

# Challenger Wave



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

## NEWS

### Challenger Fellowships and Challenger Medal

The Challenger Society will be considering nominations for the Challenger Fellowships and Challenger Medal at its next meeting and we would be happy to receive nominations from the membership. The criteria for the awards are laid out below.

#### **Fellowships:**

Awarded to early career scientists for their achievement or promise in a branch of marine science.

#### **The Challenger Medal:**

The award is for a distinguished UK marine scientist or other person who has made a single major contribution, or a sustained contribution, to the development of marine science, or whose innovation has opened up new perspectives.

Please send nominations to me as President, thanks - **Tim Jickells** ([t.jickells@uea.ac.uk](mailto:t.jickells@uea.ac.uk))

### Norway's Arctic university recognises Scottish scientist's research

A leading Scottish marine scientist who has been at the forefront of Arctic research for the past decade has been awarded a professorship at the Arctic University of Norway, Tromsø. Dr Finlo Cottier, head of the Physics and Technology Department at the Scottish Association for Marine Science (SAMS), was awarded the adjunct position as recognition for his participation in a decade of Arctic research projects and encouraging closer working links between Scottish and Norwegian researchers. He has also helped to develop the Arctic science degree run by SAMS through the University of the Highlands and

Islands and alongside the University Centre in Svalbard (UNIS).



*Dr Finlo Cottier has been awarded an Adjunct Professorship at the University of Tromsø, the Arctic University of Norway, for his Arctic research.*

The professorship announcement comes ahead of this week's UK Arctic Science Meeting in Sheffield. Dr Cottier is currently working with Norwegian colleagues on two new Arctic research programmes, Arctic ABC and FAABulous, worth a combined £4.7m and says that international co-operation on major projects will help answer many of the big questions about the Arctic region. Welcoming a recent announcement of £16m in research grants from the Natural Environment Research Council (NERC), the UK's environmental science funding council, Dr Cottier

added: "There is still much to learn about the Arctic, particularly during the polar night and how Arctic ecology will respond to retreating sea ice, but we are making numerous important discoveries with each project, thanks to collaborations with international partners. The Arctic is one of the most undiscovered areas of the planet and our drive to understand it requires us to work together, not separately. I take a great deal of personal satisfaction in receiving this adjunct professorship from the University of Tromsø, the Arctic University of Norway, but I think it is more a recognition for the Arctic research being done at SAMS as a whole. I hope this can help develop a relationship between the two institutions, which share a natural alliance and a common interest in the research areas of aquaculture and oceanography, as well as the Arctic."

Professor Jørgen Berge, of the University of Tromsø, said: "Through long-term co-operation with SAMS on ocean observatories on Svalbard we now have an unbroken time series of physical and biological measurements from 2002, so this alliance has proven exceptionally valuable. Dr Cottier has been *the* key player since the start of this co-operation. Based on this long and close history of co-operation, and considering the research challenges and opportunities that lie before us, I am convinced that our future is even greater than our past."

Newly-appointed SAMS Director, Professor Nicholas Owens, said: "As well as being a well-deserved personal accolade for Finlo, the award of his Professorship reflects the considerable investment SAMS has made over the years in developing an internationally strong Arctic research programme. Although the Arctic may seem very distant to us here in the UK, the region has important influences on our weather, climate and marine ecosystems. I look forward to this award strengthening the links between SAMS and the University of Tromsø and the enhancement of research in the Arctic."

### Eye in the sky gives Arctic scientists new insight into ice loss

A custom-built Remotely Piloted Aircraft (RPA) has helped Scottish-based scientists survey one of the world's most dangerous terrains as they seek to discover causes of ice loss in the Arctic.

The RPA, a quadcopter, was built by Scottish Association for Marine Science (SAMS) engineer

Shane Rodwell and used a mounted laser-range finder and a camera to measure and photograph glaciers in the polar region, collecting unique data for glacier experts Dr Nick Hulton of The University of Edinburgh and Professor Doug Benn of St Andrew's University. The detailed images will help provide a 3D image of glaciers for their investigation into glacier 'calving', the term given to large sections of glaciers breaking off and falling into the sea, which is increasing with global warming.



*SAMS engineer Shane Rodwell operates his quadcopter in the Arctic.*

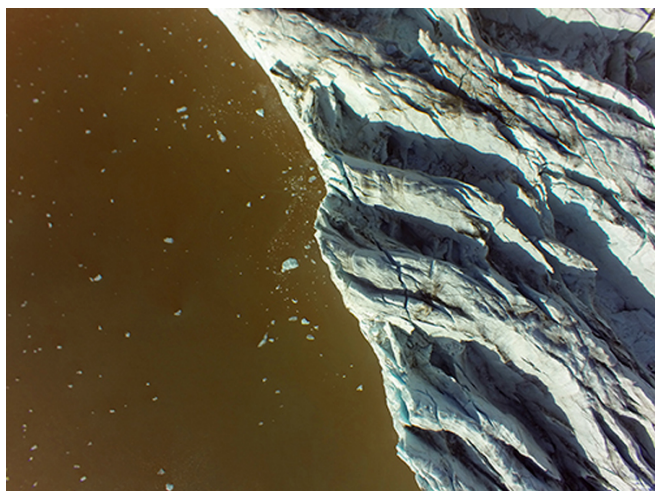
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Large crevasses open up in the glaciers as they break, so the terrain is unsafe to survey on foot and the previously accepted, but costly, alternative is a helicopter. Satellite imaging produces comparatively low resolution images. The work, undertaken in the Svalbard archipelago, Norway, is the first time geoscience researchers have combined a laser-range finder with photogrammetry to measure the depth and size of crevasses in the glaciers.

Dr Hulton explained: "The biggest increases to ice loss in the world's major ice sheets are happening not because of increased melting, but because of increased iceberg calving. Glaciologists worldwide are trying to better understand the main mechanisms involved in the calving process and how it might accelerate if the climate continues to warm. Warmer ocean temperatures have an effect because they lead to more melting at the edge of the ice and this can destabilise and break-up the ice margins. Measuring crevasses is a fiendishly difficult problem as often researchers are unable to get close enough to measure them and, if they do, the shape and size of the crevasses makes mapping them incredibly difficult. I

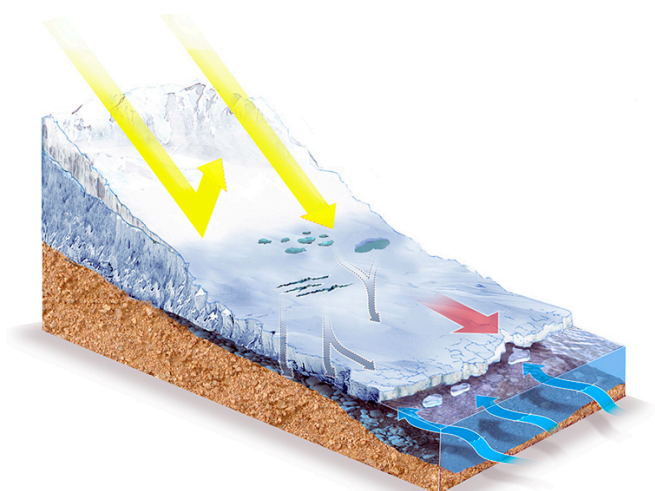


know people who have done this with a ball of string while tied on in precarious locations. The crevasses you often particularly want to measure, the big ones, are more or less totally inaccessible."



*An image taken from the quadcopter of a glacier calving.*

The mounted laser-range finder allowed SAMS engineer Shane Rodwell to photograph and measure the depth of every crevasse. On each of the 15–20 minute missions, the camera took 1,000 images and after 10 missions the team had enough still images to map the glacier in a 3D model.



*A diagram detailing the process involved in a calving glacier. Courtesy of Denver Museum of Nature and Science*

Mr Rodwell said: "The quadcopter has given us a viewpoint we didn't have before, so it will be really interesting to see what conclusions can be drawn from the new data. It is exciting to be involved in a project such as this, using technology to help us

cover hard-to-reach places and producing great results. The terrain there is as tough as it gets."

The scientists will now build up 3D virtual models of the glaciers using a technique called Structure From Motion (SFM). This works by taking the photographs of features from multiple different angles to create the shape of a feature. Once all the data is processed researchers hope to summarise whether the spacing and size of the crevasses match the predicted rate of change. This will enhance predictions on how crevasses form and the role they have in iceberg calving.

The research was funded by the University of Edinburgh's Innovation Initiative Fund, the Carnegie Trust for the Universities of Scotland and the CRIOS project at the University Centre in Svalbard (UNiS) led by Professor Benn. The work was also supported by the Marine Alliance for Science and Technology Scotland (MASTS) and the NERC National Capability Funding for Technology Development.

### **Scientists to give Shetland's aquaculture industry early warning on harmful algae**

Scientists at the Scottish Association for Marine Science (SAMS) in Oban are helping to safeguard stocks of farmed shellfish and salmon in Scottish aquaculture's industrial heartland.

The waters around Shetland produce around 77 per cent of the rope-grown mussels in Scotland and the seafood sector on the islands is worth around £350 million per year, meaning the Shetlands are crucial to Scottish Government targets of sustainably producing 210,000 tonnes of fish and 13,000 tonnes of shellfish by 2020. But these stocks can be threatened by masses of harmful algae that can form off the coastline, known as Harmful Algal Blooms (HABs); one bloom in July 2013 led to a voluntary ban on harvesting from all 20 mussel sites on Shetland. Toxins from some of these algae are absorbed by shellfish, posing a risk to human health, and others can kill farmed fish.

Human health is protected by regulatory monitoring that leads to fishfarms or shellfisheries being closed if toxin levels rise. To help improve this monitoring, SAMS scientists, in conjunction with Marine Scotland, have deployed 16 floating 'drifters' in the waters to the north of Scotland to track ocean currents, which along with data from satel-

lite images, will help them anticipate when some of these HABs could occur. The collected data will then be used to validate a model that will more accurately predict the emergence of blooms and will complement, The Bulletin ([http://www.somuchtosea.co.uk/news/bulletin\\_for\\_shellfish\\_farmers.aspx](http://www.somuchtosea.co.uk/news/bulletin_for_shellfish_farmers.aspx)), a HAB monitoring service currently funded by the Natural Environment Research Council (NERC) and Biotechnology and Biological Research Sciences Council (BBRSC). This will give fish and shellfish growers a reliable early warning system to the emergence of HABs, allowing them to take mitigating actions.



*Drifters are being released into the seas off Shetland to help predict the occurrence of harmful algal blooms.*

Professor Keith Davidson, SAMS' principal investigator in Microbial Ecology and Modelling, said: "The security of Shetland's aquaculture industry is key to ensuring products are safe to eat and to the success and reputation of both Scotland and the wider UK seafood market. Science can help build robust early-warning systems that can help reduce the risk of HABs affecting farmed products. The more work we can do in this area, the better prepared we will be."

Drifters are floating GPS instruments, anchored to the water so that they can track currents, rather than being blown by the wind. They transmit their

location via satellite every hour. Eight of the 16 drifters have sails to anchor them to the surface metre or so, and 8 have a wire tether and a sea anchor at 15m depth, to follow subsurface currents. That lets investigators see how the more wind-driven surface layer moves compare to deeper water.

Plymouth Marine Laboratory and Exeter University are conducting remote sensing as part of this project and the drifters will be released from the Marine Scotland Science vessel, Scotia. The Shetland-based North Atlantic Fisheries College (NAFC) Marine Centre is also contributing to in-shore oceanography.

### **Challenger Society Council**

The Challenger Society AGM took place in Sheffield on September 16 associated with the societies Sea Ice Meeting and the UK Arctic Science meeting. Full minutes will appear in due course but I wanted to alert members to the changes to the Challenger Council personnel and their particular responsibilities. At the AGM Chris Comyn and Hilary Kennedy rotated off the Council and we thank them both for their work for the society. I want to particularly thank Hilary who was my predecessor as President and who worked really hard for the society. Hilary led us in an important modernisation drive as well as helping me and supporting the society in a myriad of often unseen ways during her time at the helm.

We welcome three new members to the Council after the AGM, Louisa Watts who is based in Swindon and takes over education and outreach, Luisa Cristini who is based in Southampton and will take over our early career network and Rachel Mills also based in Southampton who is re-joining the Council, having served some years ago, as President Elect to take over from me at the Challenger conference in Liverpool next year. I welcome all three and thank them and the other committee members for all their hard work for the Society. The new council is listed below - **Tim Jickells**

Tim Jickells - President  
 Rachel Mills - President Elect  
 John Bacon - Honorary Secretary  
 Sinhue Torres-Valdés - Honorary Treasurer  
 John Allen - Editor, Challenger Wave  
 Matt Green - Membership, Student Travel Awards  
 Gideon Henderson - UK SCOR representative  
 Luisa Cristini- Early Career Scientist Network



Abigail McQuatters-Gollop - Communications,  
Web manager  
Ruth Airs - Meetings, SIGs & Local Networking  
Events  
Terry Sloane - Industry Liaison & Technology  
Louisa Watts - Education & Outreach

#### **Ex-Officio**

Jennifer Jones - Executive Secretary  
Angela Colling - Editor, Ocean Challenge  
Grant Bigg - Chair, Editorial Board, Ocean Chal-  
lenge  
Matthew Palmer - Chair OC Challenger Confer-  
ence 2016

## **VIEWS**

### **First meeting of the Deep-Sea Ecosystems SIG (Special Interest Group)**

At the end of June over 30 marine scientists met at the University of Liverpool for the inaugural meeting of the Challenger Society's Deep-Sea Ecosystems special interest group (SIG). The meeting brought together representatives from 10 universities, 3 NERC research facilities as well as other government agencies, museums and independent research organisations.



The Deep-Sea Ecosystems SIG was formed in February with the aim of creating a national forum for UK scientists working on deep-sea habitats. While most of its members are biologists, the group aims to bring together scientists from a broad range of related backgrounds. To that end, it was heartening to also welcome geologists, chemists and those in between. There were representatives from all levels of academia with an

encouraging number of PhD students in attendance.

The variety of presentations, outlined below, were complemented by a range of excellent posters. In addition to these traditional elements, a full half of the timetable was given over to open discussion sessions, ensuring that all attendees were able to engage and contribute to the meeting. The discussion sessions were a resounding success and generated exciting new ideas and actions, such as the proposal for a new global expedition to celebrate the upcoming 150<sup>th</sup> anniversary of the Challenger expedition (more below).

We are very grateful to our host, Rachel Jeffreys from the School of Environmental Science, who heroically arranged all of the local logistics. The meeting was graciously sponsored by the Challenger Society for Marine Science, and as a result of the new SIG, and its first meeting, the Challenger Society can now welcome over 20 new members.

The meeting began with a presentation by Louis Byrne from the British Oceanographic Data Centre, highlighting the services that they offer and stimulating discussions about how we could implement a data storage strategy for video data. This was followed by an introduction to the Marine Alliance for Science and Technology for Scotland (MASTS), particularly the work of their Deep-Sea Forum. As a research community, UK deep-sea biologists are spread far and wide so there were lots of useful insights from the success of MASTS in bringing together the resources from multiple institutions to get some science done.

Unfortunately, two colleagues were unable to attend because of last-minute difficulties. This space in the timetable allowed Tammy Horton to provide an impromptu overview of the leading work being undertaken by the DeepSeas Research Group at the National Oceanography Centre in Southampton. Tammy joined us via the internet on both days to represent her colleagues - most of whom were at sea getting some science done !

After lunch Adrian Glover (Natural History Museum) led us through the history and policy of mining in the deep-sea with a preview of initial data coming from the Abyssline project. Adrian and a multinational consortium of colleagues have been working to collect baseline data on the

UK's claim area in the central Pacific. This session continued into a wider discussion on the future of mineral resource exploitation in the deep sea and the implications for deep-sea research.

In the final session of the day Kerry Howell showcased some of the mapping and predictive habitat modeling work being carried out by the Deep-Sea Conservation Research Unit at Plymouth University. We then had a whistle-stop tour of recent research on chemosynthetic habitats in UK territorial waters across the globe, courtesy of Jon Copley (University of Southampton). Jon then led us in a discussion looking at how we could generate more funding to carry out biodiversity research on the huge areas of deep-sea habitats in UK territories and marine protected areas.

The first day was rounded off with dinner at HOST restaurant, providing a chance to unwind and catch up with old friends, as well as make new ones. A fine meal was had by all that evening with conversation flowing as freely as the wine. Discussions went on into the night as the merry band of scientists sampled some of Liverpool's finest establishments.

Day two took us to the deepest of deep-sea ecosystems with an overview of recent hadal research by Alan Jamieson (University of Aberdeen). Alan concluded with a plea to move beyond our preoccupation with the Challenger Deep to some more representative hadal provinces. This was followed by Michelle Gaither (Durham University) who took us through her fascinating work on the genetics of adaptation in deep-sea Grenadier fish. The group's website ([deep-seaevolution.com](http://deep-seaevolution.com)) is well worth a look.

After a brief coffee break we began the first of the discussion sessions that took us through the rest of the meeting. Kerry Howell put forward her exciting proposal to commemorate the 150<sup>th</sup> anniversary of the Challenger Expedition in 2022 with a new global oceanographic venture in the spirit of Challenger. The idea was enthusiastically welcomed by the group with lots of useful advice on a timetable of action to get this ambitious project off the ground. Get in touch with Kerry for more information on how to get involved. Kerry then led us in another discussion on how we might be able to emulate the MASTS model to pool our shared resources to get some deep-sea work done in the current funding environment.

The final discussion session of the day was held as a continuation of lunch in the seminar room. We considered some of the most serious problems surrounding funding and resourcing of deep-sea research in the UK and explored ways that we as a community could work together to see more projects funded. The meeting concluded with a discussion about the future of the group and SIG activities. It was agreed that another meeting should be held at the Challenger Society conference next September (make a note in your diaries). Until then we will be creating an email list to keep in touch, open to anyone who wants to keep updated on the discussions.

After two days of research highlights and fruitful discussion, we parted ways with a new community formed ready for the upcoming International Deep-Sea Biology Symposium in Portugal later this summer. It was a genuine pleasure to have so many deep-sea researchers together in one place. The flow of discussion and ideas was exciting and inspiring. Now we need to keep the energy and enthusiasm going ! - **Nicholas Higgs, Deep Sea Ecosystems SIG Coordinator**

#### **Top ranked aquaculture course seeking scientific elite**

The Scottish Association for Marine Science is looking to produce the aquaculture industry leaders of the future as it invites applications for its new, world-class Joint Masters Degree course. The specialised degree in AquaCulture, Environment and Society (ACES), which has just taken on its first cohort of students, is part of the European Union's ambitious Erasmus+ programme (previously known as Erasmus mundus), making it one of Europe's highest ranked academic programmes.

The two-year course aims to attract talented international students with a Bachelor's degree (or equivalent), as well as mature students with relevant experience, in one of the fields of environmental or social sciences and will be run in partnership with the universities of Crete and Nantes and the United Nations University Institute of Water, Environment and Health (UNU INWEH), Canada. Fully-funded scholarships are available for ACES, which has been specifically designed alongside industry to address major scientific, technological and social obstacles facing the sustainable development of the global aquaculture industry.

Italian student Francesco Boatta is part of the first ACES cohort, which has begun studies at SAMS, near Oban. He said: "My application to the ACES Joint Master Degree was motivated by the perfect match I found between the programme and the interests arisen during my academic career. I saw it also as a great opportunity to develop my professional skills, to achieve an applied knowledge of aquaculture industry and its relation with society and to broaden my expertise in different fields across Europe. I firmly believe that this Masters Degree will provide me the opportunity to establish an international professional network, the privilege to learn directly from several academic and private sector experts and the tools to reach a highly-specialised professional competence, permitting me to be an active part in sustainable aquaculture development."



*Italian student, Francesco Boatta, one of the first cohort of ACES Masters Degree students at SAMS, holds some Ulva seaweed, known as 'sea lettuce'.*

Successful applicants spend semester one at SAMS, part of the University of the Highlands and Islands (UHI), before going on to study finfish aquaculture in Greece and shellfish aquaculture in France. The students will then complete research projects at one of the three centres in semester four, before returning to Oban for the final student conference. Dr Lois Calder, SAMS UHI's head of education, said: "We are delighted to be co-ordinating this exciting programme and welcoming the first ACES students. The ACES Masters Degree is a fantastic opportunity for any student wishing to flourish in the aquaculture industry and we look forward to receiving applications now for the course beginning in August 2016. We have strong relationships with the aquaculture industry, which will help to build student networks and support personal and profes-

sional development of the very particular skill set they will need for the future."

David Jarrad, Director of the Shellfish Association of Great Britain, said: "As a trade association, representing large and small aquaculture businesses UK-wide, we are often asked for sources of practical training and I believe this Joint Masters Programme will provide the opportunity to learn a broad range of skills relevant to the industry. The ACES programme will also address a pressing need in the European aquaculture sector for a mix of expert practical skill with high level scientific knowledge."

### **IMBER ClimEco5 Summer School, University of Rio Grande do Norte, Natal, Brazil, 10-17 August 2016**

Towards more resilient oceans: Predicting and projecting future changes in the ocean and their impacts on human societies. The ClimEco5 summer school will focus on anthropogenic, oceanographic and environmental changes affecting the ocean, and will emphasize linkages between these and social, economic, and policy issues associated with maintaining sustainable and productive oceans. Participants will be guided through integrated modelling and monitoring approaches, as well as the use of indicators to evaluate these complex systems, and to make the information relevant to managers and decision makers. More info soon, and applications will open in November 2015

## **SALTS**

### **No news from sea this month I'm afraid**

I know that this is a favourite section for many readers, where we get the inside information about life at sea, its thrills and spills. So please the next time you are at sea or carrying out any fieldwork, please remember that a simple paragraph or two will get you published here. – **Ed**

## **CALENDAR**

**9th October 2015: Scottish Inshore Fisheries Conference**  
*Inverness, UK*





**SCOTTISH INSHORE FISHERIES CONFERENCE 2015**

**FRIDAY 9 OCTOBER  
EDEN COURT  
INVERNESS**

It's your opportunity to have a say on how inshore fisheries are managed!

The third Scottish Inshore Fisheries Conference will be held on Friday 9 October 2015 at Eden Court, Inverness, and will be of real interest to active fishermen. The event will provide an informal opportunity to meet fishermen and others from around Scotland with an interest in inshore fishing.

The conference will provide the opportunity to share experiences and knowledge in an informal setting on a wide range of issues. This will include long-standing fisheries management challenges and actions, and proposals to improve the evidence base on which fisheries management decisions are made.

For more information visit: [www.gov.scot/Topics/marine/Sea/Fisheries/InshoreFisheries/InshoreFisheriesConference](http://www.gov.scot/Topics/marine/Sea/Fisheries/InshoreFisheries/InshoreFisheriesConference)

marine.scotland

The Scottish Government

## 20th October 2015: EMODnet Open Conference

*Oostende, Belgium*

You are kindly invited to join us at the **First Open European Marine Observation and Data Network (EMODnet) Conference**. The Conference is free to attend but **registration is necessary**.

To register:

<http://www.emodnet.eu/conference/registration#content>

For more information about the programme, speakers and regular updates, consult the Conference website:

<http://www.emodnet.eu/conference>

For more information about the programme contact [info@emodnet.eu](mailto:info@emodnet.eu)

For more information about the logistics contact [registration@emodnet.eu](mailto:registration@emodnet.eu)

### About the Conference

Halfway through the development of EMODnet, it is timely to consider progress made since its inception in 2009, learn from past experiences and make plans for the third and final development phase (2015-2020) – and beyond. The Conference provides a unique forum to bring together the marine observation and data community, policy makers/advisors and diverse stakeholders to meet, discuss and respond to the future challenges and opportunities. It will provide an opportunity to showcase the wealth of marine data and information that is already made available at European level through EMODnet and to listen to the needs and advice from key users from industry, policy, science and civil society. The main objective of the Conference is to reinforce the EMODnet foundations and to consider what avenues to take to further develop an open, user-

friendly and fit-for-purpose pan-European marine data infrastructure. A fully operational EMODnet, corresponding to user requirements, will reduce costs for offshore operators, stimulate innovation and blue growth, improve our knowledge of the marine environment and support effective marine management and maritime policy making.

### About the EMODnet

EMODnet is a network of organisations working together to observe the seas, to make marine data freely available and interoperable, to create seamless data layers across sea-basins and to distribute the data and data products via the internet. The primary aim of EMODnet is to unlock already existing but fragmented and hidden marine data and make them accessible for a wider range of users including private bodies, public authorities and researchers. Currently, seven thematic assembly groups have been created to develop thematic web-based Data Portals covering data resources from diverse fields including hydrography, geology, physics, chemistry, biology, physical habitats and human activities. Many of these thematic portals are already operational. In addition, six sea-basin checkpoints have been established to assess the observation capacity and adequacy of marine data available at regional sea-basin level. To strengthen the coherence and functionality for users, a common 'EMODnet Entry Portal' provides an entry point delivering access to data, metadata and data products held by EMODnet thematic sites. More information about EMODnet in general can be found on the information pages of the central portal [www.emodnet.eu](http://www.emodnet.eu).

## 27th-30th October 2015:IMBER IMBIZO IV - Marine and human systems: Addressing multiple scales and multiple stressors

*Trieste, Italy*

IMBER will hold the fourth in its IMBIZO\* series at the Istituto Nazionale di Oceanografia and Geofisica Sperimentale (OGS) in Trieste, Italy.

(\* Zulu word for "a gathering").



IMBER

**IMBIZO IV**

MARINE AND HUMAN SYSTEMS  
Addressing multiple scales and multiple stressors

**26-30 Oct 2015 — TRIESTE (Italy)**

[www.imer.info](http://www.imer.info)

IMBIZO IV will be bigger and better! The proven format of concurrent and interacting workshops, with joint plenary and poster sessions will be fol-



lowed, but IMBIZO IV will have four, instead of the usual three workshops. This format has been shown to provide an excellent forum for stimulating discussion between interdisciplinary experts, and encourage the linkage between biogeochemistry, ecosystem and social science research. To optimize participant interactions, the size of the workshops will be restricted to 40 participants per workshop.

The themes of the four concurrent workshops are:

1. Marine ecosystem-based governance: From rhetoric to reality
  2. Coastal upwelling ecosystems as models for interdisciplinary studies of climate and global change
  3. Integrated modelling to support assessment and management of marine social-ecological systems in the face of global change
  4. From regime shifts to novel systems - evaluating the social-ecological implications of lasting ecosystem changes for resource management
- Each workshop will prepare a white paper or a special journal issue containing synthesis and primary research papers resulting from the workshop contributions and discussions.

Bonus workshops on 26 October 2015!

On the day before the start of IMBIZO IV, several interactive sessions, including scientific writing and publishing, and data management will be organised. For further information about IMBIZO IV and detailed descriptions of the workshops, visit the IMBER web site <http://www.imber.info/index.php/Meetings/IMBIZO/IMBIZO-IV> or contact us at [imber@imr.no](mailto:imber@imr.no)

#### 14th-18th December 2015: AGU Fall Meeting San Francisco, USA

We would like to invite you to contribute a paper for the IMBER session (OS #21) Trajectories of change in the Southern Ocean that we are convening.

This session is a contribution to the IGBP celebration synthesis and is co-convened by the IMBER, SOLAS and PAGES core projects of the IGBP

Session ID#: 8669, Session Description:

The Southern Ocean is a critical part of the Earth system and host to unique and diverse marine ecosystems. The region is experiencing rapid changes as the climate continues to warm: dy-

[www.challenger-society.org](http://www.challenger-society.org)

namic and thermodynamic processes are affecting sea-ice cover, oceanographic processes, atmosphere-ice-ocean interactions as well as the Antarctic ice sheet. How will these changes alter the Southern Ocean's ability to absorb heat, carbon dioxide and support ocean productivity? Will the changes result in feedbacks that accelerate or slow the rate of climate change? This session will address such questions by assessing recent insights from contemporary and palaeoclimatic observations and models. We solicit integrative contributions that explore topics such as sea ice, ice-sheet stability, biogeochemical cycling, atmosphere-ice-ocean processes and marine food webs. We will also consider contributions that explore the current and potential value of Antarctic ecosystem services and how they can be safeguarded.

<https://agu.confex.com/agu/fm15/preliminaryview.cgi/Session8669.html>

#### 6th-8th January 2016: AMBIO VII, Advances in Marine Biogeochemistry Conference University of Oxford, UK



#### AMBIO VII: Advances in Marine Biogeochemistry Conference

Save the date!



January 6<sup>th</sup>-8<sup>th</sup> 2016 University of Oxford  
Coming to the Department of Earth Sciences: The 7<sup>th</sup> biannual meeting of The Marine Biogeochemistry Forum - Special Interest Group of The Challenger Society for Marine Science. Further announcements to follow.



Registration opens in August 2015

Convenors:  
Will Homoky (Oxford)  
Gary Fones (Portsmouth)

For latest info: [@challengersoc #ambioVII](http://www.challenger-society.org.uk)

#### 17th-18th February 2016: Society of Maritime Industries Annual Conference Hull, UK

Maritime Engineering: Exploring Business Opportunities in a Diverse Sector. As per previous editions the 2016 conference will include industrial visits, one-to-one meetings and an evening reception and dinner. The programme will soon be announced [info@maritimeindustries.org](mailto:info@maritimeindustries.org)

**12th-17th June 2016: Gordon Research Conference on Ocean Biogeochemistry, Hong Kong**

The 1st Gordon Research Conference (GRC) on Ocean Biogeochemistry will be held at the Chinese University of Hong Kong. The topic of this first conference will be *The Biologically-Driven Ocean Carbon Pumps*.

Interested researchers, postdoctoral fellows and graduate students are invited to apply for participation as soon as possible on the GRC website (Online Application):

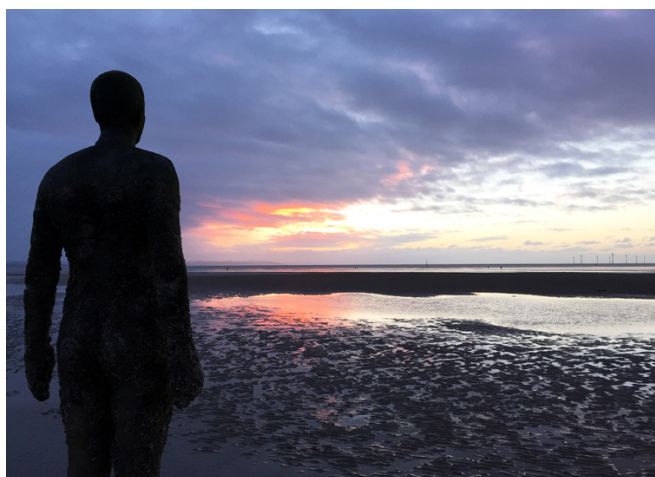
<http://www.grc.org/programs.aspx?id=17297>

[Nianzhi Jiao](#) and [Eileen E. Hofmann](#) (Chairs)  
[Louis Legendre](#) and [Sylvia Sander](#) (Vice Chairs)

**5th-8th September 2016: Challenger Society 2016 Conference**

*Liverpool, UK*

The 17th Biennial Conference of the Challenger Society for Marine Science will be held at the University of Liverpool located within the heart of the city of Liverpool, famous for its maritime history, cultural diversity and exciting nightlife.



The 2016 Challenger Conference promises to provide a fantastic showcase of marine science and technology covering all areas of ocean research. The official conference programme will commence with an ice-breaker event on the evening of the 5th September followed by a three day lecture and poster programme, culminating in a conference dinner within the breathtaking Liverpool Anglican Cathedral.

Alongside the formal conference programme there will be early career events and education and outreach opportunities that continue the ongoing contribution of this conference series to our next generation of scientists. Free facilities are available for special interest groups and large projects that may wish to combine annual meetings with this important conference that already brings together large parts of the UK marine science community. A call for sessions will be announced in October 2015.

We look forward to welcoming you to the 2016 Challenger conference in Liverpool, jointly organised by the University of Liverpool, Liverpool John Moores University and the National Oceanography Centre.

**12th-16th September 2016: CIESM Congress**

*Christian Albrechts University, Kiel*

I have the pleasure to inform you that the CIESM Board, by a unanimous vote, has just accepted the kind invitation of German Authorities to host the next Congress of our Commission in Kiel on the Baltic shore. This will be the first time that our Congress takes place in Germany, which is a Member of our Commission since 1969.



More information will follow in the near future on our CIESM web pages and via circulars, detailing the Congress themes (a dozen per committee) which will soon be selected by the Science Council. The submission period will run from 4 January to 15 February 2016. We hope that as many of you as possible will be able to join us in Kiel. With my best regards, Frederic Briand, Director General, The Mediterranean Science Commission, CIESM

**October 2015**

CSMS email addresses are president, admin, membership, secretary and [treasurer@challenger-society.org](mailto:treasurer@challenger-society.org). Contributions for next month's edition of Challenger Wave should be sent to: [john@vectisenvironmental.com](mailto:john@vectisenvironmental.com) by the 30<sup>th</sup> October.

*We continue to send printed copies of Challenger Wave to members of the CSMS without email addresses. However it is in everybody's interest to send your email address to Jennifer Jones [jxj@noc.ac.uk](mailto:jxj@noc.ac.uk) as soon as possible*

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## **JOBS**

No job adverts sent to me this month i'm afraid, come on let's get writing those grant proposals ! – **Ed.**