Water Challenges in a Changing World

FEBRUARY NEWSLETTER

Welcome to the February 2025 edition of the Water Challenges theme newsletter!

NEW STUDENT – ALI AL-MANSOORI

My name is Ali Raheem Al-Mansoori, hailing from Iraq. I completed my bachelor's degree at the College of Agriculture, University of Baghdad, specializing in agricultural machinery, and I completed my master's degree at the same university, with my research focused on water desalination for agricultural purposes. I chose to conduct my research on soil moisture sensors, entitled "Development of dynamic in situ soil moisture sensing equipment for high resolution mapping of root – zone moisture extraction traits relevant to water – limited crop production". This research is especially close to my heart as it addresses the critical issues of drought and desertification, which are of significant concern globally.

I chose the University of Birmingham for my further studies due to its outstanding reputation and commitment to fostering research that contributes to solving real-world problems. I am eager to contribute to and learn from the vibrant academic community at Birmingham.

NATURE BASED SOLUTIONS SURVEY

Please complete this 10-minute survey on how nature-based solutions for flood mitigation are planned and implemented in different countries:

Nature based solutions international survey

The survey is part of research being conducted by the IAHS - international association of hydrological sciences working group on NBS.

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SUCCESSFUL VIVA

We are thrilled to congratulate Dr Hongzheng Zhu on successfully passing his viva and earning his PhD! Hongzheng's PhD tile was: **Understanding of water quality storm event dynamic in urban catchments using in-situ high frequency monitoring.** His research focussed on monitoring urban stream water qualities, with a particular emphasis on their storm event dynamics. This approach facilitated the analysis of the concentration–discharge relationship, enabling a deeper understanding of various water pollution transport pathways and activation zones.

Well done to Dr Zhu for this fantastic achievement. We wish you the most success.

PAPER PUBLISHED ON UNVEILING LANDSCAPE-LEVEL DRIVERS OF FRESHWATER BIODIVERSITY DYNAMICS

Niamh Eastwood, Arron Watson, Jiarui Zhou and Luisa Orsini from the University of Birmingham have analysed water and biofilm samples from lakes across the country to find key links between the presence of pollutants and biodiversity loss. They can now identify the most harmful pollutants present in UK waters that are having the biggest impact on biodiversity thanks to pioneering AI technology developed at the University of Birmingham, a new study published in Environmental DNA has revealed.

The new technology allowed the team of scientists to analyse water and biofilm samples from 52 freshwater lakes across the country, efficiently and effectively sifting through reams of complex data to find key links between the presence of pollutants and biodiversity loss. The data concluded that insecticides and fungicides were the main factors affecting biodiversity, along with 43 other physico-chemical factors, including heavy metals and alkalinity. **Please see the full UoB article here: AI technology helps scientists detect which pollutants in England's lakes are most harmful to life. Details of the publication can be found below in the Publications section.**

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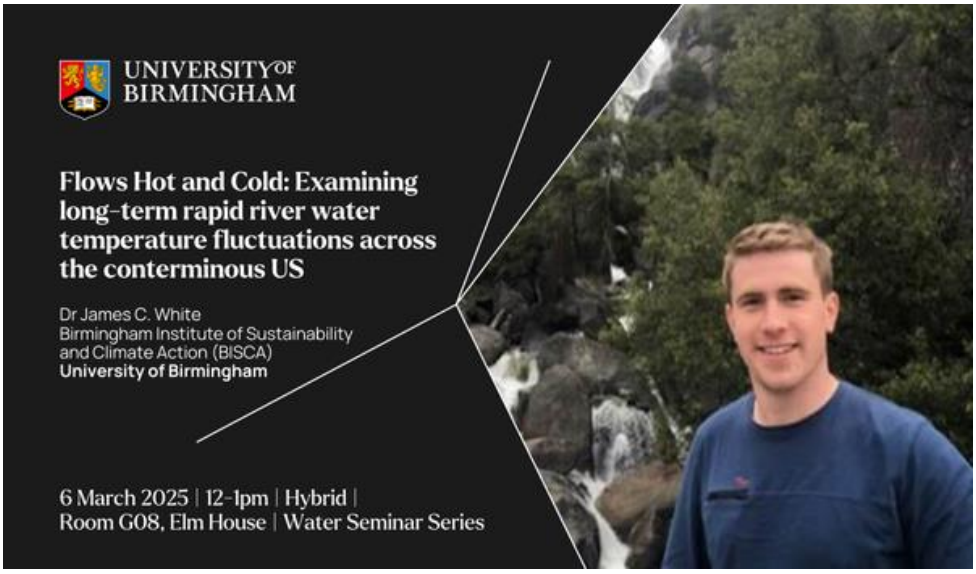
WATER SEMINAR SERIES – MARCH



You are warmly invited to join us for our March Water Seminar Series talk by UoB's Dr James White on the **6th March at 12pm** in Room G08 at Elm House. This will be followed by a networking lunch at 1pm. The calendar invite for this seminar talk has been sent but if you haven't received this and would like to be added to the invite, please drop s.hira@bham.ac.uk an email.

Title: Flows Hot and Cold: Examining long-term rapid river water temperature fluctuations across the conterminous US.

Abstract: River water temperature (T_w) regimes are fundamental to freshwater ecosystem health, but rates of thermal change have been understudied despite its ecological importance. Rapid T_w increases ('surges') or decreases ('plummets') have been observed across individual catchments and short-term periods but have been seldom characterized across broader space-time domains. Moreover, how multiple environmental drivers governing surges and plummets have been sparsely examined. To address this, we collated and cleaned high-resolution T_w data spanning the conterminous United States (US) between 2008-2023. We demonstrated the national-scale prevalence of surges (n = 6507) and plummets (n = 4787) that were recorded at 88 of the 102 monitoring stations. Both event types spanned freezing (snowmelt-fed systems) to extremely hot (>40 °C - geothermal influences) conditions. Successive transitions between rapid T_w warming and cooling occurred mostly

in regulated systems, indicating dam-induced T_w volatility. Spatial and temporal analyses highlighted that surges were most frequently observed in the Southeast US and recurred every summer, while the same was true for plummets in the Southwest US; both were less prevalent in the West and Northwest US. Random forest models evidenced that surges were more sensitive to urbanisation, while plummets were strongly associated with minimum air temperature; both event types were driven by catchment properties like land cover, slope, soil properties and dam influences. This research provides a critical step in characterizing rapid T_w changes across vast spatial and temporal scales, as well key hydrometeorological conditions and catchment characteristics governing surges and plummets. Such insights are critical for informing evidence-based management solutions targeting extreme T_w variations and volatility.

Biography: Dr James C. White is a research fellow in Geography, Earth and Environmental Sciences at UoB, and affiliate of the Birmingham Institute of Sustainability and Climate Action (BISCA). He is an interdisciplinary research scientist whose research broadly entails characterizing freshwater ecosystem dynamics and pressures in the context of global environmental change. He works closely with non-academic partners including water companies, charities and volunteer groups to deliver applied research on managing freshwater ecosystems to benefit wildlife and people.

ANNUAL COMMONWEALTH SCHOLARSHIP EVENT IN LONDON

I had an incredible time at the annual Connect and Collaborate Event of the Commonwealth Scholarship Commission in the UK, which brought together fellow scholars, alumni, and representatives of the Commonwealth Scholarship Commission (CSC) at the Queen Elizabeth II Centre, London, UK.

It was wonderful to connect with fellow scholars from all over the world and explore unique cultures, and I am truly inspired by the diverse perspectives and innovative ideas shared.

I also had a great opportunity to meet Prof. Robin Mason, Chair of the Commonwealth Scholarship Commission in the UK, and my CSC Programme Officer, Mariam Golashvili.

I am grateful for the chance to collaborate, learn, and be part of such an empowering network. I would like to thank my Ph.D. supervisors, Prof. Manoj Jain, Dr. Rajendra Prasad Pandey, and Prof. David M. Hannah for their constant support and guidance. **Written by Ajay Gupta**

CATCHMENT SCIENCE SUMMER SCHOOL

🌟 16th Annual Catchment Science Summer School! 🌟

📅 Dates: Sunday 31 August - Friday 5 September 2025
📍 Location: University of Birmingham

🎟️ Tickets are now live – and they sell out quickly! Secure your place here: tinyurl.com/ywn3hxsj

Delivered with the Birmingham Water Centre and hosted by the Birmingham Institute for Sustainability and Climate Action, this Catchment Science Summer School offers a unique opportunity to deepen your knowledge in catchment science.

The course is taught by an outstanding team of academics, including Jeff McDonnell (University of Saskatchewan and University of Birmingham), Chris Soulsby, Jan Seibert, Ilja van Meerveld, David Hannah, Stefan Krause, and Dorthe Tetzlaff, who bring a wealth of expertise across hydrology, modelling, and field experimentation.

Designed for PhD students and postdocs, this 5-day, hands-on program covers topics such as rainfall-runoff processes, hydrochemical and isotopic analysis, model development, and the impacts of land-use and climate change on streamflow. Participants will explore cutting-edge techniques and learn to integrate field experiments with modelling approaches, with a focus on northern catchments.

Co-hosted by the University of Birmingham, University of Aberdeen, University of Zurich, Humboldt University Berlin, Leibniz-Institute of Freshwater Ecology and Inland Fisheries, and the Global Institute for Water Security, this course provides an unparalleled opportunity to connect with global leaders in catchment science while advancing your career.

Take your expertise in catchment hydrology to the next level at this highly successful summer school.

RESEARCH FELLOW - SCHOOL OF GEES - 104983 - GRADE 7

Position Details

School of Geography, Earth and Environmental Sciences
Location: University of Birmingham, Edgbaston, Birmingham UK
Full time starting salary is normally in the range £35,880 to £45,163 with potential progression once in post to £47,874
Grade: 7
Full Time, Fixed Term contract up to September 2027
Closing date: 4th March 2025
UK travel may be required for this role
Please note: We are advertising for both a Grade 6 Research Associate (104920) and a Grade 7 Research Fellow (104983), however there is only 1 post available.
Link - Research Fellow at University of Birmingham

Background

We are recruiting a Research Fellow (Grade 7) for the SMARTWATER project (https://www.smart-water.org.uk/), a NERC Large grant involving multiple UK institutions and a US partner. The position will be split between maintaining water quality monitoring stations (including In-Situ, Proteus, TriOS and Xylem in-situ sensors) in our local catchments (travel required) and using data science approaches for analysis of high frequency datasets. The SMARTWATER project aims to use high-frequency sensing to diagnose locations of pollution hot spots and hot moments and assess their impact on water quality.

Role Summary

- To complete fieldwork relating to high-frequency sensor and low-cost sensor deployment
- Working on large time series data for trend analysis related to hot spots and moments
- Work within specified research grants and projects and contribute to writing bids and manuscripts

- Operate within area of specialism
- Analyse and interpret research findings and results
- Contribute to generating funding
- Supporting other members of the research team

Main Duties

The responsibilities may include some but not all of the responsibilities outlined below.

- Maintenance and data quality assurance from sensor network
- Use of analytical software for time series data analysis
- Collation of existing hydrological datasets
- Related lab work
- Develop research objectives and proposals for own or joint research, with assistance of a mentor if required
- Contribute to writing bids for research funding
- Analyse and interpret data
- Apply knowledge in a way which develops new intellectual understanding
- Disseminate research findings for publication, research seminars etc
- Supervise students on research related work and provide guidance to PhD students where appropriate to the discipline
- Contribute to developing new models, techniques and methods
- Undertake management/administration arising from research
- Contribute to Departmental/School research-related activities and research-related administration
- Contribute to enterprise, business development and/or public engagement activities of manifest benefit to the College and the University, often under supervision of a project leader
- Collect research data; this may be through a variety of research methods, such as scientific experimentation, literature reviews, and research interviews
- Present research outputs, including drafting academic publications or parts thereof, for example at seminars and as posters
- Provide guidance, as required, to support staff and any students who may be assisting with the research

- Deal with problems that may affect the achievement of research objectives and deadlines
- Promotes equality and values diversity acting as a role model and fostering an inclusive working culture.

Person Specification

- Degree in area of specialism and normally, a PhD (or near to completion) relevant to research area or equivalent qualifications
- High level analytical capability
- Ability to communicate complex information clearly
- Fluency in relevant models, techniques or methods and ability to contribute to developing new ones
- Ability to assess resource requirements and use resources effectively
- Understanding of and ability to contribute to broader management/administration processes
- Contribute to the planning and organising of the research programme and/or specific research project
- Co-ordinate own work with others to avoid conflict or duplication of effort
- Knowledge of the protected characteristics of the Equality Act 2010, and how to actively ensure in day to day activity in own area that those with protected characteristics are treated equally and fairly
- Experience using in-situ water sensors, their maintenance and calibration
- Experience in lab-based techniques for physical parameter measurements (Fluorescence, TOC/TN)
- Ability to clean high-frequency data and create graphical plots
- Desirable - experience with R-Shiny to create apps
- Demonstrable technical knowledge of/experience in analysis of high-frequency data

Interviews

We aim to shortlist candidates in early March and conduct interviews in late March and early April. Shortlisted candidates will receive updates throughout the process. Informal enquiries to Liam Kelleher - l.kelleher@bham.ac.uk, Stefan Krause - s.krause@bham.ac.uk

WATER THEME PUBLICATIONS

Eastwood, N., Watson, A., Zhou, J., and Orsini, L. (2025) 'Unveiling landscape-level drivers of freshwater biodiversity dynamics', *Ecological Dynamics*, Advance online publication. Available at: https://doi.org/10.1002/edn3.70058.

Please see here for the related press release: AI technology helps scientists detect which pollutants in England's lakes are most harmful to life

UPCOMING GRANTS

STFC - Nucleus Public Engagement Awards 2025
Deadline to apply: 20/03/2025
Award amount: £20-100k
Apply for funding to engage the public with Science and Technology Facilities Council (STFC) supported science, technology or facilities.

AGU – Horton Research Grant
Deadline to apply: 27/03//2025
Award amount: $11k
The Horton Research Grant is awarded to up to three Ph.D. students studying hydrology, water resources, or a closely related field each year and is made possible through the generosity of the Robert E. Horton Fund for Hydrologic Research. The purpose of the award is to promote excellence by encouraging the next generation of professionals in the hydrological sciences.

Blaustein Center for Scientific Cooperation Postdoctoral Fellowships
Deadline to apply: 31/03/2025
Award amount: $29k
Every year, the BCSC proudly awards 4-5 fellowships to exceptional postdoctoral scholars from all corners of the world. Our Blaustein Postdoctoral Fellows undertake fundamental and applied studies in various fields related to drylands, including desert ecology, solar energy, environmental physics, rainfed and irrigated agriculture, soil-plant-atmosphere interactions, hydrology, aquaculture, environmental microbiology, desalination and water treatment, and biotechnology.

JSPS-UNU Postdoctoral Fellowship Programme
Deadline to apply: 31/03/2025
Award amount: JPY 8.8M

Jointly organized by the UNU and the Japan Society for the Promotion of Science (JSPS), the JSPS–UNU Postdoctoral Fellowship Programme is designed to provide promising, highly qualified young researchers with the opportunity to conduct advanced research in sustainability under host researchers at domestic universities and research institutions across Japan in cooperation with UNU-IAS.

Royal Society of Chemistry – Water Science Bursary
Deadline to apply: 31/03/2025
Award Amount: £2k
The Royal Society of Chemistry's Water Science Forum invites applications for its water science bursary. 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.

NERC - Opening up the Environment 2025
Deadline to apply: 01/04/2025
Award amount: £62,500
Apply for funding to:1) explore the potential your organisation or department has to increase diversity of representation attracting a wider talent pool into NERC science, 2) generate partnerships that identify, include and showcase a broad range of people and skillsets that contribute towards NERC science

NERC – Independent Research Fellowship 2024
Deadline to apply: 03/04/2025
Award amount: £600-800k
Apply for funding to further your career through an independent research fellowship

National Geographic - Request for Proposals: Freshwater Storytelling
Deadline to apply: 22/04/2025
Award amount: $20k, £100k
In partnership with the Conrad Hilton Foundation’s Safe Water Initiative, The National Geographic Society seeks submissions from storytellers interested in creating and disseminating content that raises public awareness and engagement of important issues around the sustainable use of freshwater resources.

UKRI – Proof of Concept
Deadline to apply: 29/05/2025
Award amount: £100-250k
Apply for proof of concept to support the commercialisation of research to enable spinouts or social ventures, licencing or other commercialisation pathways. Applications from any disciplines are welcomed. No pre-existing UK Research and Innovation (UKRI) funding is required. The programme will not support discovery-driven research. You must be based at a UK research organisation

HORIZON-EIT-2025-KIC-WATER — call for proposals
Deadline to apply: 17/06/2025
Award amount: €5M
The new "Water" EIT KIC (Knowledge and Innovation Community) will address critical challenges related to the relevant fields of the water, marine and maritime sectors and ecosystems, and demonstrate excellence in each activity area (innovation, entrepreneurship and skills education and business creation / acceleration) to build on and upscale innovative solutions developed under existing programmes and initiatives such as Horizon Europe and EU Missions. The EIT KIC will develop an integrated approach across water, marine and maritime sectors and ecosystems and will address the following challenges and opportunities through the EIT's innovation model:

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