

# Challenger Wave



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

SUPPORT THE UK'S PREMIER CONFERENCE ON  
MARINE RESEARCH

**CHALLENGER SOCIETY**  
FOR  
**MARINE SCIENCE**  
**CONFERENCE 2016**  
*Oceans and Climate*  
5-8TH SEPTEMBER 2016, LIVERPOOL

The 17<sup>th</sup> 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, host to world-leading marine research and a maritime business hub.

The 2016 Challenger Conference promises to provide a fantastic showcase of marine science and technology, covering all areas of ocean research.

Exhibitor space will be available in the conference area and there are opportunities for corporate sponsorship of events. For details please contact Terry Sloane by email: [terry@planet-ocean.co.uk](mailto:terry@planet-ocean.co.uk) or phone 01276 427 971

#### CONFERENCE INFORMATION

The official conference programme will commence with an ice-breaker event on the evening of the 5th September in the Victoria Gallery and Museum, followed by a three-day lecture and poster programme and conference dinner at the awe inspiring Liverpool Anglican Cathedral.

The Challenger conference provides exposure to around 400 of the UK's leading marine scientists and engineers in a focused and high profile meeting. Delegates cover the full spectrum National Centre directors to PhD students and is a unique opportunity to develop contacts within both academic and commercial marine sectors.

Opportunities are currently available for sponsorship of events within the conference and for exhibitor space in the shared social and refreshment areas.

Visit the website for more information:  
[www.liverpool.ac.uk/challenger-conference-2016](http://www.liverpool.ac.uk/challenger-conference-2016)



#### SPONSORSHIP PACKAGES

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  - Gold Upgrade
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- 
- Manned exhibition stand 3m x m £650
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  - Sole sponsorship of conference dinner £5,000
  - Co-sponsorship of conference dinner £1,000, £2,500
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  - ¼ Page advert in conference handbook £100
  - 1/3 A5 banner add in conference handbook £150

Corporate society members benefit from a 15% discount

## NEWS

### Professor Harry Elderfield 1943 - 2016

It is with great sadness that we report the recent passing of Professor Harry Elderfield. Details of Harry's huge contribution to Ocean Science and his involvement with the society can be found at <http://www.challenger-society.org/News>. Harry was one of the great world-leading scientists, a

true gentleman and the academic father of oceanic trace metal chemistry. He was awarded the Challenger Medal in 2012 for his sustained contributions to the Society and his field of research.

Harry was one of the foremost scientists of his generation, as is reflected by the many honours he was awarded over his lifetime. He was recognised for his contributions with several notable awards including the Lyell Medal in 2003, the Urey Medal of the European Association of Geo-

chemistry in 2007 and the V. M. Goldschmidt Award in 2013. He was awarded many Fellowships during his career and was elected as a Fellow of the Royal Society in 2001.

Harry was Professor of Ocean Geochemistry and Palaeoclimate Research at the Godwin Laboratory, Department of Earth Sciences, Cambridge University. Harry's work has shown how and why the chemistry of the oceans, atmospheric carbon dioxide and global temperature have changed over time. One of his most important contributions was the establishment of new tools for analysing seawater through studying the chemistry of fossils buried in deep-sea sediments. His work has had a far-reaching impact on our knowledge of the Earth's makeup. - **Professor Rachel Mills, President Elect of Challenger Society**

### Globetrotting marine science student set for 'dream' scholarship year

A marine science student has been given a 'dream ticket' to spend the next year diving in the most stunning underwater locations around the world, thanks to a prestigious European scholarship.

Felix Butschek, a student at the Oban-based Scottish Association for Marine Science (SAMS UHI), has been selected as the European representative on the Rolex Scholarship Programme, run by Our World-Underwater Scholarship Society. The year-long scholarship, which annually attracts applications from across Europe, will allow Felix to train in underwater research, photography, marine conservation and equipment design and testing in global locations of his choosing.

The 24 year old, who is originally from Innsbruck, Austria, has already devised a wish-list of scuba diving experiences, including cave diving in Mexico, cold-water dives in Antarctica, wreck diving in Alaska and exploring the marine life around the Galapagos Islands. "Winning this scholarship is definitely a dream come true for me," said Felix, who officially begins his scholarship later this month. "Recreational divers might get to do these things in a lifetime and I get the chance to do them in a year. It is a huge privilege. It is a really exciting time and I am still trying to work out what is possible but it is also a really busy time for me. My dissertation deadline is April 13, the same day that I fly to New York for the annual gathering of the scholarship society. I fly back on April 18 and

will present my dissertation at SAMS UHI two days later."

Felix said his time at SAMS UHI, which hosts the UK's National Facility for Scientific Diving, has prepared him well for 'a year on the road' and he plans to return to Oban during his scholarship year to enrol in the commercial scuba diving course run by SAMS. He said: "There are lots of opportunities open to me but the planning will be a mammoth task. The current scholar has advised me to do a lot of good planning but also to be spontaneous and be ready to change my plans at the last minute."



*SAMS UHI student Felix Butschek will be the envy of diving enthusiasts during his prestigious scholarship year*

Elvin Leech MBE, Vice President of Our World-Underwater Scholarship Society, said: "Felix was chosen to be the European Rolex Scholar 2016 as he proved to the selection committee that he possesses the character attributes we are looking for in our potential Rolex Scholars such as determination, forward thinking outlook, independent yet able to work as part of a team. Most of all a desire to work and establish his future career around the underwater environment and helping to improve and conserve our marine and fresh water habitat for future generations."

Applicants for the Rolex Scholarship Programme are, among other criteria, required to have high academic standing and have Certification as a Rescue Diver or equivalent with a minimum of 25 dives logged in the past two years. Felix is currently in his fourth year of a BSc in marine science with Arctic studies at SAMS UHI, where he set up a branch of the British Sub Aqua Club and also helped in the discovery and identification of several WWII flying boats near Oban.

### CCMI hires coral restoration expert

Dr. Steve Whalan recently joined the Central Caribbean Marine Institute (CCMI) as a Senior Research Scientist with expertise in coral reef ecology. Dr. Whalan brings a vast amount of knowledge and skills to CCMI, an institute that has won awards through the National Science Foundation and the UK Darwin Initiative. His research has unravelled some of the mysteries of reproduction, larval ecology and population genetics of coral reef sponges. Dr Whalan has also researched deep sea biodiversity, environmental impacts on coral reef invertebrates, and bath sponge aquaculture. More recently, he has been investigating the use of novel artificial surfaces to optimize coral larval recruitment as means to aid coral reef restoration.



Dr. Whalan has hit the ground running with his appointment at CCMI. “It is a pleasure to work with the exceptional team of scientists at CCMI. They are making phenomenal inroads to our understanding of coral reef resilience, and methods that aid coral reef restoration, both of which are pivotal for marine conservation in the Cayman Islands, and the wider Caribbean” he said.

Coral reefs are the world’s most threatened ecosystem, and part of CCMI’s mandate is to conduct

research that focuses on reef resilience. Little Cayman was chosen by Dr. Carrie Manfrino, founder and President of CCMI, because the reefs around Little Cayman are among the most biologically diverse reef systems in the Caribbean, and one of the very few locations in the world showing positive coral reef regeneration. Dr. Manfrino welcomed Dr. Whalan to CCMI by saying: “We are inspired to push forward with our work because of the serious environmental issues we are increasingly facing globally: climate change, ocean acidification, threats to endangered species, as well as the issues of reef restoration faced locally in the Cayman Islands. Dr. Whalan will provide additional strength to our team at CCMI as we continue to work towards further developing our understanding of processes that contribute to reef resilience.”

Dr. Whalan has held a number of post-doctoral fellowships in leading Australian organizations including, James Cook University, the Australian Institute of Marine Science and Southern Cross University where he has conducted research throughout Australia, the Philippines and Norway.

### European aquaculture leaders of the future to benefit from Scottish collaboration

Scotland’s largest salmon producer is teaming up with one of the country’s leading marine science research institutions to help Scottish aquaculture thrive in a competitive global industry. Marine Harvest Scotland (Ltd) has pledged two scholarships to the Erasmus Mundus Joint Master Degree in AquaCulture, Environment and Society (EMJMD ACES) run by the Oban-based Scottish Association for Marine Science (SAMS UHI) and in collaboration with the universities of Crete and Nantes. The course is part of the European Union’s prestigious Erasmus Mundus programme and gives students the unique opportunity to travel throughout Europe as they learn about sustainable aquaculture.

The two-year sponsorship, open to graduates from EU member states, will fund one student per year and includes participation fees and an opportunity to work with Marine Harvest for a period of six months in order to complete a dissertation. Dr Gareth Butterfield, Technical Services Manager at Marine Harvest Scotland (Ltd) announced the scholarships on the 25<sup>th</sup> April, saying: “Research and education is vital in an industry that is only 45 years old. For our business to thrive, and the industry to grow overall, we have to bring in

young people who increasingly require specialist skills and training. In terms of research, it's critical we keep pushing on in this area if Scotland is to become the industry leader in research, innovation and technical development, providing science-based knowledge and better solutions in a growing sector. To date, the UK has lagged behind Norway in providing an availability of aquaculture-educated personnel, but that balance is changing."



EMJMD ACES course leader Dr Liz Cook of SAMS UHI and Gareth Butterfield, Technical Services Manager at Marine Harvest Scotland (Ltd), launch the new scholarship.

The EMJMD ACES course, which began in 2015, awards a Joint Masters Degree through the universities of the Highlands and Islands, Crete and Nantes. It focuses on fin-fish and shellfish biology, interactions between farming activities and the environment and involves internationally renowned researchers in the field. It provides students with an insight to the industry, whilst stressing the importance of socioeconomics; Atlantic salmon has grown to be Scotland's biggest food export and provides the country with a financial income of more than £500 million per year.



A Marine Harvest Scotland salmon farm on Loch Duich

Dr Liz Cook, the EMJMD ACES programme leader at SAMS UHI, said: "One of the main themes behind this course is global food security, so we are delighted to receive the support of a world-leading food producer such as Marine Harvest Scotland. Thorough research into increasing the sustainability of aquaculture requires the expertise of commercial partners such as Marine Harvest Scotland. They are a crucial element of our work to produce the aquaculture industry leaders of the future."

Dr Butterfield added: "Courses like EMJMD ACES are an important vector to bridge the gap between education, research and development, and applied industry techniques and knowledge. Aquaculture-based academia within the UK is growing and beginning to receive the recognition it deserves. The research undertaken at SAMS, Crete and Nantes is industry-relevant, and students educated there are provided an opportunity to learn and understand theories and techniques that can easily be applied and incorporated into production strategies. These skills can bring a significant and sustainable growth to Europe's salmon farming industry. We very much look forward to working more closely with the team at SAMS and all the EMJMD ACES students of 2016 and onwards."

The Marine Harvest Scotland scholarship is open to EU citizens. Applications must be received by June 5, 2016. To obtain a scholarship application form and details of the documents you will need to provide, contact Helen Bury, EMJMD ACES education administrator, at [ACES@sams.ac.uk](mailto:ACES@sams.ac.uk)

## VIEWS

### 2016 Call for nominations for the IMBER Scientific Steering Committee

The Integrated Marine Biogeochemistry and Ecosystem Research (IMBER, [www.imber.info](http://www.imber.info)) project is soliciting nominations for three new members for its Scientific Steering Committee (SSC). The IMBER SSC is responsible for the development, planning and implementation of science with the goal to: *Understand, quantify and compare historic and present structure and functioning of linked ocean and human systems to predict options for securing or transitioning towards ocean sustainability.* To meet this goal, our new

Science Plan and Implementation Strategy (SPIS 2016-2025, still in review and thus only available from [imber@imr.no](mailto:imber@imr.no)) is developed around three Grand Challenges focusing on climate variability, global change, and human drivers and stressors. The qualitative and quantitative understanding of historic and present ocean variability and change (Grand Challenge I) are the basis for scenarios, projections and predictions of the future (Grand Challenge II). These are linked to understanding how humans are causing variability and changes, and how they in turn are impacted by the feedbacks between the human and ocean systems (Grand Challenge III). More information about the SSC is available at: <http://www.imber.info/index.php/About-IMBER/Scientific-Steering-Committee-SSC/SSC-Members> .



We are seeking nominations for individuals with expertise in the areas of:

- marine sustainability science
- marine policy/governance science
- integrated modelling of social and marine ecological systems
- biodiversity/adaptation science
- communication (ocean literacy)

Nominations should include following information:

**Name of the nominee:**

**Affiliation:**

**Email:**

**Website:**

**Expertise keywords:**

**Brief description** (200 words max.) of what/how the nominee would contribute to IMBER:

**Up to ten most relevant publications:**

**Short (one page) CV**

**Nominated by** (optional):

Please send nominations to the IMBER International Project Office ([imber@imr.no](mailto:imber@imr.no)) by **Monday, 23 May 2016**.

The IMBER SSC and the project's sponsors - the Scientific Committee for Oceanic Research (SCOR) and Future Earth - will appoint the new members for a three-year term. Selection is

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

based on expertise relative to existing SSC members, relevance to IMBER's goals, and geographic and gender balance. Information provided will be treated confidentially

### **Inspiring future Scientists and Engineers: Outreach and the Challenger Society.**

"Employers Warn of 'Skills Emergency'" cries the headline<sup>1</sup>: A CBI survey highlights skills shortages in the "high-growth, high-value" sectors of science, engineering and technology. "Asia Tops Biggest Global School Rankings"<sup>2</sup> shouts the next: Another OECD\* report shows UK school-children (15 years) being out-performed by international counterparts in maths and science (Asian countries occupying the top five places and the UK lagging behind in 20<sup>th</sup> place, out of 76 countries).

In addition to these headlines, data show that 50% of adults in the UK have a level of maths/numeracy equivalent to that we would expect of an 11 year old or younger<sup>3</sup> and in 2015 approximately one third of children got grade D or below in their GCSE maths exams<sup>4</sup>.

There's no doubt that these statistics are rather alarming, yet they are consistent with my own observations from working in Further Education (FE) colleges teaching Maths to youngsters and adults alike, many of whom have left school bereft of qualifications. "I have nothing on my CV but my name", said one of my students in describing her driver for learning.

The underlying message from these official reports and surveys is that by improving quality in schooling and skills of school-leavers, we can improve the economic growth for the UK; the OECD report<sup>2</sup> suggesting it could "add trillions to the UK economy". I tend to think of education and skills more in terms of improving individual wellbeing, life-chances and creating informed citizens. But, whatever your ideology, there can be no doubt of the current need to support youngsters and adults in up-skilling and gaining the qualifications they need to participate fully in society, (especially with the ever increasing State pension age and so many adults having to retrain at least once during their working life).

So how can we, as a Learned Society, play a part ? I believe that one potential route is through our outreach activities and, in particular, the significant influence we can have by raising awareness

of the rewarding careers that exist in marine science, technology and engineering, coupled with the skills required to participate within them.



Mr Colin Day (Manager of Research Ships & Facilities at National Oceanography Centre, Southampton) shakes hand with Year 9 student during a "World of work" tour, 2015.

By raising aspirations amongst potential learners, we can hopefully play a part in raising attainment in the numerical, scientific and vocational qualifications required to participate in our multi-disciplinary field. Unfortunately, very few students in Swindon or Cirencester FE colleges have ever heard of "oceanography", let alone the cutting-edge technology and engineering embedded within it and so are, effectively, excluded from a career in this area. This seems a great loss; our FE colleges provide a plethora of "outstanding" vocational courses in areas such as engineering (including electronic and mechanical) and are producing excellent early-career engineers from all types of background, which the marine world could be tapping into.

Additionally, I have found the best way to remove learning barriers such as "*I've never been any good at maths*", is to identify and nurture individual drivers and context for learning - for many, relating numerical skills to the possibility of an exciting career in marine science (or similar) and/or just seeing how maths plays a part in our observations of the natural environment, could be just the inspiration needed.

### **Challenger Society can help you deliver your Outreach - A win-win situation**

So, how can we reach this audience and inspire the next generation of scientists and engineers?

Current pathways include:

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

1.) Outreach (and impact) activities that our members (and marine centres) carry out e.g. through research grants, programmes, and on an individual basis;

2.) Challenger Society presence and participation at open days, conferences and events e.g. NOC,S Open Day, the Association for Science in Education and, of course, dedicated outreach activities aimed at youngsters and adults alike, during our biennial Challenger Society conference.

### **TeenTech events**

In addition to the valuable activities above, the Challenger Society plans to now team up with a very impressive organisation called TeenTech. Thanks to an introduction from Terry Sloane (Director of Planet Ocean and Industry/Technology representative on Challenger Council) who is a keen advocate for, and participant in, outreach, I have been able to find out more about the organisation and their impact by meeting the organisers and attending one of their events (which run in 15 regions across the UK during the year) to get a feel for how Challenger Society might be able to participate in the future.

Essentially, TeenTech runs very lively events aimed at young teenagers (and at some events sixth formers/FE colleges as well) with the aim of helping them understand their true potential and the real opportunities available to them in the Science Technology Engineering and Maths (STEM) workplace. TeenTech's founder is Maggie Philbin - whom some of us will remember as presenter on TV's "Tomorrow's World" - and the organisation has won many awards for its work in widening participation and improving diversity in science and engineering. The one-day events are run across the UK at various venues - approximately 300-500 students attend each event from 30-50 schools in that particular region. [www.teentech.com](http://www.teentech.com)

The events are very well attended with around 20 well-known STEM exhibitors (e.g. NPL, Institute of Civil Engineers, Surrey Satellites, Maplin, BOC etc). As an exhibitor, you provide either a 15 minute or 30 minute (preferably) hands-on activity for children aged around 13-14 years (just about to make GCSE choices) and also be available to chat to 6<sup>th</sup> formers/FE colleges late afternoon (only some venues run this valuable Twilight session).

The advantage of working with TeenTech is that they do all of the organising for us (and, usefully, measure a set of outcomes including how perceptions about scientists and science careers change as a result of the event). It is a very slick operation, with groups of ~ 5 children with their teacher being brought to the exhibit every 20 minutes or so – a great way to provide significant reach and influence.

Activities that I observed were wide and varied, with fizzes and bangs from BOC to timed team activities using (small!) remotely operated vehicles from British Gas, building guttering from Soldexo, writing scratch code for a robot from Samsung, using 3D printers, to a mixture of Q&A on careers with a hands-on puzzle or quiz. The stalls were very colourful and I came away with many photos and good ideas on how to engage these youngsters (which I would like to share).



### **A call to you for Activities and Resources**

In order to participate in these (and other outreach) events, it would be very useful to know what resources and activities have already been developed in the marine science community, including in technology and engineering. We can then investigate how best Challenger Society can work with you, perhaps in your region, to help deliver the activities, thus promoting your science and inspiring youngsters at the same time. This is not only a very valuable and rewarding exercise in itself, but could also be quite an attractive addition to a research proposal, endorsed and facilitated by the Challenger Society.

We are also particularly interested in promoting the role of women in science, technology and engineering.

### **So please do contact me with details of your activities and/or ideas.**

Email:

[Louisa.watts@btinternet.com](mailto:Louisa.watts@btinternet.com)

cc [louisawatts@swindon.ac.uk](mailto:louisawatts@swindon.ac.uk)

Also if you are keen to get involved generally, in outreach/education with the Challenger Society,

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

do let me know. - **Louisa Watts, Education and Outreach, Challenger Society Council.**

<sup>1</sup>[www.bbc.co.uk/education/news/education-33478930](http://www.bbc.co.uk/education/news/education-33478930), 2015 [Accessed April 2016]

<sup>2</sup>[www.bbc.co.uk/news/business-32608772](http://www.bbc.co.uk/news/business-32608772), 2015 [Accessed April 2016]

<sup>\*</sup>(OECD=Organisation for Economic Co-operation and Development)

<sup>3</sup>BIS, 2011, 2011 Skills for Life Survey: Headline Findings. Available at [www.BIS.gov.uk](http://www.BIS.gov.uk) [Accessed January 2012]

<sup>4</sup>[www.bbc.co.uk/news/education-33990713](http://www.bbc.co.uk/news/education-33990713), 2015 [Accessed April 2016]

### **Cayman Islands charity makes waves with research**

The Central Caribbean Marine Institute (CCMI) have recently presented their findings on Cayman's marine ecosystems at the 45<sup>th</sup> Benthic Ecology Meeting in Portland, Maine. From March 16<sup>th</sup> through the 19<sup>th</sup>, the annual conference welcomed over 400 top marine ecologists and benthic researchers from a variety of fields.

CCMI's Research Technician, Hunter Hughes was joined by interns who participated in the Research Experience for Undergraduates program funded by the US National Science Foundation, Aimee Cook, Lizzy Monaghan, Olivia Reda, and Abby Treadwell. The team gave poster and oral presentations on a variety of topics, from ancient corals to sea urchin densities. The conference was wrapped up by Mr Hughes on Saturday morning as he gathered CCMI's findings on the impact of the 2015 El Niño warming event on Little Cayman's corals.



Pictured left to right : Olivia Reda, Abby Treadwell, Lizzy Monaghan, Aimee Cook and CCMI's Research Technician Hunter Hughes

El Niño is the warm phase of a naturally occurring weather phenomenon – the El Niño-Southern Oscillation cycle (ENSO) in the Pacific Ocean. ENSO has been occurring more frequently in the

last fifty years. “Sea surface temperatures increased through the summer and the Caribbean experienced the highest prolonged temperatures since 2009, causing corals to pale and bleach,” reported Mr. Hughes.

With National Oceanic and Atmospheric Administration (NOAA) scientists predicting mass bleaching since the summer of 2014, it was feared a similar situation would arise here in the Cayman Islands, reported co-author and CCMI Assistant Director of Research, Dr. Kristi Foster.

The paper presented by Hughes and other indicates that weather patterns going into the fall can be unpredictable across the Caribbean, but a welcome relief arrived in October in the form of storms and high winds that churned the water, cooling it down and halting the bleaching progress. Corals surrounding Little Cayman were recovering.

Founded in 1998, CCMI is a not-for-profit organisation dedicated to the conservation of coral reefs. In 2005, the charity opened its field station, the Little Cayman Research Centre (LCRC). The LCRC serves as a home-base for scientists to conduct vital research, playing an integral part of the Integrated Coral Observing Network (ICON), which alerts coral scientists worldwide when corals are at risk of bleaching. Through the expansion of their research and education programs on island, CCMI continue to prove their authority as a premier Caribbean research centre.

## SALTS

### A new US research vessel

On Wednesday 6th April the new US research vessel, *RV Neil Armstrong*, docked at its home port of Woods Hole, Massachusetts, after sea trials in the Pacific.

The Neil Armstrong, while owned by the US Navy, will be operated by WHOI and replaces the *RV Knorr*, which left Woods Hole a month ago to become the lead research vessel for Mexico after 45 years of service. The ship steamed into Woods Hole on a fine, if cold and windy, morning accompanied by US coast guard vessels. She was greeted by a band, a large number of WHOI staff, Carol Armstrong, Neil Armstrong's widow,

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

and the local Congressman, Bill Keating. When will the first SALT report come from its decks we wonder ? For more information about the new vessel visit <http://www.whoi.edu/main/ships/neil-armstrong> - **Professor Grant Bigg, Ocean Challenge's Editorial Board chair**



*Photos courtesy of Jane Horton, Grant's wife, both of who were fortunate to be visiting the WHOI at the time*

## CALENDAR

### 23rd-27th May 2016: 48th Liège Colloquium “Submesoscale Processes: Mechanisms, Implications And New Frontiers”

*Liège, Belgium*

A rich tapestry of oceanic processes is manifest at scales  $O(0.1-10 \text{ km})$ , small enough for the constraints of the earth's rotation and oceanic stratification to be overcome, but larger than that of three-dimensional turbulence. Rossby and Richardson numbers of  $O(1)$  lead to a range of dynamical instabilities that respond to surface forcing and boundary stresses, and interact with the mesoscale flow field, upper ocean turbulence, and near-inertial waves.

These dynamics result in enhanced vertical velocities and mixing, as well as stratification, on time scales that range from a few days to the inertial period and intersect with the time scales of internal waves and tides. Their diagnoses is facilitated through advances in high-resolution autonomous, in-situ and remotely sensed observations, modeling, and theoretical advances. Their implications are wide-ranging and include the transfer of energy across scales, lateral mixing and transport, restructuring of the upper ocean's density and stratification, modulation of air-sea, ice-ocean, ocean-bathymetric interactions, the exchange of biogeochemical properties across the mixed layer base, vertical supply of nutrients for primary production, modulation of light exposure and growth rates for phytoplankton, subduction of surface water, and export of particulate organic carbon and oxygen from the surface mixed layer.

The similarity of physical and biological time scales of phytoplankton growth heightens the relevance of submesoscale processes for the production and export of phytoplankton, and the structuring and diversity of oceanic ecosystems.

This colloquium aims to advance our collective understanding of submesoscale processes, their mechanistic functioning, relevance, and implications across a range of oceanic disciplines. Discussions will include observational, modeling and theoretical approaches for elucidating submesoscale phenomena.

From this colloquium, its oral/poster presentations and scientific interactions, will emerge new cross-cutting themes for future research. For more information, please visit: <http://modb.oce.ulg.ac.be/colloquium/>

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

*Hong Kong, China*

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>

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

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

**5th-7th July 2016: UK Antarctic Science Conference**

*UEA, Norwich, UK*

We welcome everyone working on Antarctic or Southern Ocean science, including techniques such as in situ measurements, numerical models, laboratory experiments or remote sensing. The conference welcomes all science disciplines, including cryosphere, earth, atmosphere, marine, climate and life sciences.

There are rooms booked for associated meetings Monday - Tuesday and Thursday - Friday, so if you would like to organise a side meeting (e.g. UK Polar Network, Sea Ice group) then please contact us. We also look forward to hearing from you if you are interested in sponsoring the conference or having a stand or display at the conference. We look forward to welcoming you to Norwich: <http://www.challenger-society.org.uk/News/UKASC2016>

**5th-8th September 2016: 17<sup>th</sup> Biennial Challenger Society Conference: Oceans and Climate**

*Liverpool, UK*

Keynote speakers for the 2016 Challenger conference have been announced. Details are on the conference website along with session details, registration and abstract submission <https://www.liverpool.ac.uk/challenger-conference-2016/>

The abstract deadline is fast approaching so follow the link for a full list of sessions <https://www.liverpool.ac.uk/challenger-conference-2016/abstract-submission/>. Remember to book your accommodation when you register at <https://www.liverpool.ac.uk/challenger-conference-2016/registration/>. See you in Liverpool on the 5-8th September, the Challenger 2016 Organising Committee [csms\\_enquiry@noc.ac.uk](mailto:csms_enquiry@noc.ac.uk)

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

*Christian Albrechts University, Kiel*

To All CIESM Friends, this will be the first time that our Congress takes place in Germany, which has been a Member of our Commission since 1969.

The 41st CIESM Congress will take place in mid-September in Kiel, on the Baltic shore, at the kind invitation of the German Government. Our Meet-

ing, one of the largest multi-disciplinary forums in marine science, will present a major opportunity not only for researchers working on the Mediterranean and Black Seas, but also to any investigator from the Red Sea all the way to the Kara Sea, including the Atlantic shores, to come and share / compare / discuss their scientific approaches and latest findings in some 90 distinct sessions that will cover key issues. The sectors will range from marine geo-sciences, ocean climate, marine food-webs, invasive species, to marine plastics, biotechnology, geo-chemistry and marine policy. Note that each session will include a 30 minute-debate with the audience.



The link, [www.ciesm.org/marine/congresses/Kiel.htm](http://www.ciesm.org/marine/congresses/Kiel.htm), will lead you to our Congress web pages, with details on the many Congress themes. We look forward to see many of you in Kiel in September. With my best regards, Frederic Briand, Director General, The Mediterranean Science Commission, CIESM

**15th-17th November 2016: SUT 2016 Technical Conference, The Future of Underwater Technology**

*London, UK*

The conference will be held in London (UK) to celebrate the 50th anniversary year of the Society. It aims to attract the best authors in their field from across the world to showcase new technologies, products, best practices and in particular foresight the next generation of subsea engineering, marine science, and all aspects of underwater technology. It will be a flagship event for the Society and it is the intent for it to become a regular occurrence and be held in future at SUT global centres around the world.

The SUT Technical Conference 2016 will offer:

- First class sessions and networking

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

- Opportunity to connect with underwater engineering, science, and business professionals from around the world and progress your knowledge
- A showcase for the latest technologies in subsea engineering, marine science, and all aspects of underwater technology
- An opportunity to see and meet the talent of students and young professionals that are emerging as the next generation in our industry
- The conference will have an intimate exhibition area which will provide excellent opportunities for networking and knowledge exchange.

Academics, Consultants, Engineers and Scientists, Business Executives and Managers, Lawyers, Insurers and Underwriters, Researchers, Technicians, Young Professionals and Students are some of the people we expect to see at the conference. There are also opportunities for sponsorship and to take up exhibition space. The venue will allow provision for vessel access alongside.

The programme will consist of plenary sessions, technical sessions, and student poster displays. Substantial effort will be made to ensure the highest quality programme with emphasis on the theme of the event. The final programme will be developed by the Technical Steering Committee which will be made up of representatives from the whole SUT organisation including Branch Committees, Special Interest Groups, and Council. Provision has been made for approximately 200 papers to be presented in plenary and parallel sessions throughout the 3 day event.

The deadline for abstract submissions is 9 May 2016. Please use the abstract submission form, which can be downloaded from [www.sut.org/event/sut2016](http://www.sut.org/event/sut2016). If you have any queries about your submission please contact either David Liddle, Business Development Executive [david.liddle@sut.org](mailto:david.liddle@sut.org), or Kirsty Webster, Events Manager: [kirsty.webster@sut.org](mailto:kirsty.webster@sut.org)

**6th-7th September 2017: Advances in Marine Biogeochemistry Conference VIII**

*Oban, UK*

Save the date for AMBIO VIII, more information nearer the time, [www.challenger-society.org.uk/Marine\\_Biogeochemistry\\_Forum](http://www.challenger-society.org.uk/Marine_Biogeochemistry_Forum)

Advances in  
Marine  
Biogeochemistry  
Conference VIII



Save the date!  
6 – 7 Sept 2017  
at SAMS in Oban

Marine Biogeochemistry Special  
Interest Group of the Challenger Society



Organisers:

MBF Chair: Gary Fones, Uni. Portsmouth

AMBIO VIII Co-convenors: Kirsty Crocket and Natalie Hicks, SAMS

Photo: Emma Defew and Mark James

AMBIO meetings set the stage for Marine Biogeochemistry in the UK, connecting disciplines within the field and establishing networks for the integration of early career scientists. The AMBIO VIII meeting in September 2017 is to be hosted at the Scottish Association for Marine Science in Oban. Save the date! Registration will open in early 2017.

Info: [www.challenger-society.org.uk/Marine\\_Biogeochemistry\\_Forum](http://www.challenger-society.org.uk/Marine_Biogeochemistry_Forum)

Contact: [kirsty.crocket@sams.ac.uk](mailto:kirsty.crocket@sams.ac.uk), [natalie.hicks@sams.ac.uk](mailto:natalie.hicks@sams.ac.uk)

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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 31st May.

*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.