

School of Environmental Sciences Postgraduate Research Conference 16-17 May 2022



Location: Blackburne House

Welcome

Welcome to the School of Environmental Sciences Annual Postgraduate Research Conference 2022

It is a pleasure to welcome back our annual PGR conference, an event that has been a milestone in our School since its creation. In the previous years, this conference has been part of the annual progression, showcasing the exciting research undertaking across the school. Now, it is an event that brings us together, from different disciplines to learn from each other.

I would like very much to thank the organising committee for their time, effort and creativity in proposing a new format for our SoES PGR conference 2022. The first day, Monday, is dedicated to talks and posters, at a venue outside of our campus, the Blackburne House. On Tuesday, we will reconvene on campus, and this day will be dedicated to panel discussions on different topics, from mentoring to the submission process of academic papers. We will also have the pleasure to host external speakers from outside academia. Finally, we will finish as usual, with celebration, a quiz, pizzas and drinks. Looking forward to seeing you all at the conference

Fabienne Marret-Davies
School Director of PGR Studies

Welcome from Head of Department and Director of PGR at 9.00 am on Monday 16th May at Blackburne House.

Talks will finish at approx 4.00pm

Postgraduate Research Conference Organising Committee

Malachy Buck
Cameron Byron
Lauren Aylward
Jade Hrintchuk

PGR Committee

Dr. Fabienne Marret-Davies
Dr Thomas Jones
Dr. Pascal Salaun
Dr. Samantha Patrick
Dr Ruth Cheung Judge
Prof Andy Morse
Dr. Chia-Lin Chen

Professional Services Support

Student Experience

Joe Sheridan

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Lindsay Davies

Marketing and Communications

Jamie Hughes
Alison Barkley

Monday 16th May, 9:00 – 17:00 at Blackburne House

9:00 - 9:10	Introduction from the Dean Professor Doug Mair
9:10 - 10:20	Talk session 1 – Chair: Malachy Buck
9:10 - 9:40	3 * 3rd year talk (6 min/talk, 3 min questions)
9:10 - 9:20	Cammy Acosta
9:20 - 9:30	Vivian Agbasoga
9:30 - 9:40	Cillian Berragan
9:40 - 9:50	6 * 01st year talk (1 min/talk, no questions)
In order	Claudia Akolam, Jack Bishop, Thomas Fitter, Chloe Gray, Ros Green and Andrew Palmer
9:50 - 10:20	3 * 3rd year talk (6 min/talk, 3 min questions)
9:50 - 10:00	Cameron Byron
10:00 - 10:10	Charlie Cullen
10:10 - 10:20	Chloe Griffin

10.20 – 10.50	Coffee break
10.50 – 12.00	Talk session 2 – Chair: Sian Teesdale
10.50 – 11.20	3 talks (6min/talk, 3 min questions)
10.50 – 11.00	Daniela Koenig (4th year)
11.00 – 11.10	Alfie Mackie (3rd year)
11.10 – 11.20	Fionnuala McCully (3rd year)
11.20 – 11.30	6 * 01st year talk (1 min/talk, no questions)
In order	Matthew Howard, Jade Hrintchuk, Bayan Mahdi, Farida Maula, Freddie McKendrick, Mohammad Meidiansyah.
11.30 – 12.00	3 * 3rd year talk (6 min/talk, 3 min questions)
11.30 – 11.40	Xin Meng
11.40 -11.50	James Murphy
11.50 – 12.00	Natascia Pannozzo

12.00 – 1.15	Lunch
1.15 – 2.15	Poster sessions (20 posters from 02nd years)
2.15 – 3.25	7 * 01st year talk (1 min/talk, no questions)
In order	Maya Middleton-Welch, Hafi Munirwan, Mary Murray, Chiedozie Ogbuagu, Andrew Palmer, Lyuboslav Petrov, Dawid Ribak
2.30 – 3.10	4 * 3rd year talk (6 min/talk, 3 min questions)
2.30 – 2.40	Connor Shiggins
2.40 – 2.50	Cameron Ward
2.50 – 3.00	James Watson
3.00 - 3.10	Kate Williams
3.10 – 3.20	7 * 01st year talk (1 min/talk, no questions)
In order	In order: Dina Simons, Molly Spater, Ibrahim Tahiru, Alexander Tully, India Uppal, Haojia Wang, Jingwen Xia
3:20 - 4:00	Coffee break, close and prizes

Tuesday 17th May, 9.30 – 17:30 in the G-FLEX Central Teaching Hub

9.30 – 11:00	The Academy group bonding activity session focused on team-work and development
11:00-11:30	Coffee break
11:30-13:00	Panel session: logistics of academic publishing with Dr. Kathy Burrell, Dr. Fabienne Marret-Davies, Dr. Richard Dunning, and Dr. Kate Parr following a school PGR journal presentation with journal editors
13:00 -14:00	Lunch
14:00 – 15:30	Panel session: careers outside of academia with Clare Davies (Nature publishing house), Dan Slade (TCPA), Jake Smallbone (BBC Wales), and Charlotte Williams (National Oceanographic Centre)
15:30 – 16:00	Coffee break
16:00 – 17:30	Pizza and Quiz

Cammy Janeth Acosta Ramírez***A framework of urban monitoring sensors to understand pollution from meso- to local-scale.***

Achieving sustainable development with a growing population requires understanding the urban climate. Low-cost sensors and the Internet of Things facilitate the deployment of wireless sensor networks in cities. This presentation shows the results of a pilot WSN in Liverpool, United Kingdom, with 15 low-cost stations located within a radius of 1.3 kilometres in the city and 13 stations in suburban areas. First, the design of a station based on Arduino with low-power wide area network, is introduced to monitor pollution data on a near real-time basis. Second, the results of the pilot analysis are provided by area: urban, residential, touristic, green and water spaces. Furthermore, a two-year analysis of country-wide pollution during COVID-19 is presented. The effects of social restrictions are studied with mobility data, assessing their relationship with anthropogenic emissions, and the role of weather is presented as a key factor for regional air quality.

Vivian Ubaku Agbasoga***No title provided***

Stations (BTS) express fears and concerns over the environmental and health impacts of such installations. This review investigates and establishes the Environmental Impact Assessment (EIA) process conducted by telecommunication licenced operators before approving mast and BTS installations in Nigeria. This review also aims to accomplish objective three (3) of the research project, which evaluates EIA systems in Nigeria with a particular concentration in the telecommunications sector. Data collection comprises a documentary review of 40 EIA reports from 2016 to 2020, accessed from the Federal Ministry of Environment (FME) archive. Data collection also includes relevant academic literature. The EIA reports were analysed using criteria adapted from Sadler (1996). Overall findings indicated that most of the EIA report addressed significant impacts. However, people living in the mast areas are concerned over mast collapse and other environmental health impacts caused by pollution. This study will further explore the perception of residents living in areas with mast installations to investigate their experiences.

Claudia Akolam

Women Empowerment and Environmental Impact Assessment in Ghana

At the core of the fight for gender equality for women, is their empowerment. The ability to build the capabilities of women is the catalyst for the realization to develop their full potentials to actively participate in decision-making processes across all fields (Kabeer, 2010). Women play vital environmental roles (Mahour, 2016), research suggest that women are more concern about the environment than men (Xiao & McCright, 2014). With the current campaign for environmental sustainability, the importance of Environmental Impact Assessment (EIA) as a tool for environmental management is significant since it is widely accepted (Ramanathan, 2001). Women can fully participate in EIA when they are adequately empowered (Cornish, 2018). In Ghana as a developing country, the issue of gender inequality and less female participation in environmental decision-making is paramount (Glazebrook, 2011). There is therefore the merit to explore ways in which women can be empowered using the lens of EIA.

Nourah Alnajdi

Caprock and overburden characterisation: avoiding leakage of CO₂ from Carbon Capture and Storage (CCS) sites

Sequestration of carbon dioxide in depleted hydrocarbon reservoirs and aquifers is an essential method to inhibit the emission of CO₂ in the atmosphere. For this type of strategy to work, a low permeable caprocks such as mudstones must seal the CO₂ within the reservoir for a long term avoiding any possible leakage from the injection site. Properties of mudstones such as geochemical and petrophysical can control the leakage integrity of CO₂. Samples are taken from potential CCS sites for laboratory experiments and petrophysical analysis. Shale samples are characterised via thins section preparation, SEM analysis, XRD, and MICP. The Rodby shale of the Acorn storage site is less porous and more permeable than Lista shale of the East Mey. The Rodby shale is calcite-rich unlike the Lista shale. This project is expected to be used as reference in future work of CCS to tackle the effect of CO₂ fluid flow simulation.

David Bareham

Supporting complex legal and commercial decision making through Data Science and AI

1-minute flash talk

Cillian Berragan

Comparing rule-based methods and pre-trained language models to classify flood related Tweets

Social media presents a rich source of real-time information provided by individual users in emergency situations. However, due to its unstructured nature and high volume, it is challenging to extract key information from these continuous data streams. This paper compares the ability to identify relevant flood related Tweets between a deep neural classification model known as a transformer, and a simple rule-based classification. Results show that the classification model out-performs the rule-based approach, at the time-cost of labelling and training the model

Jack Bishop

Methane emissions from urban waterways

1-minute flash talk

Cameron Byron

Death and geopolitics: burial governance across Wirral cemeteries from the nineteenth Century

My work examines how the territorial politics of death burial has changed over time in England. Through an exploration of the contentious ways bodies and borders intersect, my research centres in how we effectively govern and manage the multiple relations that occur between the living and the dead. Through case studies of burial grounds on the Wirral Peninsula, and using archival data situated within changing legal, (non)secular, and economic frameworks, I aim to provide a brief overview of how death and burial come to shape everyday geopolitical relations through the cemetery. I will discuss the way denominational politics are applied and contested; how public health issues surrounding the dead have become understood, and finally I will finish by examining the future of burial spaces across the region and issues of capacity, underscoring the temporal lineage that governance has produced in respect of interment.

Charlie Cullen

De-Naturalising Failure: a Foucauldian Archaeology of the Southgate Estate

Completed in 1978 at the heart of Runcorn New Town, the Southgate estate was built to provide improved living conditions for people from across Merseyside and beyond. The estate's demolition began just 12 years later in 1990, prompting questions over what 'went wrong' with this architecturally and socially ambitious project. In order to problematise the dominant narrative of this estate's demolition as inevitable and its failure absolute, this research utilises a methodology inspired by Michel Foucault's archaeological works, which were based on the ontological principle that the ways in which we think and behave are largely defined by contingent factors that are specific to a given time and place. In action, this means unearthing the extensive body of archival material that survives Southgate, to reveal how shifts in knowledge and practice allowed this housing scheme to be thought up, realised and razed in such an acute time period.

Thomas Fitter

Multiscale analysis of ephemeral systems: Linking bed roughness to surface flow

The movement of fluid within space and time is complex and undergoes three-dimensional evolutions that are challenging to predict, interpret and forecast. Flow visualisation techniques have been developed to characterise the movement of fluids. Analytical attempts to describe and predict turbulence creates challenges due to the non-linear nature of turbulent structures. Traditional methods of fluvial monitoring involve intrusive investigations that modify the flow field, are costly and require staffing, which may be impractical during high discharge conditions. Multiple studies have explored the surface velocity of fluvial systems using non-intrusive measurement techniques within laboratory settings. Challenges arise when applying non-intrusive measurements within the field that are representative of the flow field, that are cost-effective and address market-needs. This study aims to apply a low-cost, non-intrusive measurement technique, called FlowontheGo, to relate the scale of bed roughness within ephemeral channels to the surface flow characteristics during flow conditions.

Olivia Fletcher

Healthy lifestyles or ‘dangerous competition’? – self-tracking and the geographies of surveillance in the lives of young people.

As increasing numbers of people rely on digital technologies to track their ‘health’ in everyday life, this research examines how understandings of ‘health’ and the ‘healthy self’ are being (re) formulated through the everyday personal use of online data and its associated surveillance for young people. Through semi-structured interviews and an auto-netnography, the project seeks to understand the interaction between self-tracking, social media, surveillance (self, social and external) and the performance of the ‘healthy’ self through Foucauldian and feminist new materialism theory. This research will contribute to geographical knowledge by focusing on how bodies are (re)made digitally through digital and material performances of ‘health’. In so doing, this research will help us better understand and negotiate what ‘health’ is and how it’s practiced in digital spaces, whilst contributing new ways of knowing, through digital technologies.

Jessie Foest

Sowing the seeds of change: new selective pressures of introduced red squirrels on Black spruce cone traits in Newfoundland

In regions where tree squirrels co-occur with conifers, squirrels can exert an enormous predation pressure on cones. In response, we expect conifers will develop defence traits related to seed cone morphology. Red squirrels were introduced to the island of Newfoundland in 1963, which changed conifer cone predation pressure from a regime dominated by crossbills to one dominated by squirrels. Here, we investigate which seed traits are selected for by squirrels in boreal forests for three conifer species. By comparing seed cones collected from trees of different ages in forest systems with contrasting squirrel introduction histories, i.e., with and without squirrel predators, we also explore how conifers respond to drastic ecological changes in the short term. Understanding how forest regeneration is affected by introduced species is particularly important, as many systems are expected to experience new predation regimes in a changing climate.

Millie Goddard-Dwyer

Opening the rusty brown box of marine humic dissolved organic matter (HDOM): How does biological cycling mediate the role of HDOM in iron biogeochemistry

Iron biogeochemistry is a key constraint on carbon flux through marine ecosystems via its control of primary production. A particular group of organic molecules known as humic dissolved organic matter (HDOM) are thought to play a key role in iron biogeochemistry. However, the distribution of HDOM in key iron-limited regions and the processes involved in its cycling are largely unknown. My project utilises laboratory culture experiments and shipboard incubations to give mechanistic insights into the role of different biological processes (primary production and microbial remineralisation) in HDOM cycling. Mechanistic insights will include the molecular basis of HDOM iron binding, revealed by a synthesis of structure (high resolution mass spectrometry and spectral methods) and ligand analysis (voltammetry methods). I will employ knowledge gained via these experiments together with novel HDOM data to understand HDOM cycling across the Indian Ocean Sector of the Southern Ocean, an under-sampled iron limited ocean region. Taken together these data will open the 'rusty brown box' of HDOM's role in iron cycling and thus enable predictive analysis of how iron, and consequently carbon, biogeochemistry may change in the future.

Chloe Gray

Improving Liverpool's Air Quality

1-minute flash talk

Ros Green

Wildfowl migration in relation to offshore wind farms: Case study of the common shelduck

1-minute flash talk

Chloe Griffin

A universal behaviour of natural sedimentary systems

Environmental changes on many scales, e.g. astronomical-derived climate variations, shape stratigraphic architecture. However, strata also stores evidence of internal (autogenic) processes. Ascertaining if strata contains environmental (allogenic) signals of specific events is ambiguous, as autogenic processes can overprint and replace allogenic signals prior to stratigraphic storage. Previous work quantified thresholds for signal preservation across landscapes and to stratigraphy, but to understand how a landscape promotes or inhibits environmental signal transport, we must now focus on autogenic processes. We utilise an experimental delta, physical rice pile and numerical sand pile to understand the stochastic, autogenic processes within granular systems. We find broad similarity in these systems, with different behavioural properties at increasing time scales. The similar structure of these processes allows us to characterise a universal behaviour, applicable to any stochastic sediment transport system. This is important for understanding signal propagation, and limits on the production of strata by allogenic and autogenic processes.

Tegan Havard***How magma moves and mixes beneath our feet***

VA basaltic fissure eruption involves low viscosity lava erupting from a ~1:1000 width:length ratio volcanic vent, posing danger to nearby people and infrastructure. Fissure eruptions are fed by dykes, vertical sheet intrusions of magma that transport the magma from its source (km depth) to the surface. How magmas interact underground can determine the nature of products erupted from the vent and control how long the eruption may last. We have designed a new experiment setup to model magma interaction in dykes, building on previous work that has used a cubic or cylindrical geometry. Preliminary results are presented from experiments where two fluids representing two different magmas mix in a dyke geometry. Images were captured over the course of an experiment and processed to quantify mixing and changes in the fluid dynamics (Fig. 2). Fluid samples were also taken to track the evolving fluid properties (density, viscosity) during mixing.

James Houghton***Identification and quantification of clay coats using X-ray Computed Tomography (XCT)***

Clay minerals present as coats on sand grains have been reported to exert a fundamental control on the diagenetic and reservoir characteristics of deeply buried sandstones. Clay coats on sand grains are able to preserve primary porosity in rocks through the inhibition of pore-filling, authigenic quartz cement. An optimum total clay volume of between 3.5 – 13.0% is required to form complete and continuous clay coats, but not fill pore space with clay minerals. Clay coat identification and quantification is traditionally achieved through optical point counting of thin sections and electron microscope images following the methods proposed by Wooldridge et al., (2017) and Frank and Pantano (2021). Here we make the first attempt to identify and quantify clay coat coverage in 3D using XCT data.

Matthew Howard

***Regional Inequity of Financial Vulnerabilities
and Indebtedness over Time***

1-minute flash talk

Jade Hrintchuk

***The fate of volcanic droplets impacting
surfaces during eruptions***

1-minute flash talk

Mahesh Kajendran***The effect of fracture roughness on permeability evolution during shear slip of Westerly Granite***

Shear stimulation within a geothermal reservoir is a technique used to increase the transmissivity and fracture connectivity within a reservoir. This process reactivates pre-existing fractures causing them to slip and dilate resulting in increased permeability. However, the impact of fracture roughness on fluid migration and reservoir productivity in the subsurface remains unclear. The purpose of this research is to quantify how these properties are coupled. Here we perform a suite of permeability measurements within a triaxial deformation apparatus inducing 5-8mm of shear slip along artificially fabricated granite fractures at a range of effective pressures with specified roughness profiles ranging from: (1) smooth, (2) moderately rough, (3) rough and (4) lab induced tensile fracture (natural), to investigate the role of fracture roughness on permeability evolution. Preliminary results indicate surface roughness exerts a dominant control on permeability evolution. Permeability declines for both rough and smooth fractures. For high roughness fractures, the permeabilities evolve episodically due to cycled compaction and dilation during shearing. Significant permeability reduction also occurs for rough samples due to asperity degradation clogging flow paths with gouge material.

Gladys Elizabeth Kenyon***House Price Variation and Inequality in Madrid (2011- 2019)***

Housing wealth is a key source of socio-economic inequality. Differences in the rate of house price and rent changes have been attributed to rising housing wealth inequality, which in turn perpetuates residential segregation (Levin and Pryce, 2011). This paper explores local spatial and temporal variation in house prices, density of properties for sale, and new developments in Madrid, using Exploratory Spatial Data Analysis (ESDA), geo-visualisations and spatial statistics (Moran's I and LISA's). In addition, sequence analysis is used to group house price trajectories. Novel longitudinal and geocoded data from international real estate portal Idealista facilitates the analysis, which is conducted in the years following the US subprime mortgage crisis (2011-2019), contributing to knowledge on the recovery of urban housing markets.

Daniela Koenig

Surface Ocean Biogeochemistry Regulates the Impact of Anthropogenic Aerosol Fe Deposition on the Cycling of Iron and Iron Isotopes in the North Pacific

Long-range atmospheric transport and deposition of aerosol iron (Fe) from anthropogenic activities affects surface ocean biogeochemistry far from the emission source. However, it is challenging to establish the impact of anthropogenic aerosol Fe on surface ocean dissolved Fe (dFe) cycling, due to other Fe sources and in situ cycling processes. Previous work has used a distinctively-light Fe isotopic signature ($\delta^{56}\text{Fe}$) associated with anthropogenic activity to track the contribution of anthropogenic Fe at the basin scale. However, to do this, it is necessary not only to determine $\delta^{56}\text{Fe}$ endmember of all potential Fe sources, but also to assess how Fe cycle processes modulate surface ocean dFe signatures ($\delta^{56}\text{Fediss}$). Here we introduced dust, fire and anthropogenic Fe deposition fields to a global ocean biogeochemical model with a fully integrated $\delta^{56}\text{Fe}$ cycle to quantify how anthropogenic Fe affects surface ocean Fe and $\delta^{56}\text{Fe}$, with a focus on the North Pacific. We find the effect of anthropogenic Fe is spatially distinct and seasonally variable in our model, depending on the biogeochemical state of the upper ocean. Where Fe is not limiting, anthropogenic Fe deposition leads to an increase in dFe levels and, at times, phytoplankton Fe uptake. $\delta^{56}\text{Fediss}$ decreases due to the very light anthropogenic $\delta^{56}\text{Fe}$ endmember, most prominently in low dFe areas like the subtropical North Pacific gyre. In Fe-limited systems such as the subpolar gyre, anthropogenic Fe fertilises primary production and Fe uptake with little change to dFe. Here, the $\delta^{56}\text{Fediss}$ decrease is enhanced as extra Fe dampens strongly positive fractionation effects related to Fe uptake and complexation, whereby the overall $\delta^{56}\text{Fediss}$ may remain positive. These findings highlight the need to account for biological parameters such as productivity or Fe limitation when using $\delta^{56}\text{Fediss}$ to assess the impact of anthropogenic Fe, and that anthropogenic Fe deposition is not necessarily associated with very light $\delta^{56}\text{Fediss}$.

Alice Lowry

An isotopic investigation of northern Hudson Bay

Hudson Bay is a large marine area located at the southernmost limit of the Arctic. It provides diverse habitat and resources for many species of national and international importance that may be impacted by the rapid environmental changes occurring in this region. Despite this, knowledge of the Hudson Bay marine ecosystem remains limited and there is an urgent need for baseline information to inform ongoing monitoring and management. Using stable isotopes of carbon and nitrogen from 46 species from northern Hudson Bay, we provide a coarse scale characterisation of the food web and compare its structure between two distinct time periods (2001-2009 and 2016-2019). We calculated the Bayesian standard ellipse area for individual functional groups and community level metrics to demonstrate that the food web appears to have become more isotopically diverse over time. This study provides the most detailed characterisation of the Hudson Bay food web to date, helps to clarify the potential roles of individual species and provides a baseline against which future changes can be monitored.

Alfie Mackie

Fantastic Turbidites and Where to Find Them: Stratigraphic Complexity in a Simple 2D Forward Model.

Turbidity currents are a type of submarine sediment gravity flow in which the sediment is suspended by fluid turbulence. They deliver enormous amounts of sediment from the continents to the ocean floor, and their resultant deposits – turbidites – form the largest accumulations of sediment on Earth. The deposition of turbidites occurs in hierarchical packages, with the sediment packages stacking on top of and alongside one another with varying degrees of complexity. As turbidity currents occur at great depths underwater, traditional observation is highly difficult, and thus geologists use field outcrops, physical experiments, and numerical models to understand them. This work uses numerical forward modelling to explore stratigraphic complexity in turbidite deposits, and finds that even a reduced-complexity 2D forward model can build strata wherein the complexity is sensitive to a range of inherent flow parameters, without invoking 3D autogenic or allogenic processes.

Bayan Shabeeb

Environmental impact assessment and management of produced water in the southern Iraqi oil fields.

1-minute flash talk

Michael Mahony

Obstacles and Facilitators of Economic Integration of Immigrants in the UK Labour Market

The integration pathways through which immigrants assimilate define their economic impact on host societies. Understanding factors associated with successful long-term integration is therefore essential so as to facilitate better economic outcomes for migrant populations and improve their impact on wider society.

This submission aims to better understand this process by identifying occupational trajectories through which migrants assimilate into the UK workforce, as well as their determining factors. Using data from the Understanding Society panel survey, the study uses sequence analysis to identify representative occupational trajectories of first-generation migrants over a 10-period. ANOVA and multinomial modelling is also applied to determine key individual, household and contextual factors underpinning the resulting trajectories.

The analysis identifies 8 distinct occupational trajectories that migrant and UK-born workers transition through. Individual factors are also found to be substantially more important than household and contextual drivers in determining occupational trajectories.

Fionnuala McCully

Partner intrinsic characteristics influence foraging trip duration, but not parental care coordination in wandering albatrosses (Diomedea exulans)

Seabirds coordinate foraging trip duration, but the mechanisms underpinning intraspecific variation in coordination strength remain understudied. We examined the role of focal and partner intrinsic characteristics in determining coordination strength in wandering albatrosses (*Diomedea exulans*). The foraging trip durations of 71 pairs were estimated during incubation and brooding using saltwater immersion loggers. Trip duration was modelled with focal and partner bird boldness and age, and partner's previous trip duration. Coordination was equally strong in incubation and brooding, but it was unaffected by intrinsic variables in either breeding stage. Surprisingly, incubation trip duration was mainly driven by partner intrinsic characteristics, with birds paired to older and bolder partners taking shorter trips. During brooding, increases in focal and partner boldness led to shorter trips. An individual's assessment of their partner's capacity or willingness to provide care may be a major driver of trip duration, thereby highlighting the importance of modelling pair behaviour.

Freddie Mckendrick

What are the physiological costs to seabirds adapting to Arctic climate change?

1-minute flash talk

Mohammad Meidiansyah

Participatory Budgeting and Poverty Alleviation in Indonesian Rural Areas

1-minute flash talk

Xin Meng

Analysis of physical and biogeochemical drivers of dissolved oxygen decrease in Celtic Sea under climate change

Dissolved oxygen (DO) decline is a severe global issue. Oxygen decreasing rate in shelf seas exceeds that of the open ocean, which is controlled by physical and biological processes: vertical mixing, the establishment of stratification; photosynthesis, respiration and organic matter degradation. Climate change, including global warming and nutrient enrichment, results in DO decline by enhancing the intensity and duration of stratification, accelerating respiration and phytoplankton overgrowth. This research focuses on the processes controlling DO in the Celtic Sea, based on the data from UK Shelf-Sea Biogeochemistry Research Programme. From the spatial and temporal scale to analyse DO variation, compute the budget of oxygen in the bottom mixed layer (BML). Identify the order of the processes driving oxygen dynamics in the seasonal cycle and across the shelf, focusing on the bottom layer in the stratified period. The numerical model is to be constructed to explore the processes affecting DO under changing climate.

Eve Merrall

Density dependence affects population viability analysis outcomes in multiple seabird species

Population viability analysis (PVA) is a well-used tool in assessing human impacts on animal population dynamics, and is commonly used to quantify threats to seabirds. However, it does not typically account for the relationship between breeding success and population density because the strength and direction of these 'density dependent' relationships are poorly understood. Here we quantify the strength of density-dependent regulation of breeding success in 30 populations and eight species of seabird across the British Isles. We examine how PVA predictions differ using five different structures for describing density-dependence, and find evidence of positive and negative density-dependent regulation that varies in strength and direction within and between species. We demonstrate that the inclusion of density-dependence in PVA affects modelled population outcomes. Understanding how demographic processes such as density-dependence affect prognoses for vulnerable populations will increase accuracy and confidence in PVA-based impact assessments for conservationists and other stakeholders.

Maya Middleton-Welch

Understanding the Supply and Demand for Citizens Advice

1-minute flash talk

Hafi Munirwan

Relocation as a Strategy to Manage Street Vending?

Understanding the Gap Between Government-based Street Vending Relocation Policy and Street Vendors Adaptive Capacity in Indonesia.

Mary Murray

Earth's destabilizing magnetic field between 80 and 10 million years ago

1-minute flash talk

Ruth Neville

Exploring International Student Flows into the UK: A Gravity Model Approach

The UK is one of the key destinations for internationally mobile students in the world. It is important to understand the make-up and determinants of these student. By examining the key flows over time, this study attempts to understand the market for internationally mobile students as well as what drives it. The study utilises novel count data provided by UCAS on the number of acceptances to UK universities from 161 origin destinations. The paper uses a 'push-pull' framework to understand flows, based on the idea that some factors are more prevalent at the origin and others at the destination. The determinants of the flows are then estimated using a negative binomial gravity modelling approach; taking into consideration spatial, cultural and economic factors. A variety of models are fitted and compared, considering how the addition of temporal and spatial factors contribute to the analysis.

Thomas Nichols

Mathematical Unmixing of Grain Size Distributions in the Ravenglass Estuary

The Ravenglass Estuary, Cumbria, Northwest England is a macro-tidal tide-dominated estuary. It is a complex sedimentary system composed of three rivers which merge to form a central basin with strong influence of tidal processes. The polymodal set of grain size distributions obtained by laser particle size analysis of surface sediment can be mathematically 'unmixed' to reveal distinct end-member compositions. Each of these end-members can then be related to a sediment source or process affecting the estuarine system. In the Ravenglass Estuary there are four independent end-members whose representative proportions can be mapped. Heatmaps reveal that the sediment end-members may be sourced from the three rivers, sediment transported by longshore drift and flood tides, and a nearby spit. The surface end-members can be compared to and used as proxies for modelled end-members of a core taken from the Estuary to understand how sediment supply at that location has changed over time.

Chiedozie C. Ogbuagu

Pyroclast deformation within lava fountains

1-minute flash talk

Andrew K Palmer

***Motivations to visit green and natural spaces:
How perceptions of 'quality' vary across
different communities.***

1-minute flash talk

Natascia Panno

***Integrating field and numerical analyses to
investigate salt marsh resilience to external
disturbance***

Salt marshes are valuable ecosystems that provide numerous services and act as natural coastal defences by buffering storm waves and stabilising sediments. However, it is not clear whether they will be able to retain their resilience with accelerating rate in sea-level rise, increase in storm intensity and increasing land reclamation. This project uses an integration of field and numerical analyses to investigate the resilience of estuaries and salt marshes to projected rise in sea-level, increase in storm intensity and existing embankments. The studies were conducted using the Ribble Estuary and Hesketh Out Marsh - North-West England - as a test case. Results show that embankments can promote sediment export out of the system, threatening marsh stability. Sea-level rise also threatens marsh resilience by triggering a net export of sediment, however storm surges aid the resilience of the system to sea-level rise by triggering a net import of sediment.

Lyuboslav Petrov

Entrepreneurship, local relations of care and post-capitalist degrowth ethics

This project works at the intersection of post-capitalist degrowth ethics, local relations of care and narrative entrepreneurialism. A narrative approach to entrepreneurialism nurtures embryonic post-capitalist perspectives, preparing them for germination and broader place-sensitive purposes. The ongoing cultivation of responsible subjects begins at home, in places filled with stories and experiences. These experiences intersect at place and entrepreneurs become local carers, guardians and advocates that drive sufficiency and resilience. Narrative perspectives of entrepreneurialism connect subjects to places towards situated practices. The PhD posits that entrepreneurial opportunities at place are rooted in care ethics. A narrative approach would also suggest that the local caring economy may be both created and found, leading to new insights about entrepreneurial consciousness and self-transformation for degrowth.

Dawid Rybak

Modelling fluid-filled fracture dynamics scaling processes in fractured geothermal dynamics

1-minute flash talk

Connor Shiggins

Everybody knows that the berg is the word: Google Earth Engine and icebergs

Over half of the mass loss from the Greenland Ice Sheet (GrIS) is via icebergs, with their sizes providing insights into glacier calving dynamics, as well as altering fjord environments. Here we present a new workflow to automatically detect icebergs through a graphical user interface developed in Google Earth Engine using ArcticDEM. Output data has been validated at 3 marine-terminating glaciers with different calving styles and fjord dynamics to highlight the code's versatility. After successful validation of the automated approach, we upscaled the workflow to 19 of Greenland's marine-terminating glaciers, detecting 600,000 icebergs between 2010 and 2017 which reveal varying sizes and calving styles, often dependent on how deeply the terminus is grounded. These results provide: 1) the Glaciological community with an iceberg dataset in friendly geospatial formats, 2) shows ice sheet wide differences in iceberg calving and 3) the application of automated iceberg detection across multiple glacier sites.

Dina Simons

In-situ sustained monitoring and eDNA techniques for determining responses of intertidal species to environmental change

1 Minute flashtalk

Hannah Slocombe

Baby Essential Services: exploring the classed and gendered geographies of austerity and the Covid-19 pandemic

For families and children most affected, everyday life has become increasingly strained and shaped by the classed and gendered impact of austere policies as well as the ongoing Covid-19 pandemic. This research explores this impact by centralising 'Baby Essential Services'. This term broadly encompasses a variety of organisations which although diverse in their remit, operation and scale share the common tenet of freely providing essential items and equipment to families expecting, or with, babies and young infants (though many extend beyond this core remit). It does so by drawing on a national-level survey of these organisations, as well as in-depth interviews with staff, volunteers and those that have used, or currently use, these services.

Benjamin Storey

The Geoscience Aspects of Green Hydrogen Generation via Fire-flooding of Depleted Petroleum Reservoirs: MicroCT Analysis of Post-burn Rock Microstructure

Considering the UK governments net-zero by 2050 target, the need for clean energy is paramount. Hydrogen gas has been suggested as a source of energy for the future. A high-pressure, high-temperature turbo-expander driven by fluid leaving a production well may be used to power a hydrolytic water splitter and generate green hydrogen. These may be extended for use on depleted oil reservoirs through burning of remaining oil and the generation of a pressure wave up a production well. Fluids produced may then be stored underground. Exposing the reservoir rock to such temperatures changes the rock, it is therefore vital that we understand the small-scale changes and how they affect the stability of the reservoir. MicroCT analysis was employed to image a rock before and after burning in the presence of oil. Image analysis showed grain-scale changes to the rock and reduced porosity, as a result of carbon deposition between grains.

Alexander Tully

Palaeointensity Extremes: Dynamic Implications and Future Fields

1-minute flash talk

India Uppal

Improving geothermal heat flow estimates in Antarctica using magnetic data

1-minute flash talk

Jack Walker

Taxonomic and functional changes in grassland arthropod communities along an urban-rural gradient.

Urbanisation presents various challenges to biodiversity, including the urban heat island effect, habitat fragmentation, pollution and invasive species. Arthropods carry out a wide range of ecosystem processes in terrestrial ecosystems, and their ability to persist in urban green spaces is vital for ecosystem function. Grasslands are a prevalent habitat type in UK cities, yet studies comparing their arthropod communities to those of rural grasslands are lacking. In this study, ground-active arthropods were collected from 80 grassland sites along an urban-rural gradient in Liverpool and Manchester, UK, in order to assess whether different taxa vary in their resilience to urbanisation. Habitat data such as grass height, plant species cover, and soil compaction were also recorded. A total of 4,934 arthropods were collected, representing 13 different Orders, but no clear patterns were found regarding the abundance of any taxa along the urban-rural gradient.

Haojia Wang

Evaluating the plan environmental impact assessment (PEIA) system in China: a systematic analysis of urban planning PEIA effectiveness

1-minute flash talk

Qianyou Wang

The barium-based bioproductivity estimates of the Early Silurian ocean: Constraints from petrologic, geochemical and time-series analysis

The Rhuddanian-Aeronian Longmaxi Formation rocks recovered by shale gas boreholes in the southern Sichuan Basin, China, provide a good window into palaeoproductivity levels during the Early Silurian period within the Yangtze Ocean. Integration of petrographic, geochemical and time-series data provides new insights regarding the fluxes of major and trace components to the sediment. The L202 borehole is located in a moderate productivity location at some distance from the palaeoequator. MTM Power spectral analyses on untuned Th logging data series reveals significant peaks exceeding the 95% confidence level and show that the Lower Silurian Longmaxi Formation has recorded Milankovitch cycles. The Gaussian bandpass filters were performed to extract the long eccentricity cycles (405 kyr) and short eccentricity cycles (125 kyr) and track the variation of sedimentation rate. An upward transition from black siliceous shales to grey organic-poor mudstones occurred in conjunction with decreased primary productivity (decreased TOC and Sixs fluxes, stable Porg flux, and increased Baxs flux). The benthic anoxic conditions in the Rhuddanian and the hyalophane enrichment within the Upper Aeronian mudstones may contribute to the upward increased Baxs trend. The palaeoredox trends should be made clear to help explain the palaeoproductivity fluctuations in further research.

Zihao Wang

The relationship between land value capture strategy and air quality, a case study in China's public auctions system

To explore the relationship between land value capture and air quality in the patten of Chinese development

Cameron Ward***Exploring the Spatial-Temporal Variability of Gas Consumption Within England and Wales: An Assessment of the Residential Sector Using Sequence Analysis.***

The UK housing stock is one of the most inefficient in Europe and has an overreliance of natural gas as a fuel source which has created a highly polluting sector lagging in the de-carbonisation process. For the UK to meet its 78% fall in emissions by 2035, and to be net zero by 2050, the residential sector will require significant reductions in emissions. Spatial-Temporal analysis has been adopted to track gas consumption trends, where observing such trajectories is vital for policy members, as specific policies can be implemented within specific places.

The study used has gas consumption at the MSOA level between the years 2010 – 2020. Sequence analysis is carried out on each MSOA, with a cluster analysis completed to identify key spatial trajectories in de-carbonisation. The characteristics of the clusters identified are contextualised with a range of spatial datasets representing the built environment, demographic and socio-economic factors.

James Watson***Social and spatial inequalities in healthcare use among people living with dementia in England (2002-2016)***

Inequalities exist in availability and quality of healthcare for people living with dementia (PLWD). Lack of funding and increased healthcare demand will likely exacerbate inequalities. The number of PLWD is set to double by 2030 and with greatest increases expected among those with severe dementia, the reflected cost to health and social care is set to treble by 2040. We need to understand the extent of current inequalities in healthcare use among PLWD, to reduce current and negate future inequalities. Data for six types of primary and secondary healthcare contacts for 142,302 PLWD in England were included in adjusted regression models, to explore healthcare use variation between different socio-economic and geographic groups. We found variations in frequency and likelihood in use of different healthcare types by, age, gender, ethnicity, levels of deprivation and urbanity/ rurality. We discuss systemic and social measures to improve accessibility and quality of healthcare for underserved communities.

Kate Williams

Microstructures to macrostructures: How is magma flow recorded in a large mafic sill?

Magma is transported within volcanic plumbing systems through sills and dykes, capable of transporting magma laterally for hundreds of kilometres. Understanding how magma is transported within these magma-filled fractures is key to improving volcanic hazard assessments of when and where a volcanic eruption may occur. Magma flow is recorded in the rock record at a range of scales from macroscopic structures (m-scale) to microscopic textures(μm -scale). To understand how local variations in magma flow are recorded in the rock record, field campaigns were conducted to the Whin Sill, which crops out across northern England with exceptional coastal exposures. Magma flow units, magma fingers andropy flow structures were observed; preliminary microscopic texture analysis conducted on rock samples shows that there is some preferred orientations of the crystals as well as some deformation of the crystal lattice, which could be used as further evidence for small-scale flow variations.

Jingwen Xia

How does Organisational Learning enable ESG Strategy

1-minute flash talk



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