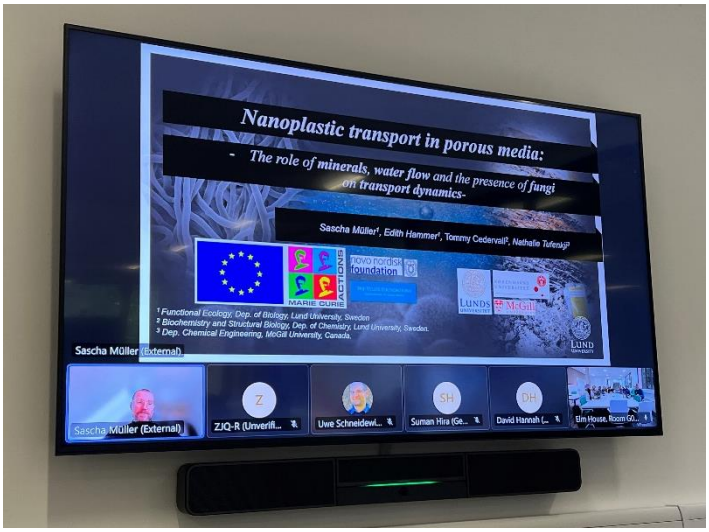
Water Challenges in a Changing World

NOVEMBER NEWSLETTER

WATER SEMINAR SERIES RECAP

This month we had 2 guest speakers for our Water Seminar Series. The first talk we had was by Sascha Müller from Lund University, who delivered an online talk for us titled "***Nanoplastic transport in porous media: The role of minerals, water flow and the presence of fungi on transport dynamics"***.



Dr. Sascha Müller's presentation examined how nanoplastics (NP) interact with subsurface-relevant interfaces and outlined the key processes that influence their fate and transport. Dr. Müller discussed the ways in which different minerals engage with various types of nanoplastics, emphasizing how particle shape and surface chemistry affect their mobility. The findings presented showed that NP transport in mineral-doped quartz porous media is strongly dependent on flow rate.

The presentation also addressed the potential role of fungal communities—prevalent yet understudied components of subsurface environments—in shaping NP behavior. Through microfluidic experiments, Dr. Müller presented new observations on interactions between nanoplastics and fungal structures within porous media, offering valuable insight into an interface that has received little previous attention.

This talk was well received and garnered much discussion.

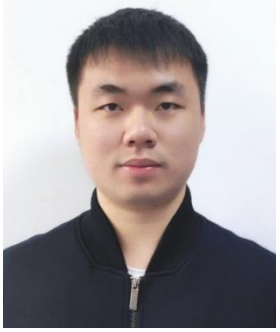
The second talk was delivered by Prof Julia Martin – Ortega, professor at Leeds University. Julia's talk was titled ***"We cannot address global water challenges without social sciences".*** Julia provided an overview of her 20-year career as an interdisciplinary researcher dedicated to advancing the role of the social sciences in addressing water challenges. In her presentation, she drew on her invited piece from the launch issue of Nature Water [We cannot address global water challenges without social sciences] to demonstrate why academics, funders, and publishers must support interdisciplinary research processes that place the social sciences on equal footing with the natural sciences and engineering. She illustrated this argument through examples grounded in her own experience and expertise.

If you missed this talk and would like to watch it back, please click here.

Water Challenges in a Changing World

NEW STARTERS

Ben Niu



We are delighted to welcome Ben Niu, a visiting researcher from China, who has recently joined the School of Geography at the University of Birmingham. Ben is undertaking his research under the joint supervision of Professor David M. Hannah and Dr. Shasha Han, focusing on the development of advanced frameworks for identifying and analyzing three-dimensional hydro-meteorological hazard events.

Ben is currently a PhD candidate at Northwest A&F University, where his doctoral work centers on compound drought–heat extremes, non-stationary climate indices, and data-driven approaches for understanding multi-scale climate risks. At UoB, his research aims to address a persistent challenge in climate-hazard science: how to detect, track, and interpret the evolving structure of extreme events not only across space, but also through time and vertical hydrological layers. By integrating multi-source observations, machine-learning techniques, and voxel-based spatiotemporal modelling, his project seeks to reveal the hidden morphology, cascading behavior, and driving mechanisms of disaster events.

Through this research, Ben hopes to improve scientific understanding of hazard evolution in a warming climate and to support more robust climate-risk assessment across vulnerable regions. His work contributes to the School's growing expertise in hydro-climatic extremes, environmental risk, and resilience.

Guhan Li

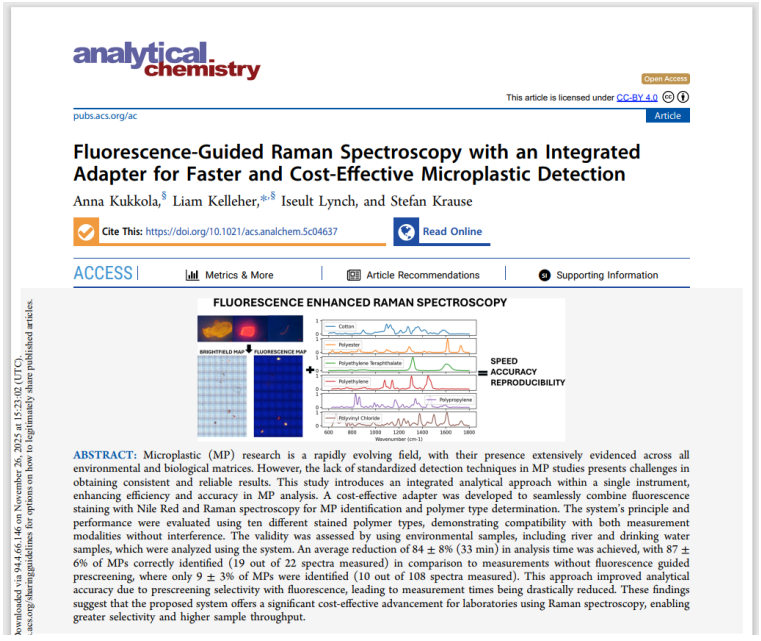
Hello everyone, I'm Guhan Li. I joined as a visiting student under the supervision of Professor David Hannah in November 2025. I am also a third-year PhD candidate at Hohai University.

My research focuses on river water temperature, primarily involving river temperature modeling and analyzing how it changes under climate change. I'm fascinated by this topic

because river temperature is such a critical environmental variable. It regulates key physical, chemical, and biological processes in aquatic ecosystems, and its changes have significant implications for biodiversity, water security, and society.

In my work, I'm exploring how to integrate advanced methods, like deep learning, with theoretical frameworks in river thermodynamics. I hope this approach can contribute to more accurate simulations and a better understanding of thermal dynamics. Ultimately, I aim for my research to support improved water environment management and climate adaptation strategies.

PUBLISHED PAPER



analytical chemistry

Open Access

This article is licensed under CC-BY 4.0

pubs.acs.org/ac

Article

Fluorescence-Guided Raman Spectroscopy with an Integrated Adapter for Faster and Cost-Effective Microplastic Detection

Anna Kukkola,[§] Liam Kelleher,*[§] Iseult Lynch, and Stefan Krause

Cite This: https://doi.org/10.1021/acs.analchem.5c04637

Read Online

ACCESS | Metrics & More | Article Recommendations | Supporting Information

FLUORESCENCE ENHANCED RAMAN SPECTROSCOPY

BRIGHTFIELD MAP

FLUORESCENCE MAP

Cotton

Polyester

Polyethylene Terephthalate

Polyethylene

Polypropylene

Polyvinyl Chloride

SPEED

ACCURACY

REPRODUCIBILITY

Wavenumber (cm-1)

ABSTRACT: Microplastic (MP) research is a rapidly evolving field, with their presence extensively evidenced across all environmental and biological matrices. However, the lack of standardized detection techniques in MP studies presents challenges in obtaining consistent and reliable results. This study introduces an integrated analytical approach within a single instrument, enhancing efficiency and accuracy in MP analysis. A cost-effective adapter was developed to seamlessly combine fluorescence staining with Nile Red and Raman spectroscopy for MP identification and polymer type determination. The system's principle and performance were evaluated using ten different stained polymer types, demonstrating compatibility with both measurement modalities without interference. The validity was assessed by using environmental samples, including river and drinking water samples, which were analyzed using the system. An average reduction of 84 ± 8% (33 min) in analysis time was achieved, with 87 ± 6% of MPs correctly identified (19 out of 22 spectra measured) in comparison to measurements without fluorescence guided prescreening, where only 9 ± 3% of MPs were identified (10 out of 108 spectra measured). This approach improved analytical accuracy due to prescreening selectivity with fluorescence, leading to measurement times being drastically reduced. These findings suggest that the proposed system offers a significant cost-effective advancement for laboratories using Raman spectroscopy, enabling greater selectivity and higher sample throughput.

We are pleased to announce the publication of the research article **'Fluorescence-Guided Raman Spectroscopy with an Integrated Adapter for Faster and Cost-Effective Microplastic Detection'.** For the full article please see here.

In this study, we developed a new adapter that makes microplastic analysis using Raman spectroscopy much more efficient. Traditionally, Raman spectroscopy can be very slow when analysing tens to thousands of particles. By first staining the particles with a fluorescent dye, we can quickly identify likely microplastics and then verify them using Raman spectroscopy. This greatly reduces the number of particles that need to be measured, significantly speeds up analysis, and increases sample throughput for larger studies.

This advancement represents an important step forward for the research community as we work toward building more detailed and accurate datasets to better understand environmental processes. For more information, please see the full article or feel free to get in touch. The system is now fully operational in the Molecular Science Building.

PLASTICS WORKSHOP 2026

Tickets are selling fast for our third **Environmental Micro – and Nanoplastic Identification and Characterisation Workshop**, which takes place from the 2nd to the 6th February 2026. This successful workshop is designed for PhD students, postdocs and professionals and is taught by Prof Stefan Krause (University of Birmingham) and his team. It is supported by the Water Research Centre and BISCA. More information about this course and the online shop to purchase tickets can be found here. Please share widely with those who you think would benefit.

HYDRO – ECO 2026

The well-established Hydro – Eco conference will be taking place at the University of Birmingham from the **14th to the 18th September 2026.** Please look out for the first announcement, coming soon!

MNP2026 CONFERENCE AT UOB

Micro - and Nanoplastics Conference 2026 (MnP26)

A One Health Approach for Understanding Plastic Pollution to Combat Environmental & Human Health Risks - 6th – 10th July 2026 | University of Birmingham, UK

We are pleased to share the Second Announcement for the Micro - and Nanoplastics Conference 2026 (MnP26). Building on strong international engagement following our First Announcement, the organising committee looks forward to welcoming a wide international audience of researchers, practitioners, policymakers, industry partners, and students to the University of Birmingham this July.

Plenary Speakers

We are honoured to welcome the following distinguished plenary speakers:

- **Dorte Herzke** (NILU)
- **Zhong Huan** (Nanjing University)
- **Chelsea Rochman** (University of Toronto)
- **Tamara Galloway** (University of Exeter)
- **Richard Thompson** (University of Plymouth)

These plenary lectures will bring together world-leading expertise in environmental science, toxicology, policy, and cross-sectoral approaches to micro- and nanoplastic research.

Abstract Submission Now Open

Abstract submissions for oral and poster presentations are **now open**.

We invite contributions addressing the environmental, human health, societal, and governance dimensions of micro- and nanoplastics, as well as emerging analytical, modelling, and cross-disciplinary approaches.

Submission Deadline: 31st January 2026 (11:59 PM Local UK Time)

Submission guidelines and the submission portal are available via the conference webpage.

Programme Highlights

The MnP26 programme will feature:

- **Keynote lectures** from leading global experts across environmental science, toxicology, engineering, policy, and social science.
- **Interactive panel discussions** on One Health perspectives, regulatory challenges, and future research priorities.
- **Parallel thematic sessions** spanning fundamental science, technology, governance, behaviour, and circular economy solutions.
- **Workshops and skills sessions** designed for early career researchers, including analytical methods, data harmonisation, and interdisciplinary communication.
- **Networking and partnership forums** to encourage collaboration across academia, industry, government, and NGOs.

Conference Themes

The conference will explore a broad spectrum of topics, including:

- One Health frameworks for understanding micro- and nanoplastic pollution
- Environmental and human toxicology
- Exposures, pathways, sources, fate, and transport
- Detection, characterisation, and modelling across scales
- Governance, regulation, and policy innovations
- Waste management and circular economy strategies
- Public awareness, education, and behavioural change

Registration

Full registration details, including fees and key deadlines, can be found on the conference webpage:

👉 **https://birminghamwatercentre.com/mnp26-microplastics-conference/**

Join Us in Birmingham

MnP26 will provide an international, interdisciplinary platform to advance scientific understanding and shape actionable solutions to global plastic pollution challenges. We look forward to welcoming you to the University of Birmingham. For any conference queries, please email microplastics2026@contacts.bham.ac.uk

WATER THEME PUBLICATIONS

A. Kukkola*, L. Kelleher*, I. Lynch, S. Krause, (2025). Fluorescence-Guided Raman Spectroscopy with an Integrated Adapter for Faster and Cost-Effective Microplastic Detection. Analytical Chemistry, https://doi.org/10.1021/acs.analchem.5c04637 **authors contributed equally*

Brown, W. H., Gloor, E., Fyfe, R., MacKenzie, A. R., Harper, N. J., Ganderton, P., Hart, K., Curioni, G., Quick, S., Davidson, S. J., Yetton, E., Diehl, J. L., Fauset, S., *et al.* (2025). Elevated CO_2 increases the canopy temperature of mature *Quercus robur* (pedunculate oak). *Global Change Biology*. https://doi.org/10.1111/gcb.70565

UPCOMING GRANTS

NERC - Artificial intelligence (AI) for environmental science phase one
Deadline to apply: 11/12/2025
Award Amount: £200-400k
Secure funding to deliver new world-leading data science and AI approaches to tackle critical environmental challenges. Interdisciplinary collaboration within and beyond environmental science is encouraged to maximise impact.

NERC – Opening up the environment
Deadline to apply: 21/01/2026
Award amount: £708k
Apply for funding to deliver activities to increase the diversity of the UK environmental science community.

NERC - Pushing the frontiers of environmental research: January 2026
Apply for funding to pursue an ambitious, high risk and high reward curiosity-driven project in environmental research.

Deadline to apply: 21/01/2026

Apply for funding to pursue an ambitious, high risk and high reward curiosity-driven project in environmental research.

NERC – Large Grant Outlines: February 2026
Deadline to apply: 26/02/2026
Award amount: £1.1-3.4M
Apply for funding to support innovative, large-scale and complex projects that tackle big environmental science questions and have the potential to produce world-leading research.

AGU – Horton Research Grant
Deadline to apply: 27/03/2026
Award amount: $10k
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.

AGU – Cryosphere Early Career Award
Deadline to apply: 27/03/2026
Award amount: £700
The Cryosphere Early Career Award is presented annually and recognizes significant early career contributions to cryospheric sciences and technology from honorees within 10 years of receiving their Ph.D.

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, unexpected environmental research opportunities created by sporadic natural occurrences such as earthquakes, droughts, floods, or ephemeral events in ecosystems.

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

[EPSRC - overseas travel grant: Nov 2023: responsive mode]
You can apply for an overseas travel grant in any area within the remit of Engineering and Physical Sciences Research Council (EPSRC). We will award 80% of the full economic cost (FEC) of the project.