Research Experience Placement (REP) Scheme 2026

Supervisor Project Proforma

Project title:	Nutrient limitation of algal blooms in rivers
Host Institution:	UKCEH
Project supervisor (name, department):	Isabelle Fournier, Water and Climate science
Project enquiries (supervisor email):	Isafou@ceh.ac.uk
Co-Supervisor, if any (name, department):	Mike Bowes, Water and Climate science
Proposed start date and weekly hours: (please note project must be of 6 weeks duration)	June 29th 2026; 36hours per week

Please provide a short paragraph or couple of sentences summarising the project to encourage potential applicants to apply (max 75 words)**:**

Algal blooms occur when suspended algae (phytoplankton) grow excessively. While algae play a key role in river ecosystems, algal blooms can cause significant problems including the presence of toxins, bad odour and oxygen reduction/depletion. Nutrients concentration is one of the key factors influencing algal blooms, limiting algal growth when too low. “How low is too low?” and “Does it vary between rivers?” are the questions we aim to answer with this project.

Project description (max 700 words, 1-2 figures may be included):

Proposed projects must:

- Have a clearly defined objective
- Be within the science remit of NERC
- Be feasible for a student to complete within the timescale of the placement
- Include more than purely a computer/modelling component i.e., some element of fieldwork, data collection, activity to give an understanding of the wider context including participation in lab/team meetings, networking, and training etc.
- Give scope for thought and initiative on the part of the student and should not use the student as a general assistant
- Be based at an eligible UK research organisation (remote placements from within the UK are also an option for enabling inclusivity)

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The objective of the project is therefore to derive the threshold at which nutrients, particularly phosphorus, starts the limit the growth of algae in freshwater rivers and to evaluate if it differs between rivers. This data would inform policies of wastewater management and fertilizer use, amongst others. Decreasing nutrient concentration in urban rivers requires significant efforts and resources, which may not yield the expected results of reducing algal blooms intensity or frequency if the reduction is not enough to reach the limiting threshold.

The limiting threshold can be determined experimentally by simultaneously exposing a river algae community to a range of nutrient concentrations and measuring their growth rates. We postulate that algal growth rate will increase as phosphorus concentrations increase, but eventually a threshold is reached where increasing nutrient no longer increases the growth rate. We aim to determine this threshold in phosphorus concentration for a range of rivers and understand how these thresholds are linked to parameters such as the algae community present in the river, water temperature, light levels, zooplankton and protists grazing pressure and the nutrient concentration they experienced in the river.

UKCEH has an experimental facility, the AQUA-REP, where such experiments can be conducted. Briefly, algae are sampled from the river by collecting water. They are then trapped in a semi-permeable membrane bag and floated in tanks filled with river water. The river water can then be modified in each tank to increase or decrease the nutrient concentration. Potentially important factors such as light, grazing and water temperature can also be investigated within the AQUA-REP.

The project includes a literature review and a discussion with the supervisors to co-design the experiments and chose the relevant co-factors. The student would then be involved in the field work and in conducting the experiments and associated chemical and biological laboratory analyses (with full training provided). The resulting data will also be analysed and briefly discussed in a short report. There is a possibility that this work will lead to a scientific publication which the student will be invited to participate.

Project timeline:

Week 1: Induction and literature review
Week 2: Design experiment and prepare for fieldwork and lab work
Week 3: First experiment
Week 4: Analyse the experiment data and prepare for fieldwork and lab work
Week 5: Second experiment
Week 6: Analyse the experiment data and write a short report.

Candidate requirements:

Knows how to use the Microsoft Office suite

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Can code in R a bonus Able to carry 10-20 kg on short distance would be ideal.
Background reading and references:
BOWES, M.J., N.L. INGS, S.J. MCCALL, A. WARWICK, C. BARRETT, H.D. WICKHAM, S.A. HARMAN, L.K. ARMSTRONG, P.M. SCARLETT, C. ROBERTS, K. LEHMANN & A.C. SINGER 2012. Nutrient and light limitation of periphyton in the River Thames: Implications for catchment management. *Science of The Total Environment* 434: 201–212.

To be completed by institutional CENTA PoC

I confirm that:

- The host institution takes responsibility for selecting a suitable undergraduate student and ensuring and confirming their eligibility under the NERC REP student eligibility criteria.
- This REP project falls within the NERC remit, is of suitable quality and meets the REP research project criteria.
- Appropriate supervisory arrangements are in place.
- The application processes used will be inclusive and accessible.
- Reasonable adjustments will be made for students that need them whilst undertaking placements.
- The placement will be carried out in accordance with all applicable ethical, legal and regulatory requirements including but not limited to relevant provisions of the General Data Protection Regulation, the Data Protection Act 2018, the Bribery Act 2010, the Fraud Act 2006, the Equality Act 2010 and the Modern Slavery Act 2015.
- The host organisation takes responsibility for identification, protection and exploitation of any intellectual property rights arising from the work.
- All facilities, agreements about access and collaborations necessary for the work will be obtained before the work commences and can be ensured through the period of the work.
- All costs awarded by NERC for the REPs will be used and accounted for appropriately.
- A report of the project by the student will be submitted no later than one week after the end date of the placement or Friday 25th September 2026, whichever falls first.
- A PhD interview (where possible) will be offered to all students who have completed a REP within the CENTA Doctoral Landscape Award.

Signed:

Date:

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Position: