British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

BUFI

BUFI Science Festival 2017

Programme

27 June 2017

Top Floor, The Lyell Centre, Heriot-Watt University, Edinburgh

NERC
DOCTORAL TRAINING

Front Cover

Tillingham salt marsh in the sun. © Helen Brooks 2017

NERC DOCTORAL TRAINING

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

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Meet the BUFI team

Mike Stephenson
Director of science and technology, BGS

Jon Naden
Manager, BGS University Funding Initiative (BUFI)

Ellie Evans
BUFI communications

Ann Evans
BUFI administration

Foreword

Firstly, thank you for supporting the BGS University Funding Initiative (BUFI) Science Festival, and if you've volunteered to be a presenter or a judge, thank you for giving up your time to take on the task — it's much appreciated. This is our ninth Science Festival and as everyone really enjoyed last year's event we've returned to Scotland and The Lyell Centre at Heriot-Watt University campus, the home of BGS Scotland, to repeat the experience. In the future we look forward to alternating the event between Keyworth and Edinburgh.

We offer our congratulations to Jenny Roberts (Cambridge), Ceri Davies (Lancaster), Samuel Cox (Leicester), Stuart Turner (Leicester), Stefan Lachowycz (Oxford), Daniel Middleton (Manchester), Peter Fawdon (Open), Konstantinos Giannoukos (Nottingham), Jack Lacey (Nottingham), Kate McFall (née Sullivan) (Southampton), Helena Stewart (Stirling), Jenny Roberts (Cambridge), Rosalind Hen-Jones (Newcastle), Verity Flett (Dundee), Damiano Weitowitz (Roehampton), Jamie Boyd (née Lakin) (Leeds), Rachel Lamb (Manchester), Rhian Rees-Owen (Leeds) and William Knight (Nottingham), who have all successfully obtained their PhDs since the last Science Festival.

The BGS, in collaboration with university partners, takes great pride in being one of the UK's largest providers of postgraduate research training in the applied geosciences. We are presently involved in the training of over 100 doctoral researchers across the UK.

Currently, the Natural Environment Research Council (NERC), the BGS's parent body, delivers PhD training through doctoral training partnerships (DTPs) and centres for doctoral training (CDTs); these are clusters of excellence providing world-class PhD training and offer studentships in all areas of the NERC science remit. The BGS is actively involved in these training collaborations (see table at back), which are alliances between universities and range of nationally and internationally renowned research organisations, which also includes the British Antarctic Survey, the Centre for Ecology & Hydrology, the Met Office, the Natural History Museum, Rothamsted Research and Plymouth Marine Laboratory.

The key feature of the DTP landscape is the 'cohort' concept where, in addition to doing the research for their PhD project, students undertake a programme of directed, environmental-science training with their peers. This includes a range of activities such as master classes from world-leading scientists, summer schools, and short placements with industrial partners and government organisations. The BGS is proud of the key role we play in developing the next generation of applied earth scientists and we are active in over 60 DTP PhD studentships. In October a further 11 BGS-sponsored doctoral researchers will joint this cohort.

Our current research topics are broad. Pure geology, such as the formation of the Arran ring complex and palaeontology, are still important. However, the majority of the earth science research training we do tends towards interdisciplinary applied environmental science. Sustainable energy and natural resources are an important aspect of the portfolio. There is a new BGS project — UK Geoenergy Observatories (UKGEOS) which will address many of the environmental issues that need to be answered for the development of home-grown, secure energy solutions. This includes carbon capture and storage, geothermal energy, nuclear waste disposal, underground coal gasification and underground gas storage — securing jobs and income for British regions. We look forward to new PhD projects in this area.

Other significant areas are groundwater resources; exploring for the rare metals required for the magnets of wind turbines; remote sensing; pollution; soil science, and medical geology. There are researchers looking at using earthquakes to probe the deep crustal structure that underlies the UK; the value of georesources in urban design; landslide early-warning systems, and field sensors for pathogens in drinking water in Africa. We have a number of climate-change projects and these focus on climate change in the Arctic and geological controls on the Earth's thermostat, along with ocean evolution in the Neogene. Research into volcanism and other natural hazards continues to be popular, but we are also branching out to investigate social impacts of natural disasters and resource use.

A list of current projects, some recently completed PhDs, and publications by the current and past students are given at the back of this brochure. Today is an event that gives the PhD researchers we sponsor and train the opportunity to present their science to a range of stakeholders and interact with researchers from outside their area of expertise. Though the work they do is of the highest quality, the festival is not just about the science: it is also about communicating research to non-specialists. So, whatever your background, we hope there will be an opportunity for both the presenters and audience to learn. The format of the day is poster presentations, so make sure you quiz the students to get the most out of the festival.

After lunch, at 2:00 pm, our guest speaker Professor Mercedes Maroto-Valer will give a talk on *Carbon capture, utilisation and storage (CCUS): from dystopia to utopia or somewhere in between.* The talk will be followed by the prize ceremony for the best presentations — this will be at 2.45 pm and everyone is welcome to attend.

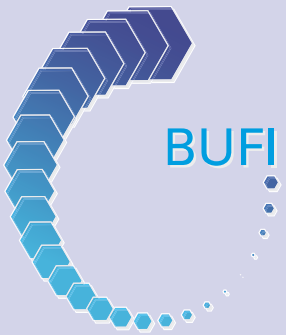
We hope you have an excellent day.

Programme

BGS BUFI Science Festival, Tuesday 27 June 2017

Top Floor, The Lyell Centre, Heriot-Watt University, Edinburgh

09.45 am	Judges arrive and briefing in Seminar Room 1
10.00 am	Welcome by John Ludden, Executive Director, BGS
10:15 am	BUFI presentation by Jon Naden, BUFI manager
10.30 am	Poster and engagement judging begins
12.45 pm	Buffet lunch available
1.00 pm	Deadline for judges, votes
2.00 pm	Guest speaker Professor Mercedes Maroto-Valer *Carbon capture, utilisation and storage (CCUS): from dystopia to utopia or somewhere in between*
2.45 pm	Presentations and prize giving
3.30 pm	Close



Guest Speaker — Professor Mercedes Maroto-Valer (FRSE, FIChemE, FRSC, FRSA)

Prof Mercedes Maroto-Valer (FRSE, FIChemE, FRSC, FRSA) is Assistant Deputy Principal (research and innovation) and director of the Energy Academy at Heriot-Watt University. She is also is director of the Centre for Innovation in Carbon Capture and Storage (CICCS).

Prof Mercedes Maroto-Valer has held academic appointments at the University of Kentucky (1997–1998), Pennsylvania State University (1998–2004) and the University of Nottingham (2005–2012). Mercedes obtained her PhD in 1997 at the University of Strathclyde (Scotland). Following a one-year postdoctoral fellowship at the Centre for Applied Energy Research (CAER) at the University of Kentucky in the USA, she moved to the Pennsylvania State University, where she worked as Research Fellow and from 2001 as assistant professor and became program coordinator for sustainable energy. She joined the University of Nottingham as reader in 2005 and within three years she was promoted to professor in energy technologies. During her time at Nottingham, she was the head of the energy and sustainability research division at the Faculty of Engineering.

Prof Maroto-Valer is the first Robert Buchan Chair in sustainable energy engineering at Heriot-Watt University, where she has served as the head of the Institute for Mechanical, Processing and Energy Engineering (School of Engineering and Physical Sciences). She currently leads the pan-university Energy Academy and is director of the EPSRC-funded Centre for Innovation in Carbon Capture and Storage (CICCS) and is a member of the Directorate of Scottish Carbon Capture and Storage (SCCS).

Prof Maroto-Valer leads a team of 40 researchers developing novel solutions to meet the worldwide search for energy, with particular emphasis on clean technologies, including carbon dioxide capture, transport, storage and utilisation. She has over 410 publications, including editing four books and 32 per cent of her publications are in the top 10 per cent most-cited worldwide.

Her outstanding contributions, publication record and service to the chemical sciences and energy engineering have been recognised with numerous international prizes and awards, including the 2013 Hong Kong University William Mong Distinguished Lecture; 2011 RSC Environment, Sustainability and Energy Division Early Career Award; 2009 Philip Leverhulme Prize; 2005 US Department of Energy Award for Innovative Development; 1997 Ritchie Prize; 1996 Glenn Award — Fuel Chemistry Division of the American Chemical Society, and the 1993 ICI Chemical & Polymers Group Andersonian Centenary Prize.

Prof Maroto-Valer has participated in a wide range of public-engagement activities, including festivals, schools programmes, lectures and policymakers' briefings. She has contributed to public debates on energy futures, including Edinburgh Science Festival; Financial Times Energy Conference; the Market Forces The Energy Forum; and China Café Scientifique. She has also collaborated with high schools developing student projects on CCS for the Crest Science Award of the British Science Association and has given invited presentations at the National Science and Engineering Week and recently at the London International Youth Science Forum (LIYSF 2015), which attracted an audience of 500 students from 65 countries.

BUFI Science Festival, 2017

Judges and prizes

Best overall poster presentation prize – £200

This category is judged by volunteers of BGS staff and other guests. Staff from both scientific and non-scientific areas attend a judges' briefing and have to mark each poster presentation based on set criteria. Each judge marks four poster presentations, but the presenters are not aware of who is judging them.

Lyell Centre staff prize – £100

This category is judged by the staff of The Lyell Centre. Both BGS and Heriot-Watt University staff vote for their favourite poster presentation.

BUFI students peer prize – £75

The BUFI students vote for their favourite.

Highly commended prize – £50

This is an opportunity for the judges to nominate an additional poster presentation for a prize outside their allocated posters.

Presenters

Poster number	Student name	Poster title	University
1	Abida Usman	Source apportionment of urban contaminants	Nottingham
2	Ailsa Guild	Drawing lines: the structural evolution of Svínafellsjökull glacier in south-east Iceland	Durham
3	Anna Bidgood	Transformation history of the Tso Morari dome, Ladakh	Oxford
4	Ashley Smith	Climatology of the polar electrojets using satellite magnetometry	Edinburgh
5	Azucena Rodriguez Yebra	Generation of source-reliable output diagrams of adited groundwater sources using models: an example from the UK	Imperial College London
6	Chloe Morris	Modelling the interaction and co-evolution of coast and estuarine environments	Hull
7	Chris Yeomans	An integrated approach to semi-automated lineament detection using object-based image analysis	Exeter
8	Eleni Wood	Geochronological insights into the metamorphism and exhumation of the Indian lower-crust in north-west Bhutan	Open University
9	Fiona Sach	Are land-use decisions of African elephants based on environmental geochemistry	Nottingham
10	Gavin Sim	Chromium mobility and speciation in the urban-industrial environment	Edinburgh
11	Helen Brooks	Analysing the geotechnical properties of salt-marsh sediments	Cambridge
12	Iain Stobbs	The preservation of sea floor massive sulphide deposits	Southampton/National Oceanography Centre
13	Jo Miles	A hydrothermal adVENTure	Bristol
14	Jon Mackay	Glacial and hydrological change in the deglaciating Virkisa river catchment, Iceland	Birmingham
15	Katherine Harris	The value of geo-resources beneath our cities	Warwick
16	Laura Deeprose	What can speleothems reveal about climate change during the Neanderthal demise?	Lancaster
17	Mihai Cimpoiasu	A world of soils	Nottingham
18	Nathan Magnall	Complex processes in rare lava flows	Lancaster
19	Niall Gandy	Modelling the collapse of the Minch palaeo-ice stream	Leeds
20	Olivier Humphrey	Iodine uptake, movement and storage in spinach and tomatoes	Nottingham
21	Paul McLachlan	Geophysical characterisation of the groundwater — surface water interface	Lancaster
22	Ryan Dick	Finding tsunami-causing landslide deposits in the lakes of New Zealand	Newcastle
23	Saeed Ahmad	Geochemistry of iodine and selenium	Nottingham
24	Simone Mancini	Reducing earthquake forecast uncertainty in the real world	Bristol
25	Stacy Phillips	How to make a mountain: investigating crustal melting in the Himalaya	Open University
26	Thomas Jones	In-conduit magma convection during basaltic fissure eruptions	Durham
27	Vangelis Pitidis	The geological dimension of urban resilience impact of geo-hazards in resilient urban design and disaster risk management	Warwick
28	Rachael Gosling	Dating in the Scottish Highlands — new approaches to the Grampian Shear Zone	Hull
29	Doris Wendt	How does groundwater use influence droughts?	Birmingham
30	Edward Lockhart	The sedimentary evolution of the Celtic Sea during marine isotope stages 1 and 2	Bangor

Current BUFI research projects

Currently BUFI supports over 100 projects with researchers at various stages of their PhDs.

PhD title	Student name	BGS supervisor	University supervisor
BGS global science			
Investigating the structural expression of passive-margin sedimentary-basin development in metamorphic basement (Grampian Highland area, Scotland, UK)	Rachael Gosling	Martin Smith	Rob Strachen, Portsmouth, and Eddie Dempsey, Hull
BGS laboratories			
Evaluating trade-offs between health benefits and risks associated with grow your own in (peri-)urban areas	Jonathon Stubberfield	Louise Ander	Neil Crout, Nottingham
Centre for environmental geochemistry			
Using Pb and Zn isotope compositions of crude oils as geological and environmental tracers	Nadege Fetter	John Ludden	Janne Blicher, University of Lyon, France
The role of underutilised crops in alleviating hidden hunger	Diriba Kumssa	Louise Ander	Martin Broadley, Nottingham
Bioavailability of chromium from Zambian soils near mine-waste dumps: implications for staple crops	Elliott Hamilton	Michael Watts	Scott Young, Nottingham
Shell proxies and the physiological effects of ocean acidification and increased temperature on two commercially important bivalve molluscs	Richard Patton	Simon Chenery	Chris Richardson, Bangor
Growth and fecundity of the whelk *Buccinum undtum* in coastal-shelf seas	Philip Hollyman	Simon Chenery	Chris Richardson, Bangor
Source apportionment of urban contaminants	Abida Usman	Louise Ander	Scott Young, Nottingham
Iodine in soils: geochemical dynamics and availability to plants	Olivier Humphrey	Michael Watts	Scott Young, Nottingham
Are land-use decisions of African elephants based on environmental geochemistry?	Fiona Sach	Michael Watts	Martin Broadley, Nottingham
Gold mineralisation and tectonomagmatic evolution of the Yalgoo-Singleton Greenstone Belt, Western Australia	Jamie Price	Kathryn Goodenough	Andrew Kerr, Cardiff
Impact of extreme rainfall events on the mobility of potentially toxic elements in floodplains	Layla Al-Mousili	Michael Watts	Tom Sizmur, Reading
Late-Quaternary Antarctic ice-sheet discharge: exploiting the sediment diatom silica archive	James Williams	Melanie Leng	Jennifer Pike, Cardiff
Climate and landscape change			
The rock record of the British Cretaceous	Fiona Walker	Andy Newell	Mike Benton, Bristol
The mid-Jurassic plankton explosion	Nick Wiggan	Jim Riding	Nick Butterfield, Cambridge
Equatorial sea-surface temperature seasonality in the Mississippian (Carboniferous) derived from brachiopod shell carbonate	Leah Nolan	Mike Stephenson	Melanie Leng, Leicester
Palaeobiology of phosphatised Ediacaran microfossils from Norway	Peter Adamson	Phil Wilby	Nick Butterfield, Cambridge
Colloidal copper and lead-sulphide dynamics in an alluvial floodplain soil and their impact on trace-metal mobility	Susanne Schwarz	Andy Tye	Wolfgang Wilcke, Berne, Switzerland
Constraining the marine environment of the Cambrian metazoan adaptive radiation	Thomas Hearing	Phil Wilby	Tom Harvey, Leicester
Deep-sea temperature and ice volume change across the mid-Pleistocene climate transition: insights from the Bering Sea	Henrieka Detlef	Sev Kender	Sindia Sosdian, Cardiff
The early Toarcian (Early Jurassic) mass-extinction event and recovery in the eastern Tethys: integrating palaeontological and geochemical data from Bulgaria	Autumn Pugh	Jim Riding	Crispin Little, Leeds

Current BUFI research projects

Basin-scale mineral and fluid processes at a palaeo-platform margin, Lower Carboniferous, UK	Catherine Breislin	Jim Riding	Cathy Hollis, Manchester
Effects of changing climate on an northern peatland: greenhouse gas sink or source	Kerry Simcock	Chris Vane	Geoff Abbott, Newcastle
Ultrasound spectrometry of the aggregation of asphaltenes during the formation of water-in-oil emulsions	Aleksandra Svalova	Chris Vane	Geoff Abbott, Newcastle
Morphogenesis and development in the Ediacaran macrobiota	Frances Dunn	Phil Wilby	Phil Donoghue, Bristol
Investigating Bering Sea oceanographic controls on the Middle Pleistocene transition	Savannah Worne	Jim Riding	Sev Kender, Nottingham
Earth hazards and observatories			
Using earthquake seismology to track transient convective circulation beneath the British Isles	Charlotte Schoonman	Richard Luckett	Nicky White, Cambridge
Toward a universal model for lava emplacement	Nathan Magnall	Charlotte Vye-Brown	Michael James, Lancaster
Fissures and fountains: magma dynamics in basaltic conduits	Thomas Jones	Charlotte Vye-Brown	Ed Llewellin, Durham
The sources, mechanisms and timing of volatile loss accompanying basaltic volcanism	Catherine Gallagher	Charlotte Vye-Brown	Kevin Burton, Durham
Petrological constraints on the structure of Icelandic volcanic systems	Will Miller	Evgenia Ilyinskaya	John Maclennan, Cambridge
The hidden hazard of melting ground-ice in Northern Iceland	Costanza Morino	Colm Jordan	Matt Balme, Open University
Soil moisture estimation: a new approach using multi-temporal satellite and airborne radar data	Clare Bliss	Colm Jordan	Danny Donoghue, Durham
Separating magnetic field sources using the Swarm satellite constellation	Ashley Smith	Sue Macmillan	Kathy Whaler, Edinburgh
Forecasting changes in Earth's magnetic field	Maurits Metman	Ciaran Beggan	Phil Livermore, Leeds
New insights into earthquake characteristics, fault behaviour, and the rheology of the lithosphere	Sam Wimpenny	Brian Baptie	Alex Copley, Cambridge
Community based, non-structural flood risk management for Malawi	Robert Sakic Trogrlic	Melanie Duncan	Grant Wright, Heriot-Watt and University of Malawi
Physics-based forecasting of earthquake sequences	Simone Mancini	Margarita Segou	Maximilian Werner, Bristol
Energy & marine geoscience			
The 3D architecture and structure of a tectonised glacigenic sedimentaty sequence in the Dogger Bank area of the Southern North Sea	Astrid Ruiter	Emrys Phillips	Simon Carr, London Queen Mary College
Seasonally resolved climate variability since the last glacial maximum from the laminated sediments of Windermere	Rachael Avery	Carol Cotterill	Alan Kemp, Southampton
Evaluating 3D sedimentary architecture as a fundamental control on geotechnical and physical properties (Dogger Bank Round 3 Windfarm Zone)	Kieran Blacker	Carol Cotterill	Sarah Davies, Leicester
High-resolution environmental change from Holocene sediments of Windermere	James Fielding	Carol Cotterill	Alan Kemp, Southampton
Seismic imaging and fluid-dynamic modelling of sequestered carbon dioxide in the North Sea, UK	Laurence Cowton	Jim White	Jerome Neufeld, Cambridge
Sulfate-reducing bacteria in CO_2	Hayden Morgan	Simon Gregory	David Large, Nottingham
The Bowland Shale of the UK: development of diagenetic models for a major UK hydrocarbon reservoir	Sarah Newport (nee Kenworthy)	Edward Hough	Kevin Taylor, Manchester and Liverpool
Unravelling the structural controls and consequent feedbacks on Permian and Mesozoic depositional systems in the Southern North Sea	Ross Grant	Thomas Randles	John Underhill, Heriot-Watt

Current BUFI research projects

Environmental assessment of deep-water sponge fields in relation to oil and gas activity: a West of Shetland case study	Johanne Vad	Sophie Green	J Murray Roberts, Heriot-Watt
Controls on UK lower Namurian shale-gas prospectivity: understanding the temporal and spatial distribution of organic matter in siliciclastic mudstones	Joseph Emmings	Mike Stephenson	Sarah Davies, Leicester
Glacial sculpting and post-glacial drowning of the Celtic Sea	Edward Lockhart	Claire Mellett	James Scourse, Bangor
Deepwater geo-hazards from bottom-currents: high-resolution geophysics, geotechnics and the bedform-velocity matrix	Philip Green	Joana Gafeira	Dorrik Stow, Heriot-Watt
Linking rifting history and magmatic cyclicity west of Britain (WoB)	Faye Walker	Margaret Stewart	Nick Schofield, Aberdeen
The influence of halokinesis on shallow-marine sediments in salt basins: the Fulmar Formation, Central North Sea, UK.	James Foey	Thomas Randles	Ian Stimpson, Keele
Shale gas in the UK — geochemical mapping of critical shale properties across Carboniferous basins	Jack Walker	Jan Hennissen	Cees van der Land, Newcastle
Collapse of the British–Irish ice sheet: the role of climate and sea level changes	Niall Gandy	Dayton Dove	Lauren Gregoire, Leeds
Finding tsunami-causing landslide deposits in the lakes of New Zealand	Ryan Dick	Dave Tappin	Stuart Dunning, Newcastle
Energy Systems & Basin Analysis			
Global change during the Jurassic: applying multiproxy studies to outcrop and cores	Alex Hudson	Jim Riding	Stephen Hesselbo, Exeter Camborne School of Mines
Analysis of shale mineralogy and fabric and its induced anisotropic seismic response for hydrocarbon exploration and production	Iain Anderson	Xiaoyang Wu	Jingsheng Ma, Heriot-Watt
Engineering Geology			
Development of a UAV-based landslide monitoring system	Maria Peppa	Jon Chambers	Jon Mills, Newcastle
Development and application of machine-learning techniques for characterisation and quantification of change in time-lapse electrical-resistivity tomography monitoring	William Ward	Paul Wilkinson	Li Bai, Nottingham
Laboratory earthquakes	Christopher Harbord	Sergio Vinciguerra	Stefan Neilsen, Durham
Early warning of landslide events using computer vision and geophysical image analysis	Luke Sibbett	Jon Chambers	Li Bai, Nottingham
Revealing hydrological and bioeochemical heterogeneity at the groundwater-surface water interface using geophysics	Paul McLachlan	Jon Chambers	Andrew Binley, Lancaster
Enhancing the information content of geophysical data applied to nuclear site characterisation	Michael Tso	Oliver Kuras	Andrew Binley, Lancaster
The geological dimension of urban resilience: impact of geohazards in resilient urban design and policy	Vangelis Pitidis	Deodato Tapete	Jon Coaffee, Warwick
Impact and value of georesources underneath cities for resilient urban design	Katherine Harris	Ian Millar	Jon Coaffee, Warwick
Geophysical indicators of slope stability: towards improved early warning of landslide hazards	James Whiteley	Jon Chambers	Michael Kendall, Bristol
Combining geoelectrical imaging and X-ray computed tomography (CT) for improved hydraulic characterisation of soils	Mihai Cimpoiasu	Oliver Kuras	Sacha Mooney, Nottingham
Environmental modelling			
Uncertainty in expert interpretation of geological cross-sections and its propagation into 3D geological framework models	Charles Randle	Murray Lark	Clare Bond, Aberdeen
Understanding the interactions between adited groundwater sources and the chalk aquifer under drought conditions, using the example of the River Colne Catchment and its groundwater sources	Azucena Yebra	Andrew Hughes	Adrian Butler, Imperial College

Current BUFI research projects

The effects of climate-induced flood events on the mobility and bioaccessibility of potentially harmful elements and biological and radiological contaminants	Diana McLaren	Joanna Wragg	David Copplestone, Stirling
Long-term morphodynamics and sedimentation of the Holderness coast and Humber estuary	Chloe Morris	Andrew Barkwith	Thomas Coulthard, Hull
Trust and risk communication format and the nature of uncertainty	Sarah Jenkins	Murray Lark	Adam Harris, University College London
Geoanalytics and modelling			
PRELUDE: predictive modelling of lead concentrations using G-base datasets for urban environments	Sarah Donoghue	Fiona Fordyce	Margaret Graham, Edinburgh
Coastal management and adaptation: an integrated big data approach — improved risk- based decision making	Al Rumson	Katy Lee	Stephen Hallett, Cranfield
Can nature protect us from the coastal impacts of climate change? An analysis of geotechnical properties of salt marshes and implications for salt marsh stability	Helen Brooks	Kate Royse	Iris Moeller, Cambridge
Geology and regional geophysics			
Formation and age of the Arran central ring complex	Robert Gooday	Kathryn Goodenough	Andrew Kerr, Cardiff
Groundwater			
Tracing pollution and seawater intrusion in groundwater systems of the Pearl river basin, China	Lee Chambers	Daren Gooddy	Greg Holland, Lancaster
Assessing the efficacy of mitigation options for diffuse water pollution from agriculture	Matilda Biddulph	Sean Burke	Ian Foster, Northampton
Stable-isotope biogeochemistry of methane in UK groundwater prior to shale-gas development	Millie Basava-Reddi	Daren Gooddy	Edward Hornibrook, Bristol
Understanding groundwater controls on microbial metabolic activity, biogeochemical cycling and associated greenhouse gas production in streambed sediments	Sophie Comer-Warner	Daren Gooddy	Stefan Krause, Birmingham
Measuring micro-aggregate bond energy for improved modelling of soil fragmentation	Rachel Efrat	Barry Rawlins	John Quinton, Lancaster
Runoff generation, flooding and flow paths in the changing environment of upland UK	Leo Peskett	Alan MacDonald	Kate Heal, Edinburgh
Chromium speciation, transport and fate in Clyde catchment soils, sediments and waters: understanding Cr mobility in urban-industrial environments	Gavin Sim	Barbara Palumbo-Roe	Margaret Graham, Edinburgh
Glacial, hydrological and landscape change in a deglaciating catchment: Virkisjökull, Iceland	Jon MacKay	Chris Jackson	Nicholas Barrand, Birmingham
Geochemical modelling of environmental processes in rare earth element mining	Alexandra Crawford	Barbara Palumbo-Roe	Steven Banwart, Sheffield
Multiscale prediction of groundwater response to extreme events	Will Rust	John Bloomfield	Ian Holman, Cranfield
Investigating heat transport by groundwater in fractured aquifers for ground-energy applications	Oleksandra Pedchenko	Corinna Abesser	Fleur Loveridge, Southampton
Understanding hydrological drought	Doris Wendt	John Bloomfield	Anne Van Loon, Birmingham
Application of novel field sensors for tracking pathogens in drinking-water supplies in Africa	Jade Ward	Daniel Lapworth	Stephen Pedley, Surrey
Informatics			
Semantic information retrieval for geological resources	Ikechukwu Nkisi-Orji	Rachel Heaven	Nirmalie Wiratunga, Robert Gordan University

Current BUFI research projects

Land, soil and coast			
Dynamics of metal nanoparticles in soil environments	Rebecca Draper	Andy Tye	Liz Bailey, Nottingham
Marine geoscience			
Fluid flow paths through sedimentary basins: implications for exploration in challenging geological environments	Chantelle Roelofse	Joana Gafeira	Tiago Alves, Cardiff
Structural glaciological evolution of rapidly receding temperate piedmont glaciers: a case study from southern Iceland	Ailsa Guild	Emrys Phillips	David Evans, Durham
Climatic cyclicity and environmental interactions in arid continental basins: the Leman Sandstone, Southern North Sea	Charlotte Priddy	Thomas Randles	Stuart Clark, Keele
Constraining the thermal histories of the Carboniferous Midland Valley of Scotland: a potential resource for unconventional gas and shale oil?	Eamon McKenna	Alison Monaghan	Cristina Persano, Glasgow
Impact of glaciation on Arctic petroleum systems: seismic geomorphology and petroleum- systems modelling offshore west Greenland and west Norway	David Cox	Erica Greenhalgh	Mads Huuse, Manchester
Minerals and waste			
Earth observation for advanced geoscience modelling — the Tellus South West airborne, high-resolution, geophysical, multispectral and LiDAR survey	Chris Yeomans	Paul Lusty	Robin Shail, Exeter Camborne School of Mines
Timing of Cu-Au-Te-PGE porphyry-style mineralisation in northern Greece and Bulgaria and its relationship to metamorphic core-complex exhumation	Rebecca Perkins	Jon Naden	Frances Cooper, Bristol
An enhanced understanding of the thermal and fluid history of a Variscan metallogenic province from critical metal investigations: the antimony and tungsten-bismuth deposits of south-west England	Eimear Deady	Kathryn Goodenough	Kate Moore, Exeter Camborne School of Mines
BLUE MINING: What drives hydrothermal systems and how does it vary over time?	Iain Stobbs	Paul Lusty	Bram Murton, Southampton
Magmatic evolution of a gold telluride district — Metaliferi Mountains, Romania	Vlad Victor Ene	Jon Naden	Dan Smith, Leicester
Epithermal palaeosurface evolution in emergent volcanoes: implications for shallow, submarine mineral deposit exploration and preservation	Jo Miles	Jon Naden	Frances Cooper, Bristol
NIGL			
U-series constraints on the evolution of the Green River (Utah) natural analogue for geological carbon storage	Peter Scott	Daniel Condon	Mike Bickle, Cambridge
Variations in the Antarctic circumpolar current and its impact on South Georgia ice sheet extent over the Holocene	Rowan Dejardin	Melanie Leng	George Swann, Nottingham
Speleothem climate capture of the Neanderthal demise	Laura Deeprose	Melanie Leng	Peter Wynn, Lancaster
Environmental lead pollution in the Roman Empire — characterising its effects on juvenile exposure, health and geographic mobility	Joanna Moore	Jane Evans	Janet Montgomery, Durham
The mid-Pleistocene transition in Asian monsoon variability	Sonja Felder	Melanie Leng	Andrew Henderson, Newcastle
Geochemical dynamics and bioavailability of iodine and selenium in Gilgit-Baltistan, Pakistan	Saeed Ahmad	Michael Watts	Scott Young, Nottingham
Tracking solar nebula evolution with analyses of single chondrules	Timothy Gregory	Stephen Noble	Tim Elliott, Bristol, and Natural History Museum
Crust–mantle exchange in orogenic lower crust: the record in high temperature eclogites	Eleni Wood	Nick Roberts	Clare Warren, Open University

Current BUFI research projects

Investigating the role of oceanic plateaux in early continental growth	David Cavell	Ian Millar	Alan Hastie, Birmingham
Subduction and exhumation of the Tso Morari dome, Ladakh, Himalaya	Anna Bidgood	Nick Roberts	Mike Searle, Oxford
Unravelling the tectonothermal history of the Aegean orogen	Thomas Lamont	Nick Roberts	Mike Searle, Oxford
When did crustal melting form the soft centre at the heart of the Himalaya?	Stacey Philips	Nick Roberts	Tom Argles, Open University
Testing tectonic–climate interactions using sedimentary records in the Tarim Basin, China	Chris Kneale	Deodato Tapete	Yani Najman, Lancaster
Provenance of the late Quaternary loess along the middle and lower Danube River, Europe	Kaja Fenn	Ian Millar	David Thomas, Oxford
NIGL-GTF			
Vestiges of the earliest crust: crustal evolution in the Yilgarn craton, Australia	Leanne Staddon	Matt Horstwood	Ian Parkinson, Bristol

Recent publications by BUFI students

Our BUFI students have co-authored nearly 20 papers so far this year. 2016 was a bumper year for publications with over 40 papers published. Listed below are publications to date for 2017, 2016 and 2015. For a full list of BUFI publications for previous years see http://www.bgs.ac.uk/research/bufi/publications/home.html

Note: BUFI student names are in *italics* and **bold**; BGS supervisors are in **bold**.

2017 to present

Broom-Fendley, S, Brady, A E, Wall, F, **Gunn, G,** and Dawes, W. 2017. REE minerals at the Songwe Hill carbonatite, Malawi: HREE-enrichment in late-stage apatite. *Ore Geology Reviews* 81, 23–41. DOI: http://dx.doi.org/10.1016/j.oregeorev.2016.10.019

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Recent publications by BUFI students

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Wilby, P R, ***Kenchington, C G***, and Wilby, R L. 2015. Role of low intensity environmental disturbance in structuring the earliest (Ediacaran) macrobenthic tiered communities. *Palaeogeography, Palaeoclimatology, Palaeoecology* 434, 14–27. DOI: http://dx.doi.org/10.1016/j.palaeo.2015.03.033

BUFI alumni

Congratulations to all our students who have successfully completed their PhDs since our last science festival. They are listed below along with those from most recent years. For a full list of BUFI alumni see http://www.bgs.ac.uk/research/bufi/alumni/home.html

Project title	Student name	BGS supervisor	University supervisor
2017			
Millennial-scale variability in ice-ocean-climate interaction in the sub-Antarctic south-west Atlantic — a multi-proxy study of intermediate water production and Patagonian ice-sheet variability over the last glacial	Jenny Roberts	Sev Kender	David Hodell (Cambridge) and Victoria Peck (BAS)
Novel approaches for speciating and tracing the metabolism of phosphorus in groundwater and surface water	Ceri Davies	Daren Gooddy	Ben Surridge, Lancaster
Adaptive large-scale mantle convection simulations	Samuel Cox	John Ludden	Tiffany Barry, Leicester
2016			
Novel X-ray diffraction and the remote analysis of Mars	Stuart Turner	Stephen Grebby	John Bridges, Leicester
Late Quaternary volcanism and climate of southern Patagonia	Stefan Lachowycz	Katy Mee	David Pyle, Oxford
Geogenic arsenic-attributable health risks in UK and the European Union	Daniel Middleton	Michael Watts	David Polya, Manchester
Early Ediacaran biotas of Charnwood Forest (UK): assembly of the first macroscopic marine communities	Charlotte Kenchington	Phil Wilby	Nick Butterfield, Cambridge
Understanding the evolution of the Syrtis Major volcanic complex (Mars) and comparison with volcanoes in the Afar rift system (Earth)	Peter Fawdon	Charlotte Vye-Brown	Matt Balme, Open University
Mineralogy and geochemistry of ultramafic rocks for mineral CO_2 sequestration	Alicja Lacinska	Mike Styles	Matthew Hall, Nottingham
Dissolution processes at the CO_2/brine interface change challenge	Thomas Ward	Chris Rochelle	Henry Power, Nottingham
Microstructural analysis of time-variant evolution in pore geometry of cement materials during carbonation	Konstantinos Giannoukos	Chris Rochelle	Matthew Hall, Nottingham
Late Quaternary palaeo-environmental reconstruction from Lake Ohrid (Macedonia/Albania) using stable isotopes	Jack Lacey	Melanie Leng	Matthew Jones, Nottingham
Investigating the controls on critical metal distribution within intrusion-centred mineralisation: Chalkidiki Peninsula, north Greece	Kate McFall (née Sullivan)	Paul Lusty	Stephen Roberts, Southampton
Peat's secret archive: reconstructing the North Atlantic storm frequency and volcanic eruption history of the last 10 000 years	Helena Stewart	Tom Bradwell (moved to University of Stirling in 2015)	Robert McCulloch, Stirling
Quantitative imaging of slope moisture dynamics	Rosalind Hen-Jones	Dave Gunn	Paul Hughes, Newcastle
Glacier-to-foreland hydrological coupling at a maritime glacier	Verity Flett	Jez Everest	Martin Kirkbride, Dundee
Geological controls on the distribution and abundance of invertebrate groundwater fauna	Damiano Weitowitz	Louise Maurice	Anne Robertson, Roehampton
The making of the modern world: ocean evolution during the Neogene, the last great warm interval	Jamie Boyd (née Lakin)	Jim Riding	Matthew Pound, Leeds
Glaciation of the North Sea Basin: integrating evidence from basin-scale 3D seismic geomorphology, site surveys, boreholes and adjacent land areas	Rachel Lamb	Carol Cotterill	Mads Huuse, Manchester

BUFI alumni

Antarctica climate and vegetation during the Neogene: a geochemical and modelling approach	Rhian Rees-Owen	Jim Riding	Jane Francis, Leeds
Public perception of shale gas extraction technology	William Knight	Mike Stephenson	Sarah O'Hara, Nottingham
2015			
Carbon capture and storage: factors influencing public attitudes	Andrey Barsky	John Rees	Brigitte Nerlich, Nottingham
Climatic cyclicity and environmental interactions in proximal continental basins: Implications for groundwater flow	Amy Gough	Tony Milodowski and Phil Richards	Stu Clark, Keele
Development of a genetic model for targeting gold mineralisation in the Scottish Dalradian	Nyree Hill	Gus Gunn and Jon Naden	Gawen Jenkin, Leicester
Investigating organo-mineral suspended sediment dynamics as controls on phosphorus export from instrumented agricultural test catchments	Richard Cooper	Barry Rawlins	Kevin Hiscock, East Anglia
Novel strategies for nutritional security in sub-Saharan Africa	Edward Joy	Louise Ander and Michael Watts	Scott Young, Nottingham
Engaging communities on geohazards: seeking community-centred approaches to reducing vulnerability to geohazards in the Solomon Islands	Kim Hagen	Susanne Sargeant	Melissa Butcher, Open University
Active and ancient geothermal systems in Tethyan ophiolites as examples of novel solutions for natural CO_2 sequestration	Amy Stephen	Mike Styles	Gawen Jenkin, Leicester
Hydrogeophysics of a restless volcano	Brioch Hemmings	Andrew Hughes	Joachim Gottsmann, Bristol
The effects of gas stream impurities and reservoir mineralogy on in situ carbonation for long-term geological storage of carbon dioxide	Chijioke Nwankwor	Keith Bateman	Mercedes Maroto-Valer, Nottingham
2015 *(continued)*			
Late Quaternary volcanism and climate of southern Patagonia	Stefan Lachowycz	Katy Mee	David Pyle, Oxford
Evaluating the role of community-based monitoring in improving the mitigation of natural hazards: a case study on Montserrat, West Indies	Jon Stone	Sue Loughlin	Jenni Barclay, East Anglia
The impact of hyper-alkaline fluids from a geological radioactive waste repository on the biological and physical characteristics of the host rock environment	Sarah Smith	Joanna Wragg	John Lloyd, Manchester
Targeting elevated concentrations of mid and heavy rare earth elements in alkaline provinces	Sam Broom-Fendley	Gus Gunn	Frances Wall, Exeter Camborne School of Mines
Rock alteration in the chemically disturbed zone of a geological disposal facility for radioactive waste	Lizzy Moyce	Toni Milodowski	Sam Shaw, Manchester
2014			
4D hydrogeophysical monitoring of landslide processes	Andy Merritt	Jon Chambers	Phil Murphy, Leeds
A comparison of the geological, geodynamic and rheological evolution of the northern and southern Rockall Basin using a 3D modelling approach	Rosie Smithells	Geoff Kimbell and Chris Johnson	Stu Clark, Keele
British ice sheet dynamics: constraining ice-sheet thickness and ice-stream collapse in north-west Scotland using cosmogenic isotope analysis	Hannah Mathers	Tom Bradwell	Derek Fabel, Glasgow
Determination of late glacial and post glacial processes using sediments from within Lake Windermere	Helen Miller	Carol Cotterill	Jonathan Bull, Southampton

BUFI alumni

Does vegetation mediate the effects of climatic change on lake catchment dynamics at Lake Mugecuo, south-west China?	Sarah-Jane Phelan	Mike Ellis	Richard Jones, Exeter
Evaluating impacts on community infrastructure following recent volcanic eruptions in Chaiten (Chile) and Rabaul (Papua New Guinea)	Victoria Sword-Daniels	Susanne Sargeant	Tiziana Rosetto, University College London
Glacio-eustatic controls on sedimentary sequences: a field and physical modelling based study	Jochem Bijkerk	Colin Waters	Paul Wignall, Leeds
Holocene sea-level change from the Thames Estuary: implications for geophysical modeling and ocean–climate interaction	Nicole Khan	Chris Vane	BP Horton, University of Pennsylvania
Investigation of Pliocene climate and oceanography of the North Atlantic region through bivalve sclerochonology: an approach to predicting future conditions	Annemarie Valentine	Peter Balson	Andrew Johnson, Derby
Lateral variations and linkages in thrust geometry in fold and thrust belts	Michael Kelly	Graham Leslie	Graham Williams, Keele
Magmatic, structural and tectonic controls on Cu-Au mineralisation in the Solomon arc south-west Pacific	Simon Tapster	Jon Naden and Gus Gunn	Mike Petterson, Leicester
Microbial response to soil chemistry defined by the Tellus dataset, Northern Ireland	Nicola Ashton	Andy Tye	Richard Pattrick, Manchester
Quantifying crustal strain due to rifting in Afar, Ethiopia	Barbara Hofmann	Charlotte Vye-Brown	Tim Wright, Leeds
Reconstructions of late Holocene storminess in Europe and the role of the North Atlantic Oscillation	Lisa Orme	Andrew Barkwith and Mike Ellis	Richard Jones, Exeter
The fate of contaminants in urban soils and road dusts: novel assessments and implications for risks (a case study from urban Manchester)	Raquel Carduso	Neil Breward	Kevin Taylor, Manchester Metropolitan
The geomicrobiology of coal mine drainage — microbes, green rust and the factors controlling iron mineralogy in coal mine drainage	Nia Blackwell	Jenny Bearcock and Barbara Palumbo-Roe	William Perkins, Aberystwyth
Development of geochemical and mineralogical methods for targeting lower environmental impact secondary copper deposits in the Troodos Massif, Cyprus	Dan Parvaz	Jon Naden	Ben Williamson, Exeter Camborne School of Mines and Richard Herrington, Natural History Museum
Using virtual earthquakes and virtual seismometers in the Earth's interior	Elizabeth Entwhistle	Brian Baptie	University of Edinburgh
Nature, timing and geodynamic context of polymetallic mineralisation in the Kassandra mining district, North Greece	Andreas Hahn	Jon Naden	Andy Rankin, Kingston

NERC doctoral training

Currently, the Natural Environment Research Council (NERC), the BGS's parent body, delivers PhD training through doctoral training partnerships (DTPs) and Centres for Doctoral Training (CDTs).

DTP postgraduate training is delivered in collaboration with partners from a wide range of backgrounds including industry, specialist research organisations, charities, NGOs, government bodies and many more, to ensure NERC DTP students are equipped with the skills and experiences to allow them to become world leaders in their chosen careers.

NERC supports CDTs to provide focused investment into areas of priority, to address training needs within the NERC remit. CDTs are supported with the intention of developing a legacy of training excellence from an initial, directed NERC investment. This training is delivered in collaboration with non-academic partners and, over the course of their studentships, individuals should also have opportunities to undertake collaborative research and training with non-academic partners.

Listed below are the CDTs and DTPs BGS is currently involved in along with the lead university and some of the main partners. To see a full list of partners please visit the individual websites.

CDT name	Lead university	Partners
UK Oil and Gas	Heriot-Watt University http://www.nerc-cdt-oil-and-gas.ac.uk/contacts.html	Heriot-Watt University • Imperial College • University of Aberdeen • University of Durham • University of Manchester • University of Oxford • BP • Cairn Energy • ConoocoPhillips • E.ON • OMV • Shell • Statoil • Total • Woodside Energy • Royal Holloway • University of Birmingham • University of Cardiff • University of Dundee • University of Exeter (Camborne School of Mines) • University of Glasgow • University of Keele • University of Newcastle • University of Nottingham • University of Southampton • University of Strathclyde • National Oceanography Centre • Halliburton • Nautilus • Neftex • PGS • Schlumberger • Spectrum • Western Geoco
STARS	Lancaster University www.starsoil.org.uk	Bangor University • Cranfield University • University of Nottingham • NERC Centre for Ecology and Hydrology • James Hutton Institute • Rothamsted Research
Urban Science and Progress	University of Warwick http://www.wisc.warwick.ac.uk/training/doctoral-training-programme/	New York's Metropolitan Transportation Authority • IBM • URS • AT&T • E.ON • British Gas and Cisco
DREAM	Cranfield http://www.dream-cdt.ac.uk/studying/application/	University of Cambridge • Newcastle University • University of Birmingham • EU Joint Research Centre • Esri (UK) • Bluesky Ltd • Centre for Environment, Fisheries and Aquaculture Science • Centre for Ecology & Hydrology (CEH) • Atkins Global • Anglian Water Ltd • Infrastructure UK • Willis • ARUP • JBA • Northumbria Water Ltd • Newcastle City Council • Defra • East Suffolk Council • Severn Trent Water plc • Ordnance Survey (OS) • Environment Agency (EA) • Herbert Smith Freehills (commercial lawyers) • Lloyds Register Foundation • Marine Scotland • Milton Keynes Council • British Antarctic Survey (BAS) • Willis • Willis Research Network (WRN) • Marine Management Organisation (MMO) • Nuclear Decommissioning Authority • Public Health England • Birmingham City Council • Scottish National Heritage • Joint Research Centre of the European Commission (JRC EC) and the James Hutton Institute (JHI)

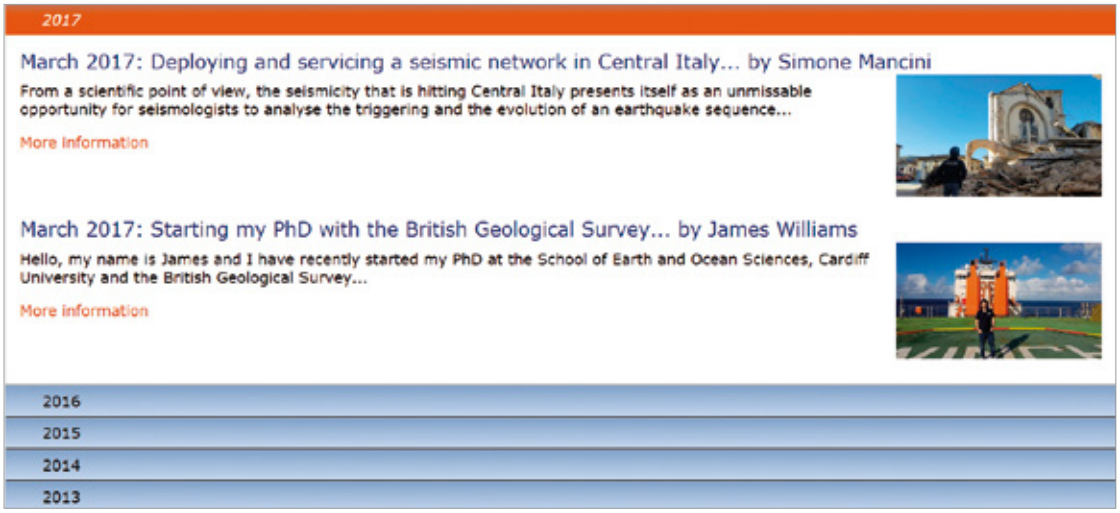
NERC doctoral training

DTP name	Lead university	Website
CENTA	University of Birmingham www.centa.org.uk	Open University • University of Leicester • University of Warwick
E3	University of Edinburgh http://e3partnership.wordpress.com	Biomathematics & Statistics Scotland • Forest Research • International Institute for Environmental Development • LTS International • National Museums Scotland • NERC Centre for Atmospheric Science • Centre for Ecology & Hydrology • Scotland's Rural College • Scottish Association for Marine Science • Scottish Universities Environmental Research Centre • UK Met Office
ENVISION	Lancaster University www.envision-dtp.org	Bangor University • Centre for Ecology & Hydrology • University of Nottingham • Rothamsted Research
GW4-Plus	University of Bristol www.bristol.ac.uk/gw4plusdtp	British Antartic Survey • Cardiff University • Natural History Museum • Centre for Ecology & Hydrology • Plymouth Marine Laboratory • UK Met Office • University of Bath • University of Exeter
IAPETUS	Durham University www.iapetus.ac.uk	Centre for Ecology & Hydrology • Newcastle University • University of Glasgow • University of St Andrews • University of Stirling
EnvEast	University of East Anglia http://www.enveast.ac.uk/	University of Essex • University of Kent • British Antarctic Survey • British Trust for Ornithology • Centre for Ecology & Hydrology • Centre for Environment, Fisheries and Aquaculture • The John Innes Centre • The Marine Biological Association • The Met Office • Plymouth Marine Laboratory • The Sir Alister Hardy Foundation for Ocean Science
SCENARIO	University of Reading www.met.reading.ac.uk/nercdtp/home	Environment Agency • Centre for Atmospheric Science • Centre for Earth Observation • Centre for Ecology & Hydrology • UK Met Office • University of Surrey
SSCP	Imperial College London http://www3.imperial.ac.uk/changingplanet	Kew, Royal Botanic Gardens • Natural History Museum • Centre for Ecology & Hydrology • UK Met Office • Zoological Society of London
Environmental Research	Oxford https://www.environmental-research.ox.ac.uk/	BirdLife International • ClientEarth • Earthwatch • Elsevier Ltd • European Centre for Medium Range Weather Forecasts • European Space Agency • Leopard Ecology & Conservation • Max Planck Institute for Meteorology • Met Office • National Centre for Atmospheric Science • National Centre for Observation • National Oceanography Centre • Natural England • Centre for Hydrology & Ecology • Operation Wallacea • Kew, Royal Botanical Gardens • Science Oxford • Shell Research • STFC Rutherford Appleton Laboratory • Sylva Foundation • The Biodiversity Consultancy Ltd • The Ecoexist Trust • Natural History Museum • Zoological Society of London
ESS	Cambridge http://essdtp.esc.cam.ac.uk/	Department of Earth Sciences • Department of Chemistry • Department of Geography and Scott Polar Research Institute (SPRI) • Department of Zoology • Department of Archaeology and Anthropology • Department of Plant Sciences • Department of Applied Maths and Theoretical Physics • British Antarctic Survey
SPITFIRE	Southampton http://www.spitfire.ac.uk/	University of Southapmton • National Oceanography Centre • Cefas • British Antarctic Survey • Centre for Ecology & Hydrology • Natural History Museum • SAHFOS • Plymouth AMrine Laboratory

BUFI on social media

GeoBlogy

BGS has several blogs including GeoBlogy (http://britgeopeople.blogspot.co.uk/) which is written by BGS staff and BUFI students, giving readers a real glimpse into the daily work and achievements of those who make the BGS a world-leading geoscience centre. Contributions by BUFI students are always welcome. If you would like to write for GeoBlogy please email the BUFI team bufi@bgs.ac.uk



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For more information contact:

Jon Naden
British Geological Survey,
Environmental Science Centre,
Keyworth, Nottingham
NG12 5GG

email:bufi@bgs.ac.uk
http://www.bgs.ac.uk/research/bufi/
Twitter: @DocBGS