Water Challenges in a Changing World

SEPTEMBER NEWSLETTER

Hello everyone, we are pleased to welcome all PGR students and staff back as we begin the new academic year. Whether you are returning or joining us for the first time, we look forward to a productive and inspiring year ahead!

As we embark on new research, collaborations, and challenges, let's continue to support one another and foster a thriving academic community. Best wishes for a successful and rewarding year!

WELCOME TO NAZIMUL ISLAM

"I am Nazim, currently working as a Post-Doctoral Research Fellow at the University of Birmingham on 'The Big Thaw' project funded by the Natural Environment Research Council (NERC). My current research focuses on using stable water isotopes to determine the relative contribution of different water sources such as cryospheric (e.g., glacier-melt, snowmelt) as well as non-cryospheric (e.g., rainfall and groundwater) in the high-altitude mountain catchments. This will help us to better understand the climate change impacts on mountain water resources. My motivation of using stable water isotopes to study mountain hydrology comes from my PhD research which focused on understanding the climate change influence on water resources in the Alpine and Himalayan catchments using tree rings and stable isotopes. Previously, I studied an MSc in River Basin Dynamics and Management with GIS from the University of Leeds, and successfully completed the dissertation on assessing the glacial lake outburst flood (GLOF) risk assessment in the Eastern Himalaya. My work is driven by a strong commitment to advancing our understanding of mountain water resources and associated risks to the local communities under the changing" climate. Being actively involved in science outreach and communication, I also take every possible opportunity to share my research with wider scientific and non-scientific audiences for environmental awareness, policymaking for sustainable water resource management and risk mitigation."

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WATER SEMINAR SERIES OCTOBER

You are invited to attend our next Water Seminar Series talk where we welcome Dr Charles-François de Lannoy from McMaster University.

This talk will be taking place on the **15th October from 12pm – 1pm** at Elm House, **room G08** and will be followed by a networking lunch in G05**.** The link for this talk has been sent around but please contact Suman s.hira@bham.ac.uk if you need it resent to you.

Title: Separating and degrading environmental contaminants in drinking water and wastewater: innovations in membrane technologies for a changing world

Abstract: How can we extract valuable resources from waste effluents? How can we protect people from trace contaminants in our water? How can stop pollutants from entering our environmental systems? Is it possible to extract contaminants and turn that waste into value? Electrochemical purification technologies may hold some of the answers.

Separation (purification) technologies form the basis of most environmental and chemical processes, ranging from water treatment and desalination, to chemical catalysis, to gas purification. Membranes are the most efficient, cost effective, and safest purification technologies and they are replacing conventional technologies, while also being adopted across many new sectors. However, membranes do not treat the contaminants they remove. They simply concentrate those contaminants transporting the problem elsewhere (i.e. a landfill, a farmer's field, or an incinerator). Moreover, a lack of contaminant specificity means that valuable contaminants (e.g. Au, Zn, various pharmaceuticals) from mining, industrial, or municipal wastewaters cannot be easily retrieved.

Prof. de Lannoy and his research lab have pioneered the field of electrochemical membrane reactors (EMRs) and applied these for environmental remediation, wastewater treatment, and resource recovery. These materials can variously

perform conventional separations while also catalyzing reactions on their surface, and in many cases enabling separations that would not otherwise be possible. This talk will present the membranes being designed and the processes for their scalable production, in-situ separations and electrochemical degradations of contaminants of emerging concern, the mechanisms of degradation, and some new applications in resource recovery. The talk will close with a discussion of the current and future challenges for this environmental remediation technology, including the unknown by-products of reaction, their possible environmental/human impacts, and their broader adoption by industry.

Bio: Charles-François de Lannoy is an Associate Professor in Chemical Engineering and Adjunct Professor in Chemistry at McMaster University. His research group develops membranes, sorbents, and purification processes to eliminate trace environmental contaminants, capture carbon dioxide, and convert waste to value.

SUCCESSFUL FIRST WATER SEMINAR

For our first seminar of the academic year, we hosted Dr Nan Wu from the British Antarctic Survey, who delivered a talk called “Flocs as Vectors for Microplastics in the Aquatic Environment”. We had a great turnout both online and in person and the talk sparked a great number of questions from attendees. We encourage you to join us for our next Water Seminar Series talks, which we currently have booked in to take place at Elm House, room G08, as follows:

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Guest Speaker	From	Date	Time
Dr Charles-François de Lannoy	McMaster University	15th Oct	12pm – 1pm
Dr Elizabeth Dingle	Durham University	25th Nov	2pm – 4pm
Dr Philip Riris	Bournemouth University	28th Nov	12pm – 2pm
Prof. Dr. Christian Laforsch	University of Bayreuth	TBC	TBC

PLASTICUNDERGROUND JOINT EXPERIMENT

Several doctoral candidates from across Europe have joined us to collaborate on a joint experiment as part of the PlasticUnderground project. Using the large columns in the eco lab, they will study the transport of microplastics (MPs) in porous media, focusing on the impact of fine particulate organic matter (fPOM), aging, and MP concentration. This research aims to deepen our understanding of how MPs move through groundwater environments.

By Fuad Alqrinawi

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CATCHMENT SCIENCE SUMMER SCHOOL 2024

We held our **15th Annual Catchment Science Summer School** between the 1st and 6th September.

This year we hosted a total of 29 students, who participated in lectures and classes by Prof. McDonnell, Prof. David Hannah and Prof. Stefan Krause from UoB and other guest lecturers. Welcome drinks and poster presentations started off the week and students were invited to attend the Lapworth Museum for this welcome and introduction.

Classes were then held at BISCA, Elm House for the first time and instructors commented on the lovely large space and excellent facilities for all. Poster boards were set up in the social area on the ground floor, which proved for excellent talking points during lunch breaks. In the middle of the week the group headed to the Plynlimon Catchment in Wales for an exciting day of lectures and learning in the field, albeit with a few drops of rain.

We received excellent positive feedback from students regarding the course and we look forward to holding the Catchment Science Summer School again next year.

ASLO 2025

Prof Stefan Krause and his team from the PlasticUnderground project are hosting the following session at ASLO 2025: **Session 33: Impacts of Hydrological Variability on Microplastic Fate and Transport.**

Abstract submission **is now open and closes on October 21st.** This session will be a fun and exciting session, allowing you to showcase the University of Birmingham, share research, knowledge and new ideas.

SS33 Impacts of hydrological variability on microplastic fate and transport

Despite the many benefits of living in the "plastic age", there are pervasive environmental and public health impacts resulting from the durability, unsustainable use and inappropriate waste management of plastics. Compared to the environmental impacts of larger plastic objects there is growing concern that micro and nanoplastics (<5mm MnP) pose an even greater threat due to direct or indirect toxicity and their pervasiveness in habitats and biota. We are still in the early stages of learning about the diversity of MnP sources and their different activation mechanisms, as well as their fate and transport through streams and rivers towards oceans. Despite many studies identifying MnP concentrations in rivers worldwide, it remains unclear how hydrological variability such as event-based meteorological forcing, seasonal and inter-annual changes or man-made alterations of flow in rivers and lakes impact storage and transport of MnP. We are soliciting presentations that aim to advance our understanding of how hydrological dynamics including seasonal inundation of the floodplain, flash-floods, regulated rivers, river-control structures, and evaporation or abstraction, among others, affect local exposures and transport of MnP. This session aims to elucidate hydrological controls of residence time, break-down and transport of MnP. To assess how these processes vary on spatial and temporal scales, we invite contributions from empirical, experimental and modelling studies. Of particular interest are studies that characterize extreme hydrological events or long-term observations. Ultimately, this session will help explain the large variability in observed concentrations, storage, and residence time of MnP during their river, lake and reservoir conduits.

SAVE THE DATE IAHS

IUGG

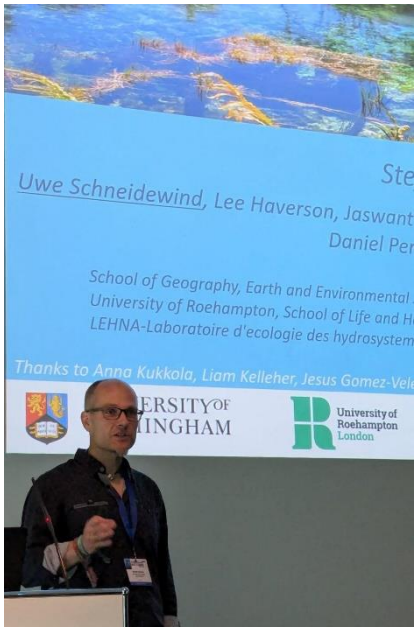
IAHS AISH
International Association of Hydrological Sciences

The 12th Scientific Assembly of the International Association of Hydrological Sciences (IAHS 2025) will take place in Roorkee, India from 5 to 10 October 2025. More information can be found here.

ENVIRONMENTAL MICRO – AND NANOPLASTIC IDENTIFICATION AND CHARACTERISATION WORKSHOP

We are excited to announce the launch of our new Winter workshop – **Environmental Micro and Nanoplastic Identification and Characterisation** Workshop. This workshop will run in person from the **27th - 31st January 2025**. It is designed for PhD students, postdocs and professionals. The course is taught by Prof Stefan Krause (University of Birmingham) and his team. It is supported by the Water Research Centre, BISCA and IGI.

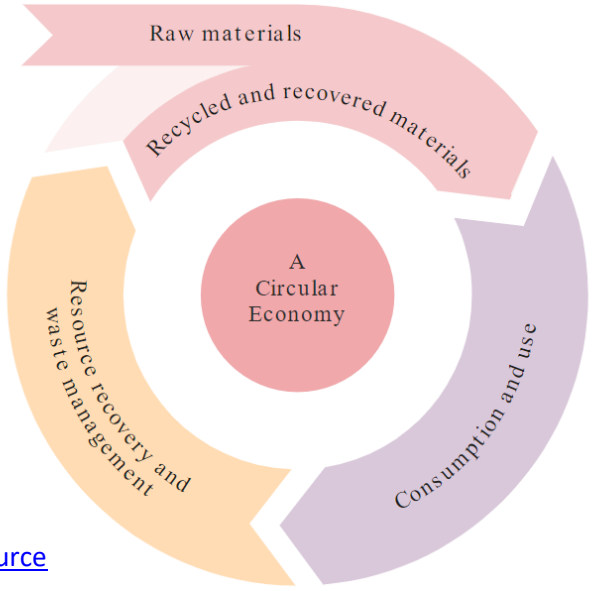
IAH 2024 WORLD GROUNDWATER CONGRESS



Prof Stefan Krause and members of the Water Challenges team attended the IAH 2024 World Groundwater Congress, held in Davos, Switzerland. Sessions were co-organised by Brijesh Yadav and Uwe Schneidewind and included microplastics, groundwater-surface water interaction with temperature time-series analysis and the impact of groundwater flooding.

PROF STEFAN KRAUSE MEETS WITH MINISTER CREAGH

As a member of the Birmingham Plastic Network leadership team, Prof Stefan Krause attended a meeting with Minister Creagh at DEFRA to discuss how recent policy initiatives can support the development of sustainable plastics within the UK's circular economy. One of the key outcomes of this meeting was the initiation of the establishment of an All-Party Parliamentary Group (APPG) on Sustainable Plastic Futures.



Source

UPCOMING GRANTS

EPSRC - Engineering Healthier Environments: Micro Network and Micro Network Plus
Deadline to apply: 02/10/2024
Award amount: £600k
Apply for funding to develop an interdisciplinary Micro Network or Micro Network Plus focused on developing new and existing collaborations within the topic of engineering healthier environments. Your network can last up to 24 months.

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.

NERC - Delivering training courses for environmental scientists 2024
Deadline to apply: 15/10/2024
Award amount: £60k
Apply for funding to deliver training short courses within the NERC remit, focusing on areas of identifiable training need.

NERC – Large grant
Deadline to apply: 12/11/2024
Award amount: £1.2-3.7M
Apply for funding to support innovative, large-scale and complex projects that tackle big science questions and have potential to produce world-leading research.

ITPOF – R&D Award
Deadline to apply: 02/12/2024
Award amount: £60k
The ITOPF R&D Award is open to any reputable R&D establishment or other organisation worldwide intending to fund a candidate (individual or project team) to undertake research. Applications are invited from all academic disciplines, although preference will be given to those with an applied scientific focus, such as marine biology, chemistry, ecology, physics, engineering and economics.

EPSRC/NERC – Sustainable Industrial Futures
Deadline to apply: 11/12/2024
Award amount: £26M
This is a £26 million (80% full economic cost (FEC)) seven year, flagship investment focused on tackling cross-sectoral research challenges rooted in excellent, leading-edge engineering, physical and environmental sciences and transdisciplinary

approaches to enable the transition of UK industrial manufacturing processes and operations to net zero.

Open Calls with no closing date:

IGB: Leibniz Institute of Freshwater Ecology and Inland Fisheries – Senior Fellows
We invite excellent established scientists to apply for a research visit at IGB. We offer stays for 3 to 12 months to enable senior scientists to contemplate and pursue new inspiring research ideas in collaboration with scientific staff at IGB. At the time of application, successful candidates can be based at institutions in any country worldwide except Germany. Scientists residing in Germany are not eligible to apply, independent of their nationality.

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.

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