to be doing. I've met so many incredible and inspiring people on my journey and Quentin Blake even designed our logo! If you're interested in finding out about the charity, see our website, www.refugeechildrenscentres.org and you can read an article I wrote about the benefits of play in a journal called Othering and Belonging (http://www.otheringandbelonging.org)

Patricia Sorrell (nee Murray)

Patricia Murray (Tricia or Trish to all) came to Menai Bridge in 1985 as a Geography graduate from Hull, having had her appetite for marine science wetted by coastal geomorphologist John Pethick. She followed the MSc in Physical Oceanography under its then Director Des Barton and continued to develop her interest in coastal sediment dynamics by following modules in the parallel Marine Geotechnics MSc and undertaking a field based dissertation project working in the Mawddach Estuary under the supervision of Colin Jago.
Motivated to continue pursuing moving sediments she began a PhD in 1986, supervised by SOS's Alan Davies and Richard Soulsby of Hydraulics Research Wallingford. There she transitioned from a field scientist to a real sediment dynamics boffin and spent much of her PhD reconstructing and instrumenting a 'walk in flume' in the cavernous hangars at Wallingford. A three month break from study took her on Operation Raleigh to Guyana in South America where she showed the same sense of adventure as she did in the mountains. Like many she had come to Bangor a mountaineering novice but left a dedicate lover of the mountains in North Wales, the Lakes, Scotland and the Alps.
After a variety of moves to university research and IT posts in Cambridge and Newcastle she latterly found permanent employment at Sheffield University as a Teaching and Learning specialist and trainer, living in a cottage in the attractive Peak District village of Hathersage where she settled with her partner Julian, a fellow walker and climber.

In December 2018 she was diagnosed with breast cancer and undertook chemotherapy but secondary cancer sadly proved untreatable and she died on 6th August 2019. If there was any consolation it was in her great happiness in marrying Julian two weeks before she passed away.
Many of us will remember Tricia's wide and infectious smile and her sense of fun and adventure. She will be very sadly missed by many SOS alumni and staff as well as all those other friends and colleagues she met on her way through life.

Dr Garry Reid, Head of Research Innovation & Impact Office, Bangor University

The Dennis Crisp Memorial Lecture and Alumni Reunion

The third Dennis Crisp Memorial Lecture will be held at 6pm on Friday, 15th November 2019 in the University's Pontio building in Bangor. We hope you can join us!

Prof. Dennis Crisp (1916-1990) developed Bangor University's School of Ocean Sciences into the world-renowned School it is today. The Dennis Crisp Memorial Lecture Series was established to acknowledge Prof. Crisp's legacy as one of Britain's best-known and most respected marine biologists. Each year, we welcome back one of Prof. Crisp's former students to present on topics that were influenced and inspired by him.

This year's Memorial Lecture will be delivered by Prof. Sandra Shumway (Marine Biology PhD, 1977) of the University of Connecticut. Prof. Shumway's research spans over 40 years in shellfish biology, filter-feeding and the physiological ecology of marine invertebrates. In her lecture entitled "**Molluscs in the New Millennium**", Sandy will share her memories of Prof. Crisp and the academic journey she's taken through his influence, and then present some of her current work and how new technologies are furthering its progress.

You are invited to join us for a drink before the lecture from 5.30pm and, following the lecture, a reunion will be held in Pontio for alumni and staff of the School of Ocean Sciences. It will be a great opportunity for you to meet up with old friends over drinks and a light buffet and make some new ones!

We hope that you can join us for the Dennis Crisp Memorial Lecture and alumni reunion. Please email alumni@bangor.ac.uk to book your place!

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