APRIL
2019

THE BRIDGE

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

PRIFYSGOL
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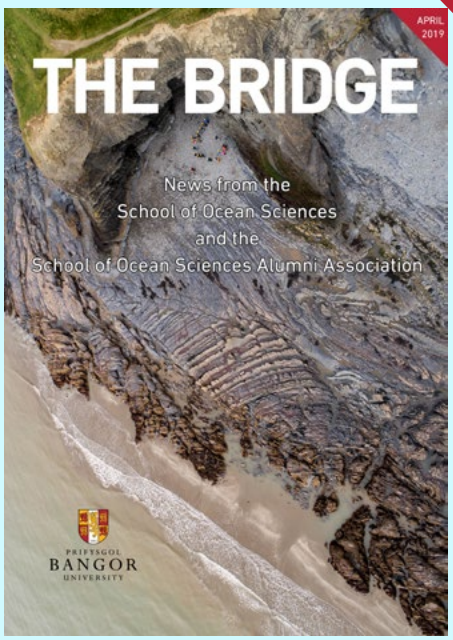
THE BRIDGE April 2019



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:
kevin@kevjen.com

TEF Gold
Teaching Excellence

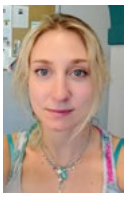
Welcome to our School of Ocean Sciences (SOS) newsletter incorporating the Alumni newsletter "The Bridge". I am excited to share with you a vast array of our achievements over the past 6 months within the School, ranging from successful student and staff fieldtrips, newly obtained grants and research 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

Saturday June 29
Saturday July 6

SCHOOL OF OCEAN SCIENCES STAFF

Following a series of retirements and promotions over the last couple of years, here is our current staff list.


Jenna Alexander
Researcher


Susan Allender
Laboratory Manager


David Assinder
Lecturer


Vallen Astley
Technician


Martin Austin
Senior Lecturer


Jaco Baas
Reader


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


Lowri Evans
Post-doctoral
Ecologist


Rob Evans
Workshop Supervisor


Kata Farkas
Researcher


Stella Farrar
Welsh Medium


Tom Galley
Researcher


Luis Gimenez
Senior Lecturer


Alice Goward-Brown
Researcher


Laura Grange
Teaching and
Scholarship 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


Colin Jago
Professor


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


Ian McCarthy
Reader


David Mills
Researcher

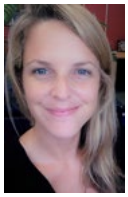

Simon Neill
Reader


Steven Newstead
Researcher


Aled Owen
Technician


Ben Powell
Technician


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


Peter Robins
Lecturer


Ronan Roche
Researcher


Steven Rowlands
SEACAMS Fieldwork
Technician


Margot Saher
Lecturer


Jennifer Shepperson
Lecturer


Martin Skov
Senior Lecturer


David Smyth
Science Officer


Lucy Southworth
Researcher


Claire Szostek
Researcher


David Thomas
Professor,
Head of School


Jamie Thorpe
Researcher


John Turner
Professor


Karen Tuson
Researcher


Katrien Van
Landeghem
Senior Lecturer


Gemma Veneruso
Researcher


Siobhan Vye
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

NEW STAFF INTRODUCTIONS

Dr Laura Grange

I am a benthic marine ecologist with a specialism in the Polar Regions. I graduated in Oceanography with Marine Biology from the University of Southampton in 2001. I remained at Southampton for a further three years undertaking a PhD in the reproductive success of Antarctic marine invertebrates and graduated in 2005. Following my PhD, I worked as a Marine Environmental Consultant at the Centre for Marine and Coastal Studies (CMACS Ltd) in Birkenhead, Liverpool. Here, I was tasked with undertaking inshore and offshore surveys, laboratory analyses and report writing to inform environmental impact assessments for a diversity of coastal and offshore developments.
In 2009 I moved to the Department of Oceanography at the University of Hawai'i at Manoa to undertake a postdoctoral scholarship, where I worked on two projects focussed on the impacts of climate change on ecological processes in Antarctic seafloor ecosystems. Among other things, these projects involved exploring the link between pelagic and benthic systems under changing environmental conditions, and investigating the evolution of seafloor communities in response to changes in ice cover. During this time, I was appointed to a part-time Assistant Professor position and tasked with developing the first Marine Biology graduate programme in Hawai'i.
In 2013 I returned to the UK after being appointed to a Teaching Fellow in Marine Biology position in the School of Ocean and Earth Science at the University of Southampton, where I delivered a wide range of undergraduate and postgraduate teaching. Following on from that role, I was promoted to Lecturer in Marine Biology and continued to engage in a variety of teaching and scholarship activities across the University. In 2018 I accepted a Lecturer in Marine Biology post at Bangor University and was delighted to move to the School of Ocean Sciences in Menai Bridge.

Dr Adel Heenan

In 2003, I obtained a B.Sc. in Zoology at the University of Edinburgh and an M.Sc. in Tropical Coastal Management at Newcastle University upon Tyne in 2004. After my MSc I worked for the IUCN (World Conservation Union) Shark Specialist Group, contributing to Red Listing and CITES processes for species of Sharks, Skates and Rays. From 2006-2010 I did a PhD on the settlement behavior of larval coral reef fish, working at the Lizard Island research station on an Australian Museum Doctoral Fellowship, as well as in Indonesia and the Philippines.
After my PhD, I worked as a marine ecologist, communicating scientific information to the Irish Sea Conservation Zone (ISCZ) stakeholder group, one of the regional projects in the UK national ecological network of marine conservation areas. From 2011-2017 I was based at the NOAA Pacific Islands Fisheries Science Center in Honolulu, Hawaii where I worked as an applied scientist for a long-term monitoring program. In that role, my time was split between collecting and analyzing a large-scale coral reef ecosystem monitoring dataset and capacity building for the implementation of an Ecosystem Approach to Fisheries Management (EAFM).
In 2017 I took a Ser Cymru fellowship at the School of Ocean Sciences and was delighted to start a lectureship in September 2018.

Dr James Waggitt

I started a postdoctoral position at the School in April 2015. Soon afterwards I was given the opportunity to cover a colleague's lectures whilst they were on maternity leave, gaining my first experience of teaching at this level. Following this, I became a teaching and research lecturer in August 2018.
I teach on a variety of undergraduate and postgraduate modules, covering a range of subjects in biological sciences. However, I specialise in cetacean and seabird ecology – in particular the influence of oceanography on their behaviour and distribution. Within this subject-area, I focus across a range of spatiotemporal scales ranging from fine-scale patterns along coastlines to coarse-scale patterns across entire basins. I hope to identify consistencies in habitat-use which persist across different ecosystems and species communities. To achieve these targets, I am currently setting-up a network of study locations across Europe ranging from Shetland to the Azores.
I have also been involved in the NERC/DEFRA Marine Ecosystems research Programme (MERP). As part of this programme, we have collated approximately 2.5 million kilometres of cetacean/seabird surveys from the NE Atlantic. I am currently working on a range of outputs from this collation, including comprehensive distributional maps. I am looking forward to embracing the multi-disciplinary expertise in the School to develop my research. I am also excited by the potential to conduct this research in Anglesey, where diverse species communities and habitats provide a great study system.

Dr Jennifer Shepperson

I am a fisheries scientist with a particular interest in researching the environmental impacts of trawling. I graduated with a BSc in Ecology from Cardiff University in 2011. I then worked for a marine conservation NGO in Greece whilst studying part time for an MSc in Geographic Information Systems. I combined my ecological and GIS skills to complete a PhD in fisheries research in the School of Ocean Sciences at Bangor University. For this I developed an individual based model to predict the behavioural response of fishermen to management, such as the displacement of effort following an area closure.
After my PhD I remained at SOS for a postdoc position, during which I developed a tool to quantify the benthic impacts of trawling. This user-friendly tool is being developed for the Marine Stewardship Council to assess fisheries against their standards for eco-certification. In 2018 I was offered a lectureship position within SOS, which I am very much enjoying so far.

FIELDWORK FOCUS

Cable Bay, Anglesey
Rocky Shore Ecology

Module OSX-1002. Marine Biology

Practical Field Science sessions involve trips to a range of coastal locations around Anglesey. Students will test a series of hypotheses about the distributions of intertidal animals in these extreme habitats.

Shell Island, Gwynedd Mudflat, Saltmarsh and Rocky Shore Biology

Module OSX4002. Habitat Ecology/ Coastal Survey

Provides the ecological knowledge and understanding of survey techniques to assess the abundance, distribution and diversity of marine life in inter-tidal habitats of north Wales.

Aberlleiniog & Gallows Point, Anglesey
Sedimentary geology

Module OSX-1003:
Earth, Climate & Evolution

An exploration of environmental change, including climate change, and its impacts on biological evolution on geological time scales. The module examines how the earth works: tectonics, climate, the sedimentary cycle, sea level change.

Clarach Bay, Aberystwyth Coastal Geology

DXX-3018. Rivers, Coast and Oceans

Spectacular coastal geology seen on the 3rd year undergraduate field trip of the Rivers, Coasts & Oceans module. This is the deep-marine Aberystwyth Grits Group in Clarach Bay, During this trip, Ocean Science students and Geography students join forces to study applied geomorphology, coastal engineering, and sedimentary geology.

(This page and cover image)

Surveying shorebirds in North Wales by James Waggitt

Tides influence the distribution and abundance of animals living in intertidal habitats.

Shorebirds that exploit benthic invertebrates including crustaceans, shellfish and worms depend on the outgoing tides uncovering rich food resources on the seabed. The area available to feeding shorebirds increases as the tide goes-out. When this happens, a diverse range of species arrive to exploit these riches. Redshanks with their short-bills peck frantically at the seabed surface to exploit small crustaceans, whereas larger Curlew and Oystercatcher probe deeper and longer to extract shellfish and worms. This seems obvious – but these are simply hypotheses until supported with field-data. However, collecting and analysing appropriate field-data is challenging: there needs to be accurate observations of animals, and observations are inherently variable and difficult to analyse.

Our second-year students were given these challenges on a cold but sunny February morning in Bangor harbour. This is an important feeding habitat for Curlew, Redshank and Oystercatcher; hundreds of birds regularly assemble on the expansive areas of mud exposed during low tide. After collecting binoculars and telescopes from the Brambell building, we made the short walk down the road to the observation area immediately alongside Beach Road. On arrival the tide was high and almost touching the small wall by the pavement. However, soon more and more of the mudflats were exposed by the outgoing tides. As this occurred, our students used their binoculars to record the numbers of each species present in their field of view. They also used their telescopes counted the rate at which individuals probed the mud to calculate feeding rates. Alongside the focal species, we were also treated to sightings of goldeneyes, godwits, greater-black backed gulls, herring gulls, lesser-black backed gulls and red throated divers; demonstrating the general importance of this area. After 2 hours of observations, we returned to the Brambell building to test whether abundance had increased as the tide went out, and whether feeding tactics differed between species.
On their return, students calculated useful summary statistics from their datasets. These statistics included mean, median, standard deviation and interquartile ranges.

From this, box-plots and scatter plots showing differences in abundance across tides and probing rates among species were produced. It was now time to test our original hypotheses. As expected, the number of birds increased as the tide went out; probe rates were highest in Redshank and lower in Curlew and Oystercatcher. So our hypotheses were correct and supported with field-data!
In doing so, our students gained valuable experience in collecting and analysing field-data to test a series of hypotheses – an essential skill in conservation and ecology.

Porpoise Postmortem by Line Cordes

The Cetacean Strandings Investigation Programme (CSIP) team from the Zoological Society of London visited Ocean Sciences in December and performed post-mortem demonstrations of two harbour porpoises which had been found dead on British beaches for undergraduate (OSX3023) and postgraduate students.

Paul Jepson and Rob Deaville explain the necropsy procedure, and took the students through the morphological and physiological adaptations of porpoises to living in the sea as well as any evidence they found along the way relating to their demise.

AWARDS

Award for outstanding work in the field of marine sedimentology

A Bangor University PhD student is the first female to be awarded an international prize for her outstanding work in the field of marine sedimentology.

Megan Baker was awarded the International Association of Sedimentologists RICHARD W. FAAS RESEARCH PRIZE and a cash award of €2000. The Faas prize is awarded every two years to an early career researcher.

This is also the first time that this prize has been awarded to a PhD student. Megan will receive the Prize at the Association's 34th annual conference in Rome in September 2019. She will also give a keynote presentation at the conference. Originally from Poole, Dorset, Megan came to Bangor University's School of Ocean Sciences to study a BSc in Ocean Science, followed by an MSc in Applied Marine Geoscience. She has continued her studies at the renowned School, following a PhD in underwater landslides in the marine environment. As a sedimentologist, Megan studies underwater landslides such as that which could have caused the recent Indonesian tsunami. We know far less about underwater landslides than we do about the land-based variety. Underwater landslides can be extremely violent and destructive and have implications for underwater engineering projects and structures, including oceanic communication cables that keep the Internet working. The deposits of these flows is also very important for oil exploration.

Megan has already received an award from the British Sedimentology Research Group for the best sedimentological MSc thesis of all British and Irish Universities and she has also been awarded a Drapers Silver Medal. This is the higher of two medals awarded annually by Drapers' Company to outstanding research students at Bangor University. Commenting on her latest award, Megan said:

"Receiving such a prestigious prize from an international association is very exciting. I feel particularly honoured as the award is decided by scientists on the Bureau of the International Association of Sedimentologists."

Megan says of her experience at university:

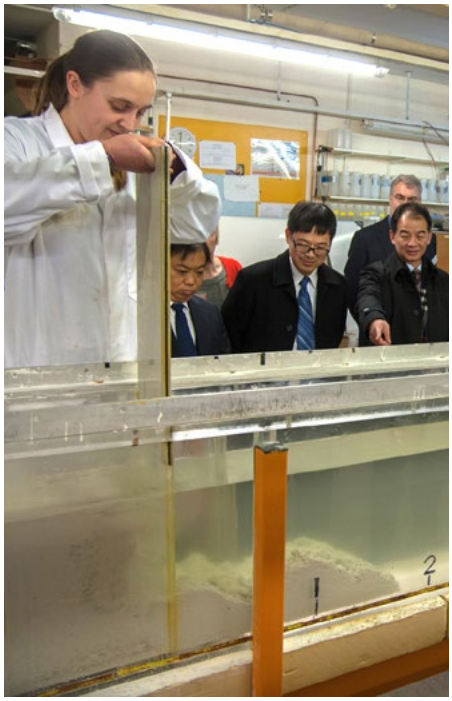
"I chose Bangor because of the reputation of the School of Ocean Sciences and its fantastic location, which is great for both fieldwork and extracurricular outdoor activities. The department has such a friendly atmosphere, which you really appreciate as a student, as the staff are always on hand to help. I think that is why I haven't managed to leave yet!"

She added:

"After my PhD I would like to stay in academia and get a post-doctoral research position. I love the stimulating environment of academia and how you can be doing something different every day."

Jaco Baas, Megan's PhD supervisor who nominated her for the prize, said:

"Megan fully deserves the prize from the International Association of Sedimentologists. Her work on the effect of sticky clay on the movement of underwater landslides is novel and important. In combining physical and geological methods in the field and in the laboratory, she has attracted wide interest from academia and industry."



Women in science scholarships 2018/2019 awarded

Three 'Women in Science' Scholarships have been awarded to outstanding Bangor University students – Katrin Frosin, Jessica Baggott and Shiromini Satkunarajah.

All three were undergraduate students at Bangor and graduated with First Class Honours. The scholarships, which cover the full course fees, will enable the talented and enthusiastic students to continue their studies and the recipients of these scholarships are now enrolled in postgraduate research courses at Bangor.

Katrin Frosin, 22, from Düsseldorf, Germany is studying for an MScRes Ocean Sciences degree, said: "I am very grateful to have received this scholarship, as it is allowing me to continue my studies at Bangor University. During my MScRes I will develop a range of practical skills useful for my future career and I am hoping to contribute to the scientific community through my study. I am planning on further expanding my work in the field of coral reef ecology and conservation via a future PhD, whilst working with organisations and governments to protect these important ecosystems."

Jessica Baggott, 23, from Sunderland, is studying for an MScRes in Biological Sciences, said: "Receiving the Women in Science Scholarship meant I could pursue a Research Master's degree which I would have struggled to fund otherwise, and could continue to study the subject that I love. The MScRes will provide me with invaluable experience I feel I could not gain elsewhere. This means I'll be in a strong position to do a PhD and hopefully progress onto a research career in the future".

Shiromini Satkunarajah, 22, from London, who is studying for an MSc in Broadband and Optical Communications, said: "I am very thankful to Bangor University for awarding me the 'Women in Science' scholarship and for the opportunity to continue my studies. I believe this postgraduate degree will broaden my knowledge and significantly increase my future job prospects."

Bangor University is committed to increasing women's participation in science at every level of education, and these scholarships are a further step towards encouraging and enabling more women to follow science careers.

One of last year's recipients, Lily Stokes, 22, from Mytchett in Surrey, is about to start a 12-month contract working as the Principal Investigator for an NGO's marine conservation project in Madagascar. Lily completed her MSc in Marine Environmental Protection in September, and said: "I will be forever grateful to Bangor and the scholarship for providing me these opportunities."

Professor Jo Rycroft-Malone, Pro Vice-chancellor (Research & Impact) and chair of the Athena SWAN Task group, said: "I am delighted that we have awarded 'Women in Science Scholarships' for the fourth year running and would like to congratulate this year's recipients. Providing a supportive environment for women like Katrin, Jessica and Shiromini who are at the beginning of their careers in science is crucial and we are pleased to be able to support these outstanding young scientists. Bangor University is fully committed to the Athena SWAN ECU Gender Charter and we have just renewed our institution-wide bronze award as well as achieving another departmental bronze award."

Award for best student presentation

Ex MSci student Bonita Barrett-Crosdil attended the Y-OSIG (Young-Offshore Site Investigations and Geotechnics) inaugural event and presented her published work that emerged from her 4th year research project within Ocean Sciences.

Bonita won 1st prize for the best presentation (and £250), and was told her talk was distinguished from the 2nd placed presenter based on the "significant impact the paper is having on the industry." She was later told by various employees of Fugro that the paper has been circulated, discussed and is actively being used across their company worldwide.

Upon receiving the award Bonita said: "I'm so pleased to have been awarded the prize, but mainly completely overwhelmed by the great feedback and positive response our paper has had."

Bangor University Early Career Research award

Sophie Ward received a £1500 Bangor University Early Career Research Award to Sophie Ward to study:

Changing tides: implications of palaeo- and future tidal-range changes in eastern Canada

EQUALITY AND DIVERSITY

The School of Ocean Sciences received a Bronze Athena Swan Award in October 2018 and received feedback on the application in January 2019.

- One of the suggestions by the panel is that we hold another organisational survey, and this will be rolled out before the summer.

- On 9/1 Nia Blackwell ran an Equality Workshop at the SOS Away Day. This training will be incorporated in the training portfolio of all staff who attended.

- On 29/1 the NRN-LCEE hosted Louise Kenny and Liz Elvidge to speak about gender inequality in Higher Education. SOS initiated this event and lead the organisation. Some 87 people attended and we received very positive feedback. Louise is the Executive Pro-Vice-Chancellor of the Faculty of Health and Life Sciences at the University of Liverpool, Professor and Maternal and Fetal Health and a Consultant Obstetrician at the Liverpool Women's Hospital. Louise has a longstanding clinical and research interest in hypertensive disorders of pregnancy. Most recently Louise was awarded 2015 Irish Tatler magazine Woman of the Year Award for STEM. Liz is the Head of the Postdoc and Fellows Development Centre at Imperial College London. She has a longstanding commitment to supporting women in academia, beginning with the Springboard Women's development Programme at the start of her career, to providing expert advice on Athena SWAN applications as an assessor and chair. She was awarded the Dame Julia Higgins Medal in 2015 for outstanding support of female early career researchers and academics. In their presentations, Louise and Liz agreed that there is concern over gender inequality in HEIs, and offered different opinions to tackle it. Louise opts for underpinning solutions to the problem with more data analyses and would like to see change in the core of HEIs to ensure more diversity in working groups, as such groups are proven to be more successful. Liz sees data collection as a distraction sometimes. She advises that we are mindful of the language we use, as this is subject to gender bias in the way it is perceived in CVs, application and reference letters.

Liz Elvidge (left) and Louise Kenny (right)

- SOS is appointing a woman as external examiner for our UG courses (was never a woman before).

- On 26/2, SOS rolled out a mentoring scheme for all staff, coordinated by David Assinder. HR will deliver a mentoring training session. This scheme will link with the annual PDR. SOS aims to give mentees a mentor with more experience, which does not necessarily mean a higher grade.

- On 8/3 (International Women's Day) we saw a variety of speakers, including David Thomas. SOS will host another speaker at this event, Dr Noemi Mantovan (Bangor Business School) to give a seminar at SOS on May 17th.

- Bangor University makes the Gender Pay Gap report public at the end of March. The median gender-based variance in pay is 11.1%. Still not enough women are in jobs at the higher grades. This is true for academic staff and even worse for managerial and professional staff.

- As we move forward from a Self Assessment Team (SAT) to include several working groups, the SAT is currently consulting with all staff what the focus of those working groups should be. The following themes have been suggested to the School Board of Studies: Part-time and flexible work, Representing Women in Science, Induction, Personal Development, Staff Surveying, Forum for (new) parents. This consultation is still running and if there are any themes you would like the SAT to consider, please email Katrien: k.v.landeghem@bangor.ac.uk.

NEW PROJECTS LAUNCHED

Marine Ecosystems Research Programme by James Waggitt

The NERC Funded Marine Ecosystems Research Programme (MERP) aims to increase our understanding on ecosystem-level processes, and address key knowledge gaps in European seas.

As part of this project, SOS researchers have been collating aerial and vessel surveys of cetaceans and seabirds across the North-East Atlantic from the past four decades to better quantify the distributions of these charismatic taxa.

This research has been led by Dr James Waggitt and steered by Dr Peter Evans and Prof Jan Hiddink. The resultant collation contains 3 million kilometres of surveys from around 40 suppliers and 11 countries, and represents the largest known collation of such surveys. Data has been scanned for errors, standardised and combined into a single spreadsheet. The initial outputs of this research are density maps showing the distributions of 24 prevalent cetaceans and seabirds during each month of the year, identifying seasonal movement into and around European waters.

These have been produced using species distribution modelling. This approach first identifies a species preferred habitat (i.e. depth, temperature, currents etc.), and then predicts the distributions of this species based on these habitat preferences.

The next outputs of this research will be a Cetacean and Seabird Atlas detailing all the sightings in the collation, including rare and infrequent species. Annual trends are also being investigated, to identify changes in the abundances and distributions of prevalent species across the previous four decades. These outputs all have important applications in marine management and conservation; providing an invaluable resource to statutory and advisory groups in the UK and mainland Europe.

NEW PROJECTS FUNDED

Shellfish aquaculture and fisheries research in Menai Bridge gets some big boosts!

A series of new grants are supporting a major expansion of aquaculture and fisheries research in CAMS and SOS, supporting the growth and development of the aquaculture and fisheries sectors in Wales.

Shellfish producers, scientists and regulators met at Bangor University on the 4th December for the opening workshop of the new **Shellfish Centre** project. This follows the announcement in August of EU funding of £2.8m for the new science and innovation hub to boost Wales' shellfish industry that will be based in the Marine Centre Wales building. The opening workshop brought together industry stakeholders, representatives of government, agencies and regulators and academic researchers to collectively identify opportunities and constraints for shellfish production across Wales. The Shellfish Centre is part-funded by the EU's West Wales and the Valleys European Regional Development Fund (ERDF) through the Welsh Government. The total value of the project is £3.9M with a £2.8M grant ERDF contribution, and £1.1M match funding from Bangor University. For further information please contact project director Professor Lewis Le Vay (l.levay@bangor.ac.uk) or project manager Esther Howie (e.howie@bangor.ac.uk)

Coinciding with the launch of the Shellfish Centre, Lewis Le Vay, Shelagh Malham, Peter Robins and Jon King have been awarded a 3-year £750k grant from EMFF for MOSSS (Menai Offshore Subsurface Shellfish Systems). This new CAMS project will support the piloting of commercial-scale offshore shellfish production systems using a test site to the east of Puffin Island and the investigation of suitable environmental conditions for their potential deployment in Welsh waters. MOSSS is a collaboration with shellfish industry partners Bangor Mussel Producers and will run alongside the recently-awarded Shellfish Centre initiative.

Shellfish research has also been boosted by a new CAMS project, led by Shelagh Malham, Lewis Le Vay and Peter Robins in collaboration with the Centre for Ecology & Hydrology on "Developing an assurance scheme for shellfish and human health" which is developing new approaches to classification and risk management in shellfish waters. This £563k project is part of a UK-wide initiative, financially supported by SEAFISH, Food Standards Agency and the Environment Agency, and with cooperation from the Shellfish Association of Great Britain.

Meanwhile new funding for fisheries research has also been secured, with Ian McCarthy, Jan Hiddink, Adel Heenan, Stuart Jenkins and Lewis Le Vay, being awarded £1.3m from EMFF for a 4 year project: *Fisher-Scientist Partnership For Sustainable Welsh Fisheries*. This new CAMS project, in partnership with the Welsh fishing industry, will gather data for data-deficient, commercially-exploited shellfish and finfish species in the coastal waters of Wales. These data will be used to provide the science-base to ensure that local Welsh fisheries are managed in an environmentally-sustainable way.

Surveying oyster populations in the Menai Strait which is a Special Area of Conservation. Strong tidal currents carrying nutrients make it well suited to the cultivation of oysters and mussels.

New NERC Standard Grant awarded to Ocean Sciences

Mattias Green, a Reader in Physical Oceanography in the School of Ocean Sciences, has been awarded a NERC standard grant with a budget of £583k, of which £320k comes to Bangor.

Mattias is the PI with Sophie Wilmes as the named Post-doctoral Researcher. Professor Dave Waltham at RHUL is CO-I and has a second Post-doctoral Researcher. The project is called Milankovitch and Tidal Cycle History (MATCH), and its aim is to constrain tidal model simulations for the past 600million years using a newly developed proxy based on bore-hole data. Obtaining well-constrained tidal estimates of the deep past has implications for our understanding and ability to simulate the history of the Earth-moon system, climates of the past, and evolution and mass extinction events where we think the tides may (or may not) have played a role. It is also the first time a dedicated proxy related to tides will be applied to simulations of the deep past.

Two NERC Highlight Topic awards to Ocean Sciences

Researchers within Ocean Sciences were among the few to be awarded NERC Highlight Topic awards.

Tom Davies is leading a consortium including Ocean Sciences, Plymouth Marine Lab, Southampton and Strathclyde who have been awarded a £1.7M award to study *Artificial Light Impacts on Coastal Ecosystems*. £794K will come to the Ocean Sciences team which also includes Stuart Jenkins, Luis Gimenez and Line Cordes.

Peter Golyshin, Davey Jones, David Thomas, Peter Robins and Bela Paizs who are part of a consortium (led by Stirling) were also awarded a £1.5M grant to study *Microbial hitch-hikers of marine plastics: the survival, persistence & ecology of microbial communities in the Plastisphere*. £479K will come to this College-spanning team.

David Thomas the Head of School said about the awards:

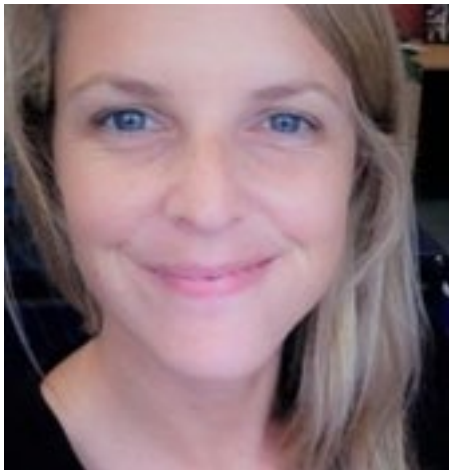
"The success rate for the round was 21% and so these two awards are an excellent outcome."

Marine Energy Engineering Centre of Excellence (MEECE)

Simon Neill won a successful bid for a major new project in Ocean Sciences: *Marine Energy Engineering Centre of Excellence (MEECE).*

The whole project is worth £5M from the ERDF West Wales and the Valleys European Regional Development Fund. £614k of this will come to Bangor. The 44 month project aims to accelerate the commercialization of marine energy technologies in Wales. This will help the Welsh supply chain capture the maximum value from this industry, and help ensure that Wales captures and embeds knowledge and expertise in its supply chain.

Marie Curie Fellowship awarded to ex-Ocean Sciences student to return to Ocean Sciences



MSc student Laura Richardson (MSc Marine Environmental Protection 2010) has been awarded a Marie Skłodowska-Curie Individual Fellowship to return to Ocean Sciences to work on a research project with Gareth Williams and Adel Heenan.

The study *Disentangling Cross-Scale Drivers of Coral Reef Fish Community Structure for Ecosystem-Based Management* will run over two years in collaboration with the National Oceanic and Atmospheric Administration's (NOAA) Ecosystem Sciences Division in Hawaii.

WORKSHOPS

SEACAMS Stakeholder Workshop by Guy Walker-Springett

SEACAMS2 convened a stakeholder workshop in Cardiff on 29 January.

The 40 attendees discussed a wide range of issues concerning the marine renewable energy sector including the challenges of data gathering in high risk, high energy regions of the shelf, identification of data gaps hindering the consenting process, optimising the efficiency of the consenting process for small companies, and the potential for complementary development of electricity generation and aquaculture in coastal waters.

The workshop was followed by a Renewable Energy Summit at Swansea University, attended by all principal players in the industry in Wales, at which Colin Jago gave an invited talk on SEACAMS2. The summit was opened by the First Minister Mark Drakeford who emphasised his commitment to marine renewable energy as a high priority for Wales; interestingly, he expressed his view that, while environmental health and sustainability were paramount, the environmental bars for consent must not be set so high as to hold back the development of the industry.

SEACAMS2 and Marine Scotland Science knowledge exchange workshop – by Alice Goward Brown

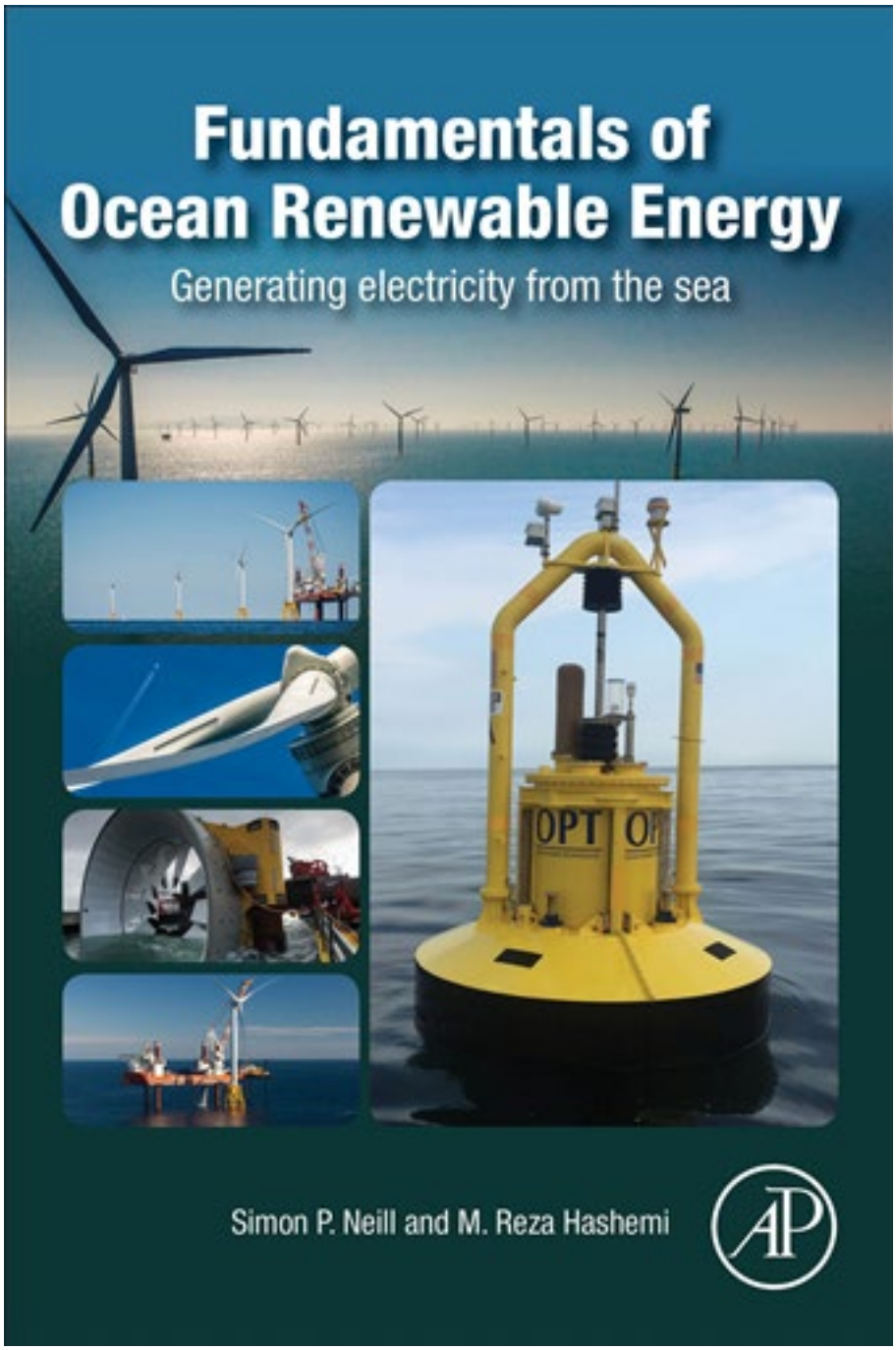
On the 2nd November 2018, Alice Goward Brown and Sophie Ward from the SEACAMS2 project, along with Rory O'Hara Murray (Marine Scotland Science), convened a knowledge exchange workshop as part of the MASTS annual science meeting at the Technology and Innovation Centre in Glasgow.

The workshop brought together 32 academics, technicians, technologists and marine renewable energy developers from far flung places including Orkney, Canada and Australia, to discuss challenges faced conducting fieldwork in tidal stream sites. The day was opened by Rory who began with a short presentation on the motivations behind the workshop. This was followed by 6 keynote presentations interspersed by three breakout sessions, where there were lively discussions between groups identifying how they would best solve the problems they were given. Key points of discussion were mooring design and equipment choice, vessel selection, post-processing of data and resource sharing between different research disciplines and the commercial sector and academia. The day concluded with a Q+A between a panel made up of the key note speakers and session chairs. The workshop was part-funded by the Interreg Atlantic Area, ERDF-funded project MONITOR and came about through a collaboration between Marine Scotland Science and the SEACAMS2 project.

If you would like to find out more: the executive summary of the meeting along with some of the keynote presentations can be found here:
https://www.dropbox.com/sh/y1xugcsm4owcd8l/AAB2tEmCN1d3jJZSe6ByDikTa

OTHER NEWS

New Textbook on Ocean Renewable Energy



Simon Neill, in collaboration with his colleague Reza Hashemi at the University of Rhode Island, has published a textbook on ocean renewable energy. The book focuses on wave and tidal energy, but includes chapters on offshore wind, OTEC and ocean currents, and covers modelling and observations. The book includes several case studies of wave and tidal energy developed in SOS over the last few years including Galway Bay (waves) and Orkney (tides). The chapter on observations includes many examples and photographs of fieldwork in SOS over the last few years, including deployments from the Prince Madog. The book, "Fundamentals of Ocean Renewable Energy: Generating Electricity from the Sea", is published by Elsevier, under the Academic Press imprint.

"The book is based on our extensive research, teaching, and collaborations with the ocean renewable energy industry", explains Simon. "Both Reza and myself run modules and programmes in ocean energy at undergraduate and postgraduate levels."

Reza Hashemi was a staff member in SOS from 2012-2014, during which he completed his (second) PhD by published works.

Ex Bangor student now a Professor in Liverpool

Claire Mahaffy (Marine Biology and Oceanography, 1995-1998) is now a Professor in Ocean Sciences at Liverpool.

New wave buoy successfully deployed

The Bangor University SEACAMS waverider wave buoy has been successfully deployed to the north of Holyhead harbour by the School of Ocean Sciences research vessel Prince Madog.

If you wish to view the wave climate off north west Anglesey please visit http://wavenet.cefas.co.uk/Map and click on the red arrow near Holyhead. These data will also be available through the Universities iMARDIS data portal as well: www.imardis.org.

Ex Bangor MB student makes Fisheries minister for Maldives

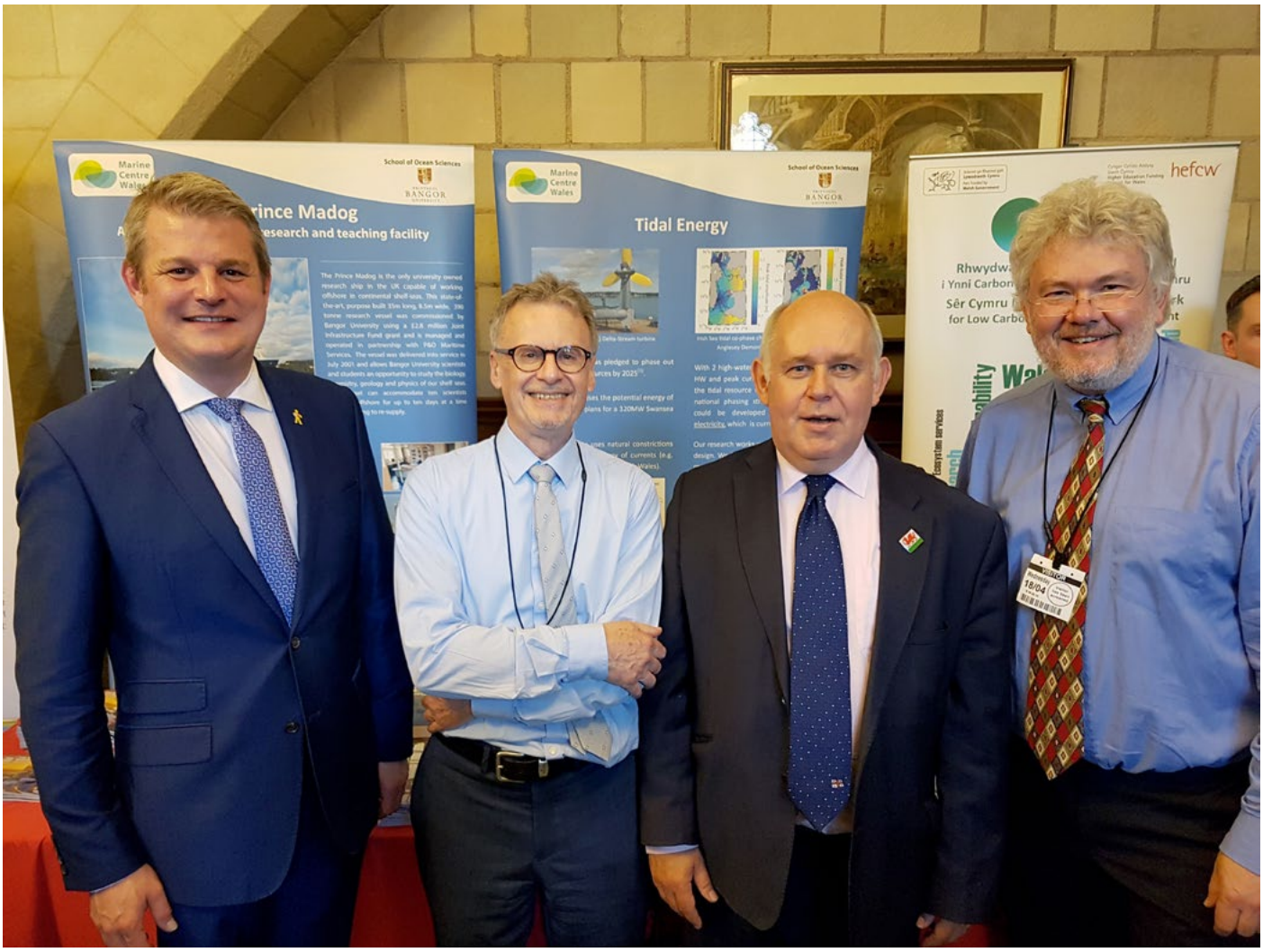
Zaha Waheed (BSc Marine Biology and Oceanography) has been made the Project Director of the Sustainable Fisheries Resources Development Project within the Ministry of Fisheries and Agriculture, in Male, Maldives.

The position is supported by the World Bank.

Anglesey Day

Head of School and NRN-LCEE Director Prof. David Thomas and Prof Colin Jago, Director of Seacam2 project represented the Network and SOS with a stand on the last Anglesey Day at Westminster Hall.

The event (with a Sea theme) was hosted by Albert Owen MP at Westminster Hall. The day attracted a constant stream of visitors who had an opportunity to learn more about the NRN-LCEE and its research. In particular, Professor Thomas met with Albert Owen MP, Stuart Andrew MP the Parliamentary Under-Secretary (Wales Office), Christina Rees MP the Shadow Secretary of State for Wales and Greg Clark MP the Secretary of State for Business, Energy and Industrial Strategy.



Stuart Andrew MP, Prof. Colin Jago from Bangor University, Albert Owen MP and Prof. David Thomas at the NRN-LCEE/ SOS stand on Anglesey Day

SCIENCE OUTREACH

Rhwydwaith Ymchwil Cenedlaethol
i Ynni Carbon Isel a'r Amgylchedd Sêr Cymru
Sêr Cymru National Research Network
for Low Carbon, Energy and Environment
www.nrn-lcee.ac.uk

Year of the Sea Lecture Series

Several staff members from Ocean Sciences gave talks at the Mostyn Gallery in Llandudno as part of public outreach lecture series sponsored by the Sêr Cymru National Research Network for Low Carbon, Energy and Environment.

The lectures were presented by leading marine scientists, all internationally recognised experts in their respective fields. The lectures examined the diversity of life in our oceans and showed how research is addressing areas of current concern. Lecture topics and video links to the lectures themselves can be found here:

Life inside Antarctic and Arctic pack ice - a talk by David Thomas at MOSTYN on 27 September 2018
https://www.mostyn.org/event/life-inside-antarctic-arctic-pack-ice

The ecology and management of marine aliens - a talk by Stuart Jenkins at MOSTYN on 11 October 2018
https://www.mostyn.org/event/ecology-and-management-marine-aliens

Sustainable farming of the sea – from global to local - a talk by Lewis LeVay at MOSTYN on 25 October 2018
https://www.mostyn.org/event/sustainable-farming-sea-–-global-local

Tides, snowballs and evolution - a talk by Mattias Green at MOSTYN on 8 November 2018
https://www.mostyn.org/event/tides-snowballs-and-evolution

The acoustic world of marine mammals - a talk by Line Cordes at MOSTYN on 22 November 2018
https://www.mostyn.org/event/acoustic-world-marine-mammals

Exploring and learning from the most remote coral reefs on Earth - a talk by Gareth Williams at MOSTYN on 6 December 2018
https://www.mostyn.org/event/exploring-and-learning-most-remote-coral-reefs-earth

Art, Aesthetics, Architecture and Algae - a talk by David Thomas at MOSTYN on 13 December 2018
https://www.mostyn.org/event/art-aesthetics-architecture-and-algae-0

MEDIA COVERAGE

Arctic Climate Change

Yueng Lenn
https://www.changing-arctic-ocean.ac.uk/outreach/blogs/clip-bbc-news-live-interview/

https://journals.ametsoc.org/doi/full/10.1175/JPO-D-18-0003.1

http://theconversation.com/extreme-weather-in-europe-linked-to-less-sea-ice-and-warming-in-the-barents-sea-100628

This is what Earth might look like when the next supercontinent forms (The Conversation)

Mattias Green
https://theconversation.com/what-planet-earth-might-look-like-when-the-next-supercontinent-forms-four-scenarios-107454

Scientists Call for “Radical Shift in Thinking” in Coral Reef Ecology

Gareth Williams
https://www.ecomagazine.com/news/science/scientists-call-for-radical-shift-in-thinking-in-coral-reef-ecology

https://phys.org/news/2019-02-coral-reefs-affected-socio-economics.html

Why foraging for free is food for the soul

Lis Morris-Webb
https://theconversation.com/why-foraging-for-free-is-food-for-the-soul-109044

https://www.metro.news/why-foraging-for-free-is-food-for-the-soul/1384664/

https://uk.news.yahoo.com/why-foraging-free-food-soul-161028457.html

https://www.timesofmalta.com/articles/view/20190110/life-features/why-foraging-for-free-is-food-for-the-soul.698861

https://www.blacknewsglobal.com/why-foraging-for-free-is-food-for-the-soul-times-of-malta/

Tracking coral feeding habits from space (The Conversation)

Gareth Williams
https://theconversation.com/we-tracked-coral-feeding-habits-from-space-to-find-out-which-reefs-could-be-more-resilient-105107

Wylfa Newydd tunnel test gives 'unique' geology study

Michael Roberts
https://www.bbc.co.uk/news/uk-wales-46296502
http://www.thebangoraye.com/menai-strait-tunnel-tests-give-geologists-unique-opportunity/

Some Seabirds Thrive At The Margins – How Tidal Fronts Are A 'Goldilocks Zone' For Hungry Marine Animals

James Waggitt
http://theterramarproject.org/daily-catch/some-seabirds-thrive-at-the-margins-how-tidal-fronts-are-a-goldilocks-zone-for-hungry-marine-animals/

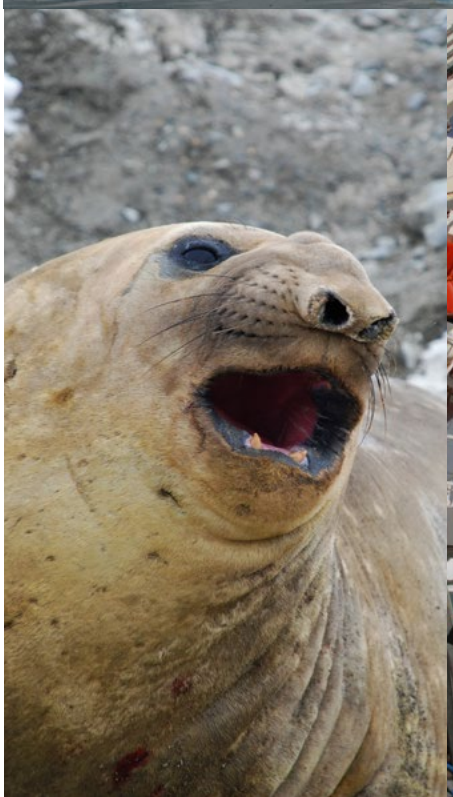
German U-boat sunk off the coast of Wales on Christmas Day 1917 is pictured for the first time using sonar imaging technology

https://www.dailymail.co.uk/sciencetech/article-6299973/German-U-boat-sunk-coast-Wales-Christmas-Day-1917-pictured-time.html

ANTARCTIC ADVENTURE

by Stuart Jenkins

The School of Ocean Science's participation in the NERC funded 'ICEBERGS' project 'Impacts of deglaciation on benthic marine ecosystems in Antarctica' took its second step into the deep south at the end of 2018 when Kate Retallick, Ben Lincoln and Stuart Jenkins spent 5 weeks aboard the RRS James Clark Ross (the JCR).



Prior to this Katrien van Landeghem and Phil Hollyman had undertaken a similar journey on the first ICEBERGS' cruise in 2017.

The ICEBERGS project is a collaboration between Bangor, Exeter, the British Antarctic Survey and Chilean researchers based in Concepcion. Its goal is to explore the benthic environment in coastal fjords of the Antarctic Peninsula with a known history of glacial retreat. Our cruise combined the goals of ICEBERGS with four satellite projects in physical oceanography, microplastics and palaeoclimatology plus the RaCE:TraX project which aimed to characterize the dissolved and particulate components of glacial melt water.

The journey began with a diverse range of marine scientists meeting at RAF Brize Norton in late November 2018 to take a bumpy flight, via a refuelling stop in Cape Verde, to the Falkland Islands where we boarded the JCR.

Our cruise took us from the Falklands south to our first sampling site – Burdwood Bank- where under the guidance of colleagues from SAERI (South Atlantic Environmental Research Institute) we used Agassiz trawls and multi-beam to gather data which will be used in furthering the spatial management of these areas. Following this we made progress through a rather rough Drake's Passage before rounding Elephant Island and then finally finding calm seas at our first ICEBERGS' sampling site, Marian Cove on King George Island.

Our science began with four busy days, which would be repeated at two additional locations further south: Börgen Bay, Anvers Island and Sheldon Cove, Adelaide Island. Each 4 day period of science flew by with a range of different science activities, interruptions to view exciting wildlife, bewildered body clocks working through the Antarctic summer night and a general feel-good atmosphere of scientists working together toward a common goal. We all enjoyed escaping the ship environment on a 3 day visit to the British Rothera Research Station and a quick trip to visit American colleagues at Palmer Station. Christmas Day at sea, complete with traditional dinner and a Ceilidh in the ship's hold, and finally New Years Eve in Punta Arenas, Chile completed our Antarctic adventure.

SUSTAINABLE MARINE AQUACULTURE IN VANUATU

Developing community capacity sustainable marine aquaculture in Vanuatu, by Ronan Roche

In 2018, I was lucky enough to be awarded a scoping award in round 24 of the Darwin Initiative program—a UK government grants scheme funded by DEFRA and DFID. This funding scheme has a challenging aim, which is to find projects that can simultaneously protect biodiversity and the natural environment, whilst working to alleviate poverty in local communities across the globe.

Figure 1. Mr. Sompert Geereva from the Fisheries Department examining giant clams at a community hatchery facility near Port Vila.

The objective of the scoping awards, which run over 6 months to 1 year, is to enable information gathering and to facilitate the establishment of contacts and working relationships to work towards full Darwin Initiative project proposals which are larger and typically run over a 3 year time frame.

The School of Ocean Sciences has connections to Vanuatu via past students from the South Pacific region, and this project sought to expand on these connections to leverage funding and develop practical projects that would benefit local communities in Vanuatu.

The initial project ideas developed from a series of discussions between Dr. Nick Jones, Dr. Tom Galley, Prof Lewis LeVay and myself, to identify the skills and expertise within the School of Ocean Sciences, which would be most applicable to the expanding range of mariculture activities taking place within coastal communities around Vanuatu.

The largest influence on mariculture development in Vanuatu within the last decade has been the destruction caused by tropical cyclone PAM in 2015; the second most intense cyclone within the South Pacific Ocean, and amongst the most severe natural disasters ever experienced by Vanuatu. It directly hit the government mariculture hatchery in the capital of Port Vila, effectively destroying the hatchery and with it the ability to provide a reliable supply of larvae to communities for a range of marine organisms, including giant clams, Trochus, and sea cucumbers.

Figure 2. Carrying out semi-structured interviews on aquaculture and community issues with village leaders.

The giant clam is part of the cultural heritage of the South Pacific Islands, but is functionally extinct in the wild in Vanuatu. Several species are found within Vanuatu and all have been traditionally harvested as a food source in the past. Now the clams are far more valuable as part of the international marine ornamental aquarium industry, and the clams grown by communities have reached the export market in the past, prior to Cyclone PAM.

During our time in Vanuatu we worked closely with Mr. Robert Jimmy from the Secretariat of the Pacific Community and Mr. Sompert Geereva from the Vanuatu national fisheries department. We visited potential sites and meet with local communities across several islands of the Archipelago. Ideas developed rapidly during the course of the visit. We learned how valuable the sales of giant clam had been, and how the export relied on private export companies who had left Vanuatu since cyclone PAM. It seemed that the supply chain which previously existed linking coastal communities had been broken, and we felt that a project to reintroduce new species of giant clam into the wild at suitable locations and to find ways of re-establishing international export chains to allow communities to benefit from the harvest of clams should be the focus of our main Darwin Initiative application.

We will be working with our colleagues in Vanuatu over the course of this year to bring these ideas together, and are looking forward to a range of future collaborations within the South Pacific region.

Figure 3. Prof Lewis LeVay and Mr. Sompert Geereva examing potential sites for mariculture activities.

ALUMNI ASSOCIATION - CHAIR'S MESSAGE

Increase SOS/Industry Collaboration

Since becoming Chair of the School of Ocean Sciences Alumni Association (SOSA) in 2009, I have been a strong advocate of closer industry/academia collaboration.

"I believe the School is now poised for closer and mutually beneficial co-operation with industry and I invite our alumni in the sector to participate and to help us develop this global SOS/Industry collaboration opportunity."

Universities are experts in the provision of tertiary education and are at the forefront of ground-breaking research, but they are in the midst of considerable change. Industry thrives on good people, innovation and the application of the kind of research performed only in universities. SOS has huge success in working with industry, especially in recent years, as evidenced by the work in CAMS, SEACAMS, the new Shellfish Center and the marine renewable sector, to name but a few. However, encouraging more industry-SOS is essential for maintaining forward momentum in an increasingly competitive world.

The School of Ocean Sciences (SOS) is a world-leading marine science teaching and research organisation. Over the years, it has produced a wealth of industry luminaries in the field of marine science. Indeed, there are so many SOS graduates in the sector, placed around the world, that we are affectionately known as the "Bangor Mafia". I believe the School is now poised for closer and mutually beneficial co-operation with industry and I invite our alumni in the sector to participate and to help us develop this global SOS/Industry collaboration opportunity. If you are in a decision-making capacity in an industry or company with collaboration potential, have ideas, or want to make a contribution to this effort, let's talk!

In 2018, we took a decision to collaborate and combine the newsletter of SOSA – The Bridge – with the SOS newsletter to bring the SOS and its Alumni closer together. The first edition was warmly received and we now plan to produce this combined newsletter bi-annually in digital format. It is distributed to some 3,000+ alumni, SOS staff and students; one of the largest cohorts of marine scientists in the world. So, in addition to the newsletter, how can we move to closer collaboration? I have provided a few pointers below but invite staff, students and alumni to provide us with your ideas.

The School of Ocean Sciences:

- Great source of highly trained marine scientists; recruitment opportunity
- World-leading research personnel and facilities including a fully equipped research vessel
- Great source of knowledge of the science of the world's marine environment

Marine Science Industry:

- Great work opportunities for marine science graduates
- Source of funding for research and/or student support
- Source of potential research projects
- Source of input to technical aspects of teaching programmes to ensure they are fit-for-purpose for the commercial world
- Work experience opportunities
- Source of guest speakers for student courses
- Careers advice for graduates

If you are interested in pursuing such a collaboration please contact either me at mick@mickcook.com and/or Katrien Van Landegham (k.v.landeghem@bangor.ac.uk) who heads up the employability initiative for SOS.

Mick Cook (Physical Oceanography MSc, 1980)
Chair of the School of Ocean Sciences Alumni Association

NEWS FROM OUR ALUMNI AROUND THE WORLD

Emma Bagnall (Marine Biology, 2014)

"The range of work I have been involved in since graduating from Bangor has been truly fantastic."

"As a keen SCUBA diver (PADI Divemaster) and all-round outdoor enthusiast growing up on the UK coast, I have strived to focus my profession around understanding the ocean and how humans interact with it."

"After completing my undergraduate degree in Marine Biology (First Class Honours, BSc) from Bangor University in 2014, I did a Masters degree in Marine Ecosystem Management (MSc) at University of St Andrews and Scottish Association of Marine Science (SAMS). I then went straight into industry with my first 'real marine' job working as a Marine (Fisheries) Enforcement Officer for the Marine Management Organisation, DEFRA (MMO) in Plymouth. In 2017, I took the bold decision to leave Plymouth and move out to Madagascar, where I worked as the Marine Science Manager for the Madagascar Research and Conservation Institute (MRCI). During that time, I helped to build the marine program's research capabilities and external partnerships and ran multiple coral reef restoration and MPA monitoring projects. I returned to the UK in 2018, as the Blue Planet II 'Plastic Oceans' special hit the UK press, which led to fantastic work experience as an Environmental Consultant for a plastics packaging company in Cornwall. The range of work I have been fortunate enough to be involved in, since graduating from Bangor has been truly fantastic, and I feel has all contributed to leading me to my current position.

This January (2019), I started a new job, back in Plymouth, as the leading Fisheries Officer for the Shark Trust - a UK based charity working towards shark, skate and ray conservation and sustainable fisheries management on a UK and international scale. I love my job - I get to combine my interests in shark biology, conservation and fisheries and put them towards worthwhile projects. Every day is different, ranging from dissections to report writing to meetings and conferences with industry and scientific experts around the world. I continue with scuba diving here in the UK, have joined the local Gig Rowing club and still get involved in Beach Cleans and campaigning to reduce plastic waste. I look forward seeing to what the future holds, and encourage any budding Marine Biology students not to give up, finding the work in our field is tough (and is not achieved without -in my case- a fair few bar shifts, filling pasties and receiving frustrating rejection emails), but the reward is absolutely worth it."

Karin Lochte
(Marine Biology PhD, 1981)

"...we scientists have the duty to make our often complicated scientific problems visible and understandable for everyone. We should not underestimate its power."

"When I was a student at the University College in North Wales in Bangor (in the last century!) I did not expect where my scientific work would lead me."

"As a Marine Biologist I had the chance to do research in boreal, tropical and polar oceans. The most fascinating work was, however, in the Southern Ocean and the Arctic Ocean. It is an incredible experience for any scientist to see the massive changes that are happening in the Arctic. Both environmental and economic changes have now focussed the attention of people more and more on the Arctic and its ocean.

As past director of the Alfred-Wegener-Institute for Polar and Marine Research in Bremerhaven, Germany (https://www.awi.de), I had the chance to accompany politicians from Germany to the Arctic and show them how the glaciers on Svalbard and Greenland have already retreated, how small the sea ice cover has become and how the ecosystem is changing. Although the ministers knew of course about the effects of climate change in the Arctic, it was visible how deeply impressed they were when they realized what it means in reality. It has helped them to understand how important research in these regions is before industry starts to drill for oil or opens up shipping routes. It became clear that it is necessary to provide the best scientific advice before any industrial use of the resources of the Arctic should be allowed. These experiences with people in power demonstrated to me and my colleagues that we scientists have the duty to make our often complicated scientific problems visible and understandable for everyone. We should not underestimate its power."

Karin (right) in 2008 with the then Ministers of Science of Norway, India and Germany.

Mike Pigott
(Geological Oceanography, 1997)

"North Wales is special for me. I grew up in Sheffield, rock climbing in the Peak District and when it came to my choice of university, Bangor University was the obvious choice to pursue my passion for geology, whilst having the mountain crags of Snowdonia and the sea cliffs of Ynys Mon as my playground."

"Most recently I was attracted to Rolls-Royce in 2018 as Civil Nuclear Engineering Projects Director, a UK wide role."

"I graduated in 1997 with BSc (Hons) in Geological Oceanography and took my first career steps as Offshore Processing Geophysicist in the Southern Atlantic Ocean, offshore Argentina and the Falkland Islands, 6 weeks on, 6 weeks off. In 2000, I jumped ship and took my technical skills into the UK rail asset management environment when Railtrack were struggling to understand what they had and what condition it was in, while there I slipped into project management. By 2004, the UK nuclear industry was trying to understand its total civil nuclear liability and I moved back to Snowdonia, working at Magnox Wylfa Site, as Site Programme Manager with accountability for ~£100M annual spend. I then took a 2 year secondment to the Office for Nuclear Regulation, implementing a modern programme management methodology. This led me into nuclear new build, which opened up an opportunity in 2015 to work with Hitachi-GE and Horizon Nuclear Power on the development of Wylfa Newydd, regularly travelling and working in Japan. Most recently I was attracted to Rolls-Royce in 2018 as Civil Nuclear Engineering Projects Director, a UK wide role Bangor University unlocked a tremendously rewarding career path, working on the most fascinating projects, varied and challenging locations, however, most importantly of all, it is where I met my wife and our lifelong friends, in the Bangor University Mountaineering Society (BUMS).

I'm really keen to help a new generation into UK infrastructure and can be contacted via LinkedIn http://linkedin.com/in/mikejpigott.

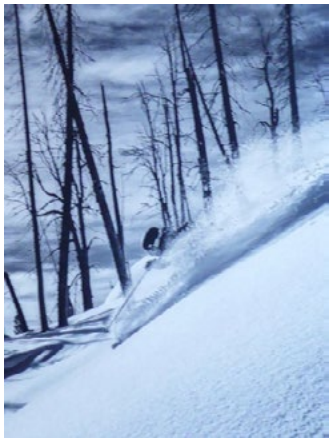
Ernst (Manuel) Nicolaus
(Marine Biology/ Zoology, 2006)

"I am still enjoying working at Cefas (an executive agency to defra).

"Over the last two years a team of many scientists of the defra family have been involved with the updated intermediate assessment for the Marine Strategy Framework Directive."

"Over the last two years a team of many scientists of the defra family have been involved with the updated intermediate assessment for the Marine Strategy Framework Directive. Within the Clean Safe Seas Evidence Group we lead the compilation of the assessments for eutrophication, contaminants, litter and noise. I was especially involved in some of the contaminant indicator assessments. They will be published later this year and provide an in depth analysis of the environmental status of the UK seas. Part of the data gathering process within England and Wales forms the annual Clean Seas Environmental Monitoring Programme survey which I currently lead as the Scientist in Charge. This survey also helps me to stay in touch with scientists from the School of Ocean Sciences (James Waggitt) who is heavily involved in a Marine Mammal and Bird Observation programme we try to support by providing a platform during this survey."

"I was offered a job mapping the soils of some boggy, midge-infested part of Scotland but despite the fact that I come from the highlands... I turned that one down."



Stuart on a downhill slope

Stuart Stephen
(Soil Science & Oceanography, 1980)

"I was the first person to do a joint honours in Oceanography and Soil Science at Bangor in the late 1970's / early 1980's; maybe the first in the world to mix the salt and the soil! I lived on a beach on Anglesey and loved my time in Wales."

"Obviously, I became a toy buyer when I graduated! I was offered a job mapping the soils of some boggy, midge-infested part of Scotland but despite the fact that I come from the highlands... I turned that one down. I went on to work for four retailers and two pharmaceutical firms, did an MBO and worked as a consultant for a while before retiring to be a ski bum in France and Canada. I picked up a couple of postgraduate qualifications (including the delightfully named Diploma Institute of Marketing), an MBA., mountain guiding and ski instructing qualifications I worked all over the world, set up a ski business on the side, did my "gap" year at 47 and now live between Canada and the Lake District. So the career ladder is not always straight up, and there have been many downwards snakes, but if you keep learning, keep working hard and use your imagination... an Oceanography degree is a good place to start! I would love to hear from fellow grads in my time at Bangor who may still have the memory cells left to remember me. You can email me at: stuski@me.com "

"In 2007, I founded BNRG Renewables, an international renewable energy company. BNRG is based in Dublin, Ireland..."

David Maguire
(Marine Environmental Protection, 1997)

"After graduating from School of Ocean Sciences, I spent 15 years in consultancy and 3 years running the R&D division of the Environmental Protection Agency in Ireland before going back into the private sector. "

"In 2007 I founded BNRG Renewables, an international renewable energy company. BNRG is based in Dublin, Ireland with a solid track record of successfully delivering in multiple markets simultaneously. The Company has developed, financed and constructed over 125 MW of ground mounted and rooftop projects comprising approximately US$285 million in value in the UK, Northern Ireland, Bulgaria, Greece, and the US and is currently constructing a 24 MW portfolio of projects in Oregon, USA. Every project that BNRG has completed has exceeded its initial performance projections. Furthermore, at BNRG we insist that every project that we construct enhances the local biodiversity. The Company has a portfolio of 750 MW of projects under development in Ireland, the USA and Australia."

"My PhD is part of a larger project working to restore the native oyster to the Dornoch firth (The Dornoch Environmental Enhancement Project)"

Hannah Lee
(Marine Biology and Zoology, 2016 / MSc Marine Biology, 2017)

"I would say I'm a double alumna... I joined the School of Ocean Sciences back in 2013 to study Marine Biology & Zoology and fell in love with Wales."

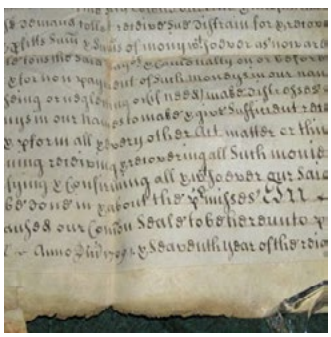
"This led to me staying on to complete my MSc in Marine Biology (one of the busiest years of my life, until the PhD). My Masters research was carried out under the guidance of Professor Chris Richardson, Dr Phil Holyman and Dr Luis Gimenez looking at phenotypic variation in bivalves due to hypoxic conditions. Between this and working with the marine invertebrate team at Cardiff Museum I would say a fascination with bivalves was ignited!

Fast forward a year and a half since I left Bangor and I'm 11 months into my PhD looking at the role of native bivalve beds as carbon stores. My PhD has been an absolute whirlwind so far with time spent above and below the waves all over Scotland as well as time spent surrounded by the media! My PhD is part of a larger project working to restore the native oyster to the Dornoch firth (The Dornoch Environmental Enhancement Project). This project is one of many across Europe which are looking to restore a key ecosystem engineer which has been lost mainly due to overfishing and the spread of disease resulting in low density remnant beds.

Read more about our project here:
https://blogs.gov.scot/marine-scotland/2018/11/16/researching-blue-carbon-meet-hannah-lee

http://www.theglenmorangiecompany.com/about-us/deep

His lab is at the forefront of studying DNA from parchment, birch-bark tar and beeswax, helping to understand new aspects of historical production and trade.



Matthew Collins
(Zoology with Marine Zoology, 1982)

Following a degree at Bangor, Prof Matthew Collins' research has taken him from marine fossils to DNA analysis of old books and manuscripts.

His lab is at the forefront of studying DNA from parchment, birch-bark tar and beeswax, helping to understand new aspects of historical production and trade. The Beast2Craft program exploits biomolecular and imaging methods, allied to craft knowledge, to document the first two stages in the story of the manuscript: the livestock and the craft that turned skins into a writing medium.

Read more about Matthew's fascinating research here:
https://www.theatlantic.com/science/archive/2019/02/dna-books-artifacts/582814

Learn more about Beast2Craft and hear Matthew talk about his work here:
https://sites.google.com/palaeome.org/ercb2c

Professor Graham Jones (Marine Chemistry/ Oceanography MSc, 1971)

"I was a student in 1970/71 undertaking an MSc in Marine Chemistry/ Oceanography with Alan Morris, John Simpson, Jack Derbyshire and Sinclair Buchan."

"I have fond memories of Menai Bridge where I took up diving with Keith Hiscock and David Lane who I keep in contact with. Other students of that year were Rod Jones (Marine Chemistry and still lives on Anglesey), Daphne, Alan and Phil Reece who did the Geotechnics course. My poor memory precludes naming others.

From Menai I went to work with Professor Dennis Burton a chemical oceanographer at the Department of Oceanography, Southampton University. He became a mentor and close friend. He took me on my first oceanographic voyage across the Atlantic Ocean and into the Caribbean Sea onboard HMS Hecla (a hydrographic ship) which was really my first introduction to the tropics. I did not like the radioactive work with Dennis so after 3 years I found myself travelling to James Cook University, Townsville, Australia with my new wife Rosemary to undertake a PhD (part-time) with Professor Cyril Burdon-Jones (a former head of Marine Biology at Menai).

This was an amazing 5 years working as a Research Officer on a metal pollution study assessing the effects of a nickel refinery on the Townsville marine environment, and doing the PhD on metal. One week in every four we would go out to our sampling stations in the three bays and collect various tropical marine organisms for analysis. I worked alongside Gary Denton who was a marine biologist and thus learnt a lot from him on the tropical organisms we collected. We had our first son Douglas in Townsville and after 5 years we returned to our home in Southampton to have our second son and be near Rosemary's parents in Christchurch.

"With a wife and 2 children I had to find a job quickly so I became a milkman! This had the advantage of being able to finish my milk round by 10.00am and continue writing-up my PhD."

With a wife and 2 children I had to find a job quickly so I became a milkman! This had the advantage of being able to finish my milk round by 10.00am and continue writing-up my PhD. The amusing part of this job was that I delivered milk to Dennis Burton! After a year we returned to Townsville where I eventually got a job as the Foundation Lecturer in Marine Chemistry at James Cook University.
I started research on a volatile trace gas called dimethylsulphide. DMS is involved in a climate feedback through the formation of low level cloud. I taught marine chemistry, chemical oceanography, and marine pollution. Together with my PhD and honours students I started the first research on DMS in coral reefs in the Great Barrier Reef where we started to amass evidence on this coral reef-cloud-feedback. I also started research on DMS in the Antarctic and was fortunate in getting this research into the Australian Antarctic Divisions strategic plan for 16 years. We made some important discoveries in the Southern Ocean, and the Antarctic sea ice zone. In 2001 after 12 years at JCU I became an Associate Professor in Geochemistry at Southern Cross University and continued my DMS research.

In the last 10 years I have concentrated my research on the Great Barrier Reef with my PhD students and I believe we are now getting closer to proving that DMS emissions from the GBR have an important part to play on the climate of NE Australia.

For those interested my publications can be accessed at "Graham Barry Jones Google citations " and a recent paper on DMS emissions from the GBR published in December 2018 can be found at Journal of Geophysical Research: Atmospheres, 123. https://doi.org/10.1029/2018JD029210, which I presented at a recent SOLAS/SCOR workshop in Rome. Not bad for a milkman!"

"I'd like to thank my lecturers in the School of Ocean Sciences for their encouragement and knowledge."

Elise Hitchcock (Marine Vertebrate Zoology MSc, 2017)

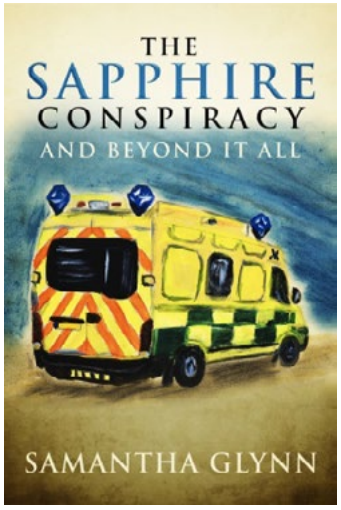
"I studied an Integrated Research Masters in Marine Vertebrate Zoology at Bangor University and graduated summer 2017. That October, I was accepted by an animal technologists' agency and started working at University College London."

"I was quickly accepted into the Fish Facility staff and became the nursery technician in the clean room (one of only two clean rooms for zebrafish in the world).

I recently wrote an article about becoming an aquatic animal technician for the International Animal Technologists Bulletin (which is edited by other members of the UCL Fish Facility staff) and became qualified to apply for a PiL with the Home Office to be able to perform regulated procedures.

Currently, I'm doing a project researching the physical results from feeding different dry food brands and taking the initial findings to the International Animal Technologists congress in April this year.
I never thought I'd end up in a job I love so quickly after finishing uni, so I'd like to thank my lecturers in the School of Ocean Sciences for their encouragement and knowledge."

"I wrote a book about my experience which is now available on Amazon and I am hoping to write another one which looks at some of my fun experiences at Bangor University."



Samantha Glynn (née Farndon) (Marine Biology, 1996)

"After graduating with a 2:1 in Marine Biology in 1996 I got a job at Pfizer in Kent."

"I was there for 11 years and had the opportunity to do environmental testing. I also did some volunteer work for the Thanet Coast Project which led to me training to be a teacher. I loved passing on my enthusiasm for science but becoming a teacher was one of the hardest things I've ever done and during my NQT year I had a breakdown. I have suffered with anxiety ever since and found that writing helped me get over the worst of it. I wrote a book about my experience which is now available on Amazon and I am hoping to write another one which looks at some of my fun experiences at Bangor University. I met some good friends there and then my husband in the second year at Bangor; we now have two sons aged 16 and 14. I am hoping that my book will be helpful to lots of people.

I know I didn't get to work studying dolphins in America which was one of my initial plans but Bangor gave me so much more in the way of life experiences and personal qualities."

"My memoir The Loneliness of the Long Distance Book Runner was published in 2011. It had good sales and won Wales' Book of the Month (Welsh Books Council.)"

Bill Rees (Marine Biology, 1986)

"I live between Bangor (North Wales) and Le Vigan (South of France), and make a precarious living by selling used books."

"I studied at UCNW and Birkbeck College. I worked as a reporter for a local newspaper in London before the lure of travel and bookselling led me to take a less conventional path. My memoir The Loneliness of the Long Distance Book Runner was published in 2011. It had good sales and won Wales' Book of the Month (Welsh Books Council.) My travel book Rebel Land - A Portrait of the Cévennes was published a few years later. I have several other books, including On Ping and Other Addictions. https://www.amazon.co.uk/Ping-Pong-Other-Addictions/dp/1976955793".

Photo: Sailing the Wayfarer somewhere near the mouth of the Hamble.

Sarah Brightwell (nee Rutt) (Ocean Science, 1998)

"I'm now settled in Southampton, where I've been since escaping London after my Master's in 2000, and have two amazing teenage boys."

"I'm currently a money adviser and manager for Citizens Advice, which I love; the maths has come in handy - the average housing benefit calculation is far more complicated than the partial differential equations that were thrown at us in 3rd year physical oceanography. I've discovered sailing (why on earth I didn't do this in Bangor is beyond me) and spend as much of my summer on the Solent as possible in Lasers, Wayfarers and whatever else we can lay our hands on. Boat Tetris is an annual challenge as we try to figure out where to put them all for the winter!

I spend most of my winter painting and drawing, and have my first big solo show coming up this summer - my love of surrealism, shiny things and glow stars hasn't changed a bit, and stuff that was on my walls at uni is slowly finding its way onto my canvasses. I also co-organise the Gypsyjam Collective, a small group making decor and interactive art installations for festivals and arts events, including some pretty large-scale projects. I don't get to play science any more, but instead deal with exciting questions such as "What colour is G#?", "How are we going to get this spaceship into that tree?" and my favourite, "Is it even possible to make a xylophone beater that punters can't actually break?!" (Answer: yes, but it took us 6 years).

The river next to the slipway where we sail regularly, with Northam Bridge in the background; and sailing the Wayfarer somewhere near the mouth of the Hamble.

I'd love to hear from old friends and classmates so please do get in touch. You can find me via the Gypsyjam Collective on Facebook, or my art page, Sarah Phoenix Art."

First boat trip out; Photo credit P. Griffin

Nadescha Zwerschke (Marine Environmental Protection MSc, 2011)

"The 7 years after I completed my Masters in Marine Environmental Protection at Bangor University were a string of incredible highs and devastating lows."

Being offered and completing a PhD in marine Ecology at Queen's University Belfast was definitely one of the highs. Yet being unable to find a suitable postdoc afterwards was an incredible difficult period. Riddled with imposter syndrome I muddled myself through, working 14 h days on construction sites while trying to write up papers and grant applications, heavily relying on my safety net of relatives and friends while constantly questioning my life choices.

After two years, I was ready to give up on an academic career when I saw a job advert for a Marine Biologist at the British Antarctic Survey (BAS). Not only was the job description very much tailored to my skill set – it offered an 18-month stint to Antarctica! Thinking I got nothing to lose, I applied for the job and got offered an interview. Leaving nothing to chance I made my way to Cambridge for half a day of interviews, medicals and kitting-out sessions. I got offered the job 2 days later. After 5-month in Cambridge, preparing my project on Antarctic benthic foodwebs, as well as training for life in such a remote and extremely hostile environment,

Boarding the JCR in the Falklands

I found myself on the James Clark Ross (the BAS owned research vessel) steaming from the Falklands to Adelaide Island and my new home Rothera (the biggest BAS Research station). During my journey South I was lucky enough to participate on a research cruise and was able to already collect data.

I arrived at Rothera on Christmas Eve 2018 and since then I have been spoiled rotten with opportunities, most Marine Ecologist would give their right hand to experience and see. Not only are sighting of charismatic megafauna (such as Orcas, Humpback whales, Adelie Penguins and many, many different seals) a daily part of life, but one of the main roles of my job involves diving in this incredible and unspoiled environment. Although it is extremely demanding to work in waters that are between 0 and -1°C and experience some of the greatest plankton blooms on the planet we are generally welcomed back on board with hot tea and chocolate before zooming past icebergs on the way back to base. And even after two months of living in this spectacular place, I still get stunned by the view out my office window and want to pinch myself every time I am about to roll of the boat into the icy water. Having experienced such difficulties in kick starting my career, I am very aware of how privileged I am to be here now (hell, I would have done the job for free) and am determined to make the absolute most of this once in a life-time chance. As the days shorten and the nights return we are starting to get our first whiffs of winter which I will spend here with a team of 23 (a severe cut-down from the 160 people on station during the summer season).

Another day in the office; Photo credit A. Reichards

This will bring on completely new experiences and challenges, such as diving through sea ice in crystal clear waters and periods of no daylight.
So watch this space for my return to civilisation in about a years' time!"

Emma Keen
(Marine Biology and Oceanography, 2017)

Cambodian Marine Mammal Conservation Project

"I graduated from the School of Ocean Sciences in 2017, having completed and masters in marine biology and oceanography. I am working specifically on the Cambodian Marine Mammal Conservation Project (CMMCP) at MCC."

"Ground breaking research? Outreach in developing countries? Educating small coastal subsistence fishing communities? Protecting important marine habitats? Creating Protected Areas? Here at Marine Conservation Cambodia (MCC), a small NGO based on the island of Koh Ach Seh in the Kep Archipelago, we do these things and more! Through multiple projects, including seahorse and seagrass mapping, reef and fish surveys, artificial structures and floating fish aggregation devices, the coastal waters of Cambodia are slowly being protected from IUU fishing.

I graduated from the School of Ocean Sciences in 2017, having completed and masters in marine biology and oceanography. I am working specifically on the Cambodian Marine Mammal Conservation Project (CMMCP) at MCC. The coastal Irrawaddy dolphins, especially in Cambodia, have had very little research focus. CMMCP has confirmed the presence of Irrawaddy dolphins, and progress is being made in defining the population, residency patterns, and habitat use of these endangered but once widespread dolphins. Through this knowledge, and bridging the gap between fishermen and dolphin, and trying to inform the government about IUU fishing, we can start to protect the species. A Marine Fisheries Management Area (MFMA – the Cambodian equivalent of an MPA) has already been established, and the area has officially been recognised as a hope spot by Mission Blue, the marine conservation initiative started by Dr Sylvia Earle. The IUCN (International Union on the Conservation of Nature) has also recognised the area along with the province across the border in Vietnam as a transboundary Important Marine Mammal Area (IMMA). This does not mean our work is over, and soon we are hoping to start mapping dugong presence, as another endangered species that was once abundant in the area, they are rarely spotted any more. We are constantly working to stop the IUU fishing which is destroying the coastal communities of Cambodia.

If you want to get in touch, have any ideas about how we can achieve our dreams, know of any grants we can apply for, have any knowledge you would like to share with us, want to come and volunteer with us, would like to donate to our project, or anything else you can think of, send us an email: seahorseconservation@gmail.com or cambodiandolphinproject@gmail.com
Or if you just want to follow our progress and keep up with what we are doing then please like our pages on FaceBook: Marine Conservation Cambodia, and Instagram. Spreading the knowledge is as important as doing the research!"

Jake Davies (Applied Marine Biology, 2018)

"I am employed as the Project Coordinator for Angel Shark Project: Wales which aims to better understand and safeguard the Critically Endangered Angelshark through fisher-participation, heritage, and citizen science.

Safeguarding One of the World's Rarest Sharks

The Angelshark, once common across the western British Isles, is a rare species of shark that glides across the seabed with elongated fins. After suffering widespread decline across its range over the last century, there have been an increasing number of sightings of this rare species along the Welsh coast in recent years, giving hope for its future. Our project is led by the Zoological Society of London and Natural Resources Wales, funded by Heritage Lottery Fund Wales and Welsh Government.

Angel Shark Project: Wales team filming with Will Millard and fishers about Angel Shark Project: Wales for upcoming BBC Wales series coming out soon.

For more information visit the website: https://angelsharknetwork.com/wales and keep up to date on social media: Twitter: jakedavies333, Facebook: JDScuba or Angelshark Project and Instagram JDScuba or Angelshark Project."

The bridge I share with Dippers!

Colin Noble (Ocean Science, 1995)

"Colin Noble here, from Huddersfield. I graduated in 1995 with a III class hons in Ocean Science at the tender age of 42. I'm 65 now.... boo!"

"I went on to become a school teacher up north here for a while. I'm retired now but keep busy keeping Bees! I've also ventured in Heliculture too..... a slow process though!

The photo of my bridge is not very impressive, it's at the bottom of our road over the A616 Sheffield Road out of Huddersfield. What's good about it is there are a pair of Dippers living in the river Holme and can be seen most days around dawn and dusk on the Huddersfield side of the river. Don't all rush at once to see them - the bridge might collapse! Love and best wishes to all who remember me."

Vicky Pawson
(Marine Env Protection MSc, 2012)

"I have fond memories of walking along Beach Road looking up at the Menai Suspension Bridge in awe of its sheer magnitude and manufacture."

"Since leaving Wales in 2013 I have been fortunate enough to work at a number of locations, each offering beautiful scenery combined with idyllic sunrises and sunsets.

Between October 2013 and June 2015 I worked for Yorkshire Wildlife Trust, delivering marine education to thousands of people on some of Yorkshire's most beautiful beaches. Even on the gloomiest of days (when the best thing about it is your packed lunch - quoting one small girl on a school trip), the combination of sand, sea and fresh air is the perfect remedy for life's trials and tribulations.

Now, as a fully qualified Teacher of Science and more recently, Key Stage 4 Coordinator, I take great comfort in being outdoors, looking up at, or driving along the Humber Bridge.

In 2016 I moved to Cottingham, East Yorkshire, to pursue a career in secondary education. Now, as a fully qualified Teacher of Science and more recently, Key Stage 4 Coordinator, I take great comfort in being outdoors, looking up at, or driving along the Humber Bridge.
I'm not sure what the future holds, or which beaches or landmarks I'll be in awe of in years to come, but I'll never fail to remember where my love of the natural environment came from over 10 years ago."

Colin Poat
(Marine Geotechnics MSc, 1990)

"I am Managing Director of a freelance consultancy, CP Geo-Services Ltd, and this last year has seen me engaged in numerous marine construction and geo-survey projects; Scotland to Orkney power cable route survey work, a major trans-Pacific cable route survey, geotechnical and site survey work for Qatar Shell and UK Ireland power cable work."

"This season looks as busy as ever with the offshore industry seeing a resurgence of both Oil and Gas work and cable work too which is unusual. I'm hoping for a good stint out in Sakhalin to supervise inspection and site survey work for Exxon's pipelines and Platforms. My last job in Qatar saw me supervising deep geotechnical work and I'm glad to say that I still reference Sinclair Buchan's notes from my Marine Geotechnics MSc year at Bangor."

"My career and leisure time have taken a number of twists and turns but all has involved water in some way!"

Catherine Fearon (Née Jones) (Ocean Sciences, 1995)

"I completed my BSc. (Hons) Ocean Sciences in 1995 with the School of Ocean Sciences at Bangor University and since then my career and leisure time has taken a number of twists and turns but all has involved water in some way!

After graduating from Bangor, I started a job at the Met Office in the Ocean Applications department working on computer models forecasting the temperature and salinity of the oceans. After 2 years I decided to do a MSc at Trinity College in Dublin in Water Science and Technology, which led me into a career in the water industry. Since then I have worked in the drinking water quality field for the last 20 years and am now Water Quality Regulation Manager for Anglian Water, living and working in Huntingdon in Cambridgeshire. I am an active member of the Institute of Water and a Chartered Scientist and Environmentalist through this professional organisation. I am married to Mark and have 3 step children and 3 step grandchildren.
Alongside these roles I joined the Royal Navy Reserves (RNR) in 2001 and am now a Lieutenant Commander RNR serving with HMS President in London. My RNR role is a Maritime Trade Operations Officer, which involves liaising between merchant shipping and the Royal Navy and advising on navigational safety. To continue the watery theme, in 2004 I took part in the Global Challenge, an amateur round the world yacht race, which took me 10 months and which was a fabulous experience.

Recently a group of my alumni friends and our families returned to Bangor and Menai Bridge and we had a fantastic weekend visiting all our old haunts and remembering the fun we had. It was good to see what had and what hadn't changed. My time at Bangor has definitely helped shape the last 33 years of my life and I am eternally grateful for my experiences and education at Bangor University and the School of Ocean Sciences.
The bridge I have chosen is Tower Bridge in London as this is right next to my Royal Navy unit, HMS President. I am with my Bangor University friend, Jane Grundy (née Cartwright) (on the left of the picture) who also graduated in 1995 but with a banking degree. Jane and I were at an employer engagement evening in June 2018 and this was the view from the deck."

Keith Hiscock
(Marine Biology PhD, 1976)

"My PhD at Menai Bridge was the foundation for a working life spent studying Britain's shallow seas."

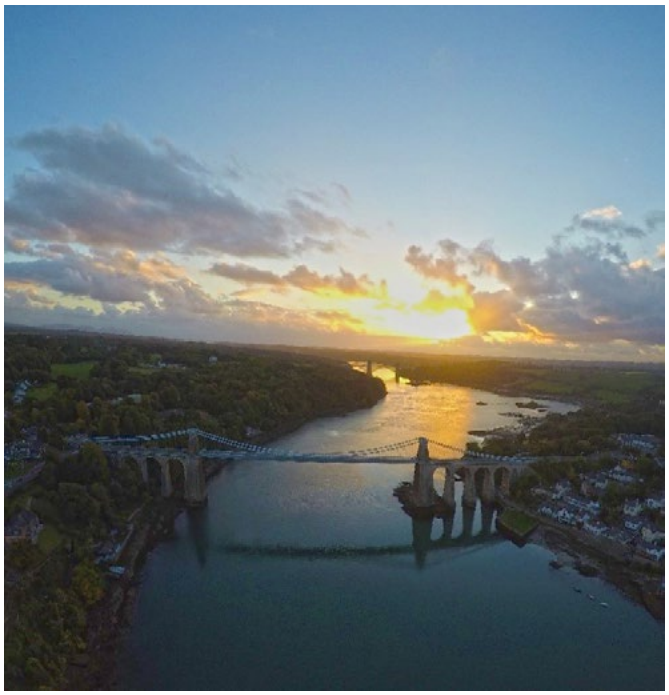
"The tolerance that Prof. Dennis Crisp had to let me pursue my fascination with the ecology of our shallow seas was a starting point to what is a now widely acclaimed book that is, essentially, the last 50 years of my academic life.
See: http://www.wildnaturepress.com/our-titles/exploring-britains-hidden-world

Now, I am trying hard to retire from my retirement!"

Alex Reid
(Applied Marine Geoscience MSc, 2014)

"I am currently working as an Exploration Geoscientist for CGG GeoSpec in Llandudno.
GeoSpec is a business line of CGG that specialises in sourcing, integrating, enhancing and interpreting global legacy exploration data."

"Founded in 1998, GeoSpec carries out new interpretations, identifies leads and prospects and looks to demonstrate through new analysis of old data why companies should consider the project areas.
Recent projects I have been involved in include; Cenopach (an Cenozoic Isopach of a chosen area), a regional interpretation of the Gulf of Thailand, Western Approaches, Alaska, Argentina and East Coast USA, whilst also producing value added products such as 'Well and Seismic Montages'.



"I still live in Menai Bridge so here's a photo of my bridges!"

Nuraini Mohamed Arsad
(MSc Marine Environmental Protection 2004)

"I graduated in 2004 with an MSc. in Marine Environmental Protection from the School of Ocean Sciences when it was still the University of Wales, Bangor. "

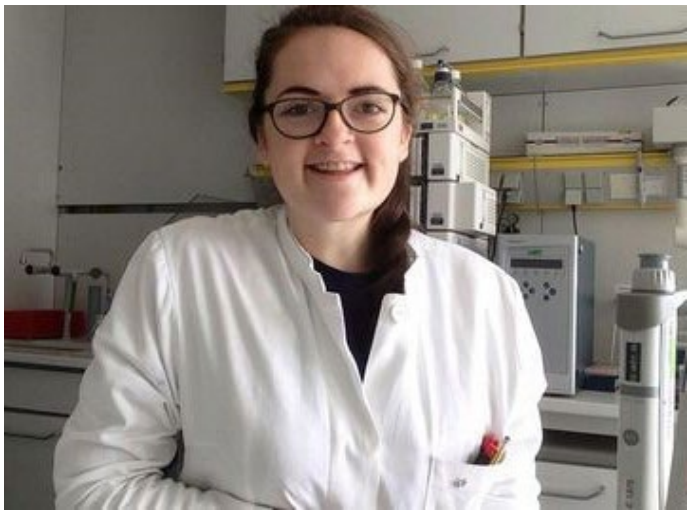
"I saw the need for science and technical people to become better at communicating knowledge to laypeople"

"Working life after graduation has had very little resemblance to my postgraduate course! I spent the next 10+ years back in Malaysia, in the field of hydrocarbon contaminated land, first managing soil & groundwater projects for Royal Dutch Shell in Asia, and subsequently as a subject matter expert providing business technical assurance for contracted work, as well as acting as a technical strategy advisor for key projects. A key challenge in the region is the low demand for rigorous scientific delivery, and a high turnover of the best scientific talent, in part due to the lack of environmental legislation. As such, a large part of the work involves spurring capacity building within consultancies hired by the company, as well as providing technical advice in the region to support efforts by governments to draft environmental legislation.

In recent years, I thought I would like to contribute more directly and slightly differently towards advancing my primary passion in sustainability. More specifically, I saw the need for science and technical people to become better at communicating knowledge to laypeople, for career professionals to communicate experience to younger generations, and for people working at good causes to be linked better together. To that end, I began experimenting with modern media platforms, and began a sustainable travel blog, Teja on the Horizon. To do this, I took a part-time work arrangement, i.e. taking a 20% pay cut in order to receive 20% of time back. The blog is almost two years old now, and the experience has led to different networks and opportunities - one such unexpected opportunity was to co-found an ethical cashmere social enterprise, Ethical Cashmere (still very young!). Looking ahead, I am keen to return to my marine roots, and have planned a series of Pacific trips loosely themed around climate change issues and mitigation. Up on the shortlist are trips to the 'front line' nations of the Pacific such as Fiji and Vanuatu, and ending with the Great Barrier Reef, currently experiencing unprecedented coral bleaching events.

A bridge in Nepal

The bridge that I'm showing is high up in the Himalayas - in the Annapurna range of Nepal. I consider it the first journey where I really began this multiple-career phase, and although it is very far from the sea, I brought back from the mountains a souvenir fitting for a graduate of the ocean sciences - an ammonite fossil from a long lost age when the sea had reached the mountain."



Molly Czachur (Marine Biology, 2017)

"I graduated from SOS with a master's in Marine Biology in 2017, and I now find myself making waves in South Africa."

"I am completing my doctoral research in the von der Heyden lab at Stellenbosch University, South Africa. I didn't completely leave my Welsh roots behind though, as we are collaborating with a team from Bangor University. This time I'm 'across the strait' with the MEFGL lab in the School of Natural Sciences, but I enjoy popping back over to Anglesey when I'm in the area.

My research aims to describe widescale coastal fish biodiversity in South Africa, using an environmental DNA (eDNA) metabarcoding approach. Living organisms shed DNA into the environment, and this is especially apparent for slimy fish! I take samples of seawater, and extract any traces of DNA that may be in the water. I then sequence the fish DNA and match it to the DNA of known fish species. This gives us a good estimate of which fishes have recently been swimming in the area, and we can start to build profiles of the species diversity in different areas.

The eDNA metabarcoding method is rapid, cost-effective and gives us a lot of data! I am excited to use our international collaboration to build capacity for the tool in South Africa, and also to see how our eDNA baselines may contribute to marine spatial planning in the region. If you'd like to find out more, kindly check out my website at www.zoologymolly.com, or follow me on Twitter @ZoologyMolly. You'll see that I've recently made a comic to illustrate our research, and it has now been downloaded by hundreds of teachers all over the world. If you'd like a copy for your classroom or office, or know somebody who would, you can download the comic for free at www.zoologymolly.com/teachers.

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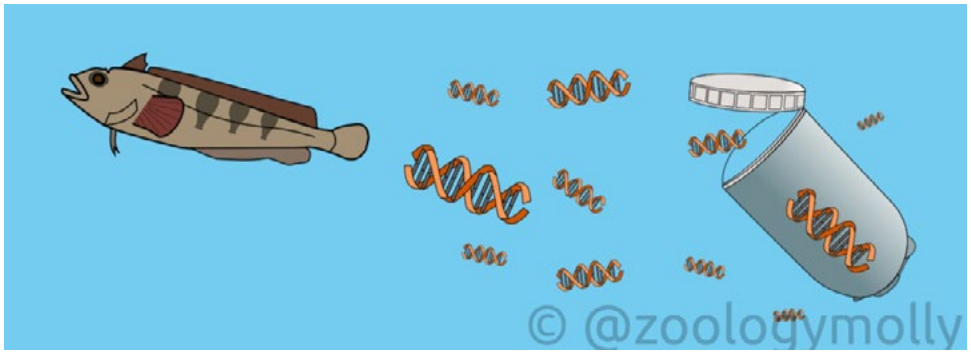


"I was not expecting a medal... and somehow took the gold!"

With my medals after the games.

Leo Johnson
(Marine Biology, 2004)

"In August 2018 I competed in the 2018 Cerebral Palsy International Sports and Recreation Association (CPISRA) Games for Team England. My training in the months before the games was intense. The sessions focused on developing endurance, speed and my anaerobic capacity before "tapering down" (sessions were shorter but more intense with a real emphasis on quality) to give my body some rest in preparation for what was to come. Although one notable session involved swimming 100 metres as fast as I could 16 times!

Team England flew out to Sant Cugat on the 6th August. The arrival day was a real lesson in what can go wrong in a major logistical operation and how to just "go with it". After arriving, we had a team briefing where the initial logistics of the opening ceremony and anti-doping protocols were explained. This was the moment where the reality of the Games struck me; I came out thinking, "It's show time!"

In the evening, it was the opening ceremony. Although it took place in a modest sized hall, it was quite an experience! There were teams from more than 20 countries with hundreds of competitors and it was great to meet and interact with lots of new people. There was also one particular speaker, a veteran of several CPISRA World Games and a multiple Paralympic medallist, who gave a moving speech about the battles he has fought having Cerebral Palsy and what the Games mean to him and what they had enabled him to achieve. He urged us to put all our fears and nerves behind us and go out and enjoy the experience.
The next few days were fairly repetitive in routine. We would get up at around 7:30 am, having an hour and a half to train in the pool. I was under strict orders from my coach on what I should train on each day! We would then go to the athlete canteen for breakfast, making sure to put away some serious calories. The subsequent down time in the afternoon and evening was an opportunity to get to know my teammates across the different sports.

It began to really sink in when the athletics competition started the day before the swimming competition. There is a feeling I get when I hear a national anthem play for someone and it is a unique experience when you know that it could be you tomorrow! Then the first day of racing was upon us. I had the 200m Individual Medley (IM) and the 100m backstroke. They were well spread out. One was at 11:00am and one at 7:05pm. I was nervous going into the IM with the new rule on single arm butterfly meaning disqualification was a possibility for me. I ended up winning by close to 40 seconds, avoiding a disqualification and matching my personal best time! So, I got to stand atop the podium in front of my parents and hear God Save the Queen - to be honest, it was blur as I was buzzing from the adrenaline.

The 100m backstroke was far more competitive and I was not expecting a medal: although I missed my personal best by 0.3 seconds, I somehow took the gold! This time I took the medal ceremony more in my stride and soaked up hearing and singing along.
I struggled to sleep the night before the 400m freestyle. This was the event I had trained for the most. An old coach of mine used to tell me sprinting is all nerves but in endurance events you have to tap into something inside. I said to myself, "Keep your head, the body knows what to do". I was nervous and I remember shaking. When I got in the pool, I just raced it... and I won by 20 seconds, just shy of my best time by 0.12 seconds. This time the emotion really hit me, I could not physically get out of the pool afterwards from the exertion and cried when I got to hear "God Save the Queen".

As to what happened afterwards at the closing ceremony party, well let's just say that what goes on at the CPISRA World Games stays in Sant Cugat! I think that the photo shows that I enjoyed myself!"

Conducting winter oceanographic sampling in some of the harder to reach locations with Arctic Eider Society and University of Manitoba

Chris Peck (Applied Marine Geoscience MSc, 2016)

"My name is Chris Peck and completed my undergraduate (Marine Biology and Oceanography) and my masters (Applied Marine Geoscience) at Bangor University."

"I am currently working towards my PhD at the University of Manitoba in Winnipeg, Canada. My research is looking into the coastal circulation of the La Grande river plume along the North East coast of James Bay and into South East coast of Hudson Bay.

I am sharing a story from some of my fieldwork where I crossed an ice bridge from the Belcher islands to the mainland of Hudson Bay, something which had not been attempted since 2003 by the Canadian Rangers. The ice bridge rarely forms between the Belcher islands and the mainland. However, the Arctic Eider Society and University of Manitoba team have been keeping an eye on opportunities to conduct winter oceanographic sampling in some of the harder to reach locations. With five communities (Sanikiluaq, Inukjuak, Umiujaq, Kuujjuaraapik, and Chisasibi) working together as a part of a Community-Driven Research Network and documenting the presence of winter freshwater layer under the ice, the key missing piece of the puzzle was the middle of the bay between the Belchers and Kuujjuaraapik. This winter, a colder La Nina year, ice formed quickly, and the bay largely froze to the mainland by the end of January. With this in-tact throughout March, local hunters from Sanikiluaq and the Arctic Eider team figured this could be the chance to finally get out into the middle of the bay. Now with some new fancy tools on the SIKU platform that allowed comparing the most recent Sentinel 1 Radar and high-resolution visual Sentinel 2 imagery, it was possible to investigate how passable the ice bridge may be and to identify routes that might provide the smoothest crossing.

Ice core taken

The plan was to leave the Inuit community of Sanikiluaq early in the morning and sample 4 sites to the middle of ice bridge and return to town. There was a long drive ahead before the first site with Dr Jens Ehn (My supervisor) and I bouncing around in the back of qamotik, a sled that is towed behind the snowmobile. Before reaching the first site, Puasi (local guide) spotted a red fox in the distance and before I could stand up and dust the snow off myself he had unhitched his qamotik and was chasing after the fox on his snowmobile, with Charlie (local guide) following soon after. The chase was unsuccessful and soon we were on the move again. At the first site, we took an ice core, a water sample, measured ice thickness and snow depth, and took several CTD (conductivity, temperature, and depth) casts. As

we expected, the water was becoming fresher than the previous sites closer to the islands. Another long snowmobile trip to the next site had us out in the middle of Hudson Bay, which was quite an exciting place to be. The sun was shining, the ice was smoother than we expected, and we could see the mainland in the distance. We never expected to get this far so quickly, and the team was getting excited about the fact that we could probably make it to the mainland if we wanted to! As Joel (Arctic Eider Society founder/researcher) indicated previously, as soon as we saw the mainland, we knew that everyone was going to want to go the whole distance! At the third site, approximately ¾ of the way across on the ice bridge we took CTD casts in a nice 140 m deep water spot and collected water samples. The ice was so thick that we had to cut holes for the handles of the auger to get all the way through. We discovered that the water was very warm below the surface mixed layer, which we thought might be an Arctic analog to how Atlantic water flows into the Arctic Ocean. The warm water here, however, is a remnant from the summer.

On the way to the fourth site is when things started to go wrong. Unfortunately, Charlie's snowmobile broke down around 20 km from the mainland. Puasi had just a small kamotik with mostly fuel on it which left three of us and two qamotik with one skidoo. We left Charlie's snowmobile, a qamotik, and most of our equipment behind. Jens and I were now sharing a qamotik and Charlie was standing on the back with Joel carefully driving his snowmobile. It was here that we hit the rough ice. The ice had been piling up against the coastline creating large ridges which were difficult to navigate. Fortunately, the snowmobile only got stuck once and after pushing it over the ice ridge we made it to Kuujjuarapik just as the sun was setting, and we were greeted by a large herd of caribou.

With full bellies, the logistics planning began. Being one snowmobile down, which had to be recovered there was no way of all of us traveling the 180km back to Sanikiluaq. So, after a frantic email to Michelle back in Winnipeg to change our flights, the trip had now been extended to Sunday. The hotel in Kuujjuarapik was fully booked, but we managed to find a place to stay for the last beds in town at the CEN research station. Word about our little adventure spread fast around the town and everyone was impressed and thought we were slightly crazy! With only two functioning snowmobiles, we decided that the best course of action was for Jens and me to fly back to Sanikiluaq on Friday with the other guys travelling back across the ice bridge on Thursday, collecting the abandoned equipment on the way. They arrived back cold and tired at around 1am that night after a rough journey (we had a leisurely day reading magazines).

It was snowing and in addition to the reduced visibility, the drifting snow had made it much rougher making the return trip substantially more difficult. For those guys, it was about 24 hours of driving skidoo in about a 36-hour window, but after 20 years we were the first team to have made the journey across the elusive ice bridge. Despite the long 12-hour journey across the bridge and several extensions to the trip, it was an amazing adventure and something I will never forget.
We came, we saw, it took longer than expected... but eventually, we conquered! And more importantly, we came back with some good data."

Frankie Hobro (MSc Marine Environmental Protection 2002)

Frankie Hobro is the Director and Owner of Anglesey Sea Zoo and an Alumni of Bangor University.

Frankie has a long history working on hands-on conservation projects with critically endangered species in difficult conditions abroad, having worked in many different countries in both terrestrial and marine environments, and specialising in island nature reserve and endangered species management.

Frankie has always been a passionate advocate for conservation, particularly endangered species and marine conservation and has held many positions involving lecturing and teaching environmental, conservation, marine biology and ecology to various levels and ages, both in developing countries and elsewhere. Her hands-on field-work experience in island restoration and management and on critically endangered species monitoring and breeding programmes has gained her many practical skills including scuba diving, reef monitoring, abseiling and climbing, bird ringing, tube and hand rearing of birds and mammals, turtle and elasmobranch tagging and driving boats, as well as basic skills in other practical tasks such as plumbing, mechanics and DIY. It has also resulted in Frankie working in over 20 different countries across the globe, often in challenging and isolated conditions.

Having spent a large amount of her childhood in North Wales and on Anglesey, Frankie returned to do postgraduate studies at Bangor University School of Ocean Sciences in 2001, then after further work on island conservation projects abroad, she returned and settled on Anglesey 12 years ago when she bought the Anglesey Sea Zoo, becoming the sole Owner and Director of the business in 2013.

Since purchasing the business Frankie has transformed it into a unique product and it is the only exclusively British aquarium, housing only native species with an entirely natural sea water supply directly from the Menai Strait and specialising in the captive breeding of endangered native species for reintroduction into the wild. The Anglesey Sea Zoo uniquely focusses on sustainability, education, marine conservation and captive breeding and release programmes for endangered native species such as seahorses and lobsters.

Frankie has set up a successful bilingual education and outreach programme at the Sea Zoo, as well as a voluntary marine animal rescue centre, with the capacity to rescue and rehabilitate all kinds of stranded or injured marine animals, including mammals, sea birds and turtles. The voluntary and non-profit-making beach clean group based at the Sea Zoo has been running for over a decade and is funded through collaboration with Keep Wales Tidy and the Marine Conservation Society, carrying out beach cleaning events throughout the year with the results contributing to the global Beachwatch database for marine litter patterns.

Frankie is a Role Model and Inspirational Speaker for Big Ideas Wales, going out to schools, colleges and other organisations across North Wales promoting entrepreneurship and encouraging skills-based learning and experience, particularly promoting STEM and encouraging more women to follow careers in science and business, whilst also constantly working on increasing the sustainability of the business and local community involvement in marine based activities and projects.

MORE NEWS...

Alumna Awarded James B. Macelwane Medal

Caroline was recognised for being at the forefront of developing a dynamic understanding of how the ocean affects the climate system

Caroline Ummenhofer (Marine Biology and Oceanography, 2003)

Congratulations to SOS alumna Dr Caroline Ummenhofer from the Department of Physical Oceanography at Woods Hole Oceanographic Institution, MA, USA for being awarded the James B. Macelwane Medal by the American Geophysical Union.

Caroline was recognised for being at the forefront of developing a dynamic understanding of how the ocean affects the climate system. She has done particularly creative work in helping to understand the mechanisms of how ocean properties give rise to changes in large-scale atmospheric circulation that impact rainfall on land. Her core research discoveries have been in tropical climate variability, particularly in the Indian Ocean; the linkages between ocean variability and atmospheric blocking outside the tropics; and the connections between the Hadley Circulation and the ocean's eastern boundaries.

Upon receiving the award Caroline said:
"Science, and especially climate science, has become an intrinsically collaborative effort. The research leading to this medal was only possible through contributions from many colleagues around the world. I am continuously inspired by the wealth of groundbreaking research findings by the climate and geoscience community—many of whom are at least as deserving of this medal. The interdisciplinary nature of the field is what first drew me to ocean sciences and my degree in marine biology/oceanography at the School of Ocean Sciences, University of Wales, United Kingdom. Three individuals there in particular opened my eyes to the attraction of interdisciplinary research in biophysical interactions and paleoclimate that I enjoy at the Woods Hole Oceanographic Institution (WHOI) today, namely, Dave Bowers, David Thomas, and James Scourse."
The full citation and response can be read here:
https://eos.org/agu-news/davis-immerzeel-santos-turner-and-ummenhofer-receive-2018-james-b-macelwane-medals

The medal is for "significant contributions to the geophysical sciences by an outstanding early career scientist."

Photos: Urara and Prof Chris Richardson and Urara as a student in 1993

A warm welcome back for Urara!

Urara Yamamoto (Marine Biology, 1996)

Aluma Urara Yamamoto from Japan returned to Menai Bridge at the end of 2018 and enjoyed a tour of the School and its new facilities by Prof. Chris Richardson._

Urara was delighted to be back at the School and during the tour met with Dr Martin Skov (Senior Lecturer in SOS) and Karen Tuson (SEACAMS) from her graduation class of 1993 who are still in Bangor!

Edwin Bourget (Marine Biology PhD, 1975)

Edwin Bourget C.M. is a retired professor with the Department of Biology and a Professor Emeritus of Université Laval, Québec.

He is well-known for his marine ecology research, his key role in public administration and in supporting innovative start-ups in Québec. Professor Bourget holds a MSc (ecology) from Université Laval (1971) and a PhD from the University of Wales (1975). His PhD work was carried out at the Marine sciences laboratories from 1971 to 1974, under the supervision of Professors Dennis Crisp and Graham Walker, mainly in ecophysiology, but with an interdisciplinary outlook. During his career, he was one of the first marine biologist to apply extensively advanced techniques from other disciplines (civil engineering, geomatics, hydrology, electrical engineering, molecular genetics and mathematics) to understand the structure and function of shore communities. A renowned researcher, with over 130 papers, 5 books or book chapters and numerous reports, he has received many prizes, in particular the Michel-Jurdant Award from the Association francophone pour le savoir (ACFAS) and the Armand-Frappier Prize from the Québec Government for his achievements in environmental science.

He also held numerous positions in university administration and forged countless research partnerships in Canada and internationally. As an administrator, he showed leadership that mobilized others and helped advance the university as an institution and foster Quebec's economic development, by strengthening the bonds between the university and society. He has many achievements to his credit as Vice-Rector of Research and Innovation at Université Laval (2007-2010 and 2014-2015) and as Vice-rector Research at Université de Sherbrooke (2001-2007).

At Université Laval

- He successfully launched a program for the advancement of research and innovation, the only one of its kind in North America, with the goal of creating 100 new research chairs in partnership with various companies and organizations, for a total investment of $100 million over five years. Less than two and a half years after the instalment of the program, 26 new chairs had been created, for a total investment of over $125 million. Ten years later, the total number of chairs in partnership at Université Laval is close to its initial target.
- He founded a research office, a business-university liaison office and an office to promote research chairs. Their complementary missions enhanced substantially the effectiveness of research management. He was also responsible for the creation of the Institute of integrated Biology (IBIS).

At the Université de Sherbrooke

- Professor Bourget founded the Environment and Sustainable Development Institute, two agencies responsible for the commercialization of research findings, and the Innovation park, a designated on-campus area for high-tech companies which use research findings from the university research and for university research centres working closely with industries. During his mandate as Vice-Rector, the volume of grants and contracts at the university doubled.
- For his achievements as a research administrator, he received the ADARUQ award (Association des administratrices et administrateurs de recherche universitaire du Québec).

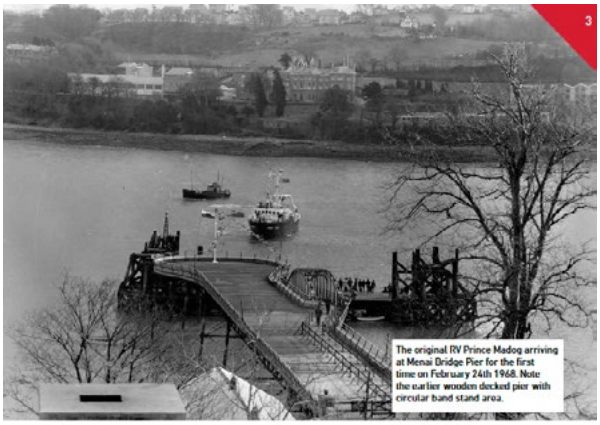
In addition to his university career, he has always been highly committed to helping a large number of organizations devoted to supporting entrepreneurship. He was the Chair of the Board of directors of the Parc Technologique du Québec Métropolitain from 2008 to 2014, was a Board member of numerous research organizations (still serving on the Board of AG-Biocentre, an incubator for biotech enterprises on the Québec tech scene), and remains a mentor to innovative start-ups in the Québec City region and scientific councillor to funding agencies, particularly the Fonds québécois de recherche (FRQ). He served as an ambassador for organizations fostering the interest of young people in science and technology. He currently chairs the Board of directors of the Musée de la mémoire vivante, a unique virtual museum devoted to the collection of testimonies relating the lives of individuals.

For his various achievements, Professor Bourget was appointed Member of the Order of Canada by the Governor General of Canada in 2017.
Professor Bourget's interests also include non-scientifically related activities. He has been an active painter for the last fifteen years (see edwinbourgetpeintre.com), an activity which he began while a student in Menai Bridge. In conjunction with the Fondation de l'Université Laval, the proceeds from the sales of his artwork is used to provide scholarships and project support for art students at Université Laval.

Prof. Dudley Williams (B.Sc. Zoology/Marine Zoolo Zoology, 969 & D.Sc. Zoology, 1989)

The Prince Madog and a Life in Benthos

The July 2018 edition of 'The Bridge' featured a Newsletter from the School of Ocean Sciences Alumni Association (SOSAA) containing an article by Tim Whitton. The piece celebrated '50 Years and Two Ships: The Prince Madog'. Most evocative for me was the black and white photograph showing the newly commissioned Prince Madog arriving for the first time at its berth adjacent to the old Menai Bridge Pier. This image has brought back some buried memories.



50 Years and Two Ships: The RV Prince Madog by Tim Whitton

The date was the 24th of February, 1968 and I was in Year 2 of my Zoology with Marine Zoology degree. The Prince Madog had been long awaited by the staff and students at the Menai Bridge marine labs not least by me as I was hoping to be able to do the research for my Honour's Project on board. After much anxious waiting, three other undergraduates (regrettably I cannot remember their names) and I were placed under the supervision of Mr. Ivor Rees and, on the 1st of October, 1968 we set off for the Irish Sea. We did not get far as very rough seas forced the Madog to seek refuge in Red Wharf Bay. Early next morning, Captain Donovan made the decision to head for our study site, 19 miles E.S.E. of Dundrum Bay off the east coast of Ireland. Here, the depth was between 23 and 29 fathoms. Unfortunately, the weather was still foul and remained so for the next five days.

Our group's collective objective was to take an orderly series of samples to allow us to study the community structure of the bottom-dwelling invertebrates. In particular, we were interested in how these communities and their biomass were influenced by biotic (predators) and abiotic (sediment mud and organic contents) properties of their local environment. Formatively, this benthos/habitat link was to drive the research endeavours of my academic life for the next 40 years - although funding opportunities necessitated a switch to studying freshwater benthic communities and relocation to Canada.

This year marks the 50th anniversary of the first RV Prince Madog arriving at Menai Bridge Pier on the 24th February 1968 (as featured in the Bangor University's 'Archive of the Month' in March). The 28 m vessel was built in the Isle of Man and served the marine labs in Menai Bridge for 30 years, before being replaced with the current 35 m vessel of the same name. After the ship was sold by the university in 2001 she took the name MV Madog, and continued in service as a survey vessel in the North Sea up until this year. The RV Prince Madog, be it the original or current vessel, has played an important part in the research and teaching of marine sciences at Bangor University over the last 50 years.

Prince Madog (1968 - 2001) heading under the Telford suspension in the Menai Bridge. The funnel is painted in the University colours of the time. Image IVOR REES

Returning to Dundrum Bay, we had planned to sample the communities using a Smith-McIntyre grab. However, with the Madog frequently disappearing below the horizon in deep wave troughs the grab had a tendency to tip over before it reached the bottom and eventually was replaced by a more stable Peterson grab. Over a period of days, we managed to retrieve 36 grab samples from an area roughly 2 x 2 nautical miles. These were preserved with formalin (considered a carcinogen these days) to await analysis in the lab.

Life on board the Madog was a little subdued due to the severe weather conditions. Each of us students had a different way of coping, which ranged from hardly emerging from our bunks to heavy reliance on sea-sickness pills which induced a zombie-like condition (my choice). Visits to the galley were infrequent as the smell of food cooking made things worse - except for Mr. Rees who had a prodigious appetite, well deserved as he did most of the sampling; he seemed never happier than when dodging drenching waves or wayward ropes and other equipment on deck. I remember taking refuge in the wheel-house one afternoon and seeing a lone figure, sitting under the ship's stern gantry, on an up-turned bucket mending a net. The surrounding deck was awash with water which prompted Captain Donovan to send a crew member to 'advise' Mr. Rees to relocate his activities! Amid the constant pitching and rolling normal activities were difficult and I well remember one day being thrown from the 'throne' against the cubicle door and receiving a sizable bruise - there was a reason for two safety hand-rails! Despite the rough conditions the Madog performed very well, a thorough test of its sea-worthiness.

Eventually we returned to shore, with our precious samples, where for several hours I discovered how difficult it was to walk on a non-rolling surface. For the rest of the term the four of us worked on reducing each sample down to its organic and inorganic constituents and extracting, identifying, counting and weighing the invertebrates we found. This we did in a quiet corner of one of the labs that reeked of formalin. Occasionally, I seem to remember, we were told to 'take up less room' by Professor Crisp, the then Head of Department, on one of his famous work-space purges. For me, the most enjoyable task was identifying the various species that we had found. We had help from Mr. Rees and his wife, but mostly had to visit the department's library to consult often aged but still valid tomes such as Bell's 1892 Catalogue of British Echinoderms, Fauvel's 1923 Polychaetes Errantes, Polychaetes Sedentaires in the Faune de France Series, and Sars' 1952 Crustacea of Norway.

After graduation, it was off to Canada for postgraduate work, studying the benthic communities of rivers, and then to postdoctoral work in British Columbia, studying the relationship between benthos and salmon fry. In 1977, I took up a faculty position at the University of Toronto where my students and I worked on various projects in River Ecology - primarily benthic, of course!

In 1983/84, I took a sabbatical year and returned to Bangor to study the unique properties of Welsh mountain streams, particularly Yr Ogof on the Aber Ffrithoedd. A second sabbatical year at Bangor, in 1990/91, provided the opportunity to return, partially, to my marine roots. I had long been interested in the phenomenon of 'drift' in running waters (where benthic invertebrates are continuously displaced downstream by currents), but this had never been studied in estuaries. I wondered what happens to this biomass and set up a research project on the Aber Estuary at College Farm. To cut a long story short, it appears that the Aber Estuary serves as a nursery ground for flounder (Platichthys flesus) and that these young fish feed on the freshwater invertebrates drifting downstream from the Aber River, particularly chironomid (midge) larvae. At this crucial stage in their life cycle, and on this allochthonous diet, they increase their body weight more than 100 times, from an initial average fish weight of 5 mg (in March) to 540 mg (in September). Freshwater insects also contributed to the diet of gobies (Pomatoschistus microps), found in the estuary from September to February.

My 'marine roots' were also revisited annually when I began offering a Tropical Marine Biology course - which proved popular in land-locked Toronto. In the early years, I took students to Bermuda where they studied coral reefs, plankton and, of course, benthic invertebrates at the Bermuda Biological Station. In later years the course was relocated to the Bellairs Research Institute on Barbados - oddly, there was never any problem in finding graduate students to act as teaching assistants at either of these venues!

"Why is a Marine Zoologist planting a tropical forest in remote Oceania?"

Coral bleaching at Tongareva, January 2019

Dr Mike White (1994-1997 BSc Zoology with Marine Zoology, 1997 / MSc Marine Environmental Protection, 1998)

Sex! Or more precisely: that the sex of developing sea turtle embryos is determined by the nest incubation temperature.

Females are produced from warmer eggs, more males from cooler ones. So in practical terms as global warming increases it becomes harder to produce male hatchlings and we see a skew towards feminisation of populations. Incubation takes about two months and during the middle third sexual differentiation occurs, with males developing seminiferous tubules and females the cellular structures to produce eggs. Post-differentiation development continues as either female or male. Nests incubating near the pivotal temperature (about 29°C) are likely to produce balanced sex ratios (1:1), with females from eggs in the centre and upper part of the clutch (rising metabolic heat and nearer to the warmer beach surface), with males from eggs at the bottom and periphery of the clutch in contact with cooler sand. Ocean and land temperatures are increasing and nesting sites will suffer. Over decades or centuries the lack of male honu will worsen the extinction risk for these already-endangered species. Climate change is being driven by anthropogenic activities and needs, in particular excessive fossil fuel use and deforestation. The five previous mass extinctions all had atmospheric CO2 levels driving them, and one lost the ozone layer enabling higher solar irradiance.

Tongareva Atoll (9° South; 158° West) is the most important green turtle Chelonia mydas habitat in the central South Pacific: with year-round juvenile development, regular mating, and egg-laying in all months on an uninhabited motu (cay). Leaving our honu to nest in peace, by staying off beaches at night, we see nesting numbers steadily increasing, so coupled with no nest predation it looks as if our undisturbed honu are successful. Remote atolls act like an oasis in a desert: a haven!

Unfortunately Tongareva is also the atoll worst affected by climate change impacts in Kuki Airani (Cook Islands). We suffered severe coral bleaching in the 2015-2016 El Niño and most (95%) giant clams Tridacna maxima died. Sea surface temperature (SST) was 34°C and lagoon 38°C: many fish species left and so did the larger seabirds, presumably following their prey. A combination of higher temperatures, increased solar ultraviolet radiation, limited rainfall, occasional wave overwash and high levels of wind-borne salt is causing large areas of forest to collapse. Most surveys find newly fallen trees. Loss of trees behind the main honu nesting beach at Akasusa means that many nests are now exposed to full sunshine all day long, whereas previously the forest shaded it in the mornings.

Hakono Hararanga Incorporated (Tongareva's Community Environmental Society) secured a grant from the Global Environment Facility (GEF SGP) for: biodiversity conservation, habitat restoration, community education, and managing oceanic plastics ~ an overwhelming problem for our natural subsistence food supply. Our approach was to identify key sites and decide which trees to plant; the hardwoods tend to grow more slowly and in 2018's extreme heat pandanus species grew best of all. We also felled dead trees to prevent them crushing new saplings later on. The long-term aim is four different tree heights closing the canopy, with ground cover plants to hold soil moisture and give local

cooling as the wind blows through the forest. We planted 5000 trees in 2018 and most seem successful. We have a little shadow on the beach already.

Hatchling in coconut... it was trapped under a tree root in the nest we inventoried

Coincidentally we began deep decarbonisation. Fuel has to be shipped from Auckland or Honolulu, a substantial shipping impact, yet it is sunny here every day. We had two solar-powered outboards made in Cairns, Queensland; then got a Storm Rides electric scooter from Auckland, and a load of different Ryobi battery-powered tools including a chainsaw that we charge with solar. We calculated our carbon footprint using emissions factors for the various fuels: simply changing from a 2-stroke to a 4-stroke outboard saved us 60% fuel and reduced greenhouse gas pollution.

Wildlife can survive if the basic needs are met, but this becomes more challenging as humans have impacted much of the planet, leaving few untouched places. January 2019 we have coral bleaching again at Tongareva, but this time the ocean is cooler (SST 30-32°C): without an El Niño influence. I quantify the impact using a CoralWatch health card from the University of Queensland (i.e. citizen science). Bleaching is happening very quickly, within days, and we fear another ecosystem tragedy is unfolding before our eyes.

Governments seem loathe to change unfortunately and appear more comfortable with 19th Century ideas and polluting machinery; and largely oblivious to the consequences. In contrast I use a holistic approach: what is the problem and how can I fix it. It takes many months for cargo to arrive on my remote atoll, but that is no reason not to try.

Mixed height trees create good shadow

My advice for future scientists is don't get too fixed on there only being one way to fix something, and don't be constrained by some 'scientific discipline'. Think widely and think deeply. Bangor University has an excellent reputation around the world and if you take to heart our motto: 'Gorau Dawn Deall' ~ it will stand you in good stead for years to come. Good luck!

Dr Mike White is President of Hakono Hararanga Incorporated, a Fellow of the Marine Biological Association and Member of the IUCN Species Survival Commission: Marine Turtle Specialist Group.

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2017 The Bridge (https://www.bangor.ac.uk/alumni/mike-white.php.en)
Tongareva is at the forefront of climate change in 2016

Training Course on Coastal Altimetry to Support Coastal Oceanography Around Mexico

Dr Armando Trasvina
(PhD Physical Oceanography, 1991)
CICESE Unidad La Paz, Mexico

(Co-author Stefano Vignudelli, Consiglio Nazionale delle Ricerche, Pisa, Italy)

Sargassum seaweed invasion of the Caribbean coast of Mexico has been increasing during last years, but 2018 has been the worst year. While the origin of seaweed is known, what is unclear is why the coastal ocean currents now drift tons of seaweed onto Caribbean beaches, with severe impacts on tourism, fisheries and wildlife.
A technology called satellite altimetry plays a crucial role in mapping changes in sea level and currents. Recent progress made in processing (e.g. re-tracking), and the advent of new radar techniques (e.g., Synthetic Aperture Radar (SAR) mode on CryoSat-2, Sentinel-3A and -3B) made possible to retrieve more and better data closer to the coast.

Today, a set of techniques exists under the umbrella of the coastal altimetry term. This has accelerated the generation of coastal altimetry products. Therefore, coastal altimetry opens now new possibilities to better describe ocean phenomenon with high dynamics at fine spatial scales, and can be coupled with coastal models, eventually helping to predict the seaweed arrival in advance and prioritizing coastal areas at risk.

A training course on coastal altimetry was organized by CICESE (Center for Scientific Research and Higher Education of Ensenada) in La Paz, México, as one of the activities planned to commemorate its 45th anniversary. The European project ALTICORE was one of the first initiatives that tackled satellite altimetry over the coastal zone in various regions of the world (South Africa, India) and ALTICORE Mexico is now touching Central America.

The aim of this 5-day training course was to illustrate the technical progresses of coastal altimetry and demonstrate the application of the existing coastal-dedicated datasets alone or in combination with other data and/or models to contribute to the study/research/monitoring of relevant ocean processes around Mexican coasts (e.g., storm surges and hurricanes; coastal ocean circulation; sea level rise; etc.).

Beach near Chetumal, Mexico invaded by Sargasso. Unusual amounts of the floating algae arrived to the beaches of the Caribbean Sea during 2018. This is the third season in a row. The Mexican Caribbean received tons of the material generating a crisis in the touristic industry. Oceanographers believe that both a warmer ocean and intense rainy seasons contribute to the surge in biomass. Then large hurricanes and changes in regional wind patterns drive the algae towards the coast (photo by Suleyma Sánchez Hernández, ECOSUR).

The course brought together 25 selected participants, including early career scientists (Postgraduate-level, Ph.D. students, post-doctoral researchers), from several regions of Mexico (the Mexican Caribbean, the Gulf of México, the south Pacific states of Oaxaca and Nayarit, and from the states bordering the Gulf of California in NW Mexico) but also attracting attendees from surrounding countries (Peru and Chile). The course was a combination of theory lectures and practical exercises.
The technical subjects covered conventional and SAR altimetry, with major focus on new waveform modeling and retracking, improvements in corrections and the assessment of the capabilities of the latest missions in the coastal zone. By accessing coastal altimetry data from the various reprocessing initiatives (e.g., CTOH, ALES, GPOD) participants learned how to process and exploit these data sets in a number of relevant case studies for coastal oceanography.

This training course positions Mexico to become a reference of excellence about coastal altimetry for the Central America. After the course, the group of participants maintains a live user group to continue interaction and link to the coastal altimetry international community (www.coastalt.eu). The next step is to implement a capacity building plan seeking partnership with foreign organizations.

Bangor Alumnus Presents Paper at "Chalk 2018" at Imperial College

Jim Pyrah
(Environmental Science PhD, 1996)

Bangor Alumnus, Jim Pyrah, recently presented a paper at the "Chalk 2018" Conference at Imperial College.

Jim works for DeepOcean (based Darlington, UK) who in turn have been busy installing an electricity interconnector power cable between the UK and Belgium, known as the "Nemo Link". This cable has now been commissioned and has a capacity of 1GW and subject to electricity price differences between the UK and Belgium can supply up to 2.5% of UK energy needs. In themselves, Interconnectors in turn compensate for the often patchy distribution of renewable power on a continental scale, allowing, for example, the UK to export cheap wind generated power when it's windy and import cheaper European power when not.

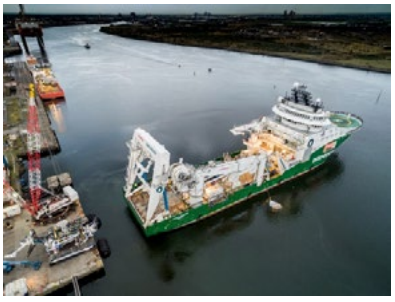
This project involved a number of challenges including identification of removal of a variety of different types of UXO, the dredging and pre-sweeping ~1,500,000m3 of sand from sandwaves along the route, crossing the Goodwin Knoll and South Falls Sandbank, not to mention of course actually laying a bundled HVDC cable (itself manufactured in Japan) and burying it between 1 and 3m below the seabed. Bangor Alumnus Roger Birchall was also involved in the UXO clearance phase.

From a geological perspective the route was also very interesting with underlying geology consisting of Upper Cretaceous Chalk at the UK end of the route, the K-T boundary roughly half way along and Tertiary deposits of London Clay most common in the Belgian Sector.

Of particular interest was the Chalk, which presents a number of challenges to cable burial, notably in the form of flints contained within the Chalk. The presence or not of flint was a talking point in pre-contract discussions but at the time there was no way of understanding where any particular flint horizon might be or even whereabouts in the Chalk stratigraphy the route might be. To solve this issue, the Geoscience Team led by Jim, approached a biostratigraphy specialist with a view to dating the Chalk samples recovered in the vibrocores samples and hence better understanding the chances of encountering flints (flints are common in the oldest and youngest Chalks but most common in the Middle Chalk with the "Lewes Nodular Chalk" being of particular concern). To cut a long story short the dating activity indicated the Chalk along the Nemo route to be relatively young and flint free, and subsequent burial operations with DeepOcean's massive underwater trenching machine "T3200" went smoothly in the Chalk zone.

At the same time DeepOcean were also involved in the installation of the Race Bank Export Cable which also encountered Chalk in The Wash and the same techniques were utilised to determine Chalk units along this route too. As a result of this experience, Jim prepared a paper which was submitted to the conference, which was subsequently submitted to the Conference Committee, accepted and presented in September last year.

In the meantime, Jim and his DeepOcean Geoscience team have moved on to a different project and are now engaged on installing cables on the world's biggest windfarm, Hornsea 1, which has recently generated first power although construction is ongoing.



Burial machine load-out onto the DeepOcean construction vessel Havila Phoenix on the River Tees, ahead of installation operations on the Nemo Link

History is being made on climate change

Pete Harrison
(Marine Biology, 1994)

Scientists studying melting ice sheets in Antarctica reported recently they had found a giant hole in the Thwaites Glacier, one of the world's most unstable, highlighting how little we know about the pace of climate change.

"I am no climate scientist, but I do know something about how society is dealing with this challenge, especially in Europe.

It has been a long time coming, but the last few years have brought tremendous progress at a political level. We now have the Paris Agreement to limit temperature increases to well below 2 degrees above pre-industrial levels, which is an honest reflection of what is needed. Note the emphasis on "well below". Scientists tell us that to make that pledge meaningful, we will need to make our economies zero-carbon by the middle of this century – nothing short of an industrial revolution.

Politicians working at the EU level have made a promising start. In the last few months, they agreed a package of targets and policies that by 2030 will put us well on track towards that revolution. Take, for example, the agreed goal of getting 55% of electricity from renewable sources within a decade. That is truly transformational, requiring a system-wide revamp. Another example is that 30-40% of car sales will need to be electric within a decade. It is those kinds of policies that helped trigger a multi-billion-dollar technology race so disruptive that no company dares get left behind for fear of becoming the next Nokia or Kodak.

The challenge is what happens next, because political targets are threatened as soon as voters start resisting change. When French President Emmanuel Macron tried to raise fuel taxes last November as part of his clean mobility plan, he unwittingly sparked a wave of grassroots protests by the Gilets Jaunes that put his presidency in crisis. In Germany recently, the mere mention of setting a speed limit on the autobahn triggered a wave of indignation.

Nonetheless, there remain plenty of reasons for optimism. Clean technology is advancing at a rapid pace. Last year, deals were struck to build wind farms in the North Sea and Baltic with zero subsidy. Since I was at Bangor University in the 1990s, the output of the average wind turbine has increased by a factor of 15. Solar power is another success story, with costs having plunged by a whole order of magnitude since the 1990s. Lithium-ion batteries for vehicles, while further behind, are on an equally steep downward trajectory.

Socially, there is also movement, especially coming from the youth. Children are skipping school in their thousands to protest about inaction on climate change, many of them inspired by Swedish student activist Greta Thunberg. Such strikes are controversial. When an Australian minister opposed the strikes, Thunberg tweeted her response: "Your statement belongs in a museum." Regardless of where one stands on that issue, one cannot contest that Thunberg is right about the context. We are indeed watching history in the making, and many familiar things of today will become the museum pieces of the future. Let's hope those artefacts are polluting technologies and not our ecosystems."
regulations assessments (HRA's).

Carcinus Ltd

Matthew Davison
(Marine Biology/Zoology, 2005)

"I graduated from Bangor University in 2005 with a degree in Marine Biology and Zoology. Since that time, I have worked throughout the UK and abroad as an aquatic ecologist in the commercial sector. Three years ago I was invited to join Carcinus Limited as Director / Principal Ecologist."

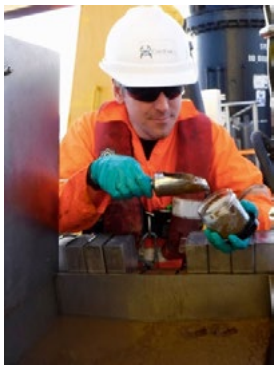
"Carcinus Ltd was established in 2016 by its co-founders who have over 30 years' combined experience of working within the marine and freshwater environmental sector. Carcinus is now a leading provider of aquatic environmental consultancy and survey services in the UK.

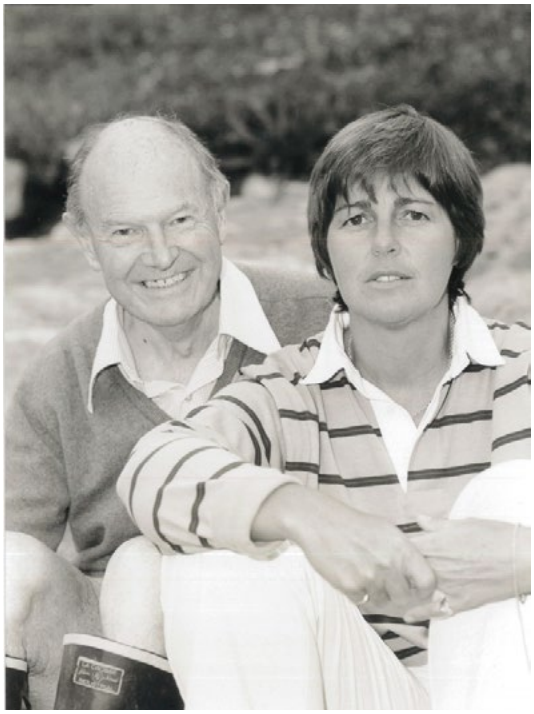
From our base in Southampton, we provide consultancy advice and support as well as ecological, topographic and hydrographic survey services to clients throughout the UK and abroad. Our clients operate in a range of industry sectors including civil engineering and construction, ports and harbours, new and existing nuclear power, government, NGOs, transport and water, oil and gas, public sector and renewable energy (including, offshore wind, tidal energy and wave energy).

We have developed a pragmatic and proportional approach to assessing the needs of a project that allows us to deliver a cost-effective service that provides the necessary level of information needed to inform both our clients and the regulatory authorities. We routinely support our clients in the production of feasibility and scoping studies, specialist technical studies, environmental impact assessments (EIA's) and habitat regulations assessments (HRA's).

We offer a broad range of services both in the marine and freshwater environments that include ecological fisheries studies, benthic grab sampling, seabed imaging and water / sediment quality sampling, using the latest techniques, innovation and recognised best practice. Our freshwater services include fish population studies, habitat mapping, water quality analysis and macroinvertebrate sampling. See our website for more information about the services Carcinus Ltd provides: www.carcinus.co.uk"

Company Pictures:





Prof Crisp and Sandy Shumway

The Dennis Crisp Memorial Lecture & 2019 Alumni Reunion

The third Dennis Crisp Memorial Lecture will be delivered by SOS alumna, former Crisp student, and Honorary Fellow Prof Sandra Shumway of the University of Connecticut on Friday, 15th November 2019 at 6pm in the University's Pontio building. An alumni reunion will be held the next day.

Prof. Dennis Crisp (1916-1990) was one of Britain's best-known marine biologists who developed the School of Ocean Sciences into the world-renowned School it is today. This memorial lecture series sees the diaspora of Dennis' PhD students return to their alma mater to present on topics that were influenced and inspired by Prof. Crisp.

Prof. Sandra Shumway (Marine Biology Phd, 1977) is currently Research Professor in the Department of Marine Sciences at the University of Connecticut and is a Bangor University Honorary Fellow. Prof. Shumway's research spans over 30 years in shellfish biology, filter-feeding and the physiological ecology of marine invertebrates.

A reunion for School of Ocean Sciences' alumni will be held the following day on Saturday, 16th November 2019 in Menai Bridge. You'll have the opportunity to see the new Marine Centre Wales building, learn about current. research and hear from our students and academics. A reunion dinner will be held that evening where you'll have ample opportunity to catch up with old classmates and make new friends!

Further information and ticket details will be sent soon but please put the date in your diary and we hope to welcome you back to the School of Ocean Sciences in November.

2016 Reunion Dinner

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