School of Earth & Environment

Faculty of Environment

UNIVERSITY OF LEEDS

SEE ANNUAL NEWSLETTER 2017

Natural World category winner: Evgenia Ilynskaya— Erebus volcano, Antarctica

Life@SEE category winner: Dave Hodgson — @SEELEEDS

Fieldwork category winner: Nicholas Roxburgh— Winnowing the Chaff

Congratulations to the SEE Photo Competition 2016 Winners (above)

Welcome to an overview of the recent SEE activity!

By Jerry Lee - Faculty Facilities Manager

2016 has been another successful recruitment year for SEE. This is great for the school's prestige however, it means we're running out of space! The Dynamics Group from **ICAS** has decanted out of the school into temporary space at Fairbairn House. **NCAS** will move there too in early 2017 into the main building which is connected directly to the space occupied by the Dynamics Group. This will assist the school in meeting its short term space needs and will provide NCAS with the high quality space appropriate for a national centre and will aid them in fulfilling their national science delivery.

The Dynamics Group will relocate back into the school during the summer of 2018 as space for them will have been created by infilling the current Staff Centre undercroft and refurbishing Level 10 to form a new mezzanine Level 11. This project generates additional office accommodation for staff and research students, along with a series of much needed meeting spaces and hot desks for visitors associated with the School and the **Priestley International Centre for Climate**.

The University capital building investments have assisted the school in relocating its archive rock stores out of the old mining building into a new location directly adjacent to the main building, and currently the field equipment stores will be relocating into more appropriate facilities on the Fairbairn House site.

Included inside this issue:

Head of School Statement & Future Forecast

Professor Simon Bottrell

The School continued to build on previous successes and performed strongly in 2016 across the full breadth of activities in SEE. This is confirmed by external metrics that assess our performance on the world stage; for instance we were ranked 8th in the world for the impact of our environmental research (**Times Higher Education**); 21st in the world for Earth and Marine Sciences (**QS world rankings**) and we are in the Top 3 of **Russell Group for NSS** student satisfaction for Environmental Science.

We continue to innovate in both student education and research. In the student education sphere our cutting edge developments in the Virtual Landscapes project have been recognised both within the University with a fellowship from LITE (**Leeds Institute for Teaching Excellence**) and the Times Higher Education award for **Best Digital Innovation**. This project created virtual environments in which students can learn and hone a variety of field skills.

2016 saw the launch of **CEMAC** (the Centre for Excellence in Modelling Atmosphere and Climate). In supporting this venture the School will secure and develop the high quality support that will underpin the modelling activities that support our research and teaching and facilitate achievement of our ambitions in these areas, not only in atmospheric and climate science but also more widely across the School.

Concerns about climate and environmental change remain at the fore and research related to climate change takes place across much of the School. The breadth and diversity of SEE means that we have groups researching the evidence for climate change, understanding its causes and predicting its effects, and impacts of climate change on our world, ways of mitigating them and also how climate change, its impacts and what adaptations are possible are perceived by different groups. In this way, the School is able to conduct "end-to-end" research that addresses climate change and its impacts. Of course, this climate expertise also influences our teaching, both at undergraduate level where there are numerous modules with a climate theme, and two masters programmes with the science and policy of climate change at their core.

During 2016 the School was joined by **Professor Steven Banwart** as a new Integrating Chair in Soil/Water/ Agriculture Research. He champions integrating research into **Earth's Critical Zone**, the surface layer of the planet from bedrock to atmospheric boundary layer that provides most life-sustaining resources. He is developing the Leeds Institute for Food and Environment with involvement across faculties and planning new developments at the University Farm to create a "Critical Zone Observatory" linked to other similar facilities around the globe. This new venture will also have student education at its core and offer new opportunities for student engagement across a range of courses with local field-based learning and project opportunities.

We have also continued to recruit new staff as University Academic Fellows through the Leeds University "250 Great Minds" scheme. We recruited six new Fellows, some in highly interdisciplinary areas through joint appointments with other Schools, and covering research areas as diverse as modelling of evolution and extinction, sea-level change, perceptions of climate change risks, earthquakes and active tectonics and energy decarbonisation and energy transitions. These Fellowships are key to the School's future success, not only in spearheading new research but also innovating in teaching.

This year saw the further development of our Knowledge Exchange in Teaching and Learning, which supports staff efforts at teaching enhancement, with sessions on student engagement and group work as well as the use of digital technology, such as flipped classrooms.

As we start 2017, we have just received confirmation that the University will back our plans for expansion into adjacent space in the Staff Centre Building. The building will be renamed "The Priestley Building". This redevelopment represents a £7.5m investment by the University that will give SEE the space and resource it needs to deliver on our ambitious plans for the future of both student education and research in our School. The new development will also provide a focus for the **Priestley Centre** and we look forward to engaging in the new opportunities that this will bring, particularly with the recruitment of new Priestley Chair positions in the imminent future.

The School continues to thrive and 2017 will see the refresh of SEE's strategy for future developments that will guide and underpin our ambition to deliver student education and research of the highest quality through 2017 and into the future.

CONGRATULATIONS TO OUR SEE GRADUATES FOR 2015/16

SEE Successes & Awards

Geological Society Awards 2016

At the end of February 2016 we were delighted to announce and congratulate three SEE winners of the 2016 Geological Society Awards. **Professor Liane Benning** was awarded the **Bigsby Medal**: Founded by **John Jeremiah Bigsby** (1792 -1881), this medal is awarded biennially as an acknowledgement of eminent services in any department of Geology. The recipient must have done no more than 25 years full time equivalent research, thus probably not too old for further work and not too young to have done much. **Dr Anja Schmidt** received the **William Smith Fund**: The William Smith Fund is awarded for excellence in contributions to applied and economic aspects of geoscience. Recipients must be within ten years (full time equivalent) of the award of their first degree in geoscience or a cognate subject. **The Lyell Fund** was awarded to **Dr Tracy Aze**: The Lyell Fund is awarded to contributors to the Earth Sciences on the basis of noteworthy published research.

The awards were presented by the **Geological Society President, Professor David Manning** on Wednesday 8th June 2016.

The Geological Society of London, founded in 1807, is a learned and professional body, of over 12,000 Earth scientists who investigate, interpret, discuss, inform and advise on the nature and processes of the Earth. Their practical importance to humanity, and, in the interests of the public, is to promote professional excellence. The Society offers advice to Parliament and Government at individual and corporate levels.

Liane Benning, Anja Schmidt, Tracy Aze

Ravi Toor wins Sir Peter Thompson Award

BA Environment and Business under graduate student Ravi Toor won a **Sir Peter Thompson Award** in May. The prestigious awards are organised by the University's business start-up service, **Spark**, with each winner receiving £5,000 from Sir Peter, a University alumnus and business entrepreneur. Ravi already has a thriving online business importing and selling 3D printers and related products worldwide. His venture, **Filamentive**, sources and sells his own brand of high quality, sustainably produced filament, the material used to 3D print. Ravi said: "I wanted to apply what I'd learned from my studies about sustainable, pro-environmental business practices, so we sell products designed and manufactured in Europe. We're proud of having high regulatory standards and quality controls and credible supply chains. This has given us the edge we needed in selling to businesses and direct to consumers."

Ravi continued: "I've had access to so many unbelievable opportunities at Leeds already, but the Sir Peter Thompson Award is really special. Being backed by such a distinguished businessman as Sir Peter gives me real credibility in the business world."

Ravi Toor with Sir Peter Thompson

Professor Bruce Yardley awarded 2017 Collins Medal

At the end of 2016 it was announced that **Professor Bruce Yardley** will be awarded the 2017 **Collins Medal** by the **Mineralogical Society**.

The Collins Medal is named after **Joseph Henry Collins** (1841–1916), mining engineer, mineralogist and geologist. The Medal is awarded to scientists who have made outstanding contributions to pure or applied Mineral Sciences and associated studies throughout their career.

Bruce has been a valued member of the University for over 30 years, retiring in 2015. His research interests are in fluid-rock interaction at all levels in the Earth's crust. He is currently Chief Geologist to **Radioactive Waste Management Ltd**, working to understand how buried radioactive waste will interact with rocks and identify areas with suitable geology for a radioactive waste disposal site.

Bruce has been an active and respected member of our School, being Head of School on two occasions, teaching Undergraduates, supervising Masters and PhD students and leading many field trips through the years.

SEE staff celebrated at 2016 Women of Achievement Award

Two members of the School were recognised as part of the University's 2016 **Women of Achievement**. The Women of Achievement awards recognise the significant contribution and impact that women, both staff and students, have made across the University and beyond.

The awards are part of the University's commitment to promote gender equality and support the career development of talented women in all areas of the institution.

In 2015 **Dr Anja Schmidt** won the prestigious **George Walker Award for Volcanology** from the **International Association of Volcanology and Chemistry of the Earth's Interior**. She used her expertise to advise the UK government on risks from large volcanic eruptions in Iceland. Her research was pivotal in the creation of a National Risk Register item of such eruptions.

Dr Caroline Peacock's research focuses on understanding the environmental behaviour of metals in water, soils and sediments. Her contribution to geochemistry was recognised when she was awarded the **European Association of Geochemistry Houtermans Medal**, in 2015, given to scientists for their exceptional contribution to the field of geochemistry.

The University published a special book to mark the extraordinary Women of Achievement, who represent a range of academic disciplines, ranging from corporate services, arts and humanities to medicine, mathematics, environment and engineering. A link to a pdf of the book can be found via the Women of Achievement link above.

Simon Poulton awarded a Royal Society Wolfson Research Merit Award

The School of Earth and Environment was delighted to announce that **Professor Simon Poulton** received the prestigious **Royal Society Wolfson Research Merit Award** in June.

The scheme provides universities with additional support to enable them to recruit or retain respected scientists of outstanding achievement and potential to the UK. The scheme covers all areas of the physical sciences, including engineering, but excluding clinical medicine. The scheme is jointly funded by the **Wolfson Foundation** and the **Royal Society**.

Simon's five year award was for a study of 'Nutrient controls on Earth's oxygenation history'.

Sustainability Awards

The School had another successful year at the Sustainability Awards winning six **Green Impact** awards. The School team, Green Earth, was awarded **Silver** as was the Meteorology Lab. The Cohen Lab, Instrument Workshop, Thin Sections Workshop and teaching labs all won **Gold**. **Andy Connelly** also won 'Biggest Individual Contribution' due to him achieving Gold in the first year and generally being engaged and interested in sustainability within and beyond Green Impact. **Dr Jen Dyer** received the 'Being a Positive Partner in Society' award for her work with the Creating Sustainable Futures discovery team, the Sustainability Action Group and as a community mentor and mentee! Green Impact is a nationally recognised environmental accreditation scheme that brings together our staff and students into teams to play an active role in making the workplace more sustainable. The scheme is open to teams from every corner of the University, with a specific scheme for labs.

Journal of Structural Geology – Student Author of The Year

Former PhD student, IGT **David Wallis** received the 2016 "**Student Author of the Year**" for the **Journal of Structural Geology** with his contribution: Low effective fault strength due to frictional-viscous flow in phyllonites, Karakoram Fault Zone, NW India.

The Journal of Structural Geology publishes process-oriented investigations about structural geology using appropriate combinations of field data, seismic reflection data, satellite-derived data, geometric analysis, kinematic analysis, laboratory experiments, computer visualisations and analogue or numerical modelling on all scales.

Contributions are encouraged to draw perspectives from rheology, rock mechanics, geophysics, metamorphism, sedimentology, petroleum geology, economic geology, geodynamics, planetary geology, tectonics and neotectonics to provide a more powerful understanding of deformation processes and systems.

The journal paper was co-authored with **Dr Geoffrey Lloyd**, alumni Richard Phillips and Andrew Parsons and **Dr Richard Walshaw**.

European Geosciences Union (EGU) Jean Baptiste Medal

Professor Paul Wignall was the 2017 recipient of the **European Geosciences Union Jean Baptiste Medal**.

The Jean Baptiste Lamarck Medal is established by the Division on Stratigraphy, Sedimentology and Palaeontology in recognition of the scientific achievement of **Jean Baptiste Lamarck**. It is reserved for scientists for their exceptional contributions to either Stratigraphy, Sedimentology or Palaeontology.

The EGU is Europe's premier geosciences union, dedicated to the pursuit of excellence in the Earth, planetary, and space sciences for the benefit of humanity, worldwide. It was established in September 2002 as a merger of the European Geophysical Society (EGS) and the European Union of Geosciences (EUG), and has headquarters in Munich, Germany.

It is a non-profit international union of scientists with over 12,500 members from all over the world. Membership is open to individuals who are professionally engaged in or associated with geosciences and planetary and space sciences and related studies, including students and retired seniors.

The EGU has a current portfolio of 17 diverse scientific journals, which use an innovative open access format, and organises a number of topical meetings, and education and outreach activities. Its annual General Assembly is the largest and most prominent European geosciences event, attracting over 11,000 scientists from all over the world. The meeting's sessions cover a wide range of topics, including volcanology, planetary exploration, the Earth's internal structure and atmosphere, climate, as well as energy and resources.

Times Higher Education Award and Fellowship

Congratulations to **Dr Jacqui Houghton**, **Dr Dan Morgan**, **Dr Geoff Lloyd** and **Clare Gordon** who together with colleagues from the Leeds College of Art won the Outstanding Digital Innovation award at the Times Higher Education Awards for the Virtual Worlds Project.

The University covered this exciting news on the **For Staff Website**. You can read about all the Times Higher Education award winners **here**.

The group were also awarded a Leeds Institute for Teaching Excellence, Excellence and Innovation Joint Fellowship. This secondment to LITE starts in September 2017 and runs for a year.

Below: **Dr Jacqui Houghton** with Leeds College of Art's **Annabeth Robinson** accepting the award from host Richard E Grant.

SEE in the Media 2016

The devastating UK floods are set to become the new normal

A number of SEE staff were interviewed in the first months of 2016 in the wake of the devastating floods that occurred at the end of 2015. **Professor Piers Forster** was quoted in The Independent, Edinburgh Paper Evening News, The Telegraph, The Sun, Yorkshire Post and Mail Online.

Dr Andrew Ross talked to the BBC Weather Show and **Dr Jim McQuaid** talked to Sky News, BBC Look North, Radio Aire and Radio Leeds. **Dr Paola Sakai** was also interviewed about the economic effects of the floods by BBC Radio Leeds, Yorkshire Post, Halifax Courier, Hebden Bridge Times and Todmorden News.

The weather phenomena began in earnest with Desmond, a fierce Atlantic storm that dropped 13.44 inches of rain at **Honister Pass in Cumbria** between the 4th and 5th December 2015, a new national record for rainfall accumulation in a 24 hour period. Storms Eva and Frank then followed Desmond with further heavy rain falling on already saturated land.

The flooding caused a bridge over the River Wharfe to collapse in Tadcaster

The widespread flooding directly affected thousands of homes and businesses, and many thousands more suffered lengthy power cuts due to flooded electricity substations.

This exert is from The Independent. The full article can be found **here**.

What does Brexit mean for science?

There was a reaction of shock and great concern from many of Britain's scientists after the UK's unexpected decision to leave the EU at the end of June. A number of SEE staff were interviewed following the vote. An article in The Mirror featured a quote from postgraduate student **Thomas Whale** who said: "I'm about to start a job funded by the **European Research Council** (ERC) and I'm very worried about what's going to happen to that funding."

Early career scientist **Dr Cat Scott**, was also quoted as saying: "Brexit genuinely limits the future funding opportunities that will be available for us". She also questioned whether the UK's environmental record will suffer: "I am concerned that without EU legislation the UK government's record on protecting the environment and improving air quality will get even worse."

Professor Andy Shepherd was quoted in a similar article in EuroNews. He highlighted one of the strongest messages from many science commentators, that working together gets the best results: “The union of European states has been a powerful force for good and for progress and many of the achievements it has made possible could not have been accomplished by nations alone. For the UK to maintain its leadership in climate science we must continue to work closely with our partners in Europe.”

The full EuroNews article can be found **here**.

Dr Ryan Neely contributed to a discussion about a ‘Brexit brain drain’ sparked by fears over funding and immigration status for researchers on The Sunday Politics programme and **Professor Andy Gouldson** talked about the potential implications of Brexit on climate change research at the University on the BBC Weather Show.

The Secret of Sustainable Success

All over the globe companies are striving to be more sustainable and eco-conscious and it’s not just about hitting corporate social responsibility (CSR) targets. The changes made range from operational tweaks to cultural and behavioural revolutions and their potential impact is enormous, proving that a sustainable approach can be both better for the soul and the balance sheet.

One celebrated example of a huge multinational company successfully altering its culture is **Unilever**, with its **Sustainable Living Plan** launched in 2010, with the aim of doubling revenues while halving its environmental footprint.

That's a huge target for a company that owns more than 400 brands and at the end of July 2016 announced a half year turnover of £22bn.

Five years in, Unilever is already on track to meet the vast majority of its aims, which include helping more than a billion people take action to improve their health and wellbeing by 2020 and halving the environmental impact of its products by 2030.

"Unilever is an inspiring example, but perhaps too large for those smaller businesses who view sustainability as a daunting task," suggests **Dr Pablo Munoz**, a lecturer in Business and Sustainable Change at the **SRI** at Leeds University. "However, there are plenty of smaller examples of businesses putting efficiency at the heart of their strategy."

"In a recent research project we observed the different sustainability strategies used by companies entering conscious consumer markets, and there were some incredible examples," he says. "A more robust sustainability approach, developed through eco-efficient practices, such as environmental management, can significantly decrease operational costs," he says.

It's all positive stuff, he says. "As I see it, if companies don't show a commitment to sustainability they are simply out of the game."

Universities whose work has driven environmental awareness

The top ten universities across the world whose work produced the environmental science research with the greatest impact was reported in **THE** in November. The **University of Leeds** was ranked number eight.

The most highly cited papers from the ten institutions in the period 2011 to 2015 were dominated by research into climate change and the global ecosystem.

They included research from the **University of Copenhagen** in 2011 that warned that we are entering the **Anthropocene age**; in this era, mankind is having as big an impact on the planet as geophysical processes and risks "driving the Earth System onto a trajectory toward more hostile states from which we cannot easily return".

Several of the most cited articles have authors from two or more of the institutions, underlining the collaborative nature of environmental research: a 2013 analysis of the effect of soot, or "black carbon", on the climate had authors from both the University of Leeds and **Princeton University**, as well as nearly 30 other scholars.

A 2014 paper estimated that the world has been destroying trillions of dollars of "ecosystem services" a year through environmental destruction, and featured authors from both the **Australian National University** and **Wageningen University & Research in the Netherlands**.

The data came from **Elsevier's Scopus research database**, and ranked the institutions by their field-weighted citation impact, which accounts for different citation levels across subjects.

Ancient rocks reveal how Earth recovered from mass extinction

Life on Earth took millions of years to recover from the greatest mass extinction of all time. Findings from a new study have helped scientists better understand how environmental change can have disastrous consequences for life on Earth. The Permian-Triassic Boundary extinction wiped out 90 per cent of marine life and two thirds of animals living on land. During the recovery period, Earth's oceans became starved of oxygen - a condition known as anoxia.

Previous research suggested delayed recovery was linked to the presence of anoxic waters that also contained high levels sulphides.

However, researchers say anoxic conditions at the time were more complex and that this sulphide-rich state was not present throughout all the world's oceans. The study also shows how oxygen levels varied at different depths in the ocean.

Professor Simon Poulton, of the University of Leeds, said, "The neat point about this study is that it shows just how critical an absence of oxygen, rather than the presence of toxic sulphide, was to the survival of animal life. We found that marine organisms were able to rapidly recolonise areas where oxygen became available."

The full article which featured in Phys.org can be read **here**.

SEE Funding Successes and Partnerships

Governance of Low-carbon Innovation in Domestic Energy Retrofits

Dr Alice Owen of the SRI, along with the **Environmental Change Institute at Oxford**, was awarded £360,000 for a two year project on "Governance of Low-carbon Innovation in Domestic Energy Retrofits" (**GLIDER**). The grant was awarded under the **UK Energy Research Centre**'s "Incumbents in the energy system" call and includes recruiting a post doc at Leeds.

The project investigates the institutional context and patterns of decision making among construction firms in the market for Repair, Maintenance and Improvement (RMI) of homes. These firms, along with their supply chains and training bodies, are uniquely placed to reach and influence retrofit projects at scale. Energy consumption is not only a function of building physics and technology adoption, but also of user behaviour and patterns of occupancy. These are traditionally viewed as separate issues, but firms providing renovation services can influence both in that they physically alter buildings and deal with people.

GLIDER will evaluate the different ways in which the impact of RMI activity can be modelled and map the ways in which RMI performance is influenced, in order to identify policies and interventions which could transform the sector and its value chain, particularly through training.

ParaCon programme of work jointly funded between NERC and the Met Office

A team led by **Professor Doug Parker**, **Professor Alan Blyth**, **Dr Andrew Ross** and **Dr Steven Boeing** won a **NERC** grant worth £500,000 to study the fluid dynamics of the genesis of thunderstorms in the atmosphere. The project forms part of the **ParaCon** programme. At Leeds, the project will fund a Postdoctoral Research Award (PDRA) and a large team of investigators, from SEE and Maths, to develop simplified sets of equations describing the genesis of deep convective clouds.

Weather and climate models are critical to society's ability to reduce the impacts of hazardous weather and inform decisions regarding mitigation of and adaptation to climate change.

The representation of convection remains the key error in these models, limiting our confidence in predictions and thus their value for decision making on timescales from days to decades.

ParaCon, or Parametrisation of Convection, is a five year programme of work jointly funded between NERC and the **Met Office** with the aim of significantly improving the representation of convection across model scales from 1 to 100km.

ParaCon was initiated as part of a Joint Strategic Response between NERC and the Met Office and started in May 2016. It involves researchers from the **Universities of Cambridge**, **Exeter**, Leeds, and **Reading**.

NERC Research Programme Grant "The Changing Arctic Ocean"

ESSI member and Associate Professor in Biogeochemistry at SEE, **Dr Christian März**, became the Principal Investigator on a large grant funded in the NERC Research Programme, "The Changing Arctic Ocean" (**ChAOS**). The £2.1 million project, with £500,000 going to Leeds over four years, is a collaboration of geochemists, biologists and modellers at eight UK research institutes.

As one of four consortium projects to study the effects of climate change and retreating sea ice on Arctic Ocean biology and biogeochemistry, ChAOS will focus on the seafloor environment. The Leeds group will apply cutting edge techniques to study organic carbon burial facilitated by metal oxides as well as nutrient recycling from Arctic Ocean sediments on natural samples and controlled laboratory experiments.

The project commences early in 2017 and will include several expeditions to the Arctic Ocean on board the ice strengthened **RRS James Clark Ross** (**picture right**). RRS James Clark Ross (JCR), launched by The Queen and operated by the **British Antarctic Survey**, is primarily a marine research vessel for biological, oceanographic and geophysical cruises. It is equipped with a suite of laboratories and winch

systems that allow scientific equipment to be deployed astern or amidships.

The ship has an extremely low noise signature, allowing the deployment of sensitive acoustic equipment.
The vessel can steam at a steady two knots through level sea ice one metre thick.

ESRC DTC PHD Funding Successes FOR SRI

At the start of the year **Dr Susie Sallu** and **Dr Monica di Gregorio** received funding for a project entitled, 'Delivering Integrated Climate Change Adaptation and Resilience Programmes: Evaluating adaptive capacity and human well-being outcomes of a complex multi-objective climate-development programme'. It aimed to investigate interactions between multiple interventions of the Integrated Adaptation and Resilience programme in Tanzania, and how these affect local adaptive capacity and well being.

Dr Sallu also secured funding with **Dr George Holmes** for a project on innovative approaches to understanding new forms of conservation, in partnership with three international conservation non-governmental organisations (NGOs); **African Wildlife Foundation**, **World Land Trust** and **Micaia**.

Dr Stephen Whitfield, **Dr Anne Tallontire**, **Dr Martin Dallimer** and **Dr Claire Quinn** secured funding for a project on systems analysis of agricultural change in East Africa, adopting a variety of disciplinary perspectives, in partnership with the Climate Change, Agriculture and Food Security Group of the **CGIAR**.

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Royal Society Research Grant Award

At the start of 2016 **Dr Anja Schmidt** and **Dr Evgenia Ilyinskaya** were awarded a **Royal Society Research Grant**, "Measuring volcanic pollution using smartphones: proof-of-concept and citizen science", taking place at **Kilauea volcano** on Hawaii.

Kilauea volcano sits on the south east flank of the massive **Mauna Loa shield volcano** and is the youngest volcano (on land) of the Hawaiian hot spot. Not only is it the most active volcano of Hawaii but it's also the world's most active volcano. It has been in near constant activity since there has been an oral or written history. It has attracted visitors from all over the


Lava lake inside Kilauea volcano's West Gap crater

NERC New Science Board members appointed

In October **NERC** appointed three new members, including **Professor Andrew Shepherd** to its **Science Board** to replace those who had completed their term.

The Science Board is NERC Council's main source of advice on scientific matters. It is responsible, among other things, for developing NERC's integrated science strategy and for advising on the balance of the science portfolio and advising on the strategic priority of funding new programmes and initiatives.

The other new appointments who will be joining Professor Shepherd, starting from January 2017, are:

Professor Tamsin Mather of the **Department of Earth Sciences, Oxford University** and **Professor David Thomas** of the **School of Ocean Sciences, Bangor University**.

NERC Follow on Fund Success

Dr Douglas Paton, with **Dr Graham Ferrier** (**University of Hull**), were awarded a £12,000 **NERC** Follow-on-Fund award for their Quantitative 3D remote digital compositional and structural characterisation of outcrops project. This award builds on the research they undertook using their NERC Pathfinder award in 2015. Pathfinder awards complement Follow-on awards.

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.

Follow-on awards of up to £250k fund development projects where the objective is to realise the commercial potential of NERC-funded research via a combination of complementary technical and commercial engagement work programmes.

The fund is open to researchers with current or past NERC funding. Successful applications to the Follow-on Fund are invariably built upon an understanding of the likely market potential for the technology around which the project is based.

Geoscience BC Fund Award

Alkalic porphyry Cu-Au deposits are an important economic resource in British Columbia (BC), but exploration for new deposits is hampered by lack of outcrop in glaciated terranes. Certain minerals are specific to porphyry systems and their presence in surficial sediments may be used to infer the presence of concealed mineralisation. We are world leaders in the use of detrital gold as an 'indicator mineral' in this context.

In BC there are several 'styles' of gold mineralisation, of which alkalic porphyries are one, often in close geographical proximity, and consequently the ability to recognise gold particles derived from the exploration target would be highly desirable. Natural gold contains other metals in the alloy and at Leeds we have developed expertise in linking the chemistry and mineralogy of gold to source style. We have established compositional templates based on analyses gained using the electron microprobe but several elements of interest are present only at levels below detection limit.

The use of laser ablation inductively coupled plasma mass spectrometry to analyse gold permits quantitative characterisation of trace element signatures. **Dr Rob Chapman** and **Dr David Banks** received £21,500 from '**Geoscience BC**' to establish whether characterisation of trace elements in gold could underpin a new exploration methodology. We have developed a new analytical methodology which has shown that gold formed in alkalic porphyry environments exhibits a unique Cu-Hg-Pd signature. This work will inform the exploration community and permit fundamental studies into mechanisms of formation of economically important mineralisation.

Outreach & Engagement Activity

Weather and Water

Weather and Water is a carousel-style on campus activity aimed at communicating complex atmospheric physics/chemistry concepts to students in an accessible way. Coordinated to coincide with **World Meteorological Day**, the Weather and Water event has now completed its second year with the **Leeds Festival of Science**. Put together by post graduate student **Hannah Mantle** and **Dr Jim McQuaid**, Weather and Water utilises the breadth of expertise within SEE to communicate the importance of water in day-to-day weather and longer-term climate systems.

The session runs for two hours with up to 40 students participating. Split into equal sized groups, each group rotates around a series of demonstrations – all with practical elements.

Demonstrations include 'Super Cooled Water', provided by **Professor Ben Murray**'s cloud physics group, demonstrating that water can still be liquid at below 0 degrees. 'Cloud in a Bottle' uses a regular bicycle foot pump and an old bottle to demonstrate the processes that create clouds in the environment. After a 'pop!', students can see their own 'cloud' and learn about how changes in pressure and temperature cause water vapour to condense into particles in the air, forming visible clouds.

Above: Jane-Marie demonstrating the Ocean Acidification Experiment to students and teachers

The ocean acidification experiment, developed by **Jane-Marie Stocks**, asks students to blow into a straw connected to water containing a pH indicator. With each breath the colour slides down the scale and the students can see the impact that human activity has on the acidity of our oceans. With staff members and post graduate research students conducting each demonstration, experts in the field teach visiting students and questions can be readily answered.

Weather and Water has reached over 150 KS3 and KS4 students from a range of schools across the region. Feedback has been consistently positive and we have received ideas on how to improve in the future. Ideally, Weather and Water will become a standalone set of experiments that can be adapted for any event.

Post graduate student Sophie Randall demonstrating climate change concepts to students

Weather and Water has now developed into standalone outreach experiments that any member of the Earth and Environment department can demonstrate. With our own reusable equipment and instruction sheets for all experiments, **STEM** outreach participation in the department is strongly encouraged. The event has achieved its original aim of promoting STEM by incorporating everyday household items into demonstrations. With the further development of these demonstrations into standalone experiments usable by anyone, Weather and Water will hopefully continue to inspire well into the future.

Pint of Science

The annual **Pint of Science** festival aims to deliver interesting and relevant talks on the latest science research in an accessible format to the public – and it all takes place in the pub! The first Pint of Science festival took place in 2013 and was the brainchild of two researchers from **Imperial College London** - **Dr Michael Motski** and **Dr Praveen Paul**. Since then it has grown into an international festival that has to date put more than 2,000 scientists and their work in front of the public. In 2016 the founders expected that more than 15,000 people in the UK alone would head to their local pub to hear researchers speak about their projects and fascinations.

The 2016 festival was the first time that Leeds has played host to talks as part of the event, which provides a platform to allow the audience to discuss research with the people who carry it out. PhD students **Ruth Amey**, **Oliver Halliday** and **Mike O'Sullivan** were part of the team who hosted researchers from across SEE. The challenge for the scientists was to keep their crowd entertained whilst ensuring they were communicating their research in a way that informed their audience at the same time, this is no mean feat.

A huge variety of subjects was presented to packed pubs around the city. Speakers included **Dr Jim McQuaid**, **Dr Ryan Neely**, **Dr Cathryn Birch**, **Dr Marco Bagnardi**, **Dr Jon Mound**, **Dr Laura Gregory** and **Dr Amanda Maycock**, who covered topics from earthquakes to extreme flood events to the day that almost all of the Greenland ice sheet melted! Research was described from across the globe from the streets of Hebden Bridge to Hawaii.

Pint of Science will return to Leeds (and across the UK) in May 2017.

SEE hosts another two successful Environmental Studies Academies in 2016

The **Environmental Studies Academy** is a fantastic outreach opportunity for sixth forms to learn about the natural environmental and access scientific sessions relating to their AS/A2 Curriculum.

The first event was held in January. Students had the opportunity to learn hands on in our laboratories and experience fieldwork and lecture style talks in two areas of environmental science.

At the first session students investigated attributes of soils including; colour, pH, texture, soil moisture and organic matter with **Dr Phil Murphy**.

All students and teachers had the opportunity to experience lectures given by environmental scientists in SEE such as **Professor Simon Bottrell**, **Dr Stephen Arnold**, and **Dr Wolfgang Buermann**. They talked about the science they are exploring and what it is like to be an environmental scientist, highlighting course opportunities within SEE.

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 previous months. The day focused on key areas of the Environmental Studies A2 Level curriculum although students came from diverse backgrounds, including geography and biology.

The second of the events took place in July. Students collected their own soil

samples at Ringshaw Beck with **Dr Steven Dobbie**, **Dr Colin Pitts**, **Victoria Betts** and **Cara Healy**. Students then investigated the live soil samples by analysing invertebrates with SEE demonstrators in the Level 7 Teaching Laboratories.

SEE UG Student Ambassadors **Beth Watson**, **Angus Wilson** and **Vivek Kotak** were on hand to assist and make the students feel welcome while talking about their own experience of the Environmental Science programme at Leeds.

We received lots of positive feedback from schools and teachers who attended the academies and some said they would consider Leeds as their choice of study.

There will be future ES Academy dates held in January and July 2017. Further details on the ES Academy can be found **here**.

Contacts: Cara Healy (ES Academy Manager)/Dr Steven Dobbie (Deputy Head of School/Founder of ES Academy).

Innovating & Researching in Student Education

In 2016 Student Education for the school was successful in winning prizes across the board. Firstly, some of our students won university prizes for their achievements. **Ray Whitaker** (BSc Sustainability and Environmental Management) won for the most outstanding student to come through the Access to Leeds scheme, whilst **Tomas Liska** (BSc Meteorology and Climate Science) won for the most outstanding student in the Adult Learner category.

University Partnership Awards

At the university partnership awards, **Dr Lucie Middlemiss** was one of four staff across the university who were shortlisted for the best personal tutor award.

One of the nominating students described her as "the best supervisor I could have ever asked for". We were also represented at the Sustainability Awards with **Dr Jen Dyer** winning the Positive Partner in Society Award for both developing a new Discovery module which involves students working closely with a third sector host organisation to scope, prepare for, deliver and evaluate a practical project; and for her role as the **Sustainability Action Group** facilitator.

At a national level, our highly regarded Virtual Landscapes geological mapping project won the Times Higher Education award for Best Digital Innovation. The project team of Dan Morgan, Jacqui Houghton, Clare Gordon and Geoff Lloyd, with Annabeth Robinson from **Leeds College of Art**, were presented with the shiny trophy by Richard E Grant at a posh dinner in London. This project started as a small innovation to provide a virtual reality geological mapping experience, and has been a great success, and the team are now looking to apply the pedagogy and technology to new areas. The project allows students to move their way through a virtual landscape, gathering geological data, and using this to build geological maps. It allows students to reinforce their field mapping skills to make the real field experiences more effective.

Teaching Star Awards

This year's school teaching star awards were awarded to:

Most interesting lecturer – Monica di Gregorio

The nominating students noted that, "Her lectures are well structured and engaging to follow. A feature that makes them most interesting is that she makes a decent amount of time at the end of every lecture to ask us specific questions about what we as the students think about the topics she presented. She's comfortable with the silence that first ensues, and patient enough to wait for responses from us. And then the way she receives and questions the responses gets us to question our stances on the issues, which is a pretty cool process."

Most useful feedback – Dan Morgan

According to his students, "Throughout the module he would upload small debrief "sub-lectures" to explain trickier content in a more concise and clear fashion compared to the rather quick paced lectures. This was especially useful for revision for the summer exams when concepts didn't quite link together from lectures alone. He was also very patient and helpful during the field trip, never hesitating to help with queries in the field and gave a solid half hour of detailed discussion and explanations per group of three one evening, helping to compile all data and observations in the field fit the bigger picture, greatly aiding our final poster assignment and understanding of the area. "

Most inspiring – Stephen Whitfield

Students say about Stephen that, "He is always enthusiastic about the subject and makes the topic relevant to things that are happening now. The way he incorporates many different ways of learning also ensures there's something that everybody can feel comfortable getting involved in and keeps the course interesting, making you want to join in with his enthusiasm."

Best personal tutor – Anja Schmidt

According to her tutees, "Throughout my three year undergraduate degree, she has provided me with continuous support and encouragement, which has pushed me to produce the best results I can. I have always felt that I can seek advice from her, which she is consistently willing to give. She has made my time at Leeds even more enjoyable than it has already been and I hope I make her proud when I receive my final results!"

Teaching enhancement

The School recently appointed Dr Jen Dyer to the role of Teaching Enhancement Scheme Coordinator. This role builds on Jen's own innovation in teaching, as well as her research into student engagement. Through this role, Jen has established the Knowledge Exchange in Teaching Learning (KETL) initiative to foster community and spread innovation and good practice in teaching and learning in the school. In addition, she is working closely with the Student Experience Team to further develop a sense of community among students as well as to improve learning and the student experience through the creation of activities such as a Research Showcase in induction week and first year field trips.

New programme

2016 saw the launch of a refreshed and revitalised MSc in Ecological Economics. This is an area in which the school has world-leading expertise, where the school is very well placed to create a fantastic postgraduate programme, particularly given recent controversies in economics teaching and well-known figures in the area calling for a larger focus on heterodox economics education. The programme draws on the expertise of key School staff (Dan O'Neill, Julia Steinberger, Julia Martin-Ortega, Jouni Paavola, John Barratt, Martin Dallimer) as well as staff in Leeds University Business School.

EMPLOYABILITY UPDATE

There was a significant rise in graduate vacancies during 2016 with the country's top employers planning to expand their graduate recruitment by 7.5 per cent next year. The University of Leeds continues its position in the top ten of Britain's top graduate employers according to the latest **High Fliers Research**. Students from the Faculty of Environment are ranked fourth out of 23 **Russell Group** institutions in the recent DLHE (Destination of Leavers from Higher Education) survey, with 85 per cent of students securing graduate level positions.

Within the School, employability is an integral part of the student education strategy. Dedicated Professional Careers Modules are delivered to most second year students and in addition to this there are a range of employer presentations and events delivered. The annual Faculty of Environment Careers Fair in October was a huge success. The fair attracted 300 students with 25 exhibitors represented on the day. Oganisations that took part included **Aecom**, **Arcadis**, **BP**, **Hilton Worldwide**, **Leap Environmental**, **Schlumberger**, **WSP** and many, many others.

Paul Wrigley from Arcadis commented, "We found the event well organised with helpful, friendly support staff. Students appeared to be well prepared and clear on what information they wanted."

The Year in Industry continues to thrive, with a record 38 students opting for a placement in 2016/17.

Students have secured placements in various organisations ranging from environmental consultancies such as Atkins to global brands such as Pepsi-Co, Hilton Worldwide and Jaguar Land Rover. There are also a significant number of students undertaking placements abroad in countries such as Australia, India and Ireland.

Supporting Employability this year, our two new student ambassadors, **Anne Harding** and **Margarita Shivarova** are involved with several projects such as bi-weekly Career Drop-in Sessions, assisting with the promotion of job vacancies as well as helping to run the annual Careers Fair.

They are currently working on new initiatives such as running a LinkedIn Workshop and CV writing sessions for SEE students.

STUDENT EXPERIENCE

The work of the student experience team in SEE is about helping students make the most of their time at university. This is achieved through delivering events and activities that help to build a sense of belonging to the vibrant academic community of the school and providing opportunities for personal development. This year's student experience ambassadors are:

George Middlemiss, Year 2 Environment and Business;

Alex Saunders, Year 4 Geophysics;

Hannah Elms, Year 4 Geological Sciences.

George has been working hard on developing a mentoring and wellbeing scheme to support first year students, Hannah has focused on building awareness of research opportunities for undergraduate students and Alex will be delivering the 'February Focus', an online version of the annual **LEEP** newsletter communicated through a series of emails.

Attendance at conferences is increasingly being seen as a valuable opportunity for skills development as well as to provide an environment for networking and the school works hard to encourage students to get involved. SEE provides conference bursaries to undergraduate and masters students. Here is a small selection of how SEE students have bee n getting involved with conferences:

BCUR: SEE was represented by eight students at the British Conference of Undergraduate Research (BCUR) held in Manchester in March 2016.

Conference Bursaries: **Anne Harding**, a final year Geophysics student received a bursary to help attend a meeting of the **Near-Surface Geophysics Group** at the **Geological Society of London** in December. She presented her final year project and was the only undergraduate student to present to an audience of 120 industry professionals. She now talks enthusiastically about this very positive experience to prospective students at open day talks and is a great ambassador for the school.

GfGD: 25 students from across all programmes and levels attended the Geology for Global Development (GfGD) annual student conference in October.

SEG: Members of the **Society of Economic Geologists** student chapter in SEE will be visiting Vancouver in January 2017 to attend the annual industry conference.

MRes: The entire MRes cohort attended the Student and Early Careers Conference of the **Royal Meteorological Society** in May 2016.

For more information about conference bursaries and personal development opportunities please contact **K.livesey@leeds.ac.uk**.

RESEARCH INSTITUTE ACTIVITY

SRI - Sustainability Research Institute

Julia Steinberger awarded Leverhulme Research Leadership Award

At the end of 2016 **Associate Professor Julia Steinberger** was awarded a £1m **Leverhulme Research Leadership Award**. Julia's project "**Living Well within Limits**" (or "LiLi") was selected as Leeds' submission for this scheme and the project will begin early in 2017.

The project will explore the influence of social and technical provisioning systems on mediating the relationship between resource use and human well-being. The project will run for five years. It will employ four postdocs and three PhD students.

The aim is to support talented scholars who have successfully launched a university career but who need to build a research team of sufficient scale to tackle a distinctive research problem. This creates an opportunity for the development and demonstration of research leadership; that is, for the direction of a modest team or group, whose research may significantly change the established landscape in a particular field of enquiry. Each institution is limited to one bid only.

The Leverhulme Trust was established by the Will of **William Hesketh Lever**, the founder of **Lever Brothers**. Since 1925 they have provided grants and scholarships for research and education; today, they are one of the largest all-subject providers of research funding in the UK, distributing approximately £80m each year.

They award funding across academic disciplines, supporting talented individuals in the arts, humanities, sciences and social sciences to realise their personal vision in research and professional training. As well as substantial grants for research, they offer fellowships for researchers at every stage of their career, grants for international collaboration and travel and support for the fine and performing arts.

A distinctive feature of their approach is that the great majority of the awards they make are in the responsive mode – with the choice of topic and the design of the research left with applicants. Their primary aim is to fund original research that advances knowledge of our world and ourselves. They do not set strategic priorities for grant-making; in making funding decisions their sole concern is with the quality, significance, and originality of the proposed research. As far as possible, they take a non-utilitarian and academy-focused approach to funding.

Professor Lindsay Stringer set sail to the Antarctic

Professor Lindsay Stringer set sail to the Antarctic as part of the project '**Homeward Bound**', which aimed to highlight the lack of female leadership in science.

The largest ever all-female expedition to the Antarctic departed on 2nd December 2016, with 76 women with backgrounds in science preparing to spend 20 days at sea. They were given a chance to observe the effect climate change is having on Antarctica first-hand, and there was also a series of lectures, leadership workshops and networking opportunities.

Homeward Bound emerged from the recognition of the extraordinary paucity of women in leadership positions in STEM, and the subsequent cost to our planet.

The initiative looks to heighten the influence and impact of women with a science background in order to influence policy and decision making that shapes our planet.

Lindsay Stringer was selected from a pool of more than 1000 applicants. Her own research aims to advance the understanding of human-environment relationships. She focuses especially on the links between livelihoods and environment; science, policy and environmental governance and the practical and policy mechanisms that can advance sustainable development.

In 2013, Lindsay was awarded a **Philip Leverhulme Prize** for her work on environmental change and sustainable development in drylands. In 2015 she was presented with a Women of Achievement Award. Lindsay was Director and then co-Director of the Sustainability Research Institute from 2011 to 2014.

More information about the expedition can be found on the Homeward Bound website.

Follow Lindsay's Progress on her blog: **https://t.co/ANMXBEmaiy**.

Young researchers represent Leeds at UN climate conference

Two young researchers from SRI presented alongside leading international and development experts for a world leading university network at the **UNFCCC** conference in Morocco in November.

Postgraduate and Sustainability Research Institute member **Harriet Thew** and Masters graduate **Phellecitus Montana** presented the work at an official side event at **COP22** in Marrakech for the **Worldwide Universities Network** (WUN), a global academic network driving international research collaboration.

The event, **Loss and Damage due to Climate Change**: Understanding Values, Vulnerability and Livelihood Security, featured research conducted by Ms Montana for her Masters project on non-economic loss and damage among youth in informal settlements in Cape Town, South Africa. The research, which was part of a WUN project led by the **University of Western Australia**, was supervised by Harriet Thew and **Dr Susannah Sallu**, Associate Professor of Environment and Development at SRI.

It is unusual for a Masters student's research to have such high profile exposure, and Ms Montana's research is unique in being the only study of loss and damage from a youth perspective. She interviewed young people living on the outskirts of Cape Town to see how their lives were being impacted by climate change in terms of a range of values including health, access to education and mobility discovering, among others, that flooding was so commonplace that it was seen as the norm.

"Attending COP22 is a dream come true," said Ms Montana, who graduated with an MSc in Environment and Development for the University of Leeds in December. "I am thrilled to be a participant within the many critical discussions on climate change action as a youth delegate and to be presenting my research. I look forward to learning, connecting and sharing my experience."

A policy brief for the study can be found here: **cop22-loss-damage-policy-brief**.

Harriet Thew (right) and Phellecitus Montana in Marrakech

RESEARCH INSTITUTE ACTIVITY

ESSI - Earth System Science Institute

Dr Caroline Peacock receives ERC grant

Dr Caroline Peacock was awarded an **ERC Consolidator Grant** in order to study "The Role of Minerals in the Oceanic Carbon Cycle".

The grant, which is worth approximately €2 million, will start later in 2017 and run for five years. It will employ two PDRA's and three PhD students in SEE, who will be part of the Cohen Group. The research team also includes **Dr Clare Woulds** from the **School of Geography**, University of Leeds, and **Dr Andrew Dale at GEOMAR** in Kiel, Germany.

The overall aim of this work is to study the role of reactive marine minerals in the oceanic carbon cycle, specifically their role in the preservation of organic carbon in marine sediments and seawater.

The oceanic carbon cycle is important for regulating the Earth system because, in sediments and seawater, the balance between the degradation and preservation of organic carbon exerts a first order control on atmospheric carbon dioxide and oxygen. These gases have mediated global climate, planetary oxygenation and Earth's habitability through geologic time, while increasing carbon dioxide levels now present a major climate threat. In sediments, organic carbon can be preserved over millions of years, while in seawater, a dissolved form of recalcitrant organic carbon has been recently recognised as critical to carbon storage over anthropogenic timescales. However, both sedimentary and seawater organic carbon are derived from living organisms, and should therefore be easily degraded. Their persistence in the oceans is therefore one of the most enduring paradoxes in marine biogeochemistry.

This work will explore the extent to which reactive fine-grained minerals, including clays and iron (hydr)oxides, are able to protect organic carbon from microbial degradation, and thus promote carbon preservation in marine sediments, and also whether these minerals can transform otherwise labile organic molecules into microbially resistant forms, thus generating recalcitrant organic carbon in seawater. During the grant Dr Peacock will quantify the role of minerals in the preservation of organic carbon by combining cutting-edge molecular-level techniques with the first comprehensive, fully integrated experimental and modelling campaign, to determine in detail the exact mechanisms responsible for the interaction of organic carbon with minerals, and its subsequent degradation and preservation behaviour.

Dr Peacock commented 'Overall, I hope that with my newly assembled research team we can make a major contribution to understanding and predicting organic carbon preservation, and thus the Earth's carbon cycle in modern and ancient environments.'

As a recipient of the **European Association of Geochemistry**'s **2015 Houtermans award**, Dr Peacock is already well recognised for her work on the reactivity and cycling of metals and nutrients in marine and terrestrial environments. The School of Earth and Environment is very pleased to be able to congratulate Caroline in receiving this prestigious grant and wish her and her team the best of luck with their work.

The Climate-changing Desert Dust Fertilising Our Oceans

The way in which man-made acids in the atmosphere interact with the dust that nourishes our oceans has been quantified by scientists for the first time. In the international study led by two of the School's Institutes - the Earth Surface Science Institute (**ESSI**) with the Institute for Climate & Atmospheric Science (**ICAS**) - researchers pinpointed how much phosphate "fertiliser" is released from dust depending on atmospheric acid levels.

Lead author **Dr Anthony Stockdale**, from ESSI said: "The ability to quantify these processes will now allow models to predict how pollution on a global scale modulates the amount of fertiliser released in airborne dust before it falls into the oceans.

"Many regions of the globe are limited by the amount of phosphorous available, so pollution can have a very important impact on marine ecosystems."

Fellow author **Michael Krom**, an Emeritus Professor also from ESSI who is now at the **University of Haifa**, added: "If more carbon dioxide is taken up by marine plants due to fertilisation from acidified dust, it is possible that air pollution may have been inadvertently reducing the amount of greenhouse gases, while at the same time increasing the amount of plants and even fish in areas such as the Mediterranean Sea."

Co-author **Professor Athanasios Nenes**, of **Georgia Institute of Technology**, said the implications went beyond the carbon cycle and climate.

"The Mediterranean is one of many locations of the globe where pollution and dust mix frequently," he said. "This study points to one more way this interaction can affect marine life and the 135 million inhabitants of its coastline."

Professor Krom added: "The next step is to develop models which include this new pathway for increased plant growth in the ocean, in order to fully determine the effect on marine ecosystems and Earth's climate, considering a full suite of chemical, physical and biochemical processes."

Professor Ken Carslaw, who has worked on the long running project, said "These exciting results are the result of years of fruitful collaboration between Earth scientists and atmospheric scientists and promise to result in more ground-breaking science."

As well as researchers from Leeds, Georgia and Haifa, experts from three institutions in Greece, one in Israel, one in Germany and two others in the UK worked on the findings, published in **Proceedings** of the **National Academy of Sciences of the USA**.

Goldschmidt 2016

The Earth Surface Science Institute were well represented at the annual **Goldschmidt Conference** which was held in Yokohama, Japan from 26th June to 1st July.

Dr Caroline Peacock gave an invited talk and **Professor Liane Benning** was a keynote speaker, giving a presentation on 'Imaging and Chemical Speciation in Geochemistry Using Advanced Probes (X-Rays, Neutrons, Muons, Electrons and Lasers)'. **Ben Mills** and **Dr Andy Bray** also presented.

We were very pleased that many of our PhD students were accepted to give presentations, with 10 speaking about their ongoing work during the conference. PhD student Aislinn Boylan gave an invited presentation on Understanding the Behaviour of Organic Carbon—14 Compounds in Contaminated Groundwater.

Staff and Visitor Highlights

ESSI congratulated two tenure-track research fellows on their successful transfer to permanent lectureships – **Dr Fiona Gill** (Lecturer in Palaeontology and Geochemistry) and **Dr Dan Hill** (Lecturer in Global Change Modelling). We also look forward to welcoming **Professor Miguel Huerta-Diaz** (Autonomous University of Baja California) as a UK-Mexico Visiting Chair. Our research agenda has also benefited from many recent extended international visits, including **Huihui Du** (PhD student, Huazhong Agricultural University, Wuhan), **Mariel Ferrari** (Academic Researcher, Instituto Patagónico de Geologia y Paleontologia, Argentina), **Shimei Pan** (Masters student, China University of Geoscience, Wuhan), **Sebastiaan van de Velde** (PhD student, Vrije University, Brussels) and **Kan Zhang** (PhD student, China University of Geoscience, Beijing). Welcome and congratulations to all!

RESEARCH INSTITUTE ACTIVITY

ICAS - Institute for Climate and Atmospheric Science

Research in Top 100 Articles of 2016

A study co-authored by researchers from the School of Earth and Environment and the **National Centre for Atmospheric Science** (NCAS) was named amongst the top 100 publications of 2016. The original article published in **Science** on the **Emergence of healing in the Antarctic ozone layer** came in at number 36 in the **Altmetric top 100** and number 14 on **Discover magazine**'s 100 top stories of 2016.

Dr Ryan Neely and **Dr Anja Schmidt** from the **Institute of Climate and Atmospheric Science** were co-authors on the paper that discovered the hole in the ozone layer is, on average, about 20 per cent smaller than in previous years. Recovery of the hole has varied from year to year, due in part to the effects of volcanic eruptions. But accounting for the impacts of these eruptions allowed the team to show that the ozone hole is healing, and they see no reason why the ozone hole should not close permanently by the middle of this century. This research was done in collaboration with researchers at **MIT** and the **National Center for Atmospheric Research**.

Dr Ryan Neely said, "It is fantastic to see all the positive public interest and broad engagement the results of this research are having." While Dr Anja Schmidt said, "Our work demonstrates the success of the **Montreal Protocol**, which provided a solution to a global environmental issue. It is great to see so much public engagement and interest in this topic."

Altmetric tracks millions of different research outputs to identify the top 100 discussed articles. This includes tracking how often research from an article is in the news and how much people engage with it on social media. This strong international collaboration received over 2200 interactions, with over 200 news stories. Congratulations to Dr Neely and Dr Schmidt on this great achievement.

Altmetric Attention Score

Two Earth and Environment scientists named in 2016 list of highly cited scientists worldwide

Two School of Earth and Environment scientists, **Professor Dominick Spracklen** and **Professor Ken Carslaw** were named in a list of the most highly cited scientists across the world.

The Clarivate Analytics Highly Cited Researchers Award (formerly known as the Thomson Reuters Highly Cited Researchers Award) is given to those researchers ranking among the top one per cent most cited for their subject field and publication year, earning them the mark of exceptional impact.

The list is derived from highly cited papers in journals indexed in the **Web of Science** during an 11 year period, and in the latest listing from 2004 to 2014.

2016's list included only 15 Geoscientists in the UK. Ken Carslaw was also named in the 2014 and 2015 list. To see the full list, please visit **http://highlycited.com**.

Some examples of their most highly cited papers include:

Merikanto J; Spracklen DV; Mann GW; Pickering SJ; Carslaw KS (2009) Impact of nucleation on global CCN, Atmospheric Chemistry and Physics, 9, pp.8601-8616. **DOI: 10.5194/acp-9-8601-2009**

Righelato R; Spracklen DV (2007) Environment - Carbon mitigation by biofuels or by saving and restoring forests?, SCIENCE, 317, pp.902-902. **DOI: 10.1126/science.1141361**

Carslaw KS; Harrison RG; Kirkby J (2002) Atmospheric science: Cosmic rays, clouds, and climate, Science, 298, pp.1732-1737. **DOI: 10.1126/science.1076964**

Carslaw, K.S., Luo, B.P., Clegg, S.L., Peter, Th., Brimblecombe, P., Crutzen, P.J. (1994) Stratospheric aerosol growth and HNO3 gas phase depletion from coupled HNO3 and water uptake by liquid particles, Geophysical Research Letters, 21, pp.2479-2482. **DOI: 10.1029/94GL02799**

Ian Brooks Reaches the North Pole

Professor Ian Brooks and his team participated in the Arctic Ocean 2016 expedition as part of a scientific team collecting data from the central Arctic Ocean. The six week cruise took them to the North Pole and down the **Lomonosov Ridge** towards Greenland to study interactions between the atmosphere and sea ice. The expedition involved two icebreakers, **Oden** and its Canadian counterpart **Louis S. St-Laurent**, with data acquisition occurring on both of them.

The polar expedition was a collaboration between the **Swedish Polar Research Secretariat** and the Canadian Government.

Some 60 people joined the ship in Longyearbyen on Svalbard at the beginning of August, including several very different science projects sharing time on the ship. The Meteorological Team included **John Prytherch** along with two early career researchers Anna Fitch (from the **Swedish Meteorological and Hydrological Institute**) and Piotr Kupiszewski (from **ETH, Zurich and the Meteorological Institute, Stockholm University**).

On joining Oden the meteorology team immediately started sorting out the instrumentation that needed reinstalling. Most of the work was done in May, with all the sensors installed and tested, but they didn't want to leave them on the mast for the two months before the cruise started. After a week of resolving numerous problems with their equipment they finally got the majority of the measurements underway. The expedition headed north towards the region of the Amundsen Basin and northern Amerasia Basin, one of the most remote regions in the Arctic.

Air quality success, but what about the impact of Brexit?

In Brussels in October, **Professor Piers Forster** highlighted a study led by the University which found that 80,000 deaths are prevented each year across Europe due to EU policies and new technologies to reduce air pollution.

The journal, **Environmental Research Letters**, is the first study to look into the effectiveness of specific EU policies to reduce air pollution. Study co-author **Professor Dominick Spracklen** said, "Our work shows that EU policies have improved air quality. When the UK exits the EU our air quality policy will no longer be subject to EU legislation, with potential implications for future air quality.

The researchers used a computer model to compare the current amount of air pollution across Europe to a scenario in which no air quality legislation or new emissions technologies had been introduced since 1970. Study co-author **Professor Ken Carslaw** said, "To put the number of lives being saved in perspective, in 2011 400,000 premature deaths were attributed to particulate air pollution over Europe. So EU policy has improved the health of European citizens."

Dr Steven Turnock, who conducted the research as part of his PhD concluded, "Air pollution is a trans-boundary problem that does not recognise borders. The improvements have been achieved by countries acting together."

RESEARCH INSTITUTE ACTIVITY

IGT - Institute of Geophysics and Tectonics

John Elliott awarded Royal Society University Research Fellowship

In September the school was very pleased to announce that **Dr John Elliott** was awarded an esteemed **Royal Society University Research Fellowship**.

The Royal Society's University Research Fellowship is an extremely competitive scheme for outstanding early career scientists. In being awarded this prestigious Fellowship Dr Elliott will be given the opportunity to build an independent research career and become a leading name of the future in his field.

The title of the fellowship is "The Rise of Mountains" and John will be building on his current expertise in analysing individual faults and earthquakes. He said, 'I want to determine whether entire mountains are growing or collapsing, and understand how the movement of tectonic plates causes this.'

In order to address these questions, John will measure the speed at which mountains are growing across vast regions, in the first instance focusing on the seismically active **Tien Shan** in Central Asia. John explained that he will 'exploit the huge increase and improved quality of space-based datasets now being acquired systematically across the globe' and combine this data with information from GPS. In comparing these measurements with computer models it will be possible to test the behaviour of the Earth's crust and the physical laws that govern deformation over time.

As well as providing enhanced understanding of the mechanisms of tectonics it will also allow better determination of where people are exposed to earthquake hazard by increasing our ability to recognise the distribution of deformation along fault lines. The settlements that John will be researching were only small towns and villages when the last cluster of earthquakes struck – they are now towering cities, where millions of vulnerable people are exposed to the seismic hazard in these economically developing countries.

Lab opening offers new opportunities for Turkish University

Dr David Banks was involved with the opening of new laboratories for Fluid Inclusion and X-ray Diffraction (XRD) research at **Pamukkale University**, Turkey.

The Laboratory was officially opened by Pamukkale University Rector Dr Huseyin Bagci. The Dean of the Faculty of Engineering, Dr Selcuk Toprak, Secretary General, Professor Kenan Corum, and Head of Department of Geological Engineering, Professor Hulusi Khargi, were also present. Dr Banks gave a presentation as part of the opening ceremony and following this he was presented with a certificate of thanks for his assistance with opening the laboratory.

David Banks said, 'The Department of Geological Engineering in Pamukkale University has traditionally been very strong in engineering disciplines.

The opening of the XRD and Fluid Inclusion laboratories is the result of appointments of two new staff members whose research is related to Ore Deposit and Mineralogy research and opens a new area where the department wishes to make an impact.'

He went on to explain the importance of the new facility. 'Turkey is an active region in Eastern Europe with many large gold deposits in production and a very high level of exploration. The country is endowed with many other natural resources in addition. The laboratories will enable international research to be carried out related to the origin of many of the different types of ore deposits at a level above what has been achieved recently in the country. Researchers in Turkey and in Leeds have a strong history of collaborative projects which will be enhanced through the opening of the new facilities.

The importance the University places on the new laboratories was evident by the attendance of the University Rector and Vice Rector, two Faculty Deans and the Head of the Department plus members of the faculty at the opening ceremony.'

Dr David Banks being presented with his certificate

Dr Gregory awarded NERC Urgency grant

At the end of 2016 **Dr Laura Gregory** was awarded a £65,000 NERC urgency grant to study co and post seismic deformation resulting from the recent earthquakes in central Italy.

The project team, which in addition to Dr Gregory included **Dr Richard Walters** and **Professor Kenneth McCaffrey** (**Durham University**) and **Professor Gerald Roberts** (**Birkbeck College**), originally proposed to investigate surface ruptures and post seismic deformation resulting from the **24th August Magnitude 6.2 earthquake in Amatrice Italy**. However, whilst on a return trip to Italy, the team experienced the larger **Magnitude 6.6 earthquake which took place on 30th Oct**. Therefore they will now be working on the earthquake sequence as a whole.

The initial M6.2 earthquake ruptured across two faults, the Laga-Amatrice and Vettore faults. This earthquake was interesting in that it linked two faults that were previously thought to be independent, with the highest slip occurring in the link between the two faults. These were previously thought to be separate structures that could not rupture in a single event. Following this event the team visited the region to investigate the surface expression of the earthquake and to install **GNSS** equipment that will measure high resolution motion of the ground continuously for weeks and months following the earthquake. Being present at the time of the subsequent events has allowed them to acquire a unique data set of coseismic and early post-seismic afterslip that will enable them to test models of how faults link and grow. The last earthquake in the sequence was the largest to strike Italy in decades, and it will be important to try and understand why this did not strike first.

This work is urgent due to the need to document post-seismic deformation in the weeks and months following the earthquakes, and the degrading nature of the surface rupture. This research will allow the team to investigate fault connectivity and how linkage develops, as well as understand the characteristics of earthquake sequences. Dr Gregory and her team hope to test hypotheses regarding the role of post-seismic deformation after an earthquake that links previously independent structures. Fault linkage typically happens over long geological timescales and has never before been captured before with such a high quality dataset. Their results will be important for incorporating multi-fault rupturing earthquakes into future hazard assessments made in central Italy and globally.

Laura and PhD student Huw Goodall on the M6.6 earthquake rupture, taken from a helicopter surveying the rupture.

RESEARCH INSTITUTE ACTIVITY

IAG - Institute of Applied Geoscience

White Rose funding for project looking at Hydraulic Fracturing for Shale Gas

Early in the year **Dr Tom Lynch** was awarded a **White Rose Collaboration Fund** award of £11,000 for the project "Comparative Risks of Hydraulic Fracturing for Shale Gas in the UK".

The aim of the project was to bring together researchers from the White Rose network to develop a conceptual groundwater risk framework for hydraulic fracturing in the UK in a pilot study workshop, and develop initial leakage scenarios for UK shale gas formations. The aim of workshop was to build an understanding of the scale of risks presented from hydraulic fracturing in the UK, determine knowledge gaps and develop capacity for future funding proposals.

The White Rose Collaboration Fund was launched in October 2008 and is designed to support emerging collaborative activities across the three White Rose universities of Leeds, Sheffield and York. They run two rounds a year, in Spring and Autumn, and award up to £11,000 per project with a total of eight projects being awarded each year.

White Rose
university consortium

Raising the bar for fluvial reservoir modelling

In June **Petrotechnical Data Systems** (PDS) announced an exclusive licencing agreement with the **Fluvial Research Group** at University of Leeds for the Introduction to the Fluvial Architecture Knowledge Transfer System (**FAKTS**): a database of fluvial-reservoir analogues.

The Fluvial Research Group has formed a partnership with Petrotechnical Data Systems to market reservoir modelling technology that utilises the unique capabilities of FAKTS, enabling quantitative comparisons between many aspects of fluvial systems and their preserved sedimentary deposits, to ensure realistic geological architectures are correctly represented in geological models.

"Innovation will be at the heart of the Industry's recovery, which is why PDS is so excited to have the opportunity to collaborate with the University of Leeds," said Steve Daum, Managing Director of the PDS Group.

Dr Nigel Mountney, Director of the Fluvial Research Group added, "This new collaborative partnership with PDS provides an ideal opportunity to integrate our innovative database-driven approach to the qualitative modelling of complex geological successions with PDS' long-established technical expertise in the development of petrotechnical solutions for the petroleum industry."

pds petrotechnical

Major new water solutions programme to benefit the Yorkshire economy

A new £6 million project led by the University of Leeds is predicted to bring a £50 million benefit to the Yorkshire economy by reducing the costs and impact of water-related threats to the region.

Bringing together partners from across the region and using existing research funded by the Natural Environment Research Council (**NERC**), the team will look to join up ways of improving water quality, resilience to floods and droughts, carbon storage and biodiversity. In doing so, the project will make more efficient uses of resources and enable planning across the whole catchment area, bringing both economic and societal benefits.

Work on the project, called Yorkshire Integrated Catchment Solutions Programme (**iCASP**), will begin in March 2017. SEE staff involved in the programme are **Dr David Hodgson**, **Dr Julia Martin-Ortega**, **Professor Piers Forster**, **Professor Alan Blythe**, **Ruth Lawford-Rolfe**.

Our Scientists at AGU Fall Meeting

American Geophysical Union

The School of Earth and Environment was strongly represented at the 2016 **AGU** Fall Meeting in San Francisco in December. **IGT**, **ICAS**, **ESSI** and **IAG** all had members delivering presentations, running scientific sessions and showing posters of their research findings.

There were 19 members of IGT presenting their science during the meeting. **Professor Andy Hooper**, **Dr Jess Hawthorne**, **Dr Sebastian Rost** and **Dr Thomas Mueller** were all invited to talk and PhD student **Amicia Lee** was also speaking about her current work. **Dr Andrew Walker**, **Dr Andy Nowacki** and Dr Thomas Mueller convened sessions and Dr Jess Hawthorne and **Dr Matt Pankhurst** were invited to present posters.

Dr Aisling Dolan, **Professor Alan Haywood**, Academic Fellow **Ben Mills** and PhD student **Caroline Prescott** were representing ESSI. Ben Mills and Caroline Prescott both gave talks, whilst Dr Dolan convened two sessions and Professor Haywood presented three posters during the meeting.

Highlights from ICAS members included their Director, **Professor Ken Carslaw**, convening three sessions, **Professor Piers Forster** being invited

Left to right: Caroline Prescott, Dr Ben Mills and Amicia Lee

to present a poster and **Professor Martyn Chipperfield** and **Professor Dominick Spracklen** also being involved.

Dr Rob Dorrell represented IAG; convening four sessions and presenting a poster on his recent work.

During the meeting IGT member Professor Andy Hooper was awarded the **James B. Macelwane Medal** in recognition of his contributions to the geophysical sciences. The award was presented during the Honours Ceremony held on 14th December.

This medal is given to outstanding early career scientists who have shown depth, breadth, impact, creativity and novelty in their research.

Professor Hooper pioneered the development of new software called **StaMPS** to extract ground displacements from time series of synthetic aperture radar (SAR) acquisitions. StaMPS is now used widely across the Earth Observation community.

He also discovered a new link between ice cap retreat and volcanism via geodetic monitoring from space and subsequent modelling of the 2010 Icelandic volcanic eruptions, and played a significant role in the €6million **FUTUREVOLC** project, leading the long-term deformation effort to integrate space and ground based observations for improved monitoring and evaluation of volcanic hazards.

Most recently, working with colleagues from Iceland, he shed new light on how volcanoes collapse during major eruptions, focusing on the 2014/15 eruption at **Bárdarbunga**.

EQUALITY & INCLUSION

2016 has been a great year for Equality and Inclusion in SEE.

The Faculty of Environment achieved a **Bronze Athena SWAN** award, which is a major acknowledgement of the efforts of colleagues in SEE, **Geography** and **ITS** who are challenging gender inequalities for all staff. We have both a Faculty and a School action plan to work through over the next three years and hope to make significant steps towards improving the workplace experience for all staff. You can access the full application here: **http:/www.environment.leeds.ac.uk/fileadmin/docs/hr/Facuty_of_Environment_ASBronze_University_of_Leeds_Nov2015_final_final.pdf**.

SEE hosted three equality and inclusion workshops in the Spring of 2016 and 49 members of staff took part. The workshops also included vital information on confronting unconscious bias, which is particularly useful for staff involved in student and staff recruitment. We hope to be able to run similar sessions in 2017 so more staff can benefit from this training.

The School now has a permanent **Equality and Inclusion** (E&I) noticeboard in the SEE Level 8 common room, which is curated by **Vicki Parker**, where staff can access lots of useful information. The School also has four gender neutral toilets. These are located on Level 8 of the Staff Centre building. Gender neutral toilets are a way to create a safer campus environment for trans gender and gender nonconforming students and staff. These toilets are available all over campus, and are clearly marked on the campus map: **http://www.leeds.ac.uk/campusmap#**

If anyone has any issues around Equality and Inclusion that they would like to discuss or would like more information about, please contact SEE's E&I Coordinator at **s.e.haynes@leeds.ac.uk**.

ALUMNI UPDATE

Our July and December Graduations saw another 300 former UG and PG students graduate from SEE and join our alumni community: Congratulations to them all! As has become tradition, they made the most of the SEE photo booth to further dress up their graduation gowns: **https://www.facebook.com/groups/698210746893487/**

This academic year, two of our MScs celebrated a significant milestone as they reach 50 years of continuous provision. The MScs in Engineering Geology and Exploration Geophysics are widely respected across the industries that they face and between them have seen 1400 students successfully graduate! As a precursor to the main celebrations planned for later on in the year, February saw a careers event organised jointly by the Society of Economic Geologists and Leeds Engineering Geology Society which attracted significant numbers of current students and alumni to hear talks from 16 speakers! Further information about that event can be viewed here: **http://www.see.leeds.ac.uk/alumni/events-and-news/news-story/seglegs-engineering-geology-symposium-february-2016/**

As part of these celebrations, there will be a dinner in January 2017 which 90 Engineering Geologists are attending, including current students, alumni and current and former staff.

Our staff travel abroad frequently and, when the opportunity arises, are keen to meet up with former students. We are currently arranging meetings in Colombia and Brazil so if you are based there look out for an email invitation to a reunion shortly!

Meanwhile, work has continued to update and improve the SEE alumni webpages—**www.see.leeds.ac.uk/alumni** which now feature a greater number of profiles from former students, as well as further information about the benefits of staying in touch. We are always delighted to hear from former students and if you would like to contact us (profiles or careers updates in particular are very welcome!) please email: **alumni@see.leeds.ac.uk**

MEET OUR POSTGRADUATE RESEARCHERS

Lina Brand Correa

Sustainability Research Institute (SRI)

Why did you choose Leeds, and why SRI?

Through my masters dissertation topic I contacted a PhD student from SRI at the time. Meetings with him led to an invitation to attend a workshop in Leeds, where I met two of my current supervisors. That workshop was key for me to get to know Leeds, both the city and the university, as well as SRI in particular. As a city, for some reason Leeds reminded me of my hometown in Colombia. As a university I was attracted to Leeds because of its openness and diversity, culturally and academically. Finally, when I learnt of the kind of research that was being done in SRI, I couldn't believe I hadn't heard of it before and didn't hesitate to apply for a PhD here. And here I am two years on.

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

I did my undergraduate degree in Economics. It soon became apparent that my hopes of understanding why certain things in the world are as they are were not going to be fulfilled by economic theory. Explanations and real solutions to social and environmental problems are lacking in mainstream economic thought. Therefore, I decided to move away from economics towards ecological economics and interdisciplinary sustainability areas. To answer the question directly, I am interested in sustainability because I want to understand the logic behind the social and environmental problems we are facing right now, and also try to think of alternative ways of dealing with them as a society.

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

It's high quality. I consider the academic support of all staff, not only my supervisors and colleagues in SRI, to be great. There is always time and disposition for informal discussions over a cup of tea. There is always openness to listen and to share ideas, which are generally met with critical but constructive thoughts. I have found that my training and academic advice needs are not all met within Leeds, but I have received the support to find them elsewhere. Finally, I cannot underestimate the importance of personal support here in Leeds. I have made great friends and met incredible people. Whether that has been luck or it is the nature of the people SRI attracts, I don't know.

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 had a very narrow view of my future career path. My dad is an academic in Colombia and I always thought I would follow a very similar path to his. But being in SRI has widened my perspective. The opportunities to attend all sorts of meetings and have informal discussions with colleagues in all stages of their careers has clarified how academia works currently, and has opened my mind to many other alternatives. So, how will my future career shape up? I've no idea! For now, I am focused on finishing the PhD.

Hannah Foster

Earth System Science Institute (ESSI)

Why did you choose Leeds and why ESSI?

I chose Leeds because it's a **Russell Group University** with great research facilities and it was ranked highly in the Research Excellence Framework (REF) 2014. My PhD topic fits nicely into the Cohen Geochemistry Group of ESSI. ESSI has a large community of talented early career scientists who interact frequently in discussions and social events. This makes ESSI a great support network for PhD students.

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

Geochemistry is an important subject for research because geochemical processes are what have made the Earth habitable by controlling the composition of rocks and soil which ultimately feed back to the hydrosphere and the atmosphere. Indeed, geochemistry is also a part of our everyday lives, from the food we grow in soils to the energy resources we extract and utilise. Hence, geochemistry is essential to study for a growing global population.

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

The support from my supervisory team and PhD colleagues has been great. My supervisors are enthusiastic and my PhD colleagues are always there for emotional support. Training opportunities are plentiful here, with some targeted to research methods (eg. statistics) and others which coach on developing yourself as a person or as an early career scientist (eg. presentation skills). The laboratory staff of the **Cohen Research Group** also provide excellent support to PhD students by maintaining a fully operational laboratory whilst encouraging a tidy and safe working environment.

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

Regarding my future career I would like to return to industry and I think that the support and training opportunities available in ESSI are excellent for preparing an individual for industry but also for academia.

Maurits Metman

Institute for Geophysics & Tectonics (IGT)

Why did you choose Leeds, and why IGT?

The university is internationally recognised for its research in my field. Several top researchers have spent time here or have collaborated with people at Leeds. This is something that already struck me while doing similar research as an undergraduate. Also, the research project itself was very appealing and gave me the impression that it would be something that I would enjoy working on for the coming years. Other than that I was told Leeds is a very student friendly city with lots of things going on.

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

The interplay between electrodynamics and fluid mechanics that generates Earth's magnetic field is an amazingly complex and therefore fascinating system. This is reflected by the fact that we currently lack the computing power to replicate Earth's magnetic field in numerical simulations. The physics are associated with a healthy dosage of maths, which makes it all the more interesting for me.

Also, Earth's magnetic field is very relevant to society. These days we all rely on smartphones and computers (or electricity for that matter), which would be harder to imagine without decent protection from the magnetic field against radiation. This gives me additional motivation for this research.

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

I have received excellent support from my supervisors. We meet regularly and they provide plenty of feedback. Also, I am given a high degree of freedom within the project itself and that way I can emphasise on the parts of the research that I find most interesting and/or useful. I was also surprised by the amount of training opportunities that are provided by the university. These trainings can be quite research specific or can help you develop as person in general.

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

Surely, the school represents a large group of researchers, so I expect the number of connections within the group to be useful. The reputation of the school in the area of Earth sciences will likely be beneficial too.

Jonathan Pennells

Institute for Climate & Atmospheric Science (ICAS)

Why did you choose Leeds, and why ICAS?

Before my PhD I had studied mathematics at Leeds so was already accustomed to the great facilities at the university. ICAS has many great links with other institutions, both within the university and with external bodies. ICAS stood out for its excellent research and diverse range of research areas.

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

We all experience weather every day. From storms to settled clear sky there is a lot of interesting science at play controlling the weather. Having a background in fluid dynamics it is interesting to applying it to atmospheric science, to have an in depth understanding of the factors which control the weather around the world.

It is a very exciting time to be involved in atmospheric science. The research being carried out is having a positive impact on people's lives.

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

A key advantage of ICAS is the friendly atmosphere and support available, be that from your supervisor team or from your peers. With a large range of talents within the institute there is always someone who can assist you when needed. When I joined ICAS this support eased my integration within the institute and also assisted with my understanding of atmospheric science.

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

ICAS is a very dynamic institution to be part of. In addition to research opportunities there are a lot of roles which a PhD student can take. During my time in ICAS I have been PhD representative, organised Chatmosphere, been involved in organising a conference and been a demonstrator on numerous modules. These opportunities can equip you with a lot of skills for a future career both in and out of research.

James Norcliffe

Institute of Applied Geoscience (IAG)

Why did you choose Leeds, and why IAG?

I chose to undertake my PhD at the University of Leeds due to the department's excellent reputation in applied structural geology and basin analysis, the subjects which I'm interested in. I also realised that being part of IAG would give me the opportunity to interact with researchers from a wide range of technical backgrounds and that I'd be part of a vibrant research community. I believe that this environment is especially important for a PhD student.

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

The relevance of geoscience to the world we live in is what initially drew me to the subject. I am particularly interested in applied geoscience and its role in finding, developing and disposing of natural resources. Similarly, it is rewarding to do work of economic significance. Academically I also enjoy working in a subject that focuses on understanding the natural world.

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

Very highly. I have regular meetings with my PhD supervisors which provide me with academic guidance. My research group, the Basin Structure Group, also has regular meetings which gives me the opportunity to gain feedback on my work and also discuss other projects within the group. Similarly, discussions I've had with other PhD students and post-docs have been extremely beneficial to my PhD.

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

As an IAG student I interact with industry regularly through attending conferences or visiting companies. Similarly, a large number of companies come to the department to give technical or recruitment talks. I am also undertaking an internship this summer, which is encouraged by the institute and will improve my career prospects. Finally, the excellent reputation of the department will be advantageous when applying for future positions.

Launch of Centre of Excellence for Modelling the Atmosphere and Climate (CEMAC)

Around 70 scientists and external partners gathered together on Tuesday 21st June 2016 for the launch of **CEMAC**, our Centre of Excellence for Modelling the Atmosphere and Climate. CEMAC is a major new initiative within the Institute for Climate and Atmospheric Science (**ICAS**) and the School of Earth and Environment.

CEMAC aims to be the UK's leading centre of excellence in atmospheric and climate modelling and complex data exploitation. Its vision is to significantly enhance and accelerate our high impact research in weather, climate and atmospheric composition and to train and educate a new generation of scientists in the latest techniques in scientific computing and data processing and visualisation. It aims to provide technical and scientific expertise to support a broad and ambitious range of modelling and visualisation activities, rivalling the best international examples of how model and data support and strategy is organised in computing intensive research institutions. CEMAC will enable complex problems to be tackled, pushing the frontiers of scientific research, and providing solutions to some of the most pressing problems faced by society. The new centre will strengthen research links between SEE and external partners, including the **Met Office** and **NCAS**, providing core of scientific and technical expertise that will ensure ICAS-led science can inform development of key UK and international modelling strategies in climate, air quality, and weather research.

The launch event was opened with welcoming remarks from ICAS Director, **Professor Ken Carslaw**, and an introduction to the vision of the new centre by CEMAC Director, **Dr Stephen Arnold**. Dr Arnold said, "Our vision is to capitalise on untapped potential in our advance computing and modelling, to enable development of our most ambitious science, leading to substantially increased impacts of our research".

Dr John Marsham outlined the grand challenges CEMAC aims to address in terms of weather, **Professor Dominick Spracklen** spoke about atmospheric composition and **Dr Amanda Maycock** about climate science. **Dr Jon Petch** from the Met Office discussed the academic partnership between Leeds and the Met Office and how the contribution from CEMAC in terms of joint model and joint technical development will be critical in the future.

Professor Alan Haywood introduced the University new tape archive facility (**PETAL**) and **Dr George Holmes** gave a perspective on how CEMAC will provide a massive contribution to research-based teaching in terms of visualisation and computing for education. **Dr Anna Hogg** and **Dr Juliane Schwendike** then outlined example case studies on the potential use data visualisation tools within CEMAC.

The CEMAC launch was closed by **Dr Alan Real** (Director of Research Computing, University of Leeds).

For more information regarding CEMAC and its activities, visit cemac.leeds.ac.uk or contact cemac@leeds.ac.uk.

Launch of Priestley International Centre for Climate

The launch of the **Priestley International Centre for Climate** was held in June. The centre is one of the University's flagship strategic investments, with more than £6 million being dedicated to the centre over five years.

The centre aims to bring together world leading expertise in all the key strands of climate change research, helping deliver research which underpins robust and timely climate solutions. **Professor Piers Forster**, the Centre's Director and **ICAS** Professor of Physical Climate Change introduced the Priestley centre.

Planting a tree in front of SEE to mark the launch of the Priestley Centre

The launch saw **Piers Sellers OBE** give a video message of support to those attending and discussing his time at Leeds, where he gained a PhD in Biometeorology in the School of Geography in 1981.

In honour of his work as a renowned climate scientist, the Priestley Centre created two annual Piers Sellers Prizes to recognise outstanding research in the field. Deputy Director of the Priestley centre, **Professor John Plane**, from the School of Chemistry, introduced the awards.

The first prize, The Piers Sellers Prize for 'World leading contribution to solution-focused climate research' was awarded to **Dr Joeri Rogelj**, a research scholar at the **International Institute for Applied Systems Analysis** (IIASA), Austria.

The second prize, for 'Exceptional PhD Research', designed to reward and encourage current University of Leeds PhD students undertaking excellent research to better understand or address climate change, went to **Kate Scott** from the **SRI**, who published six papers during her PhD. Kate Scott's research seeks to understand how environmental policies, consumption side measures and industrial policies can be used to best effect in mitigating climate change. Her research has been integrated into assessments of evidence by the **Committee on Climate Change** and has been presented to various government departments.

The awards presented by **Sir Alan Langlands** were followed by the signing of the Memorandum of Understanding between the Center for International Climate and Environmental Research, (**CICERO**) and the University of Leeds.

The Director of CICERO, **Kristin Halvorsen**, talked about how "the partnership links the decade of research collaboration with Leeds and has produced many publications, with **Professor Ken Carslaw**, Piers Forster and **Dr Julia Steinberger**."

Following Kristin's talk, **Professor Andy Shepherd**, director of the **Centre for Polar Observation and Modelling** (CPOM), described research on 'Earth's ice from space', an overview of how satellites have enhanced understanding and highlight changes in inaccessible areas. The centre's work focusses on, in particular, the **Cryosat satellite**, which is the first to travel over the Antarctic and has led to improvements of models, changes on ice and global sea depth and in the sea ice thickness in the Arctic.

Professor Lindsay Stringer then presented her research on 'Triple wins adaptation'. Her research focuses on the links between livelihoods and environment, ecosystem degradation, science, policy and environmental governance, and the practical and policy mechanisms that can advance sustainable development.

Next to present his research, entitled 'Climate smart cities and low carbon development' was Professor of Environmental Policy and Associate Pro Vice Chancellor (Interdisciplinary Research) **Professor Andy Gouldson**. He works on environmental and climate policy and in related areas such as energy and development policy, with particular interest in cities and climate change, and has worked extensively on low carbon development for cities in Europe, Asia, South America and Africa.

Finally **Wändi Bruine de Bruin**, Professor of Behavioural Decision Making and Deputy Director of the Priestley Centre presented her research 'Developing effective communications about climate change'.

Become a member of the Priestley Centre. Priestley Centre Membership is free and open to any University of Leeds staff or PhD student whose research and interests align with the vision of the Centre. For more information, see **Join the Priestley Centre**.

SEE BABIES 2016

Here are just some of the babies born to SEE members during 2016.

Mal McMillan's son, Thomas Imrie McMillan born on 1st September 2016 weighing 7lb.

Charlotte Close's daughter Annabelle Mary Close was born at 8:25am on 10th of November, weighing 8lb 12oz.

John Marsham and **Ann-Kristin Koehler**'s daughter Eilidh.

Peggy Achtert 's daughter, Karla Friederike Tesche, was born on 7th July 2016.

Susanne Lorenz's daughter Evie Elodie Nippard was born at the end of 2016, weighing 6lb 8oz.

Katy Roelich's son, Arthur Roelich Robinson on an Autumn walk.

Stephen Stackhouse's daughter Hannah kindly waited until the day after the end of the semester to be born!

NEW MEMBERS OF STAFF & APPOINTMENTS

SEE New Members/Appointments 2016

Thomas Fletcher – Research Fellow (IAG)

Kathryn Lock – PICC (Priestley International Centre for Climate) Communications Officer

Helena Brown – Sorby Laboratory Technician

Laura Gregory - NERC Intendent Fellowship

Duncan Hedges – Electron Optics Research Technician

Cecile Cam - Cecile visited SRI and the BOSS group for six months

Shona Smith – Research and Innovation Development Officer, Priestley International Centre for Climate

Duncan Hedges – Duncan joined the team in Electron Optics/ LEMAS as SEM technician

Alistair McDougall – working for Tim Wright as a Scientific programmer and strain mapping research fellow

Richard Keane – Met Office Research Scientist, collaborating with researchers in ICAS to improve the Met Office prediction models for weather and climate

Jennifer Fletcher – PDRA position on INCOMPASS project studying the dynamics of the Indian Monsoon

Steve Banwart – Chair in Soil/Agriculture/Water Research

Rory Fitzpatrick – Research Fellow working with Doug Parker

Xiaoming Zhao – from Southwest Petroleum University, co-hosted by Bill McCaffrey & Dave Hodgson

Lauren Molzahn – Student Education Service Officer in the Faculty Admission office

Rachael Garrard – Faculty HR Administrator in the Faculty HR office

Christian März – Associate Professor: Biogeochemistry

Susanna Ebmeier – Leverhulme Fellow

David Ferguson – Academic Research Fellow

John Elliott – University Academic Fellow IGT

Karsten Spaans – Research Fellow

Gareth Berry – Research Fellow

Dave Lee - Stratigraphy Research Group Support Assistant

Caroline Carr – Project Administrator

Jonathan Weiss – Research Fellow

Menno Hofstra – Research Fellow

Malcolm Morgan – Research Fellow

Daniel McCoy – Research Fellow

Megan Alexander – Research Fellow Climate Impact Indicators

Elisa Greco – Post-Doctoral Research Fellow

Joe McNorton – Research Fellow

Ajay Bhave – Research Fellow on UMFULA project with Andy Dougill and Suraje Dessai

James Norman – Research Assistant

Graeme Lloyd – UAF (ESSI)

Allyson Tessin – Marie Curie Fellowship (ESSI)

Maria (Pepa) Ambrosio – Research Fellow (SRI)

Song Haijun – Marie Curie Research Fellow (ESSI)

Milena Buchs – Lecturer/Associate Professor in Sustainability (SRI)

Nicola Favretto – Research Fellow (SRI)

Meaghan Daly – Research Fellow (SRI)

Adele Dixon – Student Education Service Officer

Ioana Colfescu – Research Scientist in NCAS

Rachel Tilling – Research Fellow (ICAS)

Welcome back

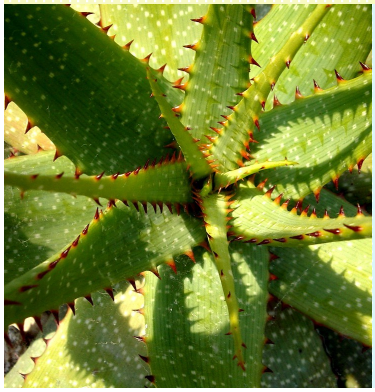
Fiona Gill - Royal Society Research Fellow

Katy Roelich - Senior Research Fellow

Zoe Wallage - Administrative Manager: Integrated Centre for Agri-Food Research

Further information can be found on our Staff pages

www.see.leeds.ac.uk/people/



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Please note any newsworthy items that you would like to be displayed on our Social Media accounts can be forwarded to **news@see.leeds.ac.uk**

This document can be downloaded from the school's homepage: www.see.leeds.ac.uk

The editor (Lisa Smith) would like to thank everyone who contributed items to this issue of the SEE Annual Newsletter.

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