UNIVERSITY OF Southampton

Spring 2014 | Ocean and Earth Science

SOES News

Welcome to SOES News – the magazine for current and prospective students, alumni and friends of Ocean and Earth Science. We look forward to sharing exciting updates on our world-renowned scientists, features on cutting-edge research, profiles about our talented alumni, and fun stories about our students. Enjoy!

National Oceanography Centre Southampton

Dragonet (*Callionymus lyra*)

From Rock Pools to the Deep Sea. Ocean and Earth Science Research Aquarium

Although Ocean and Earth Science Southampton is well-known for its world-leading research and education, it also hosts a wealth of cutting edge facilities including the fascinating Ocean and Earth Science seawater aquarium.

This aquarium houses local fish, species from further afield, marine creatures such as jellyfish and anemones, Professor Joerg Wiedenmann's coral laboratory and our very own lobster Rocky that has been at the aquarium for the last ten years.

Throughout the year, the aquarium is in demand by hundreds of students. From first years keen to learn more about life in the Solent before going out on the University's Research Vessel *Callista*, to postgraduate and academic researchers involved in advanced projects; groups of local schoolchildren also visit to gain an insight into the natural world.

Aquarium manager Chris Sturdy is himself a Southampton graduate of Marine Biology. "After graduating I worked at the Scottish Sea Life Sanctuary in Oban and at Chessington World of Adventures aquarium but I was keen to come back to Southampton to get involved in research and conservation again." Chris is supported by Biology Technician Beth Wills and student volunteers.

New saltwater tanks allowing controlled conditions for research

New research tanks

The aquarium is important both for teaching students about the realities of the marine environment and supporting independent research. It has two 30,000 gallon underground tanks which contain water pumped in from the dockside. A major refurbishment programme is now underway and Chris is looking forward to introducing more people to the south coast's ecosystems. The £100,000 programme includes investment in new seawater tanks, cooling systems and better security systems.

The aquarium has associations outside of the university in preserving marine life. Earlier in 2013, the aquarium provided a 'nursery' for a thornback ray from Chessington that needed a quiet tank with space to grow. The University of Southampton has several collaborations with the popular tourist attractions in Surrey.

The aquarium also hosts a sea grass tank which is home to goldsinny wrasse fish, dragonets, shrimps and sea stars. A kelp tank houses sole, lesser spotted cat sharks (formerly known as dog fish) and more wrasse. A simulated rock pool also illustrates the diversity of creatures that live in Solent waters and reveals how their camouflage keeps them safe from curious or hungry eyes.

Many of the creatures are the subjects of several academics' research projects. Dr Cathy Lucas's research is in jellyfish blooms and her tanks of moon jelly polyps are in the aquarium. Dr Sven Thatje, who is interested in the evolutionary history of life in extreme marine environments, works with pressurised tanks to understand deep sea conditions. PhD students Amonsak Sawusdee is investigating the restoration of native oysters *Ostrea edulis* using raised broodstock reefs in Poole, Dorset and Alastair Brown is studying king crabs' response to elevated pressure.

The Ocean and Earth aquarium is a unique education and research facility. Chris is keen to continue to grow the aquarium and allow the university community and beyond to utilise its resources.

For more information on our facilities visit:
www.southampton.ac.uk/oes/research/facilities

Best Earth Science Student in the UK. Award for Southampton geologist

Recent geology graduate Alex Bromhead has won a prestigious Science award at a ceremony in London.

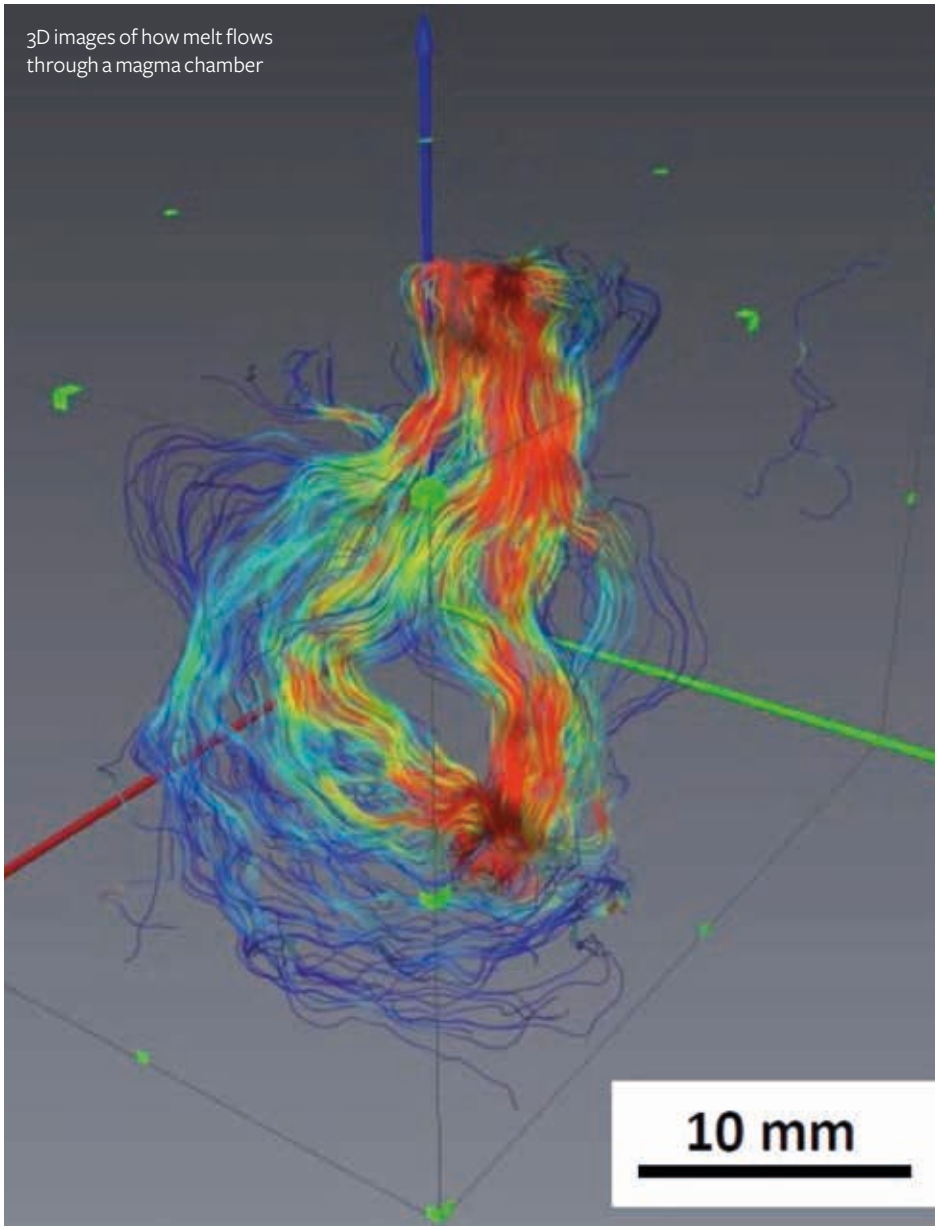
Sponsored by Rio Tinto, the Science, Engineering and Technology award receives hundreds of entries, with three nominated for the final stage. Alex was announced the winner of the nominees in Kensington Town Hall in front of an audience of key industrial sponsors and leading academics.

Alex accepting his award

Alex, who graduated July 2013 with first class honours, was shortlisted for his Masters year research project 'Mushy Cumulates Reveal the Workings of Explosive Volcanoes', which was based upon his study of cumulate material (frozen fragments of the magma chamber) ejected from the Las Canadas volcano on Tenerife.

After the ceremony Alex said: "I feel extremely honoured that the project received this level of recognition and I feel very proud to have contributed something significant to the field. I would like to thank my supervisor Dr Rex Taylor for setting me up with such an interesting project and allowing me to experiment with some innovative new techniques. I would also like to thank the many other people who have helped me along the way."

Rex Taylor from Ocean and Earth Science said "Alex is an exceptional talent and produced some outstanding results – some will revolutionise our view of what happens beneath volcanoes. We are continuing our collaboration and will be publishing the findings in the near future. This award recognises the quality of our undergraduate projects at a national level".



3D images of how melt flows through a magma chamber

As a whole, University of Southampton students were nominated for 5 of the 14 award categories. In addition to Alex's triumph, Christopher Frohmaier won the Physics category.

Alex Bromhead is currently working for Neftex: a consultancy company servicing the hydrocarbon industry.

Find out more about our geoscience degrees:
www.southampton.ac.uk/geology
www.southampton.ac.uk/geophysics

A student profile. Marine Biologist Naomi Allison

Naomi Allison studies MSci Marine Biology and is currently in her third year. Naomi tells us why she decided to study at Ocean and Earth Science Southampton and the path she took to get here.

Keen on maths, Naomi took A-levels in biology and chemistry as well as mathematics and an AS in further maths at school in Suffolk: "While I liked maths, I wanted to study for a degree in an applied subject. I was interested in genetics as well as marine biology but decided on the latter after coming to Southampton on an open day, instantly I knew I'd be happy at NOCS."

Loving the practical side of studying marine biology Naomi particularly enjoys the field work, including fieldtrips to Falmouth and Dale Fort in Wales earlier in her four year degree and also the opportunities her course presents for summer internships. Naomi feels the fieldwork puts lectures into context while helping her to develop useful experimental and analytical skills. "It's good to be out in the fresh air and learn more about your subject, on the field trips, the lecturers also treat you as colleagues, it's a different dynamic to classes," says the third year undergraduate.

Alongside her academic work, Naomi encourages the next generation of young people to seize their opportunities. She works at Southampton's summer schools for A-level students who might not have considered going to university. She also carries out e-mentoring with the teenagers, takes part in Southampton's Discovery Oceanography initiatives and helps out at open days, meeting potential students as they tour the facilities.

Naomi's next big challenge will be her dissertation, a major piece of work involving original research throughout her final year. She is fascinated by the deep ocean hydrothermal vents where strange newly discovered creatures live and evolve; this is the research specialism of Southampton's Dr Jon Copley, a lecturer in marine ecology: "I've already been to see Jon to talk about what I should do in my final project, I'm hoping there might be a chance to see the deep ocean for myself from a research submarine," explains Naomi. Jon has already journeyed to the deepest parts of the oceans to examine the Cayman Abyss in the Caribbean, the location of the deepest and hottest vents ever discovered. Jon is an inspiration to Naomi and the students at NOCS as he is so far, the first and only British person to dive more than 5 km (3.1 miles) deep in the ocean.


Naomi alongside RV *Callista* at NOCS

Naomi has yet to decide what to do after her master's degree. She is considering applying for postgraduate research position (PhD) at Southampton or another university or perhaps entering the world of work. "Whatever happens, I have enjoyed my time at Southampton very much and have made the most of all the opportunities it has given me, opportunities that were only possible by studying my degree here." she says.

Find out more about our degrees: **www.southampton.ac.uk/marinebiology**

A unique opportunity. Dan Pitt, 3rd year student placement

"I'm currently a student at University of Southampton studying oceanography. I suspended my course In June 2013, between my 3rd and 4th year, to undertake a student placement year with Titan Environmental Surveys, a coastal survey company based in south Wales.


Dan at sea

As a surveyor at Titan my time is split between working in the field and the office. As Titan provide oceanographic, hydrographic, geophysical and environmental surveys I am not just learning and improving oceanographic skills that I learnt during my degree, but I'm having the opportunity to learn and improve in other related disciplines. Field work is predominantly UK based and can involve being away from a day to a month at a time. I spend approximately a third of my time in the field undertaking surveys of various natures. This work has so far included projects such as water temperature monitoring in west Wales, hydrographic surveys on the east coast of England and an oceanographic tidal survey in Scotland. Office time is mainly spent processing data and compiling reports but can also involve calibrating and testing instruments for your next job.

I have found that many of the skills learnt during my time at Southampton have been useful to me. The Falmouth field trip has been especially useful, as it involved the complete process of data collection through to reporting results. I didn't really understand the importance of things like written logs and file structures at the time, however now I realise how important these are to make you and a company efficient. As all of Titan's surveys are within coastal waters, I have found from the second year coastal and estuarine oceanography modules useful, as well as the third year shelf seas module. Sea floor surveying has also been a great use to me as it gave me a very useful introduction to hydrographic and geophysical surveying.

In the office I had to learn quickly to use data processing software and databases that I had previously had little or no experience in. As well as improving my very weak GIS skills so I am able to display data to clients in clear, original and interesting formats.

I have really enjoyed this placement and I would urge anyone to consider doing a 12 month or summer placement. I was initially unsure about the benefits but I can honestly say I don't regret my decision at all."

Find out more about our degrees: **www.southampton.ac.uk/oceanography**

Changing workplace culture. Athena SWAN, the next steps

Work is well underway at Ocean and Earth Science to make sure all students and academics have the opportunity and support to achieve their full potential during their time at the University of Southampton. These efforts are being driven by an Athena SWAN (Scientific Women's Academic Network) project team at Ocean and Earth Science.

Since 2012 the team have been setting out steps to ensure gender equality truly becomes part of the culture here at our waterfront campus at the National Oceanography Centre Southampton (NOCS). These efforts were rewarded in summer 2013 with a Bronze award from the Athena SWAN charter for demonstrating good practice in higher education in recruiting, retaining and promoting women in science, technology, engineering and maths.

Winning this award spurred us on to further develop this good practice and to ensure that any prospective students or staff looking for career opportunities at Ocean and Earth Science were aware of our commitment to embed equality and diversity into the department.

"There are frequently barriers in academic life which may hinder individuals from succeeding in their careers, such as combining care for children or elderly relatives within a working day" explains the lead for Athena SWAN, Dr Martin Solan. "We are breaking down these barriers. We are establishing a supportive environment and culture that values everyone in the department equally and supports a diversity of contributions that reflect modern lifestyles to the benefit of everyone."

The self-assessment team has identified areas where support or change in practice will make a difference in achieving the aims of our submission. For example, a Faculty initiative encourages individuals requiring leave of absence to apply for funds to maintain their work prior to, during and after their period of absence.

Dr Martin Solan accepting our Bronze award

"One of our new members of academic staff received support to send a researcher on three of her research cruises during a period of maternity leave. Without this assistance, she would have had to withdraw from a major research project and lost the opportunities that she had worked so hard to secure" says Professor Rachel Mills, member of the Athena SWAN project team.

Martin added "Our attainments so far have been rewarded with a Bronze award and the Athena SWAN team are now diligently working towards Silver, which recognises delivery. Our action plan has the support of the students and staff in Ocean and Earth Science and, already, we are seeing the tangible rewards from the processes and support mechanisms that have been put in place. What's fantastic is that we are creating a more conducive environment for us all."

If you would like more information the action plan is available via the Ocean and Earth Science website: **www.southampton.ac.uk/oes**

Beasts from the deep. Monitoring change in Antarctica

SOES cruise participants Alastair Brown (left) and Kathryn Smith (right)

A king crab (*Paralomis birsteini*)

During November and December 2013, Southampton scientists participated in a sea-going expedition to the Western Antarctic Peninsula (WAP) to investigate the distribution of deep-sea predatory king crabs.

The cruise, carried out from on board the US research vessel *Nathaniel B. Palmer*, was joined by Southampton PhD student Alastair Brown and led by Dr. Kathryn Smith, who was awarded a PhD from Southampton back only in March 2013. Dr. Smith, now at Florida Institute of Technology and at a very early stage of career, was endorsed to lead this US-funded research expedition.

The cruise was part of a series of cruises set to map and monitor the distribution of seafloor-inhabiting communities from shelf to deep-sea depths along the WAP. Using a towed camera system, Seasled, provided by Woods Hole Oceanographic Institution (USA), the team has now mapped large areas of seafloor. Research includes assessment of the distribution of widespread deep-sea king crabs of the genus *Paralomis* which are suggested to be migrating into the shallow waters of the continental shelf, facilitated by rapidly rising sea temperatures. Shallow waters in Antarctica are cooler (sub-zero °C) than the surrounding deep sea; these low temperatures set physiological limits for the crabs, restricting their distribution. Seafloor communities thriving in these cold waters have enjoyed a life in absence of major predators for millions of years.

Research carried out by the *Marine Evolutionary Ecology* group led by Dr Sven Thatje, Ocean and Earth Science, Southampton, has suggested that continued warming of the waters along the WAP will allow king crabs to invade these shallow water environments, with potentially devastating effects on the organisms living there. Crabs are known to be major predators in shallow seas globally and, by selectively feeding on other organisms, structure the animal communities inhabiting the seafloor.

The team will return to Antarctica in the next Antarctic season and in close collaboration with US partner institutions and the US-Antarctic Science funding initiative.

The US research vessel *Nathaniel B. Palmer*

Colour patterning in marine reptiles - ichthyosaurs, mosasaurs and turtles - revealed in a new study of fossil tissue

Fossil pigments reveal the colours of ancient sea monsters

An international team of scientists including Dr. Gareth Dyke, Senior Lecturer in Vertebrate Palaeontology at Ocean and Earth Science Southampton has, for the first time, revealed the colour scheme of an extinct marine animal using fossilised skin pigment from three multi-million-year old marine reptiles.

Previously, scientists could only guess what colours huge reptiles, such as mosasaurs and ichthyosaurs had; however, pigment preserved in fossilised skin has now been analysed at SP Technical Research Institute of Sweden and MAX IV Laboratory at Lund University in Sweden. The unique soft tissue remains were obtained from a 55 million-year-old leatherback turtle, an 85 million-year-old mosasaur and a 196–190 million-year-old ichthyosaur.

Dr Gareth Dyke who was among the scientists that made the spectacular discovery said "The most sensational aspect of the investigation is that it can now be established that these ancient marine reptiles were, at least partially, dark-coloured in life, something that probably contributed to more efficient thermoregulation, as well as providing means for camouflage and protection against harmful UV radiation." The results of the study by scientists from Denmark, England, Sweden and the USA are presented in the scientific journal *Nature*.

Find out more: **www.southampton.ac.uk/oes**

Royal Research Ship *Discovery* named by HRH The Princess Royal

RRS *Discovery* is a state-of-the art platform for world-leading oceanographic research and represents a £75 million investment in frontier science by the Department for Business Innovation & Skills. Commissioned by the Natural Environment Research Council (NERC) and operated on NERC's behalf by the National Oceanography Centre Southampton (NOCS) for the United Kingdom's marine science community, Discovery's wide capability will allow deep-ocean research in the remotest and least hospitable parts of our planet, from tropical seas to polar waters.

Southampton scientists from NOCS, which is the integrated collaboration between the Southampton-based-part of the Natural Environment Research Council's National Oceanography Centre, and the University of Southampton's Ocean and Earth Science, will help RRS *Discovery* play a key role in the scientific mission to understand the role of the oceans in the Earth system. One of the first University of Southampton scientists from Ocean and Earth Science to embark on a large research project on *Discovery* is Dr Martin Solan, who is lead Principal Investigator for Southampton on the Shelf Sea Biogeochemistry research programme, co-funded by NERC and DEFRA. Focussing activity in the Celtic Seas, the aim of the £10.5 million programme is to reduce the uncertainty in our understanding of nutrient and carbon cycling within the shelf seas, and of their overall role in global biogeochemical cycles and will provide important advice to policymakers. The first shelf sea biogeochemistry cruise will leave Southampton in March, 2014.

Naming ceremony

Gaia: scientific masterpiece or myth?

Professor Toby Tyrrell has intrigued Earth and environmental scientists with his systematic and wide-ranging analysis of James Lovelock's Gaia hypothesis. This famous idea proposed that life itself has intervened to keep our planet stable and favourable for life throughout Earth's history.

Toby's book *On Gaia: A Critical Investigation of the Relationship between Life and Earth* is the culmination of more than ten years of research into the subject. Toby talks to SOES News about his research.

Why did you become interested in Gaia?

When I read Lovelock's book Gaia: a new look at life on earth, I became intrigued by the idea that the planet could regulate itself. It is a very attractive theory but it seemed too good to be true; could things really be as simple as he suggested?

How did you become a sceptic?

Lovelock put forward three main arguments for why Gaia is correct: that Earth is extremely favourable for life, that life has greatly altered our environment and that the environment has remained fairly stable over the last three billion years. Surprisingly, these claims have not been comprehensively challenged since they were made in the 1970s. After testing these assertions against the latest scientific evidence, I found some serious problems with the theory.

What did you find?

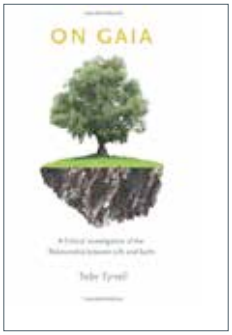
The suggestion that Earth has always been a hospitable and stable planet is at odds with what happened during the ice ages, as environmental scientist Stephen Schneider previously argued. During these periods, around half of the vegetation died away and shallow seas, which teem with life, were mostly lost due to the fall in sea level. Ice ages are paced by periodic variations in our planet's orbit about the sun, not by life, although life, through its influence on the carbon cycle, is partly responsible for the low CO_2 levels which allow ice ages to occur. Lovelock claims there is the 'right amount' of nitrogen in the seas to support life. However, most of this element is found as inert molecules made of two nitrogen atoms which only a few specialised organisms can make use of. Unfortunately, powerful microbial processes in the nitrogen cycle ensure that nearly all of the vast stores of nitrogen on Earth are kept as the 'wrong sort', and nitrogen starvation is, as a result, widespread. His assertion that life has greatly altered the environment can be supported, but the alterations over geological time have not always been helpful. An alternative hypothesis, 'coevolution of life and planet', which I support, argues that life and the environment do influence each other but not necessarily in a beneficial manner.

Does this have implications for climate change?

Belief in Gaia can potentially make people dangerously complacent about the impact of human activity on our planet, although Lovelock himself was in fact sometimes overly alarmist. In my view natural systems are not as robust as Gaia can lead one to believe. Rather than assuming a Gaian network of stabilising and protective mechanisms, we should instead be vigilant for Achilles' heels in the climate system, as previously found for CFCs and the ozone layer.

How did you become an oceanographer at Southampton?

I was always interested in the natural world, growing up in the countryside in North Wales, helping my father with his forestry business at weekends, and walking in Snowdonia. After degrees in other subjects I was stimulated to convert to oceanography partly through reading Lovelock's books. I now research ocean acidification and marine biogeochemistry and am also interested in how life, in particular phytoplankton, interacts and has interacted with the environment.



See Page 12 for our book giveaway featuring Professor Toby Tyrrell's book.

Mining, Guiness and Caledonian Rock. An award winning student project

Alex is an MSci Geology graduate (2013) and now works for oil company, Nexen. For his final year Master's thesis he was fortunate enough to gain sponsorship from the New Boliden mining company. This was made possible through the connections of Ocean and Earth staff. It gave him exposure and experience in industry and the opportunity of an exciting research project. He tells us here about this experience and how his research project went on to win the Minerals Deposit Studies Group award for 'Best student project'.

My thesis focussed on the world-class Irish Midlands mining district, specifically on the giant Navan orebody, Europe's largest lead and zinc deposit. The area has been subject to scientific interest for decades due to its long mining heritage with particularly interest in where the metals found within the 105Mt deposit originally came from. My project sought to input to a growing consensus that the metals were derived from Caledonian basement rocks, which at Navan directly underlie the deposit. In particular, to test the hypothesis that characterisization of the presence, extent and controls of the hydrothermal alteration found in these rocks could provide a focus for further exploration efforts at Navan and in the wider area.

Ocean and Earth Careers day 2014

Ocean and Earth Careers Day

This year's Ocean and Earth Careers day, organised by Career Destinations, saw students taking the opportunity to network with potential employers and gain valuable advice from Ocean and Earth alumni panels. The focus for the day was career pathways and the best way to prepare for your future in full time employment.

More than 20 companies including IMarEST, Fugro EMU, Ordnance Survey, Neftex and Southern Inshore Fisheries and Conservation Authority supported the day and all were very enthusiastic about meeting potential future employees.

One of the key points highlighted in both of the alumni panel sessions was that students should use the National Oceanography Centre Southampton as a resource even after graduation. The people and opportunities that come from being part of a world-leading centre are invaluable to their future. Dr Clive Truman reassured students that there is support available to them through their student years and beyond.

Great tips from the alumni panel included:

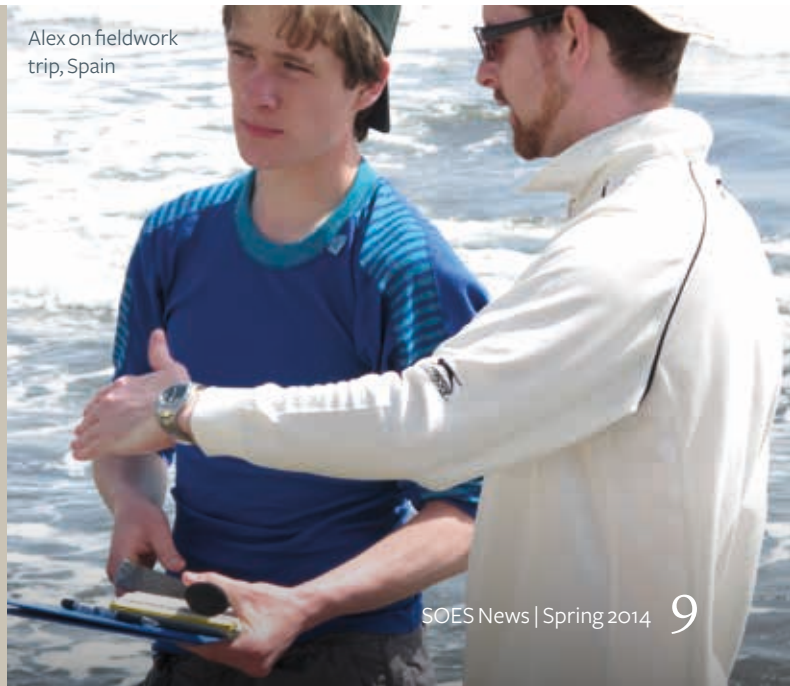
- 'Work experience is absolutely key' – Amy Stewart, Hanson Aggregates Marine Ltd
- 'Practice networking and interviewing techniques. It helps.' – Phobe Bailey, Fugro EMU
- 'Get yourself a Linkedin profile, recruitment companies use them and jobs are advertised there.' - Sarah Walby, Fugro EMU
- 'Don't be afraid to keep connections after you leave' - Sarah Birchenough, Southern IFCA
- 'Email companies with your CV outside of the recruitment cycle. Get on their radar early'- Lawrie Cowley, Neftex Petroleum Consultants
- 'Make yourself stand out, be a bit different.' - James Ayliffe, Fugro GEOS
- 'Do your homework, don't send your CV without tailoring it.' - Amy Paddington, Fugro EMU
- 'Follow your applications up, it shows that you are really interested.' - Sarah Birchenough, Southern IFCA
- 'Show good rounded knowledge of your area.' – Amy Stewart, Hanson Aggregates Marine Ltd

The key theme of advice offered to students throughout the day was to be ambitious in every element of their career pathway.

For further information about Career Destinations and the support on offer, please visit **www.southampton.ac.uk/careers**

Apart from some Guinness and a trip 1km underground in the mine, my time in Navan mainly revolved around logging all sections of core intersecting Caledonian rock. As this was previously unclassified stratigraphy, I also constructed a detailed facies scheme based upon the 1000+ m I logged which has subsequently been adopted by the mining company for all future Caledonian sections in the area. This helped refine a sampling strategy, which saw 40 core samples shipped from Ireland for analysis in the labs at Southampton.

After sectioning, samples were analysed at NOCS for their mineralogical and geochemical compositions before being the subject of scanning electron microscopy. Through these analyses it was found that the Navan basement samples showed a complex history of early burial diagenesis, followed by a strong, wholesale multi-stage alteration by low temperature basin fluids. My study concluded that within reasonable assumption, the entire orebody could be and likely was derived entirely from Caledonian rocks beneath the deposit.



Alex on fieldwork trip, Spain

Earth science students head to Prague

On the 6th March, a team of five Ocean and Earth Science MSci students will travel to Prague, Czech Republic, to compete in the 2014 American Association of Petroleum Geologists (AAPG) Imperial Barrel Award (IBA).

The Southampton team will feature geology students Alice Wenborn, Ben James, and Sam Bunnett, along with geophysics students Suzanne Millis and Chris Wilkinson.

On Friday 14th February, they won through an extremely closely fought internal competition featuring four teams of Southampton MSci students. So close were the four teams that it took the judging panel, which featured industry experts and Southampton Alumni's Neil Ritson and Roy Franklin, over forty minutes to eventually pick a winner!

Designed to mimic an industry exercise, the teams had three weeks to review the hydrocarbon potential of a 1000-km2 site in the Cooper Basin, Australia. Comprising 3D seismic data as well as geological well logs, the comprehensive data set rewards the students for working in an efficient team and, according to Alexandra Cookson who took part in last year's competition, "forces them to solve the challenges that evolve from working with a real industry dataset".

Mark Vardy, who advised all four teams, said, "What our students can achieve in such a short space of time is quite incredible. Having such a closely fought internal competition is a credit to all the students who took part. Although, sadly, not everyone can go to Prague, the skills they have learnt will prove invaluable in their future careers."

Ocean and Earth Science MSci students: Alice Wenborn, Ben James, Sam Bunnett, Chris Wilkinson and Suzanne Millis.

Exploring our Oceans with the University of Southampton's second MOOC

Adding another innovative learning experience to their bow, Ocean and Earth Southampton hosted its first Massive Open Online Course (MOOC) this year, called 'Exploring our Oceans'.

Starting in February, the course focusing on Oceanography enabled anyone to study online, for free, wherever they were in the world. To take part in the MOOC, no previous experience was required, and there was no admission interview and no need to have ever studied online or even in higher education.

The MOOC's aim was to reach an audience that has an interest in the world's oceans. It offered a great opportunity, whether you were a student wanting a taster of our oceanography degrees or are a lifelong learner with a passion for the oceans. The purpose was to introduce exciting science in an accessible way. The course was delivered by leading ocean explorers from Ocean and Earth Science at the University, lasted six weeks and required two to three hours of study per week. The course included recorded lectures, carefully selected readings, planned learning activities and online formative multiple-choice tests. There was also a discussion forum based around weekly topics that promoted lively debate and helped build an online community around key areas of interest.

Dr Jon Copley, Senior Lecturer in Marine Ecology and lead educator on the MOOC, says: "Ocean science is as big as the oceans themselves. This course investigated an underwater realm that's been unknown for most of human history. Learners learnt how the ocean depths are no longer out of reach and how they are connected to our everyday lives."

For participants, the benefits of taking part in a MOOC are clear; they get an engaging educational experience that developed new skills and understanding. In addition, there was no cost, no travel and the timing of a MOOC is flexible so that they can fit study in around their work and other activities. The MOOC was a great success and delivered a unique opportunity for learners to engage with one of the leading marine science departments in the world.

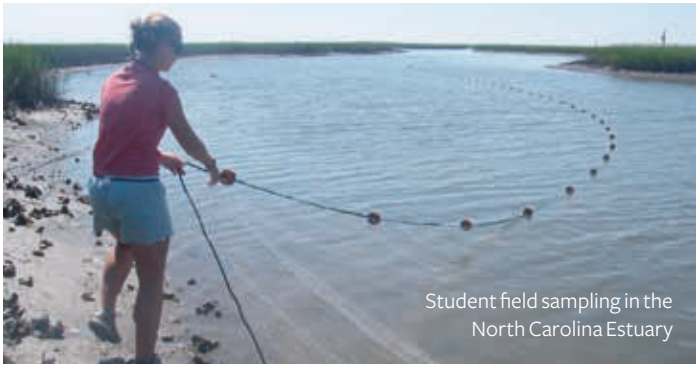
Dr Verity Nye and Dr Jon Copley, lead educators

Keep an eye out for when this course will run again at **www.southampton.ac.uk/oes**

Renewed support for successful student and staff exchange programme

The Joan Gillings Foundation has generously renewed its support of our successful student and staff exchange programme with the University of North Carolina, Wilmington (UNCW). Originally established in 2008 through a philanthropic donation from The Gillings Family Foundation; this new and significant gift will allow us to continue our exchange programme for the next five years. This is fantastic news for Ocean and Earth Science as the exchange scheme enables us to attract the best students to our programmes and plays an important role in building academic collaborations. Over the last five years it has enabled us to set up both an undergraduate and graduate exchange programme, a faculty exchange programme which allows us to pursue innovative research ideas and a ten-day tropical marine biology course at the Bermuda Institute for Ocean Science (BIOS) for all Master of Marine Biology students.

Phillip Turner (1st in MSci Marine Biology with Study Abroad, 2013) is one of the students to have benefitted from this support. He spent his third year at UNCW in 2011-12 and went on the Bermuda field trip in 2013. He explains, "The exchange programme helped me to explore the more traditional side of marine biology; complimenting my education from Southampton and providing me with a well-rounded degree. The independent project work, practical sessions and travelling opportunities increased my passion for research and has encouraged me to pursue postgraduate opportunities both within the UK, and abroad."



Student field sampling in the North Carolina Estuary

The renewed funding received by Ocean and Earth Science will allow us to make two Bermuda field trips possible this year. One will take place in early March for current fourth year Marine Biology students and a second trip will be arranged for early June for end of third year Marine Biology students and UNCW undergraduate exchange students studying with us this semester.

Southampton undergraduate exchange students studying at UNCW will also benefit from a new dedicated exchange student field trip investigating North Carolina coastal habitats. We also plan to expand the graduate and faculty exchange programmes, building on the success of a Gillings Family Foundation funded visit by Southampton PhD student, Debbie Hembury, which has just resulted in a publication on the impact of volcanic ash on anammox* communities in deep sea sediments[1].

Dr Cathy Lucas, who leads the exchange programme adds, "We are very grateful to the Joan F. Gillings Foundation for their support of this worthwhile programme. We are proud of our collaboration with the students and staff of UNCW and look forward to continuing the great work with the team there over the next five years."

[1] Song BK, Buckner CT, Hembury DJ, Mills RA, Palmer MJ (2014) *Impact of volcanic ash on anammox communities in deep sea sediments.* Environmental Microbiology Reports, DOI: 10.1111/1758-2229.12137

**anammox = Anaerobic AMMonium OXidation*

Career profile – Roy Franklin, OBE

SOES News catches up with alumnus Roy Franklin OBE (BSc Geology, 1973) to find out more about his time at Southampton, career and motivations for supporting current students.

"I remember wanting to study geology from about 8 or 9 years of age, I spent the first 15 years of my life living near Loch Lomond in Scotland where geology was all around me. I chose Southampton primarily because it had a really good reputation for the subject. I enjoyed the course and also did a lot of sport, mainly football, squash, hockey and a bit of trampolining!

When I graduated I wanted to go out into the world and put my geology skills immediately to use. I joined BP and that was the start of a career in the oil and gas industry. For the first ten years at BP I worked as a wellsite geologist, field geologist and did office based roles, increasingly taking on more responsibility. As my career progressed and I moved into senior management I no longer had responsibility for the geological or exploration aspects of a proposal but was able to use my knowledge to sense check those that did. For the last seven years I have held a number of non-executive roles, they are all global companies and I use my 40 years' experience to advise others which I find really satisfying.

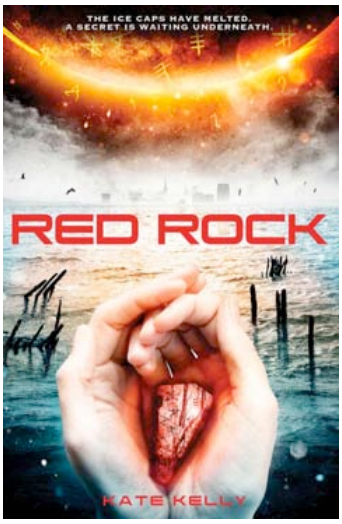
There are still excellent opportunities in the oil and gas industry for geology graduates. I have found my geology degree to be really useful throughout my career as it taught me invaluable skills such as how to handle uncertainty, to be receptive to other people's ideas and to be willing to adapt my model, whatever it might be.

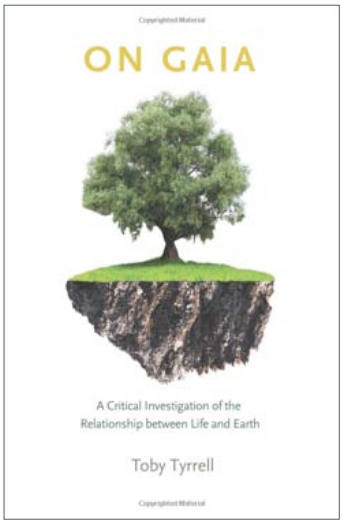
I now want to be able to give something back and put my time and effort into something close to my heart. I have been working with undergraduates in Ocean and Earth Science to help them with their mapping work and I'm only too happy to be able to fund undergraduate fieldwork and part-fund two PhD projects. The students are fabulous with lots of enthusiasm, inquisitiveness and the desire to learn more. The University of Southampton prepared me at the start of my career, and if I can now help students be better prepared when seeking work after graduation, then that's great."

Roy Franklin, OBE

Book giveaway!

We're lucky to have five copies of each of the following books, written by Ocean and Earth Science alumni, to giveaway to our SOES News readers.





Red Rock

Alumna Kate Kelly (MSc Oceanography, 1988) is celebrating the publication of her first novel for young adults, *Red Rock*. The book is a science fiction thriller set in a world beset by climate change. Kate studied for her MSc in Oceanography when the department was based at the old Burgess Road site and says that it was this year at Southampton that instilled in her a love for all things marine and led her to follow a career in Marine Science.

"It is my passion for the sea, and my own experiences in the Arctic on board oceanographic survey ships, that gave me the inspiration for the world I created in Red Rock." Kate says. "And I used my scientific background to try to make this world appear as realistic as possible."

On Gaia

Alumnus and academic at Ocean and Earth Science, Professor Toby Tyrrell (BSc Civil Engineering, 1988) has intrigued Earth and environmental scientists with his systematic and wide-ranging analysis of James Lovelock's Gaia hypothesis. This famous idea proposed that life itself has intervened to keep our planet stable and favourable for life throughout Earth's history. Toby's book *On Gaia: A Critical Investigation of the Relationship between Life and Earth* is the culmination of more than ten years of research into the subject.

Toby says: "After degrees in other subjects I was stimulated to convert to oceanography partly through reading Lovelock's books. I now research ocean acidification and marine biogeochemistry and am also interested in how life, in particular, phytoplankton, interacts and has interacted with the environment."

How to receive your free book!

To be in with a chance of winning a copy of either *Red Rock* or *On Gaia*, simply email us at alumni@southampton.ac.uk clearly stating which book you would prefer and we will choose the winners at random. The closing date for entries is 31st July 2014.
Full terms & conditions for this prize draw can be found at:
www.southampton.ac.uk/oes

Congratulations...

Students can benefit from a variety of scholarships, bursaries, prizes and awards made possible by the generosity of donors and the University of Southampton. Ocean and Earth Science alumni, friends and industry are increasingly recognising the impact private donations have on the student experience.

We encourage students to take advantage of a variety of scholarships and awards made across our degree programmes.

We would like to congratulate the people shown here that have won the following awards and scholarships this year.

- Peter Killworth Memorial Scholarship - Iordanis Magiopolos
- The Hodson-Najoan Prize – Rachel Roberts
- The D E Wisden Prize – Jennifer Saxby
- The Mineralogical Society Prize – Jennifer Saxby
- The Palaeontological Society Prize – Kimberley Dunn
- The Veritas Prize - Yr2 Peter Spokes/ Yr1 Eric Joyce
- The PESGB Undergraduate Sponsorship Offer – Rachel Roberts
- Micro-palaeontological Society Prize – Tamsin Leaver
- British Geophysical Association Prize – James Mills
- Tyler Prize Best MSci Marine Biology Project in Yr4 – Lucy Martin
- Tyler Prize Best Yr3 MSci Marine Biology Student – Melissa Brandner

Alumni support

To learn more about how you can support Ocean and Earth Science and the University of Southampton please visit **www.southampton.ac.uk/supportus** or email supportus@southampton.ac.uk

www.southampton.ac.uk/oes

Undergraduate admissions | ugafnes@southampton.ac.uk
Graduate School enquiries | gsnocs@southampton.ac.uk
Alumni office | alumni@southampton.ac.uk

+44(0)23 8059 7755

80% Printed on recycled paper.