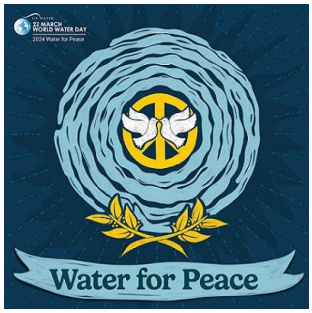
Water Challenges in a Changing World

MARCH NEWSLETTER



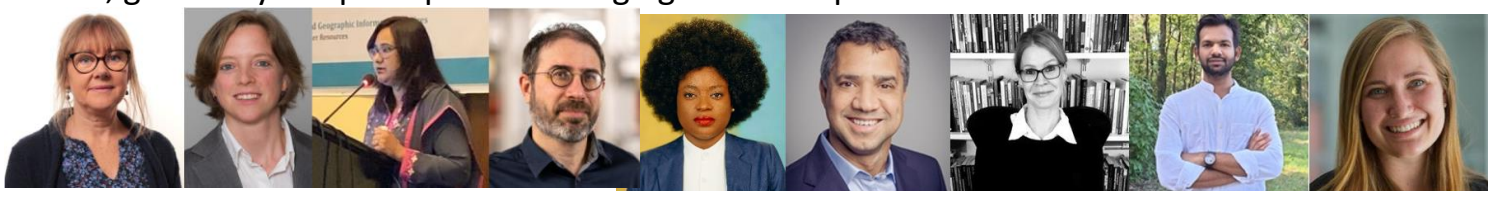
Hello everyone and welcome to the March edition of the Water Challenges Newsletter.

In honour of World Water Day, we orchestrated a focused week of events from March 18th to March 22nd, dedicated to raising awareness and advocating for sustainable water management practices. With the theme "Leveraging Water for Peace," we aimed to highlight the crucial role water plays in promoting cooperation and peace among communities and nations. All talks were hosted by our fantastic chairs, Stefan Krause, David Hannah and Iseult Lynch.

The week commenced with a series of enlightening seminar talks held from Monday to Thursday, featuring experts including Berit Arheimer (IAHS), Annabelle Houdret (IDOS Bonn), Tahmina Yasmin (UoB) and Wouter Buytaert (Imperial College London). These talks provided invaluable insights into the current state of global water resources and underscored the urgency of implementing sustainable solutions.

On World Water Day itself, we hosted a dynamic panel discussion. Experts from diverse backgrounds came together to delve deeper into the challenges and opportunities surrounding water management on both local and global scales, within the context of fostering peace and cooperation. The panel discussion served as a focal point for the week's activities, providing a platform for robust dialogue and inspiring attendees to take meaningful action.

The World Water Day at UoB was successful as shown by the enthusiastic participation and overwhelming support from the community. Thank you to everyone who joined and those who initiated discussion by asking questions. As we reflect on the week's accomplishments, we are energised and committed to continuing our efforts towards ensuring a sustainable water future for all, guided by the principle of leveraging water for peace.



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VISITING STUDENT – PAULINE LAURENCY

My name is Pauline and I am a visiting student under the supervision of Thaiënne van Dijk and Stefan Krause from 26 February to 11 June 2024 at the University of Birmingham. My subject is the vertical distribution of microplastics in the Waal riverbed in the Netherlands. My work involves extracting microplastics from a sediment core. The resulting data will supplement an existing dataset and enable me to carry out analyses. I will also be working on the relationship between sediment size and microplastic size. This work placement will enable me to complete my Masters in Anthropocene Ecology, Urbanisation, Biodiversity and Water, which I'm doing at Claude Bernard Lyon 1 University in France. Having had several professional experiences in microplastics, I'd like to continue in this field with a PhD in France or abroad if the opportunity arises.

VISITING STUDENT – TAMARA MEIZOSO

My name is Tamara Meizoso Regueira. I am currently pursuing my PhD at the Free University of Berlin under the supervision of Prof. Dr. Matthias Rillig, with a MSCA fellowship from the PlasticUnderground Doctoral Network. I am doing my first secondment at the University of Birmingham for two months, and will be working under the supervision of Prof. Dr. Stefan Krause until mid-May 2024. My research focuses on studying the fate, transport and effects of microplastics in soil. I am interested in the mechanistic interactions between biological and physical processes that influence the transport of microplastic particles in soil, as well as in statistical and mechanistic modelling.

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During this time working at the University of Birmingham, I will be learning about mathematical modelling and experimental design of microplastic transport in soil columns. I am also building a global database with microplastic concentrations and different properties and environmental conditions that may influence their transport through the soil matrix, potentially reaching groundwater and rivers. I will also contribute to the design and analysis of results of the joint experiment I of the PlasticUnderground Doctoral Network, related to the influence of various factors on microplastic transport, to be set up in September 2024 at the University of Birmingham.

MICRO 2024 LANZAROTE

The 5th Edition of the International Conference MICRO 2024 will be taking place in Lanzarote and will be an intense in person Conference, taking place from the 23rd -27th September 2024.

Abstract submission for MICRO 2024 has opened and will close again on 20th May.

Click the image for more information.

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SEMINAR TALK – SAM CUSWORTH

You are invited to attend a seminar talk by Dr. Sam Cusworth on the **9th April** from **1pm to 2pm**. The talk will take place at Elm House, room G08 and also online. This will be followed by a networking lunch at 2pm. The link for this talk has been sent around but please contact Suman if you need it resent to you. Please feel free to forward onto anyone who you may think will benefit.

Microplastics in Agroecosystems: Past, Present and Future

Abstract: Since their invention, plastics have driven a revolution in behaviour in all aspects of our lives, including agriculture. In-use and as a waste material, plastics degrade and accumulate in agricultural systems. Accumulation of plastic pollution in agricultural systems has negative impacts on human health and agricultural productivity but little is known about concentrations of microplastics in soils. Utilising a Nile Red staining technique, microplastics from agricultural soils across the UK and from a historical archive were quantified using fluorescence microscopy. We highlight that agricultural soils are receptors of and reservoirs of microplastic pollution from agricultural and non-agricultural sources, a legacy which is growing over time. Given that microplastic concentrations in agroecosystems are amongst the highest recorded in current research, what does the future hold for agroecosystems and what research questions are still left unanswered?

Short bio: Dr Cusworth is a recent graduate from Lancaster University, where he studied plastic use in agriculture as part of his PhD. His research focused on agriplastics, plastic pollution and the fate, behaviour and impacts of microplastics in agroecosystems. He is interested in the holistic assessment of micro- and nanoplastics in agroecosystems and how plastic particles impact the environment, but how they are also affected by the environment itself. In June, he will be working as a postdoctoral researcher on a project titled "Developing a framework for micro- and nanoplastics sampling and extraction from soil" as part of the ECAM group at ETH Zurich.

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WATER SEMINAR SERIES IN APRIL

You are invited to attend our next Water Seminar Series talk where we welcome Dr Changqing Wu from the University of Delaware, who is currently at the University of Birmingham as a Fulbright Distinguished Scholar. This talk will be taking place on the **25th April** from **12pm – 1pm** at Elm House, room G08. The link for this talk has been sent around but please contact Suman if you need it resent to you. Please feel free to forward onto anyone who you may think will benefit.

Insights into the Health Impacts of Nanoplastics on Embryonic Development and Gut Health using a Chicken Embryonic Model

Abstract: Micro/Nanoplastics (MNPs) may be taken up by both humans and animals, via food and water. Recent evidence demonstrates the presence of MNPs in various human tissues -- urine, blood, and placenta -- as well as in human breastmilk. As published by World Health Organization in 2022, huge knowledge gaps exist regarding the health impacts of dietary nanoplastics on human. We leverage our research tools in food toxicity to study the dynamics of dietary nanoplastics and their health impacts, including its genotoxicity and developmental toxicity. In my talk, I will share our research platform, which uses a chicken embryonic model, and some recent findings on the different toxicities using model MNPs: 500 nm polystyrene (PS) nanoplastics and fluorescently labeled carboxylate-modified PS spheres with diameters of 20, 500, and 1000 nm. I will also discuss the many challenges of filling knowledge gaps about dieatary nanoplastics, such as the detection of nanoplastics in complex food matrices. We will need to use innovative interdisciplinary approaches to understand this emerging food contaminant.

Dr. Changqing Wu is a Professor and a food toxicologist/food chemist at the University of Delaware. Dr. Wu has over 18 years of research in the field. Dr. Wu has established multiple bioassays to determine the toxicity and bioactivities of various chemicals from food or food waste products. Wu research lab has successfully evaluated the toxicity of nanoparticles, natural and newly synthetic phenlic compounds including phenolic-branched fatty acids , lignin compounds, food extracts or food waste. Wu research group tools include in silico molecular docking, in vitro (e.g. cell culture and bacterial mutant assay), and in vivo methods (e.g. chicken embryonic assay and chicken feeding trials).

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FIELD IN THE ARCTIC

In March on a NERC/BAS funded research expeditions researchers Liam and Alice, working for Stefan, travelled to the Harland-Cox Arctic research station in Svalbard. The project focused on collecting glacier ice, snow and airborne particles to assess microplastic (MP) presence and concentration. The topic of MP pollution in the polar regions is slowly growing and the team are planning to publish their findings over the next few months. Key in this will be the first study of MP in terrestrial ice, as existing studies have focused on sea ice analysis.

The trip was support by the station leader, Iain “Cheese” Rudkin, who provided the much-needed guidance and training. As field researchers know having suitable weather is key to getting all the samples you want! Weather temperatures ranged from negative single to double digits (-3 to -20^{o}C), and generally there was good contrast to travel to field sites from the base at Ny-Alesund. The photos may be misleading as these were taken on the nicer weather days!

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JOB OPPORTUNITY

Research Fellow - Changes in mountain hydrology & water resources @University of Birmingham, UK - 103691

We are seeking candidates to this job opportunity – full details here:

https://edzz.fa.em3.oraclecloud.com/hcmUI/CandidateExperience/en/sites/CX_6001/job/4424

- Full time starting salary is normally in the range £34,980 to £44,263 with potential progression once in post to £46,974
- Full Time, 2 year Fixed Term contract.
- **Closing date: 16 April 2024**

We seek to appoint a talented and highly motivated individual to join the School of Geography, Earth and Environmental Sciences at the University of Birmingham, UK. This person will contribute to the creation of new knowledge by undertaking collaborative research in the fields of **mountain catchment hydrology** and **water resources** as well as environmental observation and modelling. This exciting role is part of the team for the ambitious **UKRI/NERC-funded Highlight Topic** project -**The Big Thaw** - that aims to assess past, present and future changes in global mountain water resources by studying snow/ice accumulation and melt in the European Alps, Himalayas and other mountain regions.

The magnitude and timing of river flow from glacierized catchments is determined by the aggregate response of the different (snow, ice, non-cryospheric) water stores present in the watershed, and their input-storage-release characteristics. These hydrological processes can vary strongly in space and time. The successful candidate will develop and apply methods to quantify these **hydrological dynamics and processes** using new and improved estimates of (a) river discharge/ water level based on **novel technologies** and (b) **water source contributions** based on hydrochemistry/ isotope **tracers**. Together, these new data will be used to calibrate hydrological models and advance the mechanistic understanding of mountain watersheds –including response to **environmental change** now and into the future.

The successful applicant will have the opportunity to conduct **fieldwork** at mountain sites for hydrological monitoring (including the installation and maintenance of low-cost sensor

networks) and water sampling (for natural tracers). The PDRA will join an **interdisciplinary team** of researchers and will be based at the University of Birmingham.

The successful candidate will have a strong **publication record** and both the technical and **quantitative skills** to deliver innovative science contributing to our project goals. The appointee will be expected to liaise with project investigators and partners, contribute to fieldwork, analyse field data (including tracers hydrology and other space-time observations) and produce peer-reviewed journal publications along with selected research impact activities; demonstrating strong initiative and excellent **teamwork skills**.

Informal enquires to David Hannah, email: d.m.hannah@bham.ac.uk

We believe there is no such thing as a 'typical' member of University of Birmingham staff and that diversity in its many forms is a strength that underpins the exchange of ideas, innovation and debate at the heart of University life. We are committed to proactively addressing the barriers experienced by some groups in our community and are proud to hold Athena SWAN, Race Equality Charter and Disability Confident accreditations. We have an Equality Diversity and Inclusion Centre that focuses on continuously improving the University as a fair and inclusive place to work where everyone has the opportunity to succeed. We are also committed to sustainability, which is a key part of our strategy. You can find out more about our work to create a fairer university for everyone on our website.

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15TH ANNUAL CATCHMENT SCIENCE SUMMER SCHOOL

The 15th annual Catchment Science Summer School will be running from **the 1st September until the 6th September 2024**. It is designed for PhD students and postdocs in catchment science. The course is taught by ***Jeff McDonnell*** (University of Saskatchewan and University of Birmingham) ***Dr. Chris Soulsby***, ***Dr. Jan Seibert***, ***Dr. Ilja van Meerveld***, ***Dr. David Hannah***, ***Dr. Stefan Krause*** and ***Dr. Dorthe Tetzlaff***. It is co-hosted by the University of Birmingham and the University of Aberdeen, University of Zurich, TU Berlin and the Global Institute for Water Security.

The Catchment Science Summer School is a 5-day short course that is intended for post-graduate students and post-docs interested in a hands-on catchment science curriculum, focusing on northern catchments, runoff processes and combined hydrometric, isotope/chemical tracer and modeling techniques in catchment hydrology. The learning objectives for this short course are to understand:

- Rainfall-runoff processes
- Rainfall-runoff model development, use, and testing
- Hydrochemical and isotopic measurement and analyses
- Linking field experiments with modeling approaches
- Evolution of empirical and theoretical understanding of runoff processes
- Landscape analysis, land-use and climate change impacts on streamflow

Buy tickets for this course here.

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UPCOMING GRANTS

RSC – Water Science Bursary
Deadline to apply: 31/03/2024
Award amount: £2k
This supports researchers engaged in projects that involve the application of chemical sciences in the management of the water cycle, and the impact these activities have on the environment.

11th Hour Racing – Ocean Health Grants
Deadline to apply: 31/03/2024
Award amount: $150k
As the climate crisis intensifies, so does the impact on ocean health. We need a global paradigm shift from an extractive economy that depletes our natural resources to a sustainable economy that uses resources wisely and protects our ocean. We work to facilitate this transition by supporting local solutions to global problems, led by community organizations and industry leaders.

UKSA – Aqualunar Challenge
Deadline to apply: 08/04/2024
Award amount: £150k
The Aqualunar Challenge is an international challenge focused on making human habitation in space possible by finding ways to purify water buried beneath the Moon's surface.

UKRI – Aryton Challenge Programme (outline)
Deadline to apply: 09/042024
Award amount: £2-3M
Apply for funding for interdisciplinary research projects aiming to drive forward the clean energy transition in developing countries and deliver real change in clean and just energy access.

NERC – Doctoral focal awards in environmental sciences 2024 (outline)
Deadline to apply: 09/04/2024
Award amount: £2.86M
Apply for funding to deliver a doctoral focal award to address priority or emerging training needs within the environmental sciences. This training will produce the next generation of internationally recognised doctoral researchers in challenge-led focus areas.

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[NERC - Environmental sciences: Global Partnerships Seedcorn Fund 2024]
Deadline to apply: 25/04/2024
Award amount: £100k
Apply for funding to create new and sustainable global partnerships in environmental science. The inclusion of one of more international project partners is mandatory.

[NERC/AHRC - Amazon +10 initiative: research expeditions to the Amazon]
Deadline to apply: 30/04/2024
Award amount: £1M
Apply for funding from this Brazil-led programme to collaborate with Brazilian partners on research expeditions to increase our knowledge of the biodiversity and socio-cultural diversity of the Brazilian Amazon.

[ADR – UK Research Fellowships 2024]
Deadline to apply: 30/04/2024
Award amount: £200k
Apply for funding for an Administrative Data Research UK (ADR UK) research fellowship using ADR England flagship data. Fellowships can be up to 18 months, up to a maximum of £200,000 at 100% full economic cost.

[National Biofilms Innovation Centre – Proof of Concept Funding]
Deadline to apply: 12/04/2024
Award amount: £75k
In this PoC call we are looking for proposals that are a collaboration between at least one company (micro, SME or large) or stakeholder with a UK presence and one (or more) UK university/ research institution. The project will be expected to develop a concept, idea or technology from any application sector which can be in a laboratory, model or real world setting to give confidence for further work

[NERC - FMRI: Accelerating adoption of marine sensor innovation]
Deadline to apply: 02/05/2024
Award amount: £800k
Apply for funding to enhance marine biogeochemical sensors for integration and validation with autonomous underwater vehicles. This opportunity is part of the Future Marine Research Infrastructure programme.

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[STFC - Leadership fellowships in public engagement 2024]
Deadline to apply: 07/05/2024
Award amount: £225k
Apply for funding to support a fellowship in the leadership of engaging the public with STFC supported science, technology or facilities.

[NERC/BBSRC - Sustainable and Resilient Aquaculture Systems in Southeast Asia]
Deadline to apply: 09/05/2024
Award amount: £3M
Apply for funding to undertake interdisciplinary research for the development of sustainable, resilient and productive aquaculture in Southeast (SE) Asia.

[EPSRC - Accelerating research outcomes to deliver a prosperous net zero: outline]
Deadline to apply: 16/05/2024
Award amount: £100-800k
Apply for follow-on funding to build on existing engineering and physical sciences research outputs to accelerate economic, societal, policy and environmental benefits on the path to net zero.

[NERC - TEAMxUK: Quantifying atmospheric processes in mountainous regions]
Deadline to apply: 13/06/2024
Award amount: £587.5k
Apply for funding to improve understanding of atmospheric processes in mountainous regions across scales for: weather and climate prediction; the UK's management of vulnerability, risk, and resilience to environmental hazards.

[MRC - Applied global health partnership: stage one]
Deadline to apply: 13/06/2024
Award amount: £150k - £1M
Apply for funding to support a partnership to enable research that will address global health challenges and inequities. We will accept applications of all sizes, including large projects and small to medium-scale applications

[AHRC - Doctoral focal awards in the arts and humanities]
Deadline to Apply: 02/07/2024
Apply for a doctoral focal award in the arts and humanities. Formerly pre-announced as focused Centres for Doctoral Training, this is the same funding opportunity but under a new name to align it with other upcoming UKRI doctoral funding opportunities. There are two broadly defined priority research themes or areas for this funding opportunity: arts and humanities for a healthy planet, people, and place creative economy.

[EPSRC - Network Plus: Tomorrow's Engineering Research Challenges]
Deadline to apply: 09/07/2024
Award Amount: £1-1.75M
EPSRC aims to encourage a new approach to address Tomorrow's Engineering Research Challenges (TERC) by supporting diverse teams from across disciplines and build unprecedented research capabilities.

[UKRI - Maximising UK adaptation to climate change research projects]
Deadline to apply: 16/07/2024
Award amount: £2M
Apply for funding for transdisciplinary research projects under the UKRI-Defra co-funded Maximising UK Adaptation to Climate Change programme to help improve the UK's resilience to climate change impacts.

[NERC - Pushing the frontiers of environmental research: July 2024]
Deadline to apply: 17/07/2024
Award amount: £950k
Apply for funding to pursue an ambitious, high risk and high reward project in environmental research.

[NERC - Addressing environmental challenges: NERC highlight topics 2024]
Deadline to apply: 09/10/2024
Award amount: £2.35M
Apply for funding to address one of five environmental research challenges. We encourage multidisciplinary research and collaborations with other UK organisations, and applications from diverse groups of researchers.

Open Calls with no closing date:

[NERC Urgency Fund (£100k)]
Apply for funding to respond quickly to transient and unexpected scientific opportunities.

[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.

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[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