Water Challenges in a Changing World

NOVEMBER NEWSLETTER

Hello everyone and welcome to the November edition of the Water Challenges Newsletter. This month has been incredibly busy, with everyone trying to get meetings and work booked in and wrapped up before Christmas (no pun intended!). We would like to take this opportunity to invite you to join us for a final **Water Theme Meeting of the year**, which will be held on the 19th December between 1pm – 2pm. Invites have gone out to all, but if you haven't received this, please get in touch. We will also be celebrating the **end of year** with our PGR students and extended this invitation to the Water Theme, so please join us at Elm House on the 6th December from 1pm – 3pm. We will be having a quiz; providing light refreshments and the group will also be bringing in home made delicacies from their native country for everyone to enjoy.

NEW PGR STUDENT – GUILIN LUO

We would like to welcome our latest PGR student, Guilin Luo, who joins us from China. Read about Guilin below in his own words:

After obtaining my bachelor's degree from Lanzhou University in China, I studied for my master's degree at the Chengdu University of Technology. During the seven years of bachelor's and master's studies, I learned about natural geo-hazard, groundwater, rock and soil. Finally, I chose groundwater analysis as my research direction according to my interest.

I am currently working in Professor Stefan Krause's group on analysing groundwater-surface water interactions and modelling the effects of peculiar climate change on the soil-plant-atmosphere in forested areas. Because of the need for modelling in this project, I am also working with Professor Liling Chang and Professor David Hannah.

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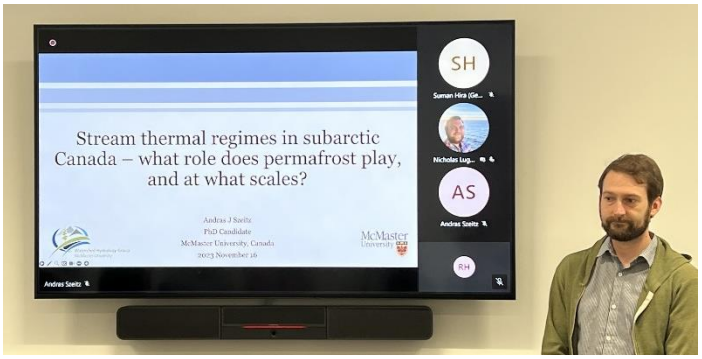
WATER SEMINAR SERIES

Our Water Seminar Series continues and this month we were lucky enough to have two excellent talks. The first talk was carried out by our visitor Andras Szeitz, from McMaster University in Canada. The title of Andras' talk was ***'Stream thermal regimes in subarctic Canada – what role does permafrost play, and at what scales?'***



Talk summary: Stream temperature is the master water quality variable, as it strongly influences stream physical and biological processes. Local environmental conditions can strongly influence stream thermal patterns, and lands capes in northern Canada are rapidly changing in response to climate change. This seminar will present the first regional-scale analysis of stream temperatures in subartic Canada (Yukon Territory), with a focus on the influence that permafrost plays on stream thermal regimes, along with some context on cold regions hydrology. This research sheds some light into the role that permafrost plays on stream temperature as a control on catchment storage and energy exchange, and how we might expect thermal regimes to change as permafrost degradation continues.

The second talk was carried out by Dr. Dave Tickner and Dr. Conor Linstead from the WWF-UK

'How fundamental, applied and activist freshwater sciences can contribute to monitoring and recovery of the world's rivers'

Talk summary:

If the world is to solve the problems of the Anthropocene, including rapid biodiversity loss, a combination of fundamental, applied and activist science will be needed. Fundamental science is primarily concerned with acquisition of new knowledge for its own sake. Applied

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science seeks to use knowledge to address real world challenges. Activist science aims to accelerate changes in policy and practice by combining knowledge with advocacy.

Nowhere is the biodiversity crisis more acute than in freshwater ecosystems. The WWF Living Planet Index has documented an 83% decline in freshwater vertebrate species populations since 1970, more than twice the decline on land or in the oceans. Meanwhile, water scarcity and pollution threaten human water security worldwide.

The UN Sustainable Development Goals promised action to address unsustainable water management. The recent agreement by 196 nations of the Kunming-Montreal Global Biodiversity Framework provides a platform for urgent action to halt and reverse biodiversity loss, including in “inland waters”. The private sector too is mobilising through initiatives such as the Alliance for Water Stewardship and the Courtauld 2030 Water Roadmap. But how can governments, companies and citizens know whether these promised actions and investments are resulting in healthier freshwater habitats?

In this seminar, we will outline how freshwater scientists have stimulated recognition of the twin freshwater biodiversity/water security crises and describe the responses from public and private sector actors. We will share insights from recent work to establish frameworks for monitoring river health at nested scales, building on fundamental and applied science. And we will share thoughts on how the academic community can equip a new generation of activist scientists that can drive a freshwater transition for the Anthropocene.

Please email s.hira@bham.ac.uk to be given access to the talk recordings.

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WATER SEMINAR SERIES – UPCOMING TALK

We are delighted to have Prof. Dr. Christian Laforsch from the University of Bayreuth, joining us at the University of Birmingham for 2 days in January. Christian was meant to join us in December but was unfortunately unable to get his flight from Munich due to severe snow. The new date for Christian's talk in January will be set and confirmed soon.

Talk Summary:

Microplastics in the environment

The ubiquitous contamination of the environment with microplastics (MP) and the associated potential risks perpetually attracts a great deal of public, political, economic and scientific attention. However, the problem is very complex, as MP represents a very heterogeneous group of particles with a wide range of chemical and physical properties, which also constantly change due to various environmental impacts and the resulting aging processes. This can lead to altered environmental behavior as well as to different biological effects. However, due to the myriad combinations of properties that MP exhibit in the environment, the study of aging, environmental behavior and effects is a tremendous challenge and requires an interdisciplinary approach that bridges traditional academic disciplinary boundaries. The CRC initiative on microplastics (SFB1357) aims therefore to gain a fundamental understanding of the processes and mechanisms that 1) condition biological effects of MP in limnetic and terrestrial ecosystems as a function of the physical and chemical properties of the particles, 2) influence the migration behavior of MP particles and 3) cause the formation of MP starting from macroscopic plastics, based on model systems for plastics, organisms, and environmental compartments. These findings provide a scientifically sound basis for assessing the environmental risks of MP, as well as for developing environmentally friendly plastics and processes to prevent the emission of MP into the environment. The presentation will highlight the state of the art in this young field of research, identify the key knowledge gaps, present the findings of the CRC, and show how they will contribute to solving this global issue.

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PLASTIC UNDERGROUND DOCTORAL TRAINING PROGRAMME – KICK OFF WEEK IN PISA, ITALY

The first week of October was the kick off for a new EU innovative training network "Plastic Underground", focused on researching the transport, fate, and impacts of micro and nano plastics in soil and groundwater ecosystems. Professor Stefan Krause is the lead for this.

It was an exciting week, with keynote lectures on topics such as modelling microplastics in natural environments, strategies for extracting micro and nano plastics from environmental samples, and how to quantify the risk of microplastics. There was also plenty of breakout discussion focused on experimental design and communication.

In January, The University of Birmingham will host the analytical training course for this next generation of plastic researchers. The PhDs on this programme will visit for training in microplastic sample extraction analysis, focusing on techniques such as Raman and FTIR.

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WATER AND PARTICLES RESEARCH FEATURED IN THE CURIOSITY VAULT PODCAST

Professor Alice Roberts discusses whether we can make water safe for all with Prof. Iseult Lynch and the UoB Institute of Advanced Studies Vanguard Fellow, Dr. Adenike Akinsemolu on episode 4 of the Curiosity Vault. Iseult talks about our research on microplastics, nanoparticles, PFAS and other water pollutants as well as daphnia (#daphniaLove) as both a tool for exploring the impacts of pollutants on ecosystem and human health, and as a solution for remediation of pollution (with a shout-out to the exciting research of other Water Challenges researchers Prof. Luisa Orsini, Dr. Mohamed Abdallah and Prof. Stefan Krause on using resurrected daphnids as bioremediators). The conversation also explores the potential to merge technological advances in nano-materials sensors with nature-based solutions such as biochar and biomass for bioremediation, and harnessing nanotechnologies for solar-powered water purification in areas that are lacking access to energy and water infrastructures for local at-home solutions. Adenike shared some of the immediate issues she faces in her research related to oil spills, and how climate change has exacerbated challenges such as food security, gender-based violence, and socio-economic disparities. Iseult and Adenike also co-hosted the UoB World Water day activities in March 2023, so it was really fun to chat together with Alice and explore further overlaps and interlinks between our common interest and contrasting approaches to ensuring safe water for all.

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PLASTICUNDERGROUND TRAINING

Prof Stefan Krause will be leading an advanced training course in January 2024 for the PlasticUnderground, EU Horizon funded project. There will be 10 spaces available for the general public. More information including fees to join will be released soon, so if the below sounds of interest to you, ***please keep an eye out for more information.***

January 29th to February 2nd
Birmingham,UK

ATC 1: Microplastic sampling and extraction techniques (Host UoB)
This course will focus on training in different microplastic sampling techniques in aquatic and terrestrial environments, including soil and sediment extraction and microplastic identification. This course will address the need for standardised methodologies, while providing hands-on training in novel analytical techniques such as the use of Nile Red and TGA-FTIR-GCMS. It will also focus on critical aspects of contamination, repeatability and reproducibility in microplastic quantification, as well as protocol versioning and integration into SciNote.

ATC 2: Entrepreneurship and Innovation – The Innovation Pipeline (Host: PolyM)
This will address how scientists can utilize scientific innovations as a basis for successful business ideas, through organizing resources and translating research results into practical tools and services. The ATC will focus on improving innovation capabilities, team-based innovation, and innovation management and will build upon ideas provided by the DCs. The leading role of non-academic partners and decision makers in delivering this ATC will ensure that the impact of the DN will be of highest practical relevance, including use of communication plans to increase visibility of research findings among non-academic stakeholders.

This project has received funding from European Union's HORIZON EUROPE research and innovation program GA N°101072777-PlasticUnderground HEUR-MSCA-2021-DN-01

MARIE CURIE ACTIONS

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UPCOMING GRANTS

Pre-announcement: NERC strategic capital funding opportunity 2023
Deadline to apply: 05/12/2023
Award amount: £350-£750k
*Call opens in September. Apply for funding to improve the environmental research landscape through new or improved equipment.

Innovate UK - UK - Singapore Collaborative R&D Call Sustainability and Net Zero
Deadline to apply: 06/12/2023
Award amount: £750k
UK registered organisations can apply for a share of up to £5 million as part of a collaboration with a Singapore partner for industrial research projects that develop sustainable technologies helping reduce emissions and achieve a net-zero future.

US - Postdoctoral and Visiting Research Scientist Program
Deadline to apply: 08/12/2023 (forecast)
The Atmospheric and Oceanic Sciences program provides a stimulating and supportive environment for career development of both early career and established researchers. Postdoctoral and visiting research scientists have access to collaborators from a pre-eminent government laboratory in NOAA-GFDL, as well as Princeton University research collaboration and training opportunities.

UK Space Agency – Climate Services
Deadline to apply: 30/12/2023
Award amount: £10k
The UK Space Agency is looking to provide small grants to help the UK develop business-viable ideas that use space data in a climate-related application.

C-DICE (UK) – Research Sandpits
Deadline to apply: 11/01/2024
Award amount: £30k
C-DICE is hosting two new research sandpits for postdoctoral researchers to engage with interdisciplinary research in two distinct areas that contribute to the net zero agenda.

ICAERUS (EU) – Pull Open Call
Deadline to apply:16/01/2024
Award amount: €50K

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The ICAERUS Open Calls will provide a significant opportunity to engage industry partners and create exploitable results. There are two distinct types of Open Calls each with two release dates. Each sub- project accepted will last for 12 months and be divided into 3 phases: Design, Development and Market.

NERC – Pushing the frontiers of environmental research: Jan 2024
Deadline to apply: 23/01/2024
Award Amount: £1M
Apply for funding to pursue an ambitious, high risk and high reward project in environmental research. You must be based at a UK research organisation eligible for NERC funding.

MDPI – Water Journal Travel Award
Deadline to apply: 31/01/2024
Award amount: CHF 800
This supports PhD and postdoctoral researchers in presenting at an international conference relating to water.

Horizon Europe: Clean Environmental and zero pollution
Deadline to apply: 21/02/2024
Award amount: €5M
This supports projects that set out a credible pathway contributing to halting and eliminating pollution to guarantee clean and health soils, air, fresh and marine water for all and ensure a sustainable and circular management and use of natural resources.

Horizon Europe: Biodiversity and ecosystem services
Deadline to apply: 22/02/2024
Award amount: €8M
This supports projects that set out a credible pathway to contributing to the objective of putting biodiversity back on a path to recovery, and preserving and sustainably restoring ecosystems and their services on land, inland water and at sea through improved knowledge and innovation.

Horizon Europe: Land, oceans and water for climate action
Deadline to apply:22/02/2024
Award amount: €10M
This supports projects that set out a credible pathway to contributing climate action on land, including forestland, grassland, cropland and wetland, ocean and water

International IGB Fellowship Program in Freshwater Science
Deadline to apply: 01/03/2024 (forecast)
The Institute invites excellent postdoctoral and senior scientists to apply for a fellowship at IGB. Positions are offered to enable postdoctoral scientists to further their scientific development. Senior

scientists are supported for up to 12 months to contemplate and pursue new inspiring research ideas in collaboration with scientific staff at IGB.

NERC - Research biological influence on future ocean storage of carbon
Deadline to apply: 29/03/2024
Award amount: £1.9M
This supports research providing new understanding of the role of marine life in ocean carbon storage. The aim of the call is to fund research addressing three specific challenges that will provide a fundamental understanding of key biological processes that are globally relevant.

Open Calls with no closing date:

UKRI – Knowledge Transfer Partnership
Open for business and not-for-profit organisations. Partnerships can last between 12 and 36 mounts. Business provide one-third to half the project cost depending on their size.

NERC - Work with US-based researchers on environmental science research
Award amount: £300k
Apply for funding to work with US-based researchers on an environmental science application. Collaborative work is governed by an agreement between NERC and NSF.

Work with Brazilian researchers: NERC FAPESP lead agency
This opportunity allows UK-based researchers and researchers in the State of São Paulo, Brazil to submit a collaborative proposal under existing NERC funding opportunities. This will go through a single review process.

UKRI - Collaborate with researchers in Norway
UK Research and Innovation (UKRI) and Research Council of Norway (RCN) have signed a Money Follows Cooperation agreement to reduce barriers to cross-border collaboration.

UKRI - Collaborate with researchers in Luxembourg
UK Research and Innovation (UKRI) and FNR have signed a memorandum of understanding (MoU) to welcome and support collaborative applications. The MoU provides for a lead agency agreement whereby UKRI will receive and assess joint applications from eligible UK and Luxembourg applicants on behalf of both organisations.

We welcome your contributions and suggestions for the newsletter. Please feel free to email Liam and Suman – l.kelleher@bham.ac.uk / s.hira@bham.ac.uk