School of Earth & Environment

Faculty of Environment

UNIVERSITY OF LEEDS

ANNUAL NEWSLETTER 2016

Photo by Sam Wright Overall Winner & Natural World Category Winner SEE Photographic Competition 2015

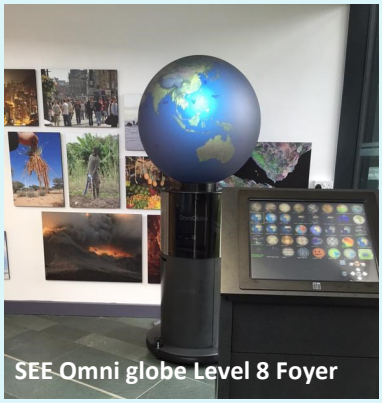
Photo by Ben Craven Life@SEE Category Winner SEE Photographic Competition 2015

Photo by Andy Parsons Fieldwork Category Winner SEE Photographic Competition 2015

Welcome to an overview of the recent SEE activity!

We have had lots of activity across the School over the past year. We had an Omniglobe installed in the SEE Foyer and a new Head of School, Professor Simon Bottrell was appointed in March 2015.

During the period 2014-15 the School saw the end of the refurbishment to Level 8 of the Staff Centre building. This created individual academic office spaces, meeting rooms and research space for Postgraduate students and Postdoctoral Research Staff. Associated with this project was also the refurbishment of Level 9 to relocate the Faculty Offices directly between Earth and Environment and Geography around Chancellors Court.



SEE Omni globe Level 8 Foyer

The Faculty relocation has enabled the remodelling of the previous School Admissions Office to create four academic offices helping to free up a series of small multi-occupancy spaces and to aid the accommodation of the Independent Research Fellows across the School.

The Maths Phase III refurbishment was completed in August 2015. This included an element of backlog maintenance for the area of the School based around the Coffee Bar on the Red Route, and to update and enhance the fire protection and emergency lighting systems in labs at the eastern end of Level 7 South Wing. This has brought all of the decanted staff based in Clarendon Place back into the School.

In 2014-15 the Faculty and NCAS IT servers were relocated into new locations. This has removed equipment from the North Wing, creating space to create an academic office.
The new Staff Centre server room generated during the above refurbishment of Level 8, provides a significantly enhanced location for the equipment and includes space for the newly installed robotic tape storage system, purchased as part of our capital investment.

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A previous store room located in Level 7 South Wing, accessible via the teaching lab has been redeveloped to fulfil the laboratory requirements for Dr Thomas Mueller's research activities and is currently being established with equipment. As a consequence of the University's significant investment in capital building (£520m), the current archive rock store needs to move from its location in the basement of the Old Mining Building.

The plan is to assess the holdings and redevelop an area on Level 5 of the Roger Stevens Building. This brings the resource closer to the academic school and within easy lift access.

Looking forward the Faculty is working with Estates to plan Phase II of the Staff Centre refurbishment. This includes infilling Level 7 and refurbishing Level 10 to create additional growth space for office accommodation needed by the School, along with the provision of facilities to house the cross-faculty research platforms of the Priestley International Centre for Climate Change, and the Met Office Joint Research Unit.

University Capital Group has recently approved the strategic outline case for this development and we are now creating the full plan to be presented to University Council. Alongside this major capital investment the School is planning a number of smaller projects to enhance the space, including a feasibility study looking at the potential creation of an additional series of academic offices within its current footprint.

Head of School Statement & Future Forecast

Prof Simon Bottrell (Head of School)

Synopsis of 2015

In the past year we have continued to build on our success in the Research Excellence Framework (REF) exercise last year. Our success there confirmed our leading position in Environmental and Geosciences research and this has been confirmed recently by other external metrics, such as the QS World rankings, where we rank in the Top 20 Schools internationally for Geosciences.

We also aim to lead in Environmental and Geosciences teaching and our efforts here have been rewarded with increasing student satisfaction survey scores , with an overall score of 92% (higher than the university average) including 100% for Sustainability and Environmental Management and 96% for Environmental Science.

Part of our Student Education Strategy is to enable students to go on to benefit society and an increasing number of our students are in employment with some programmes such as BA Environment and Business and Geophysics achieving 100% graduate employment in the most recent Destinations of Leavers of Higher Education Survey (2013-14), and we continue to invest in teaching enhancement to support these excellent outcomes for students, as we highlight elsewhere in this review.

Growth

The School continues to grow as a leader in UK Geoscience and Environmental research, with the last year's research income exceeding even our own ambitious targets. Our multidisciplinary approach to research within such a broad School has allowed us to identify emerging new research areas and diversify our funding base.

Amongst very many success stories over the past year John Barrett now leads the Centre for Industrial Energy, Materials and Products (CIE-MAP), working to reduce carbon emissions associated with material production, and Piers Forster's "SMURPHS" project is the first NERC Strategic Highlight Consortium, working to understand both the slowdown in the rate of warming since the late 1990s and also earlier hiatus and surge events……

We aim to undertake research that has genuine societal and industrial impact and benefit. Our teams of researchers in CPOM and COMET continue to use satellite observations to monitor and understand changes in the Antarctic and Greenland ice sheets and the processes associated with earth-quakes, such as the recent devastating events in Nepal.

Many of our researchers from both the Sustainability Research Institute and Institute of Climate and Atmospheric Sciences were closely involved in the Paris COP21 summit in various ways and closer to home the possible role of climate change in the recent unprecedented rain and flooding in northern England and Leeds itself and what may be required for adequate flood protection in future has been commented on by staff from the School in local and national media.

Looking Ahead

The School continues to grow, with an influx of new "tenure track" Academic Fellows through the University's 250 Great Minds initiative on Fellowships funded both by the University and externally and we will be welcoming more Fellows in the coming year. The past year also saw new developments in the signing of an agreement to take forward our Meteorological Office Partnership and the inception of the University-funded Priestley International Climate Centre, in which the School is centrally involved.

We have recently had outline approval for the School's plans to expand into adjacent space on campus (and first indications are that Leeds' planners believe that we can do this whilst adequately protecting our fine Grade 2 listed brutalist concrete architecture!) so I am genuinely hopeful that we can look forward to a future in which we have the resources we need to maintain the high quality of our teach-ing and research activities.

Congratulations to our SoEE Gradaunds for 2014/15

SEE Successes & Awards

SEE celebrates success in QS World University Rankings

The University of Leeds has risen in the rankings of the top universities in the world for Earth and Marine Sciences and Environmental Sciences, according to a recent international league table.

The 2015 QS World University Rankings (by subject) reveal that the School of Earth and Environment now joins Oxford, Cambridge, Bristol and Edinburgh in the top five universities in the UK for **Earth Sciences** (top 20 worldwide), and is now in the top ten in the UK for academic reputation for **Environmental Sciences**.

The league table provides the only means for prospective students to review universities by subject area rather than the institution as a whole. Commenting on this success, Head of School, **Professor Simon Bottrell** said, "these improved rankings reflect our progress against our ambitions to be an international leader in our fields for both teaching and research.

The gains made in these rankings, in all our subject areas, show the success of our interdisciplinary approach to tackling global issues and is a result of the hard work and dedication of all our staff and students."

IGT Professor receives Rosenstiel Award

IGT member Professor Tim Wright was selected as the 2015 Rosenstiel Award Recipient by the University of Miami (UM) in recognition of his research into deformation of the Earth's crust in response to tectonic forces.

The Rosenstiel Award honours scientists who, in the past decade, have made significant and growing impacts in their field. Tim's major achievements include the discovery of a continental rifting event in Ethiopia's Afar region, one of the few places on Earth where a mid-ocean ridge comes ashore. He was also one of the first scientists to measure how plate boundary zones deform, solely relying on satellite observations using a technique called satellite radar interferometry.

Tim presented the 2015 Rosenstiel Award Lecture, "Witnessing the Birth of Africa's New Ocean" at the UM Rosenstiel School auditorium on Friday 3rd April 2015.

You can read more here.

Professor Doug Parker wins Vice Chancellor's Impact Award

ICAS member Professor Doug Parker has recently been recognised by the University of Leeds **Vice Chancellor's Impact Awards** for his work on the **African Monsoon Multidisciplinary Analysis (AMMA)**.

The awards recognise outstanding examples of the contribution that the University's research makes to society. Four awards were made across the University, with Professor Parker's work representing the Engineering and Physical Sciences category. Also recognised were Co-Investigators Dr Jim McQuaid and Professor Dwayne Heard of the School of Chemistry.

Professor Parker led part of one of the **largest research programmes ever carried out in Africa**, studying the impact of the West African monsoon on the African and global environment. Beginning in 2003, the programme has greatly improved weather prediction, and climate monitoring and modelling in West Africa.

You can read more here.

Postgraduate Researcher Publication Prize Winners

Congratulations to Paul Brockway along with **Douglas Hamilton, David Bekaert and Erin Dawkins** on being awarded the School 2014/15 Postgraduate Researcher Publication Prize.

This event is now in its fifth year and the Committee continues to be impressed with the quality of the nominations. A high number of nominations were received and it is encouraging to have so many researchers taking part and making such a great contribution to the success of the School.

SEE staff celebrated at 2015 Women of Achievement Award

Two leading members of the School have been recognised as part of the University's 2015 Women of Achievement.

Dr Andrea Jackson, Pro Dean for Student Education, was nominated as a result of her National Teaching Fellowship and Professor Lindsay Stringer, Professor in Environment and Development, Sustainability Research Institute, was nominated following her 2013 Philip Leverhulme Prize for Geography. The Women of Achievement awards help to support the University's Athena SWAN objectives.

The University of Leeds has been commended for its work to support the career development of talented women working in the traditionally male dominated fields of Science, Engineering and Technology (SET) in the form of a prestigious bronze award under the Athena SWAN Charter for Women in Science. The Faculty of Environment is currently working towards a bronze award submission.

The Roll of Honour for all the 2015 Women of Achievement celebrants can be found here.

Prof Lindsay Stringer

Dr Andrea Jackson

SEE Academic Research Fellow receives highly prestigious George Walker Award

SEE Academic Research Fellow Dr Anja Schmidt has won the highly prestigious George Walker Award of the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI).

The award is given every two years to a scientist up to seven years after PhD and recognises achievements of a recent outstanding graduate in the fields of research encompassed by IAVCEI.

Dr Schmidt's award recognises her position as one of a very small number of scientists who has successfully and convincingly established a career at the boundaries between volcanology, atmospheric science and geohazards.

Although trained as a geologist, she has published a series of innovative and influential papers on the atmospheric impacts of volcanic eruptions. Within less than three years of her PhD (which won a Springer Thesis Prize) she has published 17 papers spanning the impacts of eruptions on air quality, aircraft hazards, as well as current and ancient climates.

These papers have contributed to important developments in our understanding. Notably, she has quantified the climate impacts of tropospheric volcanic aerosol and shown how it can alter our calculations of human effects on climate.

Dr Schmidt has also edited a book titled 'Volcanism and Global Environmental Change'.

Her 2011 study published in the Proceedings of the National Academy was the first to show how air pollution from a present day Icelandic fissure eruption similar to Laki could cause the premature death of many people in Europe.

Full story can be found here.

Success in the Guardian University League Tables 2016

The School of Earth and Environment has achieved an impressive result in the 2016 Guardian University league table, rising 11 places to number seven for Earth and Marine Sciences, placing it firmly amongst the top ten universities in the country offering courses such as Geology and Geophysics. The success was in part attributed to the excellent results from the latest National Student Survey in which 98 - 100% of students were satisfied with their course.

The School also achieved success in Geography and Environmental Studies, rising 13 places to rank it amongst the top 20 universities for these subjects. Published annually, the Guardian's University League Tables rank institutions according to student/staff ratio, spend per student, graduate career prospects, and the overall student satisfaction with the course based on results from the annual National Student Survey (NSS). For a full breakdown of the University of Leeds' results by subject, visit the Guardian University League Tables 2016.

theguardian

Dr Dominick Spracklen receives Philip Leverhulme Prize

Dr Dominick Spracklen has been awarded a 2015 Philip Leverhulme Prize in recognition of his research in understanding interactions between the Earth's biosphere, atmosphere and climate and the way that these are being altered by human activity. Recent work by Dr Spracklen includes a Nature article which relates lowering deforestation rates in Brazil to improvements in air quality.

This improved air quality can also be linked with improved human health (Reddington et al., 2015). Philip Leverhulme Prizes are awarded to outstanding scholars who have made a substantial contribution to their particular field of study, recognised at an international level and whose future contributions are held to be of correspondingly high promise.

Philip Leverhulme Prizes commemorate the contribution to the work of the Trust made by Philip Leverhulme, the Third Viscount Leverhulme and grandson of the founder. Each Prize has a value of £100,000 which can be used for any purpose to advance the prize holder's research.

Research Award Winner

Dr Caroline Peacock was awarded the European Association of Geochemistry 2015 Houtermans Award. This award is bestowed annually to a scientist no more than 35 years of age or within 6 years of their PhD 'for a single exceptional contribution to geochemistry, published as a single paper or a series of papers on a single topic'.

Caroline has been recognised for a series of papers investigating the biogeochemical reactivity and cycling of tracemetals in terrestrial and marine environments. Her work has been among the first to characterise and quantify the molecular level processes occurring at mineral water interfaces that control the partitioning of trace metals between soils and freshwaters, and marine sediments and seawater.

Caroline uses a combination of laboratory experiments, advanced synchrotron based spectroscopic techniques and geochemical modelling to probe the mineral water interface, and shed new light on the complex behaviour of trace metals in our environment.

Prof Martyn Chipperfield wins the Royal Society Wolfson Merit Award

The Merit Awards recognise respected scientists of outstanding research achievement and potential. Professor Martyn Chipperfield's group develops and uses numerical models, coupled with satellite, balloon, aircraft and ground-based observations, to improve our understanding of atmospheric chemistry and its interactions.

For two decades Prof Chipperfield has been at the forefront of global ozone depletion research, making some of the landmark model simulations of the polar ozone hole. His award is entitled *Sources and Impacts of Short-Lived Atmospheric Halogens.*

Environment and Business student Ravi Toor wins the Shell LiveWIRE Smarter Future Award

The LiveWIRE Smarter Future Award was launched in 2015 with the aim of supporting start-ups that provide solutions to the UK's sustainability challenges. Ravi's prize winning idea was to do with turning waste plastic into usable 3D printing filament.

Ravi is currently on a Year in Enterprise, with the Leeds Enterprise Centre. His Year in Enterprise business is Filamentive - a brand of 3D printer filament (the 'ink' for desktop 3D printers), which differentiates from the competition by offering degradable plastics, European manufacture and a low carbon footprint.

He is one of five students who will spend the year developing their business plan into a business. A born entrepreneur, Ravi started his first business during his first year in 2013, selling 3D printers online. He was awarded £5,000 to develop the idea and will also receive mentoring by Shell LiveWIRE alumni. As a winner of this prize Ravi will be considered for the Young Entrepreneur of the Year Award in March 2016!

SEE in the Media

Adaptation to climate change in different parts of the world

Professor Lindsay Stringer was interviewed for Paul Hudson's Weather Show (first broadcast on 1st August 2015). She talked about adaptation to climate change in different parts of the world, as well as greener travel options. The BBC iPlayer link is at www.bbc.co.uk/programmes/p02xkqtv. Lindsay's main segments are at c.13 minutes and again at c.39 minutes into the show. Professor Stringer has been selected by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) as a coordinating lead author for the Africa Regional Assessment of Biodiversity and Ecosystem Services.

She attended the first meeting for assessment authors, held in Pretoria, South Africa. She was also selected as a lead author for the IPBES Global Land

Degradation and Restoration Assessment. These assessments will be presented to governments around the world in 2018 and will play a key role in informing policy decision making.

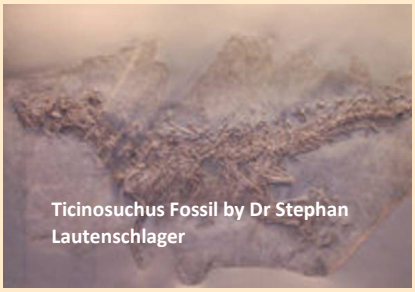
Mass extinction survival is more than just a numbers game

There have been five mass extinction events in the Earth's history, including climate change caused by volcanoes and an asteroid hit that wiped out the dinosaurs.

In general, geographically widespread animals are less likely to become extinct than animals with smaller geographic ranges, offering insurance against regional environmental catastrophes. However, a study published in *Nature Communications* has found this insurance is rendered useless during global mass extinction events, and that widely distributed animals are just as likely to suffer extinction as those that are less widespread. The research by Dr Alex Dunhill, from the School of Earth and Environment at the University of Leeds, and Professor Matthew Wills from the University of Bath's Milner Centre for Evolution, explored the fossil record of terrestrial (land-living) vertebrates (including dinosaurs) from the Triassic and Jurassic periods (252-145 million years ago).

They found that although large geographic ranges do offer insurance against extinction, this insurance disappeared across a mass extinction event that occurred around 200 million years ago (at the Triassic-Jurassic boundary) associated with massive volcanic eruptions and rapid climate change which caused the demise of around 80% of species on the planet.

Full article can be found here.



Ticinosuchus Fossil by Dr Stephan Lautenschlager

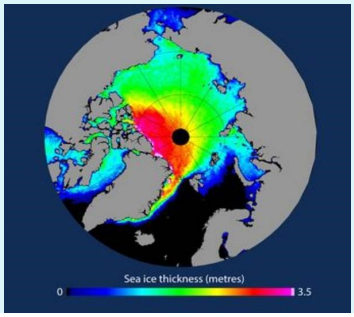
Cool summer of 2013 boosted Arctic sea ice

The volume of Arctic sea ice increased by a third after the summer of 2013 as unusually cool air temperatures prevented the ice from melting, according to University of Leeds and UCL scientists.

This suggests that the ice pack in the Northern Hemisphere is more sensitive to changes in summer melting than it is to winter cooling, a finding which will help researchers predict future changes in its volume. The study, published in *Nature Geoscience*, used 88 million measurements of sea ice thickness recorded by the European Space Agency's CryoSat-2 satellite between 2010 and 2014. It showed that there was a 14% reduction in the volume of summer time Arctic sea ice between 2010 and 2012, but the volume of ice jumped by 41% in 2013, when the summer was 5% cooler than the previous year.

Study co-author Professor Andy Shepherd, from the School of Earth and Environment at the University of Leeds and Director of the Centre for Polar Observation and Modelling (CPOM), said, "*understanding what controls the amount of Arctic sea ice takes us one step closer to making reliable predictions of how long it will last, which is important because it is a key component of Earth's climate system.*"

Full article can be found here.



Two centres for studying the Earth from space, hosted by SEE, have continued to lead the way in Earth Observation, attracting significant media attention.

The Centre for the Observation and Modelling of Earthquakes, Volcanoes and Tectonics (COMET), led by Professor Tim Wright, received widespread coverage for its work on the 25th April 2015 Nepal earthquake. Using data from the European Space Agency's Sentinel-1A satellite, COMET researchers based at Leeds along with colleagues from the InSARap project produced an interferogram showing how an area of 120km by 50km around Kathmandu lifted up by over 1m in places, whilst elsewhere the ground subsided.

Researchers could also see how the fault which caused the earthquake ruptured east from the epicentre, and did not break the surface, indicating that not all the strain built up in the rocks prior to the earthquake was released in the magnitude-7.8 event and its subsequent aftershocks.

The research was initially covered by the BBC and soon appeared across national and international media outlets. Research carried out by the Centre for Polar Observation & Modelling (CPOM), led by Professor Andy Shepherd, continues to hit the headlines. Earlier this year, a team led by Dr Mal McMillan, also based at SEE, showed how a remote Arctic ice cap has been rapidly losing ice. Their study combined observations from eight satellite missions, including Sentinel-1A and CryoSat, with results from regional climate models to demonstrate just how quickly ice caps can evolve, and to highlight the challenges associated with making projections of their future contribution to sea level.

As Dr McMillan explained, "new satellites such as Sentinel-1A and CryoSat are enabling us to systematically monitor ice caps and ice sheets, and to better understand these remote polar environments. "The long term observations these satellites provide will also be crucial for monitoring changes to the polar regions in the years and decades to come.

Image credit: CPOM/GRL. Rate of ice cap elevation change between 2010 and 2014 observed by CryoSat, overlaid on an image acquired by Sentinel-1A (in 2014). Red indicates that the ice surface is lowering.

IPCC Summaries for Policy-makers harder to read than Einstein

Global action on climate change is being hampered because advice from the world's leading body of advisors is so hard to understand. Summaries issued by the Intergovernmental Panel on Climate Change (IPCC) should help governments frame effective laws to counter global warming. But research, co-authored by Professor Suraje Dessai (SRI), revealed policymakers need the equivalent of a PhD in the subject to begin to make full sense of the reports. Even texts by Albert Einstein are easier to read than the so-called Summaries for Policymakers (SPMs).

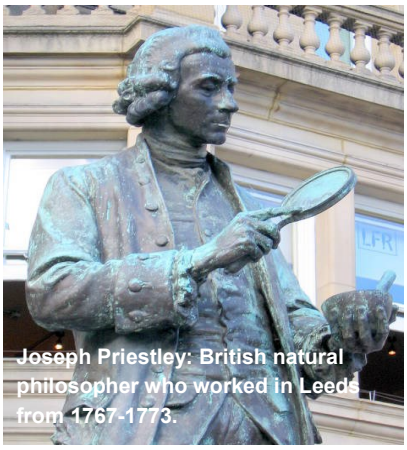
The study was published ahead of the UN talks in Paris that aim to forge a binding global agreement to combat climate change (COP21). **Professor Dessai** said, *"if governments can't even fathom the scientific facts presented to them, how can they begin to reach consensus or a joint legal wording?"* Co-author Dr Ralf Barkemeyer, of KEDGE Business School Bordeaux, added, "the IPCC was established to inform global climate policy, but clearly it's not doing this when its summaries for policy makers are so unreadable. It's failing in its task."

The study, published in ***Nature Climate Change*** (12th October 2015), used established metrics to determine the 'readability' of the policy summaries. It also explored the extent to which information published by the IPCC differs from the presentation of respective findings in the popular and scientific press. It uncovered a strong relationship between the political mood at IPCC conferences and the 'readability' of the body's summaries for policymakers, stating, "when political tensions and disagreements are high, readability is lowered. When plenary sessions are characterised by efficient organisation, constructive and straightforward exchange, and a good spirit of cooperation, readability is increased."

The paper was picked up and reported on by numerous news outlets including the Washington Post and the **Toronto Metro**. **Full story (in press) available here:** doi:10.1038/

IPCC plenary meeting which includes our own Prof Piers Forster

SEE Funding Successes & Partnerships


Joseph Priestley: British natural philosopher who worked in Leeds from 1767-1773.

Priestley International Centre for Climate Launch

2016 will see the launch of the Priestley International Centre for Climate, a new research institute that will establish the University's reputation as a world leading centre for interdisciplinary climate research.

Climate change is a global problem requiring an international solution - PICC's research will be international and interdisciplinary from the outset.

The University of Leeds is unique as being the leading UK institution with world-leading expertise in all the key strands of climate change research including physical science, ecosystem responses and changes and adaptation and mitigation. In the last 5 years, over half of the 78 Leeds articles published in *Nature* or *Science* were authored by PICC researchers. ***Bringing in research income of over £20m per year***, Leeds is one of the UK's largest recipients of research funding for climate-related research. PICC will provide a research platform that exploits expertise across laboratory measurements, fieldwork, satellite remote sensing, modelling and social science. It will seed new collaborations between world leading researchers across the campus and with international colleagues. Its focus is to develop its reputation as a recognised international authority of policy- relevant information on climate change, responding to the research needs of Government departments, the United Nations, the Intergovernmental Panel on Climate Change, private companies and the global public.

Professor Piers Forster is the Director of PICC, **Professors John Plane** and **Wandi Bruine de Bruin** are Deputy Directors.

Website: www.picc.leeds.ac.uk/

The University of Leeds and Met Office Recommit to Partnership as Chief Scientist visits Leeds

A new Memorandum of Understanding (MoU) setting out the basis for Academic and Research Cooperation in the field of weather and climate between Met Office and The University of Leeds was signed on Wednesday 28th October 2015 by **Sir Alan Langlands, Vice Chancellor, University of Leeds and Professor Dame Julia Slingo DBE FRS, Met Office Chief Scientist.**

The new agreement outlines the shared intention of both organisations to continue to grow their successful research, education and training partnership and forms the basis for future collaboration. An important strategic vision is to work together on science that has real benefits for society and the economy, through translation of excellent science to operational weather forecasting, climate prediction and service delivery. The MoU marks five years since the University of Leeds joined the Met Office Academic Partnership, a prestigious grouping of the Met Office and four UK Universities committed to working together on the grand challenges of weather and climate science. Professor Doug Parker, Met Office Joint Professor of Meteorology at the University of Leeds and academic lead said: *The partnership is all about maximising the impact of our research, to the benefit of the UK economy, through the Met Office's world-leading forecast capability.*

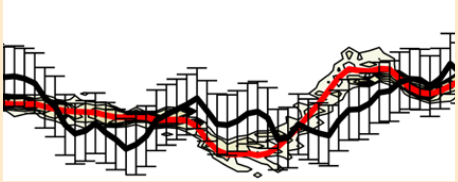
The Met Office Academic Partnership is bringing together the scientific expertise needed to maintain the UK's position at the forefront of weather and climate science. Translation of research results into weather and climate prediction models demands that scientists have opportunities to collaborate. The MoU comes at a time of significant developments in Leeds that will enable Met Office-facing research to thrive. The new Centre of Excellence for Modelling the Atmosphere and Climate will provide the numerical modelling capability and leadership that is vital for much of our collaboration.

The new campus-wide Priestley International Centre for Climate will enable the Met Office Hadley Centre to engage with climate researchers across the university. Scientists at the National Centre for Atmospheric Science provide links to nationally important research programmes and NCAS shares critical research infrastructure with the Met Office.

SEE is leading the First NERC Strategic Highlight Topic consortium

Prof Piers Forster was a PI on a new NERC grant beginning December 2015. The research will aim to better understand the causes of periods where the rate of global-mean surface temperature is increased or decreased at decadal time scales compared with long term (multi-decadal) trends. The work will seek to understand both the slowdown in the rate of warming since the late 1990s and also earlier hiatus and surge events. For more information see a recent Nature paper by Marotzke and Forster (2015).

SMURPHS is a consortium grant with a total value of **£3.75m** including **Leeds (£1m),** UEA, Edinburgh, Exeter, Oxford, Reading, Southampton, National Oceanography Centre and the British Antarctic Survey. The Leeds team will be made up of Professor Forster, Dr Anja Schmidt, Dr Amanda Maycock, Dr Graham Mann and Professor Ken Carslaw, and supported by Ros McDonnell.



NERC Black and Bloom project: Understanding melting of the Greenland Ice Sheet

As part of NERC's latest round of large grants ESSI's Professor Liane Benning and Dr Jim McQuaid from ICAS are joining forces to work on the Black and Bloom project.

With over £500,000 coming to Leeds, the £2.4m project is being led by Professor Martyn Tranter from the University of Bristol and includes scientists from the Universities of Sheffield and Aberystwyth but also international collaborators from Denmark, the US and Canada. The Greenland ice sheet (GrIS) adds ~1 mm/yr to sea level, it is said to be the largest driver of sea level rise. Earlier this year, a House of Lords report highlighted "momentous" change in Arctic and identified the critical role of UK science in furthering our understanding of the processes impacting the polar regions.

The main aim of Black and Bloom is to investigate the causes of accelerated melting of the Greenland ice sheet. Traditionally, it has been thought that the long range transport of soot from wild fires in Canada and Siberia, as well as desert dust cause arctic ice sheets to darken.

These darker surfaces absorb more sunlight, and this may be causing the ice to melt more quickly. However the story is much more complicated with coloured algal blooms on snow and ice now being thought to be important.

Full story can be found here.

Two Living with Environmental Change EPSRC Networks funded

Two Leeds-led EPSRC networks have been funded as part of the Living with Environmental Change (LWEC) and Mathematical Sciences themes.

Led by Prof Onno Bokhove (School of Mathematics), Maths Foresees aims to use new collaborations between mathematics and environmental science to deal with challenges associated with the prediction of extreme weather events. Mitigating severe environmental events, such as river flooding and storm surges, relies on accurate predictions of rainfall and storms. Maths Foresees aims to help quantify uncertainty in the approaches taken in extreme event analysis.

The Past Earth Network led by Dr Jochen Voss (School of Mathematics) and Prof Alan Haywood (SEE) will use earth history (paleoclimates) as a basis for testing our understanding of mechanisms of climate change. The network will promote a thorough assessment of uncertainty in climate models and a quantification of the uncertainty around paleo data by bringing together statisticians, climate scientists and geologists.

Each network provides three years of funding to support the establishment of new collaborations between researchers, project partners and interested stakeholders, bridging the disciplines of mathematics and environmental science.

LWEC's aim is to provide Government, business and society knowledge in order to be able to adapt to, mitigate and capitalise on environmental change.

NERC Urgency Grant to study rain-triggered lahar hazards

Congratulations to Dr Vern Manville (PI) and Professor Jurgen Neuberg (Co-I) who have secured a **£64k** NERC urgency grant to study rain-triggered lahar hazards at Calbuco in Chile, following its eruption on 24th April 2015, in collaboration with Eliza Calder and Simon Mudd (Co-Is) at Edinburgh and a number of Chilean project partners. NERC urgency grants allow scientists to respond rapidly to unexpected and transient events affecting the environment. Additionally, **£4k** of SEE Climate and Geohazards Service funding was also awarded to cover monitoring equipment and a reconnaissance field trip.

NERC Follow-On Funding Success

Dr Douglas Paton has secured **£12,000** from the Natural Environment Research Council (NERC), with a Follow-On Pathfinder award, in collaboration with the University of Hull.

Douglas is a Co-Investigator on the project and will be working with Dr Graham Ferrier on "Quantitative three-dimensional remote digital compositional characterisation of outcrops" (NE/N007948/1).

NERC Follow-On Pathfinder funds enable the development of projects whose objective is to realise the commercial potential of NERC-funded research via a combination of complementary technical and commercial engagement work programmes. Activities include market assessment and competitor analysis, intellectual property searches and engaging with potential commercial collaborators and end users.

Leeds wins £4.2m funding to develop robot fixers of the future

The University of Leeds is leading a pioneering **£4.2m** national infrastructure research project with the vision of creating self-repairing cities. Dr Martin Dallimer will be involved with this project.

The project will develop small robots to identify problems with utility pipes, street lights and roads and fix them with minimal environmental impact and disruption to the public. The project is funded by the Engineering and Physical Sciences Research Council (EPSRC) and was announced today by the Universities and Science Minister, Jo Johnson. It is part of a **£21m** funding for 'Engineering Grand Challenges' research, which aims to tackle some of the major challenges facing science and engineering. The researchers will initially develop new robot designs and technologies in three areas:

♦"Perch and Repair" - research to develop drones that can perch, like birds, on structures at height and perform repair tasks, such as repairing street lights;

♦"Perceive and Patch" - research to develop drones able to autonomously inspect, diagnose, repair and prevent potholes in roads;

♦"Fire and forget" - research to develop robots which will operate indefinitely within live utility pipes performing inspection, repair, metering and reporting tasks.

The team will work with Leeds City Council and the **UK Collaboration for Research in Infrastructure and Cities (UKCRIC)** to ensure that the robots are thoroughly tested before being trialled in a safe and responsible manner in Leeds. The University of Leeds has a proven track record on multi-million pound infrastructure research projects to tackle the big problems facing society, including a new focus on cities.

The project brings together expertise from across the University, including the Schools of Civil Engineering, Mechanical Engineering, Electronic and Electrical Engineering, Computing, as well as from the Faculty of Business, Faculty of Environment and the Institute for Transport Studies.

The team also includes researchers from some of the UK's other top universities including Birmingham, Southampton and UCL, with Nottingham, Sheffield, Oxford and Imperial as supporting partners.

More can be read here.

SEE takes a leading role in the DfID/NERC "Future Climate for Africa" Programme

Future Climate for Africa (FCFA) is a **£20M programme to develop improved understanding of both climate change in Africa and its impacts**, and to work with decision makers in Africa to make use of this information for decision making on the 5-40 year time scale. This is an unprecedented UK investment in climate science for Africa.

SEE is represented in 4 of the 5 FCFA consortia (and leading 1), making Leeds the most widely represented institution in the programme that was open to applications from anywhere in the world. **Dr John Marsham** is leading the HyCRISTAL consortium addressing East Africa, working with Barbara Evans (water@leeds, Engineering).

SEE are also taking key roles in three other consortia: IMPALA (Pan-African climate modelling: **Prof Doug Parker, Dr John Marsham, Prof Piers Forster**), AMMA2050 (West Africa: **Prof Doug Parker, Prof Andy Challinor, Dr John Marsham**) and UMFULA (Southern Africa: **Prof Andy Dougill, Prof Suraje Dessai, Prof Lindsay Stringer**).

Both HyCRISTAL and AMMA2050 build on World Meteorological Office programmes and with both the National Centre for Atmospheric Science (NCAS) and the UK Met Office involved in many consortia (and the Met Office leading IMPALA) SEE's funding success demonstrates the value of our partnerships within the UK and globally.

Picture: The Rt Honourable Ruhakana Rugunda Prime Minister of the Republic of Uganda with John Marsham (HyCRISTAL) at the closing of HyCRISTAL's first meeting in Uganda in September 2015.

The Past Earth Network

The EPSRC has provided 3 years funding to develop the Past Earth Network (PEN). This network will use palaeoclimates as a basis for testing our understanding of mechanisms of climate change.

They will promote a thorough assessment of uncertainty in climate models and a quantification of the uncertainty around palaeo data by bringing together statisticians, climate scientists and geologists.

The idea behind this initiative is to support the creation of new collaborations and link the disciplines of mathematics and environmental science . This network is being led by ESSI member **Prof Alan Haywood** and **Dr Jochen Voss** from the School of Mathematics.

The Past Earth Network held its opening conference in January this year. The conference saw over 80 members of the network come together to begin discussions and set up working groups for their four themes, Quantification of error and uncertainty of data, Quantification of uncertainty in complex models, Methodologies which enable robust model-data comparison and Forecasting and future climate projections.

How can we finance adaptation of Scotland's infrastructure and built environment?

Over the last 50 years Scotland has seen a significant change in climate – to warmer and wetter weather with more extreme weather events. This poses significant risks to our infrastructure. Yet, we do not have a clear strategy for how adapting our road, rail and energy networks, or our urban and rural built environments should be financed."

Financing infrastructure projects that deliver increased resilience to both current and future climate can be particularly demanding because the benefits of addressing future climate resilience can be challenging to quantify or monetise.

The challenges of financing public sector adaptation projects have been explored in a recent project undertaken by the Sustainability Research Institute's **Katy Roelich** in partnership with ClimateXchange and Adaptation Scotland and supported by funding from the Adaptation and Resilience in the Context of Change (ARCC) network for the co-production of research outputs. The project report was launched on 28th October and highlights a series of actions that government could take to improve access to finance for adaptation projects.

More information can be found:
www.adaptationscotland.org.uk/3/213/0/Financing-adaptation-of-infratructure.aspx

Outreach & Engagement Activity

SEE hosts Environmental Studies Academies 2015

Linking Schools with the University of Leeds to deliver Environmental Science, the ES Academy is a fantastic and unique opportunity for schools to access inspiring scientific sessions relating to their AS/A2 Curriculum.

There were two successful ES Academy events held in 2015. The first of the events was held on 7th January 2015; Students had the opportunity to learn hands-on in our school laboratories about two areas of environmental science.

Our student ambassadors (**Elisa Neame, Vicky Critchton, Jordan Fellows & Richard Johnson**) were on hand to assist each of the events and make students feel welcome.

The first session focused on soils and students learned about a wide array of properties that were then used in a mock case of advising an organisation about what farmland to invest in, based on the soil characteristics and the future use with Jerry Lee.

All students and teachers had the opportunity to experience lectures given by environmental scientists in SEE such as Prof Simon Bottrell and Dr Stephen Arnold talking about the interesting science they are exploring and what it is like to be an environmental scientist while highlighting Environmental Science course opportunities within SEE (SEE Level 8 Seminar Rooms). While the second area focused on invertebrates and understanding the effects of pollution on populations with **Jane-Marie Stocks**. Both sessions used real samples collected in the field over the previous months. The day was focused on key areas of the Environmental Studies A2-level curriculum but students came with diverse scientific backgrounds, including geography and biology.

The second of the events took place on Friday 17th July; In the morning; Students took part in their very own fieldwork and collected their own water/soil samples at Tributary of Ringshaw Beck Drighlington, with Dr Colin Pitts, Victoria Betts and Cara Healy.

In the afternoon; students investigated live soil samples collected in the morning by analysing invertebrates using scientific equipment with SEE demonstrators Jane-Marie Stocks, Dr Colin Pitts, and Victoria Betts in the SEE Level 7 Teaching Laboratories. Dr Stephen Arnold also provided a talk highlighting Environmental Science course opportunities within SEE. This day focused on key areas of the Environmental Studies AS-level curriculum.

We received positive feedback from students and teachers. Visit our blog for further information. There will be future event dates in 2016.
Further details on the ES Academy can be found on the website here.

Contacts:
Cara Healy ***(ES Academy Manager)/***
Dr Steven Dobbie ***(ES Academy Founder)***

Geography Teachers Conference (Sustainability Research Institute)

In June 2015 we ran our second Geography Teachers' Conference, on the theme of 'Humans in Nature'. These outreach events are designed to raise awareness of our degrees among geography teachers, and to give them the opportunity to hear about some of our cutting edge research. It is also valuable for us to engage in conversation with the professionals that teach our students, just before they join us at university.

Fourteen teachers attended, mainly from local schools, although some came from as far afield as Scarborough.

Sessions on the day were run by Dr Claire Quinn, Dr Martin Dallimer, Professor Jouni Paavola and Dr Lucie Middlemiss, all of which were very well received. The teachers enjoyed the opportunity to be the learner rather than the teacher for the day! They also took away some of the research and materials to use in their own A-level teaching. This year we hosted a few teachers who had also attended the 2014 event, we are happy to be building strong links with the local community of Geographers. In the final session of the day we outlined our environment programmes, and showcased the work of an undergraduate student, Manjot Garewal who presented on her final year project. We will run the session again in 2016.

Saltaire Festival 2015

The Saltaire Festival is an annual celebration of music and art run by volunteers, but this year it wasn't just art on show – Kirsty Pringle (SEE) and Tay-Yibah Aziz (STEM Public Engagement Intern) decided to inject a bit of science into the event by running a successful science fair.

The School of Earth and Environment was well represented at this year's Saltaire Festival Science fair.
The science fair is a small, family friendly event organised by Kirsty Pringle (SEE) and a team of volunteers.

It is an opportunity to showcase the fun side of scientific research and to give people, young and old, a chance to speak directly to researchers about the science they do.

This year, Kirsty Pringle, Steven Turnock and Carly Reddington (SEE) presented results from 'The Air in Saltaire', a citizen science project funded by a NERC Summer of Science grant, where low-cost particulate matter monitors were lent out to members of the public so they could measure the air quality around their town.

Lots of the volunteers who took part in the project came along to the science fair to see the results, and there were a few fun demos for the younger visitors too. By far the most popular of these was the classic cloud in a bottle experiment – all you need is a bicycle pump and an old plastic bottle and you can make your very own cloud!

Weather Workshop – University of Leeds Festival of Science

This year's Leeds Festival of Science coincided with both World Water Day and World Meteorological Day, so STEM ambassador Hannah Mantle and Dr Jim McQuaid put together a series of hands-on experiments to demonstrate a range of the key concepts which underpin much of the research in the School's Institute for Climate and Atmospheric Science.

The target audience was school children aged 11 - 14. Many of the experiments made use of equipment found around the home including bicycle pumps as well as lots of empty plastic pop bottles!

The challenge was to make the experiments simple and easy to understand, whilst still communicating important science. The school's lab manager, Jane-Marie Stocks, put together a great demonstration to illustrate the effects of ocean acidification by dissolving the shell off some eggs using vinegar.

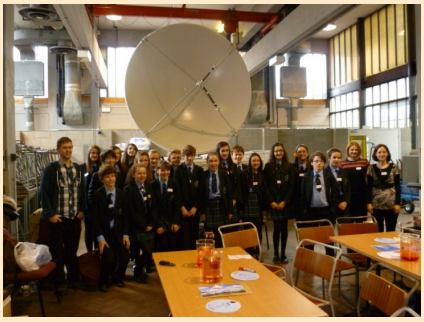
Thankfully all of the shell-less raw eggs survived the visiting students' scrutiny. Other experiments included how water vapour absorbs the sun's energy and is a very important climate gas in itself!

Dr Sarah Norris gave the visitors an opportunity to make their own tornados with two plastic bottles, some water and coloured lamp oil. Another demonstration showed how pollution in the air makes clouds 'brighter' so they reflect more sunlight back out to space.

In fact, this idea has been proposed as a geoengineering solution to mitigate for the warming climate.

The mysteries of supercooled water were also revealed, who knew that water doesn't always freeze at 0 °C? And finally, the ever popular cloud in a bottle proved a hit with the students who challenged each other to make the loudest bang!

The feedback was so good that the team have decided to reprise the activity for 2016 and expand the number of demonstrations to include 'Why is the sky blue?', which must be one of the most commonly asked questions about the atmosphere.



In 2016 we will also feature a joint talk from Ryan Neely and Anna Hogg who will present their work from opposite ends of the globe.

Ryan has a Laser based system which stares at the ice clouds above Greenland whilst Anna took part in a 'tractor train' expedition to measure the velocity of the Pine Island Glacier in Antarctica which is recognised as one of the fastest moving icesheets in the world.

Innovating & Researching in Student Education

In SEE we are actively innovating in new technologies for teaching as well as researching processes of teaching and learning. Some of these activities have been funded through the STEF – School Taught Student Education Fund which since 2012 has funded around forty projects- and others are resourced through fellowships. Each year we exchange ideas on how to improve our teaching at the SEE Student Education Away Day. Here we provide a snap shot of some of the ongoing projects in the school…..

Virtual Worlds Project

Dr Jacqui Houghton, Clare Gordon, Dr Geoff Lloyd, Dr Daniel Morgan, Dr Taija Torvela and Annabeth Robinson.

The Virtual Worlds Project is a collaboration between the School of Earth and Environment, University of Leeds, and Leeds College of Art, to develop a series of video game-style worlds using the Unity game engine.

Geological Mapping and Field Skills:

In the Geological Mapping and Field Skills virtual world, students explore the landscape with its rock outcrops to learn to collect, plot and interpret geological data on a conventional paper copy map and hence construct their own geological map. This is not a replacement for geological field (map) work but is a virtual space between classroom and field in which to train and reinforcement essential skills.

The project has received positive feedback from staff and students alike. Our results show students make the same mistakes they make when learning in the field, validating the realistic nature of the virtual world experience and providing opportunity to learn from these mistakes. The approach saves time in the field as skills are already embedded and increases student confidence in their abilities.

Using a virtual world for field work has clear accessibility potential for students unable to go in to the field. We have already created a virtual world as an alternative assessment for the Assynt fieldtrip and plan to do more.

Geological Maps Series:

To understand and interpret a geological map it is necessary to be able to visualize the 2D map in 3D. However, 3D visualisation and 3D/2D relationships are problematical concepts for many students.

The Geological Maps series of virtual worlds show geological maps draped over a virtual landscape. In these worlds, students walk/fly round the maps to understand the three-dimensional interaction of geology with topography and to compare 3D 'reality' with the 2D map.

Making Group Work, Work:

Stella Darby is working with Dr Anne Tallontire on a University Student Education Fellowship project to explore and improve pedagogical practices of group work.

A regular student concern is group work – often they don't feel prepared for it, may think marking is unfair or they don't see the relevance to their academic work.

However group work, particularly in the field, is central to education in SEE.

It is valued for developing key employability skills, especially team working and problem solving skills, for mobilising students' own expertise and experience and can help students recognise the different contributions of different disciplines to education for sustainable development.

There is a challenge in enabling students to better understand why we do

group work, for them to get the best from it and as well as appropriate assessment for group work……

We are conducting research with a colleagues from across the school using qualitative methods including interviews, action learning processes, observation and questionnaires.
The interviews cover their group work practices and reflections on the learning processes and more practical concerns.
We also will have a 'reference group' intended to help the research team reflect on the research processes as they are ongoing and ensure the findings are relevant to colleagues across the school.

Through this, we aim to explore and improve pedagogical practices of group work in the School of Earth and Environment, and share recommendations for good practice arising from the project.

Student Experience – Helping students make the most of University

The student experience team in the School delivers a programme of events and activities for undergraduate and taught postgraduate students in SEE. The aim is to facilitate opportunities for skills development as well as social interaction through involvement in co-curricular activities.

The SEE Slam and Student Showcase events, held mid semester, offers students the chance to share their experiences and help and inspire-others.

The **Slam event** saw 11 students bravely presenting inspiring, entertaining and thought provoking presentations on a range of experiences they had been involved in during the summer. The audience was entertained hearing about travel adventures in Vietnam and China, as well as South America, caving expeditions in Austria, work experience in the Canadian wilds and California adventures. Inspiring talks were delivered about working to change perceptions of epilepsy in Kenya, and a community project in Uganda as well as volunteering in India. It was a very close contest with Evelyne Ninsiima, an MSc student, coming first followed by Megan Ellis and Tom Stanley, both undergraduate students, in second and third place.

At the **Student Showcase event** 18 presenters who had either taken part in a Study Year Abroad (SYA) or a Year in Industry (YiI) presented posters of their experiences to help second and first year students make decisions for their future pathways. The quality of the posters was exceptionally high with the judging panel having a difficult decision choosing the overall winner. Zoe Cumberpatch (Bsc Geological Science) was awarded first prize for her YiI poster, with Owen Lokujeiweski-Taylor (MGeol Geological Sciences) taking runner up for SYA and Elaine Brown (BSc Sustainability and Environmental Management) runner up for YiI.

In semester two the emphasis shifts to supporting those students who are interested in developing their research experience. Promotion and recruitment takes place for the variety of research scholarships that are available as well as encouraging participation in the British Conference of Undergraduate Research (BCUR).

The School funds five research experience placements for SEE students, other opportunities include the faculty wide Undergraduate Research and Leadership Scholarships (UGRL) and the University's Q Steps Social Science Research Internship scheme. All these paid schemes allow students to experience being part of a research group. Tomas Liska, a final year Meteorology and Climate Science student was awarded an UGRL scholarship working on a project with Dr Anja Schmidt investigating the relevance of aerosol cooling throughout history. As part of his scholarship he will be attending the prestigious AGU conference in San Francisco in December. All these scholarships provide a great opportunity for those students considering academia and research as a future career.

The quality of research in the School generates a high standard of student research and showcasing the results is encouraged at events such as BCUR and Posters in Parliament and through participation in competitions such as the Undergraduate Awards. SEE actively promotes taking part in these activities and offers bursaries to provide financial assistance to attend.

Zoe receiving her prize from Prof Simon Bottrell Head of School

BCUR 2015 was held at the University of Winchester in April, with six students from the School delivering either spoken or poster presentations about their final year research. Three of those students are now in the first year of their PhD studies. Jed Atkinson (BSc Geological Sciences) presented the research he had carried out during a summer project working with Dr Crispin Little. He has remained in the School to complete his PhD. Lucy McGregor and Sophie Wilkinson have both returned to North America to their respective SYA universities to start their PhDs.

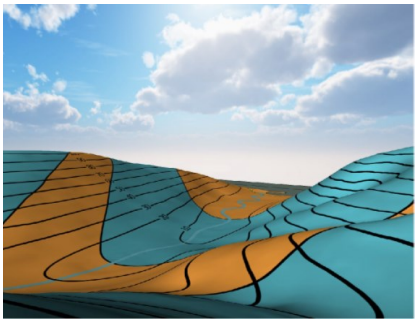
For more information about co-curricular activities please contact: Katie Livesay k.livesey@leeds.ac.uk

Student engagement research:

As part of Dr Andrea Jackson's HEA National Teaching Fellowship, Dr Jen Dyer is carrying out research into the factors impacting Student Engagement in SEE.

The research will explore trends highlighted in surveys conducted in the School over three years which suggest that student engagement, i.e. the time and effort that students spend on activities which complement and enhance their studies, varies between programme of study and between years.

Qualitative data through focus group discussions with students will examine the factors interacting to shape engagement behaviours, adding context and detail to the quantitative



survey data. The research will inform student engagement activities in SEE as well as contributing to the broader student engagement literature.

EMPLOYABILITY UPDATE

The graduate market of 2015 showed the highest increase in recruitment for a decade….

It is therefore vital to ensure that we continue to embed key employability skills and attributes as a part of our students' journey. The Faculty of Environment now ranks at a fantastic 82% in the Destination of Leavers from Higher Education survey and in 5th place in the University of Leeds ranking.

This is testament to the delivery of key events and activities on offer each year including this years 7th annual Faculty of Environment Careers Fair which was a huge success. The fair was the largest to date, attracting just shy of 400 students with 27 exhibitors representing on the day.

A wide spread of organisations took part including Arcadis, Arup, Atkins, Aecom, BP, CGG, Getech, Golder Associates, Groundwork, Lithos Consulting, Mott Macdonald, PwC, PepsiCo, WSP and many others, highlighting a range of opportunities suited to all year groups in Geosciences and Environment.

Paul Collins from Informed Solutions commented: ***"We found the event very enjoyable and productive, and it was lovely to see so many interested students! We have already heard from some of the students that we spoke to at the fair."***

The Year in Industry continues to thrive, with 36 students opting for a placement in 2014/15 and 31 students in 2015/16. The Student Placement Awards organised by the Careers Centre saw local employer VHE Construction nominate 2014/15 placement student Steven Ashton with a special mention on the day.

VHE commented: - ***"Steven commenced at VHE Construction with no experience of the remediation industry and….has grown into the position to the extent that the managers request his presence on project. He has become a valued member of the team and will be greatly missed. "***

This highlights the significance of the Year in Industry as the number of employers targeting SEE students continue to grow. Supporting Employability this year, our two new student ambassadors, **Zoe Cumberpatch and Michael Billam** are working hard to engage fellow students. Having set up the SEE Careers Clinic the ambassadors are aiming to help students with practical job hunting skills including CV writing, interview skills and much more.

Planning for the next annual careers will commence in semester two with a number of employers already keen to attend. The 2016 fair will take place on **Wednesday 19th October 2016.**

Contact: Linda Hartland
L.Hartland@leeds.ac.uk
Student Employability Officer

SEE Careers Fair 2015 (SEE L8 Seminar Rooms)

RESEARCH INSTITUTE ACTIVITY

Sustainability Research Institute (SRI)

SRI contributes to High Level Political Forum on Sustainable Development

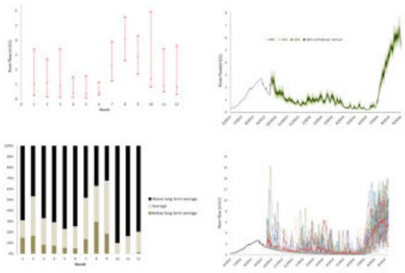
Dr James Van Alstine and Dr Stavros Afionis attended the 3rd session of the United Nations High-level Political Forum on sustainable development (HLPF), which met from 26 June to 8 July 2015. Discussions in New York this year focused primarily on how the HLPF could deliver on its mandate to review progress with respect to the implementation of the Sustainable Developments Goals (SDGs) from 2016 onwards. The SDGs are an integral part of the UN post-2015 development and will build upon the Millennium Development Goals (MDGs) which expire at the end of 2015.

Dr James Van Alstine and Dr Stavros Afionis have been awarded a £10,000 British Academy/Leverhulme Small Research Grant in order to conduct research on the High-Level Political Forum (HLPF), which was created at the Rio+20 Conference in June 2012 to replace the Commission on Sustainable Development (CSD).

The purpose of this proposed research will be to examine whether concrete steps have been taken by the international community to ensure that the HLPF does not experience the shortcomings that impeded CSD's effectiveness, such as, among others, its lack of impact on the implementation of sustainable development policies, its inability to integrate the economic, social and environmental dimensions of sustainable development at its UN-level work, and its cumbersome decision-making processes and unclear

HIGH-LEVEL POLITICAL FORUM ON SUSTAINABLE DEVELOPMENT

Uncertainty in climate change is a special issue



The Royal Society Philosophical Transactions A has released a special themed issue on climate uncertainty that includes two new open-access papers from the Climate Change Adaptation Group.

Dr Andrea Taylor led a study looking at how uncertainty is communicated in climate forecasts in the range of one month to a year (seasonal) or one year to ten years (interannual). It is expected that the use of these seasonal and interannual climate forecasts will grow as their accuracy increases. This means that, in the future, there will be a higher proportion of users without technical or statistical expertise. Climate providers thus face the challenge of communicating the uncertainty inherent in these forecasts to decision-makers in a way that is transparent, widely understood and does not lead to a false sense of certainty.

The study concluded that users currently find seasonal forecasts to be useful, but difficult to understand. In addition, information about forecast uncertainty was not easy to access or understand. The research highlights the need to find communication formats for the presentation of seasonal and interannual climate forecasts that are suitable for both expert and non-expert users. The second paper, headed by Susanne Lorenz, tested the effectiveness of climate projections visualisations for use by adaptation practitioners. Visualisations are widely used in the communication of climate projections but their effectiveness has rarely been assessed amongst their target audience. To address this, Susanne conducted an on-line survey with 162 local adaptation practitioners in Germany and the UK.

The results showed that even within a fairly homogenous user group there are clear differences in respondents' comprehension and preference for visualisations. The findings suggest that audience-specific targeted communication may be more complex and challenging than previously recognised.

Both papers can be found in the Royal Society Philosophical Transactions A special issue 'Responding and adapting to climate change: uncertainty as knowledge' that was released on 12th October 2015.

Land Ahoy! Integrated appraisals of land degradation guiding international discussions

SRI's ongoing research collaborations with the Economics of Land Degradation (ELD) Initiative are featured widely in a global land report launched in Brussels today and featured in a Guardian article. SRI led one of the ELD case study projects assessing the extent, causes and potential policy solutions to rangeland degradation in the Kalahari of Botswana. The ELD report estimates that land degradation is costing the world as much as $10.6tn every year, equivalent to 17% of global gross domestic product. The importance of land degradation issues to other global environmental problems and policy discussions has been further outlined by an opinion article by Professor Lindsay Stringer.

The article, entitled "Land Ahoy! Appreciating the Value of our Common Ground" highlights that land issues are finally gaining ground on the global political agenda. It highlights its central role in new SDG's, UNCCD and UNFCCC discussions to follow in Conference of Parties meetings over the coming months. Professor Stringer attended the launch in Brussels and also highlighted SRI's long-standing collaborative research partnership with the United Nations Convention to Combat Desertification (UNCCD) and stressed the vital links to climate change policy research ongoing through the ESRC Centre for Climate Change Economics and Policy.

Welcome Dr Pablo Munoz, new Lecturer in Business and Sustainable Change

Pablo joins us from Universidad Adolfo Ibáñez in Santiago, Chile. His research focuses on sustainable entrepreneurship, in particular on how and why particular individuals pursue business opportunities with social and environmental components, concurrent with pursuing economic returns.

Within this field he has conducted research on inclusive innovation, community enterprising and poverty alleviation, sustainable entrepreneurship cognition, social venturing and sharing economy.

His work has been published in top-tier management journals, such as Journal of Business Venturing, California Management Review, Journal of Business Research, Journal of Cleaner Production and Organization & Environment.

His work has also been presented in relevant academic conferences, such as Academy of Management Conference, NYU-Stern Conference on Social Entrepreneurship, International Conference on Sustainability Transitions, European Conference on Innovation and Entrepreneurship, GRONEN Conference, and Babson College Entrepreneurship Research Conference, where he recently received the *Dale G. Mayer Award* for the most relevant research in social entrepreneurship in 2014.

SRI welcomes new Lecturer in Business and Sustainable Change Dr Pasi Heikkurinen

Pasi joins us from UN-mandated University for Peace in Costa Rica where he was Assistant Professor in 'Responsible Management and Sustainable Economic Development' in the Department of Environment and Development. His research background began with his doctoral dissertation titled 'Reframing strategic corporate responsibility: From economic instrumentalism and stakeholder thinking to awareness and sustainable development' (available here) focused on responsible business strategies for sustainability.

His research interests extend to examining the role of the corporation in organising societies at large. In his latest research project, he studied the potential and limits of technological thinking for ecological sustainability.

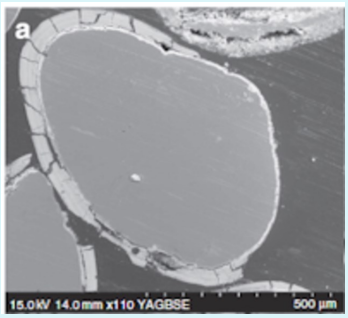
In SRI at Leeds he will work as a Lecturer in 'Business and Sustainable Change'. In research, as well as teaching, he emphasises transdisciplinary and holistic approaches as important means to gaining understanding of the prevailing unsustainability, and the urgently needed, alternative pathways for organising human activities.

RESEARCH INSTITUTE ACTIVITY

Earth Surface Science Institute (ESSI)

Unlocking secrets of the global carbon cycle

Secrets of the global carbon cycle have been unlocked by scientists in a study published in Nature Communications investigating how minerals interact at the molecular scale with organic carbon in sediments. The largest reservoirs of organic carbon on Earth are found in rocks, soils and marine sediments. The carbon in soils and sediments is mixed with minerals,



which might act to stabilise it against degradation, leading to the burial of carbon and its removal from the short-term global carbon cycle. However, the interaction between organic carbon and carbon-stabilising minerals is poorly understood due to the complexity of natural soils and sediments, and the difficulties identifying carbon-mineral interactions at the molecular scale.

The new study involving scientists from Leeds has used a water treatment works as a novel controlled environment where the interactions between carbon and minerals (such as manganese oxides) can be observed. The water treatment works filter bed consisted of sands coated with the ubiquitous manganese oxide birnessite and provided an environment where the sediment mineralogy was relatively homogenous in comparison to natural marine sediments or terrestrial soils.

This allowed for the interactions between manganese oxide and dissolved organic carbon to be closely monitored. Different types of spectroscopy and thermogravimetric analysis were used to determine the molecular mechanisms responsible for organic carbon uptake at the surface and at depth within the birnessite coatings. Results have shown for the first time that birnessite plays a critical role in carbon stabilisation acting to chemically adsorb organic carbon via carboxyl functional groups present in the carbon moiety and physically trap it within the birnessite layers.

Dr Caroline Peacock, Associate Professor in the School of Earth and Environment and co-author of the study says: Our work suggests that manganese oxides are able to transform organic carbon from a degradable to stabilised form, and hence promote the preservation and long-term burial of organic carbon in soils and sediments. Because manganese oxides are recycled at oxic-anoxic boundaries, their association with organic carbon might not be recorded in the geological record, but their ability to act as a mineral pump, cycling carbon from labile to refractory forms, could make up an important component of the global carbon cycle.

The original paper, led by Dr Karen Johnson at Durham University, is the result of a collaboration between the Universities of Durham, Newcastle and Leeds, and can be found here.

SEE Student Hannah Elms gains research skills and experience with alumni support via the UG Research and Leadership Scholarship Scheme

The Undergraduate Research & Leadership Scholarship (UGRLS) scheme gives exceptional first year students an opportunity to undertake a supervised degree-related research project during the two summers bridged by their degree programme, and to be appointed Student Ambassadors for their Faculty and School. The UGRLS scheme is funded through the Alumni Annual Fund, supported by donations from former students and friends of the University of Leeds.

SEE Geological Sciences student **Hannah Elms** is currently half-way through her 2-year UGRLS project "Palaeoecology of Cenozoic marine communities using stable isotopes of shell-bound organic matter (SBOM)". The project is linked to the Palaeontology Research Group in SEE and is supervised by Dr Crispin Little, Dr Fiona Gill and Dr Rob Newton.

By way of background to the UGRLS project, Crispin explains: "Palaeo@Leeds and Cohen Geochemistry groups at Leeds have been developing a method...

of extracting organic material from fossil mollusc and brachiopod shells (called shell-bound organic material – SBOM) from which carbon, sulfur and nitrogen isotopes can be analysed that give equivalent values to the original soft tissues of the organisms, allowing us to interpret the feeding style and food chain position (trophic level) of ancient animals.

So far, the SBOM method has been applied to fossil methane seep fossils, but the UGRLS project aims to extend the work to other, more normal, marine communities in the fossil record using specimens of excellently preserved mollusc shells from two Miocene Cenozoic European fossil sites in the Adriatic and Austria. The fossils belong to either still living (extant) species or genera, so their feeding modes are fairly easy to interpret by comparison with their living relatives."

During her first summer spent working on the UGRLS project, Hannah extracted SBOM from the shells of six gastropod species and then analysed the resulting material, initially for carbon isotopes. Further extraction of SBOM from more species, along with the analysis of sulfur and nitrogen isotopes, represents the second stage of the project for completion in 2015.

Comparison between the isotopic data and the inferred feeding mode for each species has, as predicted, not demonstrated a statistically significant relationship. This is because carbon isotopic values do not vary much between trophic levels, but, with nitrogen isotopes tending to demonstrate greater variations, more interesting results are expected once the next stage of the project is completed. Through her work on the UGRLS project, Hannah has already added significant new data for investigating palaeoecological reconstruction of fossil communities using stable isotopes of SBOM. She has presented her initial results at the Palaeontological Association Annual Meeting (PalAss 2014) in Leeds.

The Kromference

This July saw ESSI say goodbye to one of their longest serving members as Professor Michael Krom took his retirement. In honour of Mike's career at the School of Earth & Environment ESSI hosted a two day conference on Nutrient Cycling on the Modern and Ancient Earth.

A fantastic line up of speakers were arranged with Keynote and invited talks from Robert Aller (Stony Brook University), Ellery Ingall (Georgia Tech), Tim Jickells (University of East Anglia), Rachel Mills (University of Southampton), Thanos Nenes (Georgia Tech), Robert Raiswell (University of Leeds), Caroline Slomp (University of Utrecht), Clare Woulds (University of Leeds), Philippe Van Cappellen (University of Waterloo, Canada) and Aubrey Zerkle (St Andrews University).

The event began with an icebreaker on the Sunday evening in the School's foyer, delegates were given the opportunity to meet and mingle over food and drinks before the conference programme began the following morning. Monday saw the first two thematic sessions take place, *Macronutrients in the Modern Environment* chaired by Audrey Zerkle and Andy Bray and *Redox and Mineral Controls on Nutrient Cycling* chaired by Romain Guilbaud and PhD student Jenny Thompson. This was followed by a drinks reception and poster session where an excellent array of work was displayed and discussed.

In the evening we held a banquet at the Park Plaza in the city centre giving everyone a chance to unwind after the day's events. During the dinner some of Mike's colleagues spoke about their experiences of working with him over the years and a prize for best poster was awarded to Jenny Thompson for her poster titled 'Iron and phosphorus cycling in the ferruginous Lake La Cruz'

Day two of the programme had two further thematic sessions, *Micronutrients in the Modern Environment* chaired by Stefan Lalonde and Aleksandra Mloszeski and *Nutrient Dynamics Through Earth History* chaired by Sasann Henkel and PhD student Kathy Doyle. Following the final session Prof Krom took the stage for his plenary session 'Musings of an itinerant phosphorus geochemist' where he spoke about his experiences in research over the years and offered words of advice to those continuing in the field.

The event was a great success and enjoyed by all those who attended especially Mike. ESSI would like to wish Mike the best of luck with his future endeavours, although we are sure it will not be long before we see him again in the School.

RESEARCH INSTITUTE ACTIVITY

Institute for Climate & Atmospheric Science (ICAS)

ICAS create a world leading Centre for Expertise on Modelling of the Atmosphere and Climate

The School of Earth and Environment has given the go-ahead for a major new initiative to support the extensive numerical modelling research in ICAS. Up to seven new posts will be created with the aim of transforming ICAS's capability to develop and apply complex climate and atmosphere models, and to manage the increasingly large model and observation datasets associated with them. CEMAC is a joint initiative with the National Centre for Atmospheric Science (NCAS) and will be closely linked to the Met Office through the formal Academic Partnership. Computer modelling is a major scientific activity in ICAS and is also central to how we exploit our field and laboratory research.

The research of 18 academic staff is primarily model-based. In the period 2008-2013 model-based research attracted **£25 million grant income**, enabling more than 340 publications. ICAS's continued growth (from 4 academic staff in 1999 to 30 today) has led to a rapid increase in the range and complexity of models used by staff, postdocs and PhD students. Our major models cover atmospheric composition, weather, climate, climate impacts and palaeoclimate, and there are plans to extend into ice sheet modelling. ICAS is also a leading UK centre for the use of the Met Office Unified Model in almost all its configurations, ranging from scales of hundreds of metres to the global scale. **For further information about computer modelling in ICAS visit** www.see.leeds.ac.uk/research/ICAS/facilities/computer-modelling/

Leeds Forest Observatory

Researchers from the new cross-faculty Leeds Ecosystem, Atmosphere and Forest (LEAF) centre at the University are working with Leeds City Council to establish a Forest Observatory here in Leeds.

The LEAF centre, which launched in late 2014, brings together researchers from the Schools of Earth and Environment and Geography, as well as the Faculties of Biological Science, MAPS, Arts and Engineering. The Leeds Forest Observatory (LFO) will allow students and staff from the University to contribute to the collection of long-term environmental measurements and study the role of forests in the provision of ecosystem services.The LFO will be located in Middleton Park, South Leeds, home to the largest remaining area of ancient woodland in West Yorkshire. A specific 1 hectare patch of forest will be chosen for the LFO, allowing students and staff to return to the same area year on year to build up a picture of the environmental conditions, and any changes to them.

The LFO will contribute to the delivery of research-led teaching by providing opportunities for students from the University to become more deeply involved in scientific work and facilitating high-quality training in monitoring, analysing and reporting environmental data. More widely, the LFO will help address key questions in environmental research, enhancing our understanding of the role of forests in mitigating climate change, improving air quality and maintaining biodiversity. The LFO will also bring opportunities for outreach, providing an ideal location for off-campus visits from schools and colleges. There will also be opportunities for community events linked to the LFO to allow members of the public to see first-hand the work the University is doing. Establishment of the LFO has been made possible due to funding from the University of Leeds Footsteps Fund, the United Bank of Carbon: UBoC; www.unitedbankofcarbon.com and the School of Earth and Environment Teaching Enhancement Fund.

Visit leaf.leeds.ac.uk/LFO for updates on the project, contact Dr Catherine Scott (c.e.scott@leeds.ac.uk).

Mission to rule the winds

The NCAS Lidar "Flossy" has been helping a European Space Agency (ESA) Earth Explorer Core Mission, ADM-Aerolus.

The mission ADM-Aerolus, named after the ruler of the winds in greek mythology is a newly designed satellite designed to improve the accuracy of global wind profiles and so improving the accuracy of climate and weather forecasting and our knowledge of climate dynamics. Ryan Neely (Lecturer of Observation Atmospheric Science in NCAS and ICAS) has been at Summit Station (72° 36'N, 38° 25'W, 3250m), with Flossy atop the Greenland Ice Sheet helping the DLR, ESA andNASA scientists validate a satellite test instrument that is flown on aircraft for this campaign. The NCAS lidar is providing" truth" for them.

Here is link to their satellite and mission: https://directory.eoportal.org/web/eoportal/satellite-missions/a/adm-aeolus

ICE-D: A group of NCAS and ICAS scientists will be participating in the Ice in Clouds Experiment – Dust (ICE-D), based in Praia, Cape Verde, during July and August this year.

The project is being led jointly by scientists in NCAS, ICAS and the Met Office and also involves the University of Manchester.

The Leeds people are Prof Alan Blyth, Dr Ryan Neely, Dr Lindsay Bennett, Prof Paul Field, Dr Ben Murray, Dr Jim McQuaid, Hannah Price, James Groves and Dan Walker. The goal is to determine how desert dust affects primary nucleation of ice particles in convective and layer clouds and the subsequent development of precipitation and glaciation of the clouds.

Dust is thought to be an important aerosol particle in the Earth system mainly because the dust particles themselves, and particles that are chemically and possibly biologically modified as they are transported from their source, are believed to be the most important ice nuclei in a global sense and because dust particles are transported to many parts of the globe. Predicting the initiation and subsequent evolution of the size distribution of ice particles in clouds from a distribution of aerosol particles is one of the key problems in atmospheric science.

The lack of understanding of the processes causes significant uncertainty in the way global models treat the interaction of radiation with ice and mixed-phase clouds and the development of precipitation. They also cause uncertainty in Numerical Weather Prediction (NWP) models. ICE-D will address this problem by making measurements of aerosols and cloud particles close to one of the largest sources of desert dust in the world.

The dual-polarisation NCAS-AMF X-band radar based within ICAS will be playing a major part in the project principally because it can measure the raindrops that are expected to be lifted above the 0 degree level in the updrafts. These supercooled raindrops are believed to play a crucial role in the initiation of ice and the subsequent production of secondary ice splinters.

The FAAM BAe 146 aircraft will be flying within the clouds and in their environment. Measurements will be made of the aerosol particles with several instruments and filters which will then be processed to determine the ice nucleating properties of the particles. The cloud particle size distribution will be measured optimally as the cloud top ascends. The hope is to make observations when dust is present in high concentrations at appropriate altitudes and when almost no dust is present. In addition, the convective clouds in the region are known to be important since they can form clusters that lead to storms and hurricanes in the tropical Atlantic.

Model results will be compared with the observations of the initiation temperatures and rates of growth and development. A spectrum of models ranging from climate through regional NWP to explicit bin-microphysical process-based models will be compared with the data, used as forecasting tools, and as tools to interpret the data and to develop or improve parameterizations in NWP and global climate models.

The logistics of shipping the NCAS radar to Cape Verde, its first major expedition abroad, and deploying it in Praia have been formidable. The antenna had to be taken off and packed in a large crate to protect it, and the trailer itself placed on a flat-rack, since the whole system is just too wide and tall for a shipping container.

RESEARCH INSTITUTE ACTIVITY

Institute for Geophysics and Tectonics (IGT)

The Institute has had good news regarding funding with several members being awarded money for various projects:

Andrew Walker and Jon Mound, along with Martin Callaghan (Advanced Research Computing, University of Leeds), James Wookey (Earth Sciences, University of Bristol) and Aleksandra Pawlik (Software Sustainability Institute, University of Manchester), have been awarded £44k from the 2015/16 NERC Advanced Training Short Course scheme to deliver three training workshops to allow PhD students and early career researchers to develop basic software skills. Following on from the 2014/15 award, these workshops will be based on the Software Carpentry curriculum modified to cater for environmental scientists. Further details will be announced once dates for the workshops have been confirmed.

Bruce Yardley, Stephen Stackhouse and David Banks, along with Animesh Jha from the School of Chemical and Process Engineering, have been funded under the NERC Security of Supply of Minerals programme for their part in a consortium project on the Rare Earth Elements. The Consortium is led by Exeter (Camborne School of Mines) and also includes Sheffield, St. Andrews, Brighton and BGS. In SEE, the project will include a PhD student working on fluid inclusions associated with REE deposits and a 2-year post-doc position in ab-initio modelling. There is also support for other consortium partners to use the LA-ICPMS facility in SEE.

Additionally PhD student Amicia Lee has been awarded a field research grant. The grant is from the Geological Societies Thomas Jefferson Field Research Fund for fieldwork to study migmatites and shear zones in Norway. The amount is £2775 which help fund Amicia and a field assistant.

Another Earth's plate tectonic puzzle solved

In 1912 the German explorer Alfred Wegener introduced the idea that the continents are slowly drifting around the Earth (*Kontinentalverschiebung*). More than 100 years after and many generations of geologists later, the paradigm of plate tectonics that evolved from Wegener's ideas has successfully described the way the surface of the Earth is constructed and moves.

However, the development of convergent plate margins and specifically the initiation of the so-called subduction zones is one of the few processes in plate tectonics that have no recent analogue. Several models have been developed (i.e. spontaneous vs. induced subduction initiation) but these needed to be proven or redefined based on the geological (rock) record.

The International Ocean Discovery Program's Expedition 351 "Izu-Bonin-Mariana Arc Origins", aimed at drilling a single site behind the active Izu-Bonin-Mariana (IBM) volcanic arc front to recover evidence of subduction initiation. Dr. Ivan Savov was one of the proponents of this expedition. During the expedition (June & July 2014) Savov and 30 other scientists conducted observations and obtained results on board the RV JOIDES *Resolution* that lead to new insights into the process of subduction initiation. The existence of specific type of oceanic crust at the drill site location of IODP Expedition 351 proved the process of early arc volcanism associated with subuction initiation to be a really extensive and that spontaneous subduction initiation was the most likely scenario for the start of Pacific Plate subduction in the IBM arc-basin system in the Early Eocene.

The study "*A record of spontaneous subduction initiation in the Izu–Bonin–Mariana arc*" was recently published in the *Nature Geoscience*: Arculus et al., 2015. Nature Geoscience 8, 728–733 doi:10.1038/ngeo2515.

The research cruise and findings were funded by the European Consortium for Ocean Research Drilling (ECORD) and the International Ocean Discovery Program (IODP)

Dr Jason Harvey elected Chair of Geochemistry Special Interest Group

Dr Jason Harvey has been elected the new Chair of the Geochemistry Special Interest Group of the Geological Society of London and Mineralogical Society of Great Britain and Ireland at their Research in Progress meeting recently held at the National Oceanography Centre, Southampton. He will serve in this position for the next three years.

The Geochemistry Special Interest Group represents the interests of the geochemistry community at a national level. The committee is involved with providing support for early career researchers, i.e. PhD students, post-docs and on occasions masters students. They award travel bursaries for conferences to PhD students and organise an annual research in progress meeting. This year the meeting was held at the National Oceanography Centre, at the University of Southampton. This was the first ever two day meeting and attracted around 150 delegates. This year, the committee, in conjunction with Agilent Technologies, will also be supporting an early career researcher to do a national lecture series. The group also gives financial support to meetings with a strong geochemical theme which is thought will benefit early career researchers in geochemistry.

Prior to his election to position of Chair of the group, Jason has served a year as an ordinary committee member and three years as the Treasurer to the group.

Welcome to our New Academic Research Fellows

IGT's newest members are Jessica Hawthorne and Dr Andy Nowacki. Jessica started her Academic Research Fellowship with us in January and Andy will be commencing his Leverhulme Early Career Fellowship at the beginning of May. Both these positions are tenure track.

Jessica has joined us from Caltech in California, where she was a postdoc in the division of geological and planetary sciences. In her research, Jessica investigates the mechanics of seismic and aseismic slip on faults. She examines frictional models of fault slip and compares them with seismic and geodetic observations, with the goal of adding to our understanding of earthquake physics.

Andy Nowacki will be starting his Leverhulme Early Career Fellowship in May. His work involves studying how the Earth behaves in the deep interior using seismology with mineral physics and geodynamics, and making particular use of numerical methods to compare models with observations. His fellowship aims to investigate the mysterious 'Large Low Shear Velocity Provinces', regions of slow seismic wave speed at the bottom the mantle, using seismic waves which diffract along the outer core.

Andy is just completing a postdoc in Bristol, where he investigated anisotropy in the deep Earth, melt movement at mid-ocean ridges and microseismicity beneath volcanoes and geothermal reservoirs. We are very excited in IGT to welcome Jessica and Andy, and are sure that they will be great additions to our Institute.

Welcome our new University Academic Fellow

The Institute of Geophysics and Tectonics is excited to welcome their new University Academic Fellow, Dr Evgenia Ilyinskaya, to the team this August.

Evgenia specialises in emissions of volcanic gas and aerosol. Volcanic emissions can both help us understand the underlying magmatic system, and to assess the impact they can have on the atmosphere and the environment. Evgenia's work includes field sampling at actively degassing volcanoes and geochemical laboratory analyses. She has worked at several volcanoes world-wide, including Central America, Hawaii, Japan and Iceland.

After her PhD she worked at the volcano observatory in Iceland where she worked on including gas measurements in the volcano monitoring and early-warning system. For the last two years, she's been based at the British Geological Survey in Edinburgh. Dr Ilyinskaya has joined us through the University's 250 Great Minds scheme which seeks to recruit 250 exceptional University Academic Fellows by 2017.

RESEARCH INSTITUTE ACTIVITY

Institute of Applied Geoscience (IAG)

Prof Peakall has a brush with the art world

Professor Jeff Peakall, along with Dr Gareth Keevil, have had their video art installation entitled 'Underwater Rivers' exhibited as part of the 14th Istanbul Biennial.

The video installation was on display throughout October 2015 in Istanbul, alongside exhibits by such luminaries as Charles Darwin and Leon Trotsky, as part of their salt water themed exhibition.

The Biennial, organised by the Istanbul Foundation for Culture and Arts, aims to create exhibitions that enable a dialogue between the artists and the audience.

As such, Professor Peakall's video installation will be viewed by thousands of people visiting the exhibition.

You can access the full catalogue description of the installation here.

Warm welcome to Dr Na Yan

IAG is pleased to welcome Dr Na Yan,

who has joined the Fluvial and Eolian Research Group as a research fellow to work with Dr Nigel Mountney on '*Prediction of stratigraphic heterogeneity in tidally influenced fluvial successions: forward stratigraphic modelling for reservoir prediction*'.

Na obtained her BSc in Soil and Water Conservation & Combating Desertification at Beijing Forestry University in 2007. She then entered the College of Resources Science & Technology at Beijing Normal University to pursue her MSc with the exemption of the National Graduate Admission Examination and with a fully funded national scholarship.

Her MSc dissertation focused on flow dynamics and morphological evolutions of parabolic dunes. She has also been involved in various research projects and extensive field investigations regarding soil erosion, blowouts, desertification and land management as well as debris flows and flash floods. In 2010, she joined the Earth & Environmental Dynamics Group at King's College London for a PhD, supported by a Graduate School Studentship and a King's Overseas Research Studentship, to utilise numerical modelling combined with field measurements and Remote Sensing to assist in our understanding and prediction of dune

transformations driven by vegetation change arising from environmental and anthropogenic impacts. During this time, she has also contributed to many teaching, lab practicals, field trips, and marking for various undergraduate and MSc level courses. In 2015, she was awarded her PhD.

Award for IAG Student

Tom Mileham won first prize in the student poster competition at the Vancouver exploration Roundup in Vancouver (January 2015).

The Conference attracted 6,200 delegates, and has a strong history in encouraging student participation with Industry. Around fifty student posters were on display. Tom's poster was entitled: 'At the End of the Rainbow: Can the distinctive mineralogy of gold derived from alkali porphyries inform exploration programs'.

Tom was awarded his prize by the judges: Victoria Vehl of Teck and John Chapman from the Geological Survey of Canada. The judges commended Tom on the industrial relevance of his work and his progress over a very short time period.

Successful visit by SEG Distinguished Lecturer

On the 3rd November Dr Dimitri Bevc from Chevron provided a lecture on the challenges, opportunities and impact of full-waveform inversion. The Society of Exploration Geophysicists (SEG) supports this lecture series which provides our staff and students with access to leading industry experts in geophysics.

Our SEG student chapter were on hand to host Dr Bevc during his visit and as you can see from the picture, gave him a chance to sample the local hostelries of Leeds before he had to travel to Paris!

Thank you to the SEG for providing the Distinguished Lecturer series.

Successful UKCCSRC Specialist Meeting

On 2nd-3rd of November the UKCCSRC specialist meeting "Geophysical Modelling for CO_2 storage, monitoring and appraisal" was held at the University and organized by Dr Tom Lynch, Lisa Roach and Claire Birnie.

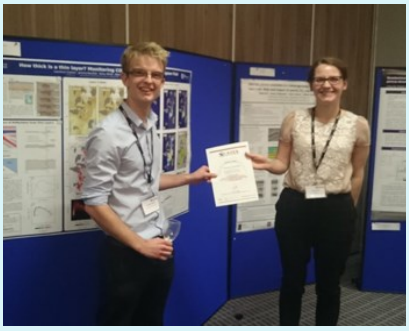
The meeting welcomed 31 people from 12 institutions across the UK, US and Norway to discuss geophysical and geomechanical modelling for CO_2 storage. The keynote speaker was Jonny Rutqvist from the Lawrence Berkeley National Laboratory who shared his knowledge on fault reactivation, induced seismicity, and leakage during underground CO_2 injection.

Jonny also provided a departmental talk on his work including his wider interests in unconventional hydrocarbons and geothermal power projects in the Geysers Geothermal Field in California.

We thank the UKCCSRC for their generous support for the meeting enabling us to attract international experts to the meeting.

Further details of the meeting can be found on the UKCCSRC blog page:

https://ukccsrc.ac.uk/news-events/blog/reporting-geophysical-modelling-co2-storage-monitoring-and-appraisal-meeting



Student photo shortlisted for award

Each year the European Association of Geoscientists and Engineers (EAGE) and the European Federation of Geologists (EFG) run a photography contest with the theme "Geologists at Work". The top 12 images are published in a calendar and are also exhibited at EAGE and EFG events across Europe during the year.

Ben Craven, a former Masters student and currently the School's Geoscience Software & Data Support Officer, photographed his image, "*The Last Few Layers*", while undertaking his Masters project in a surface mine in Ayrshire.

AAPG Poster Success

This year's American Association of Petroleum Geologists (AAPG) Annual Convention and Exhibition, which was held in Denver in June 2015, proved successful for two IAG PhD students.

Simon Oldfield, a PhD student in our Basins Structure Group won an AAPG Award of Excellence for a "Top Ten" Poster Presentation.

The poster presentation was titled "Reducing Uncertainty in the Geological Interpretation of Complex Structural Geometries Through Seismic Forward Modelling: Application to Frontal Ranges of the Llanos Basin, Colombia".

Riccardo Teloni, a PhD student in our Turbidites Research Group won the "Best Student Poster" award for his poster "Interplay of Turbidite and Mass Transport Deposition in a Deep-water Setting: The Lower Cretaceous Britannia Sandstone Formation, UK,

EQUALITY & INCLUSION

2015 has seen a step change in how SEE approaches the equality and inclusion (E&I) agenda

The School has established a new E&I committee and appointed a new E&I coordinator. The committee is made up of staff and students from across the school and represents all levels and functions.

The coordinator and the committee are tasked with delivering the University's equality and inclusion vision at a school level; "*As a research-intensive international University we will attract and retain excellent people from across the world to enable the University and the people within it to fulfil their potential*".

Since the committee's inception in spring 2015, they have been concentrating on supporting the Faculty's Athena SWAN bronze award application. Athena SWAN focuses specifically on gender inequalities in the science, engineering, technology and mathematics subjects (STEM), but often the adoption of much of the good practice that comes with the application and its associated action plan benefits all staff and students and goes beyond the women in STEM agenda.

Looking beyond Athena SWAN, the coordinator and the committee will be turning their attention to the broader quality and inclusion themes, and ensuring the school remains a supportive and welcoming environment for all who work and study within it.

Please contact Samantha Haynes, SEE E&I Coordinator if you have any questions or wish to be involved: **s.e.haynes@leeds.ac.uk.**

ALUMNI UPDATE

Where are they now? And what are they doing? The Sustainability Alumni Project

Identifying the employment destination of sustainability masters graduates.

With ten years of masters education under our belts, the Sustainability Research Institute decided to try and find out what are graduates have been up to. During summer 2015, a short project undertaken by an MSc student investigated the employment destinations of a decade of alumni. Through the internet and social media we managed to trace over two thirds of our 551 masters graduates to 2014.

Two thirds of these graduates still work in the UK, and the third who are not in the UK work in 13 different countries. One in ten of our masters graduates work in Asia and we also have connections across Europe, North America, South America, Africa and Middle East.

90% of the graduates we could track for the MSc Sustainability & Consultancy and the MSc Environment & Development programmes are working in roles relevant to their studies. The MSc wasn't the end of studying for 12% of our graduates overall – they went on to PhD research with a real cluster around climate change issues.

Of those graduates working in the UK, 44% of alumni work in environmental roles, with a slightly lower proportion (37%) if you look across all our graduates internationally. While this might at first glance seem low, in fact it means that our graduates are not pigeonholed and able to work on sustainability issues in many ways. Interestingly, nearly one third of our alumni remain in Yorkshire after graduation (31%), with a further third gravitating to London and the south East. We hope that this relatively local pool of expertise is something we can continue to connect with for the benefit of today's students and research projects.

The next stage of the project is to contact alumni who aren't already in touch with the Institute. We'd love, through interview and survey methods, to find out the impact these people are having on sustainability, through their work. We now have a database of almost 400 alumni working in a diverse set of organisations in a range of locations globally. This represents an exciting resource pool from which to explore opportunities for teaching and research related activities:

We'd love to hear from alumni so if you are a graduate from our Programmes who'd like to be involved in our teaching and research:

Contact Joanna Bowen:
J.E.Bowen@leeds.ac.uk

MEET OUR POSTGRADUATE RESEARCHERS

Simon Manda *(Sustainability Research Institute).*

Why did you choose Leeds, and why SRI?

First, choosing University of Leeds to me was a fairly easy decision given the fact that I studied here for my Masters. The academic environment, teaching facilities as well as learning support all influenced my decision to come back to Leeds. Whilst I studied under POLIS – Global Development with a focus on how the structure of the Global Economy influences development prospects in the global south for my Masters Degree – my decision to join SRI was driven by my desire to have a more in-depth and grounded understanding of micro-level development issues.

SRI – Staff, support and crucial focus on diverse livelihood projects with a sustainability focus – influenced my decision. I could not think of any other place to do my research than the University of Leeds, SRI.

Why are you interested in researching sustainability as opposed to another topic?

I have always been interested in rural development and sustainability issues obviously because I am a product of that social context – Zambia. Whilst global dynamics remain crucial in understanding elements of development, I would like to believe it is important to understand the local context within which the impacts of globalisation processes and structures are hard felt.

In Sub-Saharan Africa where poverty levels remain high, focused studies on the sub-region which illuminate lived experiences of localised growers hooked to globalised process such as value chain agriculture, as my research focuses, remain crucial in understanding and explaining impacts at that level. I am thus interested in micro-level construct of livelihoods as opposed to macro, elements I believe remain significant in determining how sustainable development interventions in the periphery can be.

How would you rate the support you receive (from supervisors and colleagues, training, etc.)?

The supervision and training has always been remarkable and fittingly relevant here at the School of Earth and Environment which has always challenged my perspectives and understanding of development issues and most importantly the dynamics of doing research. Additionally, SRI always encourages interaction of PhD students through Research Groups and other platforms such as RiDNet. These are crucial in sharing PhD experiences.

Now you've been here a while, what kind of openings do you think SRI can offer you in terms of your future career?

I consider SRI a hub with crucial links and overlaps with the world. Being here has broadened not only my perspectives and mental imaginations but has created crucial links to specific academic, NGO and other organisations that are interested in my research. Already I can see my long-standing dream of being an academic coming to reality and SRI will always be part of this journey.

Jenny Thompson (*Earth System Science Institute)*

Why did you choose Leeds, and why ESSI?

Leeds and ESSI has a good reputation for producing high quality research, with some members being leaders in my research field. ESSI is a great institute for me, with my research falling into both the Cohen and Palaeo@Leeds research groups, making them a great forum for discussion. All of this combined with a great PhD project proposal made Leeds and obvious choice for me.

Why are you interested in researching Geochemistry as opposed to another topic?

For me it's hard not to be interested in geochemistry and earth sciences as a whole. So much of our day to day life is dictated by the planet we live on and how different systems are interlinked and in balance. The fact that we still don't understand how many of these processes occur in the natural environment, and how our actions may perturb the system's stability amazes me, hence I think it is a really important subject area for research.

How would you rate the support you receive (from supervisors and colleagues, training, etc.)?

The support of my supervisory team is excellent, we have many valued discussions about my results and the progress of the project…….

They always have a high level of enthusiasm for the work and encourage me to be thinking about what we need to do to get the research published.

As I said previously, I am lucky that my project means I fall into both the Cohen and Palaeo@Leeds research groups, this means I have many people within in the department (staff and other PhD students) to talk to about my work both in a formal research meeting environment and also just over coffee! Due to the nature of my project I spend a huge amount of time in the Cohen Laboratories, which are a great facility, and the technical staff provide a huge amount of support.

Now you've been here a while, what kind of openings do you think ESSI can offer you in terms of your future career?

The training and support provided by ESSI is excellent, with many opportunities for training and preparation for future careers in academia and industry.

David Taylor *(Institute for Geophysics & Tectonics)*

Why did you choose Leeds, and why IGT?

Ever since I visited Leeds when searching for an undergraduate degree I knew it was where I wanted to be. When it came time to look for a PhD, I visited many other departments around the country, but none of them were quite as vibrant as the School of Earth and Environment, and IGT.

IGT provides the perfect working environment for studying geophysics. Not only is it probably the largest collection of geophysicists in the country, producing top quality research, but also everyone works together to provide a comfortable and stimulating atmosphere.

IGT is sociable, and supportive, and whenever you feel like you have a problem (work-related or otherwise) there's always someone you can turn to. The combination of top-notch research and a positive atmosphere enables me to make the most out of my own research, and my time as a PhD student.

Why are you interested in researching Geophysics as opposed to another topic?

Geophysics is a relatively young science, in the grand scheme of things. However, it is still one of the most rapidly developing fields in the modern world. What excites me about geophysics is that it provides challenging scientific problems that have real impacts on our society. Whether it's the study of earthquakes or volcanic hazards, or attempting to predict future variations of the Earth's magnetic field, geophysics has an exciting problem for everyone to tackle. Geophysics is the investigation of the eternal physical processes that have driven our planet for billions of years, and will continue to drive it long after we have gone, and I can't think of a more exciting topic to study from now in to the future.

How would you rate the support you receive (from supervisors and colleagues, training, etc.)?

There's always support when you need it, especially within IGT. My supervisors provide constant support and guidance, whether that's intellectually, or just giving that bit of encouragement or motivation when they realise that I need it most. I don't think my PhD would be possible without their help. But even outside of my supervisors, IGT is a close-knit community so you're never far from a friendly face or a helping hand when you need one, whether it comes from my fellow PhD students that you share an office with every day, or one of the academic staff you chat to at the daily coffee morning. There is also a vast array of training opportunities, whether you want to learn how to run huge numerical simulations on super computers, or just find out how to make your poster look that little bit more exciting for your next conference. There are plenty of opportunities throughout the year for PhD students to pick up the skills they want, whether it's provided within the university, or externally.

Now you've been here a while, what kind of openings do you think IGT can offer you in terms of your future career?

IGT has a diverse background of members and one of the advantages of this is that you constantly have the opportunity to not only meet new people, but also come in to contact with brand new ideas and topics of geophysics. This allows you to narrow down what you may like to do after your PhD, and sometimes even where you might like to go, or who you want to work with. IGT has the advantage of being one of the most well respected institutes studying geophysics in the whole of the UK, if not the world. By doing a PhD within IGT you know you will be taking part in world-leading research, and you'll have the chance to present your work at international level. I believe that being a part of such a high profile research institute makes it easy for me to get my own name out there, and my work more widely recognized.

Beth Woodhams

Institute for Climate & Atmospheric Science (ICAS)

Why did you choose Leeds, and why ICAS?

My main reason for choosing Leeds was the project (Severe Weather over East Africa) and the opportunities that came with it, such as working with the Met Office and being able to visit the region. I also chose ICAS because, having done a Physics degree in a department with only a small atmospheric group, I was excited to be able to work in a large department, surrounded by lots of other atmospheric scientists and the opportunities that would provide, such as seminars and collaborations.

Why are you interested in researching Atmospheric Science as opposed to another topic?

I knew I was interested in the atmosphere ever since I first watched *Twister* when I was around eight. I love the fact that you can use equations to describe "the sky" and I also enjoy that it is a science that everyone can relate to. Furthermore, unlike some subjects, the research done in the field actually has the potential to have a large impact on people's lives and livelihoods and so it is important to understand as much as possible.

How would you rate the support you receive (from supervisors and colleagues, training, etc.)?

The support is amazing – I feel so encouraged by my supervisors to take full advantage of all the training on offer. In addition, it is great that I am encouraged to increase my breadth of knowledge about the atmosphere by attending all the seminars and group meetings. I also have great support from the Spheres DTP and all the training which it offers.

What kind of openings do you think ICAS can offer you in terms of your future career?

ICAS has so many links and partnerships with other institutions around the world. I am grateful to my supervisors for encouraging me to make as many contacts as possible, not only to help with my PhD, but also to help me when I am looking for a postdoctoral position. In addition, I hope to work at the Met Office in the future and I know that its links with the department will stand me in good stead.

Dave Price

Institute of Applied Geoscience (IAG)

Why did you choose Leeds, and why IAG?

I initially did an MSc in Exploration Geophysics at Leeds before doing my PhD. When I was looking for a geoscience MSc, Leeds offered some of the most interesting and highly regarded MSc courses in the country and the Geophysics course offered everything I wanted from an MSc. Choosing whether to do a PhD here at Leeds after that year was easy. I knew already what a good place Leeds is to be a postgraduate. I chose IAG because I had always wanted to do applied science and it offered some of the most interesting applied projects which suited my background as an undergraduate physicist.

Why are you interested in researching Geology as opposed to another topic?

Geophysics combines all the aspects of physics that I love, interesting aspects of geology and applies them to real world problems. The applied nature of the subject has always appealed to me, how you can see an end product and why it's important or of financial significance.

How would you rate the support you receive (from supervisors and colleagues, training, etc.)?

The support here at Leeds is great! It is required, as part of your PhD to have regular meetings with you supervisor so they can always help you out or give you fresh ideas every week or so. Also, you have a lot of talks, presentations and group meeting which you can attend which allow you to learn about what everyone else is doing. It's also a good place to meet loads of other researchers, staff and students. All the PhD students are really sociable, there is always something going on and everyone is up for going to have a drink or two after work.

What kind of openings do you think IAG can offer you in terms of your future career?

IAG has so many contacts and links that it's a great place to do a PhD. It provides you with the opportunity to do internships during your PhD. I have done one 4 month internship and hopefully will do another one this summer. I also get loads of emails about different job opportunities and always have either a fellow Phd student or member of staff informing me about a company they know about or have contacts with.

SEE BABIES

Alex Dunhill (Leverhulme Fellow) and **Jenny Dunhill** (CPOM and COMET Research Administrator) with their son, Henry. Henry is almost two and is obsessed with Thomas the Tank Engine.

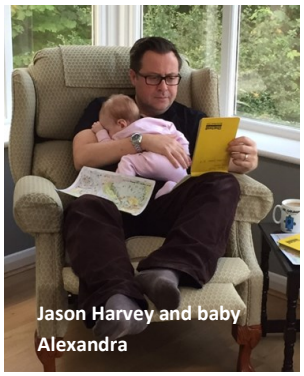
Alex Dunhill and his wife Jenny with their son Henry

Dr Chris Davies (NERC Independent Research Fellow) and his daughter Hazel. Hazel is 6 months old and her favourite activity is dancing to songs that daddy makes up.

Chris and baby Hazel

Baby Bethany

Bethany Dennis was born on the 23rd of June 2015 to **Dr Sarah Norris** (Research Fellow). Sarah also has a little boy, Logan who is 2 years old.



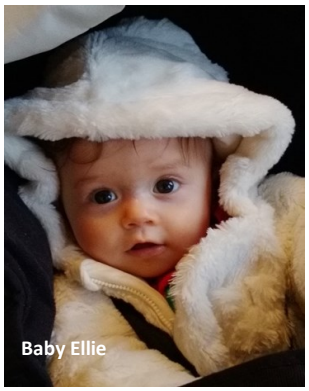
Jason Harvey and baby Alexandra

Dr Jason Harvey (Lecturer in Geochemistry) and his daughter Alexandra Felicity Harvey. Alexandra was born in June 2015 and they call this photo "work-life-balance".

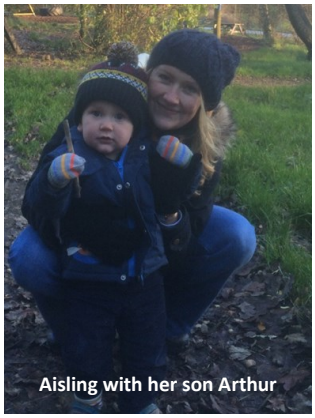
Dr Fiona Gill (Royal Society Fellow) and her husband Chris with baby Ernie (Ernest Gill Chmiel). Ernie was born in September 2015 and loves going out for walks!

Fiona Gill and her husband Chris with baby Ernie

Ellie is 16 months old and is the daughter of **Kirsty Pringle** (Research Fellow). Her favourite hobbies are exploring, eating but unfortunately not sleeping. They both like going swimming, she loves the water, unlike her older brother who loves swimming, but doesn't like getting his hair wet!

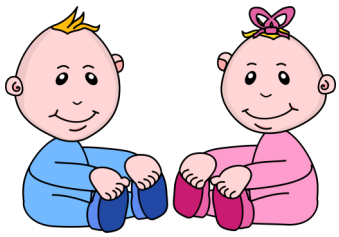


Baby Ellie



Aisling with her son Arthur

Dr Aisling Dolan (School Research Support Manager) and her son Arthur. Arthur is over 1 year old and loves being outside in the woods!



Zoe Wallage with her husband Calvin & baby Jacksen

Dr Zoe Wallage (School Office & Projects Manager) and her husband Calvin welcomed their baby son, Jacksen James Starley Cullum, into the world on Friday 2nd October 2015 weighing in at 9lb 11oz. Zoe is currently on maternity leave and loves spending family time together going for walks around her favourite local beauty spots, including Ilkley tarn (see photo) and Harrogate Valley Gardens.

NEW MEMBERS OF STAFF & APPOINTMENTS

SEE New Members/Appointments 2015

Adam Booth – Lecturer in Exploration Geophysics (IGT)

Alex Dunhill – Leverhulme Early Career Fellow (ESSI)

Alex Webb – Associate Professor Structural Geology (IGT)

Amanda Maycock – University Academic Fellow / NERC Independent Research Fellow (ICAS)

Andy Nowacki – Leverhulme Early Career Fellow (IGT)

Angela Craddy – Research Assistant in BOSS (SRI)

Anjlee Gupta – Student Employability Officer

Anna Hogg – ESA Independent Research Fellow (ICAS)

Anne Cunningham – Communications Officer, CCCEP's management team/LSE communications team

Bas De Boer - Marie Curie Research Fellow

Ben Mills - UAF (ESSI)

Carl Spence-Jones – Geological Sciences Graduate Assistant

Catherine (Frin) Bale – University Academic Fellow

Cathryn Birch – University Academic Fellow (ICAS)

Chris Davis – NERC Independent Research Fellow (IGT)

David Warburton – Research Assistant (ESSI)

Emma Hatton – CPOM & COMET Scientific Programmer (InSAR) Facility Manager

Evgenia Ilynskaya – University Academic Fellow (IGT)

Fergus Howell – Research Fellow in Palaeoclimate Modelling (ICAS/ ESSI)

H Muhamad Gouiza – Research Fellow (ICAS)

Hannah Price – Research Fellow (ICAS)

Hannah Walker – Research Fellow (ICAS)

Janina Engler – Student Education Service

Jannik Giesekan – Research Fellow (SRI)annes Konrad – Research Fellow in Earth Observation (ICAS)

Jenny Dunhill – CPOM & COMET Research Administrator

Jessica Hawthorne – Academic Research Fellow in Earth Observation – COMET

Jon Liddell – Research assistant on the Arup-funded "Circular Economy in Leeds" project in SRI

Julia Martin-Ortega - Associate Professor

Juliet Jopson – Project Officer (SRI)

Lewis Burden – Research Assistant IAG

Lindsay Lee – Leverhulme Early Career Fellowship (ICAS)

Lisa Lack – Project Officer (Secondment Climate & Geohazard Services Hub)

Lisa Smith – School Receptionist (Peak time cover 10am – 2.15pm)

Luis Garcia-Carreras – Research Fellow (ICAS)

Mark Holden – Research Fellow (ICAS)

Martin Iles – Permanent Student Education Service Manager

Na Yan – Research Fellow (IAG)

Nikki Danby - Student Education Service Officer (Programme Support & Assessment)

Pablo Munoz – Lecturer: Business & Sustainable Change (SRI)

Pasi Heikkurinin – Lecturer in Business & Sustainable Change (SRI)

Peter Steward – Research Fellow (SRI)

Rebecca Harrison - Faculty Health and Safety Officer

Richard Pope – Research Fellow (ICAS)

Robin Stevens – Research Fellow (ICAS)

Rosalind Bark - Marie Curie Research Fellow

Ruth Lawford-Rolfe – Research Impact Support Officer

Sebastien Lectez – Research Fellow (IGT)

Simon Bottrell – Head of School (As of March 2015)

Stella Darby – Research Fellow in Group Work in Student Education

Stephen Whitfield – Lecturer in Climate Change & Food Security (SRI)

Steven Boing – Research Fellow (ICAS)

Teresa Honore – (Maternity cover) PA to Head of School & School Office Manager

Tim Craig – Research Fellow (IGT)

Tom Bliss – Project Administrator (United Bank of Carbon)

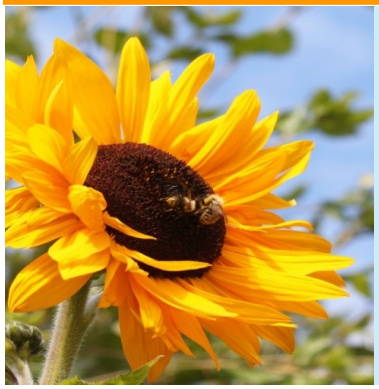
Welcome back

Ben Clark – Faculty Management Accountant

Andy Gouldson – Professor of Environmental Policy and Associate Pro-Vice-Chancellor (Research)

Linda Hartland – Student Employability Officer

Further information can be found on our Staff Peoples pages:
www.see.leeds.ac.uk/people/



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****The editor (Cara Healy) would like to thank everyone who contributed news items to this issue of the SEE Annual Newsletter.***