

# Research Experience Placement (REP) Scheme 2026

## Supervisor Project Proforma

<b>Project title:</b>	When is the best time to sample aquatic macroinvertebrates in canals?
<b>Host Institution:</b>	Loughborough University
<b>Project supervisor (name, department):</b>	Kate Mathers, Geography and Environment
<b>Project enquiries (supervisor email):</b>	k.mathers@lboro.ac.uk
<b>Co-Supervisor, if any (name, department):</b>	Alisha Higgins and Paul Wood, Geography and Environment
<b>Proposed start date and weekly hours:</b> (please note project must be of 6 weeks duration)	6 <sup>th</sup> July 2026, 39 hours a week
<b>Please provide a short paragraph or couple of sentences summarising the project to encourage potential applicants to apply (max 75 words):</b>	
<p>Canals are unique freshwater ecosystems, but they are overlooked within ecological research and routine monitoring efforts. Despite this, they support a variety of macroinvertebrate species, and, as highly connected waterbodies that are regularly used by humans, likely support a large number of invasive non-native species. This project will contribute to a unique canal macroinvertebrate dataset and underpin research seeking to identify the optimal season for sampling macroinvertebrates to support better management and research efforts.</p>	
<b>Project description (max 700 words, 1-2 figures may be included):</b>	
<p>Proposed projects must:</p> <ul style="list-style-type: none"> <li>• Have a clearly defined objective</li> <li>• Be within the science remit of NERC</li> <li>• Be feasible for a student to complete within the timescale of the placement</li> <li>• 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.</li> <li>• Give scope for thought and initiative on the part of the student and should not use the student as a general assistant</li> <li>• Be based at an eligible UK research organisation (remote placements from within the UK are also an option for enabling inclusivity)</li> </ul>	
<b>Project Introduction / Aims</b>	
<p>In the UK, the network of navigable canals spans over 2000 miles and is home to a high diversity of wildlife and plants (Canal &amp; River Trust, 2026a; 2026b). Canals support a variety of physical habitats within lightly managed rural locations to heavily modified urban locations (Gurnell et al. 2025). However, canals are underrepresented in freshwater ecological research, despite being unique habitats, particularly with regards to the macroinvertebrate diversity supported (but see The Ponds Conservation Trust: Policy &amp; Research, 2003; Walker and Hassall, 2021; Bibi et al. 2022). As a consequence of this lack of research, there is little knowledge on canal</p>	

macroinvertebrate communities and no agreement on the optimal season to undertake ecological sampling to accurately capture the biodiversity canals support, on which to base future management efforts of these waterbodies.

A further challenge for canal macroinvertebrate ecology are invasive non-native species (INNS) which threaten the biodiversity of freshwater ecosystems (Jackson et al. 2014). Within the UK, 47 non-native species are established in freshwater ecosystems and considered as having a negative effect on biodiversity (Office for National Statistics, 2022). Freshwater invasive invertebrates are particularly common and include the signal crayfish, Asian clam, zebra and quagga mussel, and demon, killer and bloody-red shrimp which have been introduced either intentionally or unintentionally through human activities such as fishing, aquaculture, and boating (Hulme et al. 2008; Keller et al. 2011). Despite being a potential hotspot for INNS, canal macroinvertebrate ecology is under researched within the UK and there are no studies that have specifically considered the distribution of invasive invertebrates in canals in the UK.

Therefore, this project will be contributing to the provision of knowledge on canal macroinvertebrate communities. Emphasis will be on the INNS present within the Grand Union Canal as it passes through Loughborough and it's connected inflowing and outflowing rivers and streams. The overall aim of this project is to determine the optimal season for sampling macroinvertebrates in canals (e.g., Hill et al. 2016 for ponds). Employing data collected in Summer 2025, this project will further develop this dataset through processing data from selected sites for Autumn 2025 and Spring 2026.

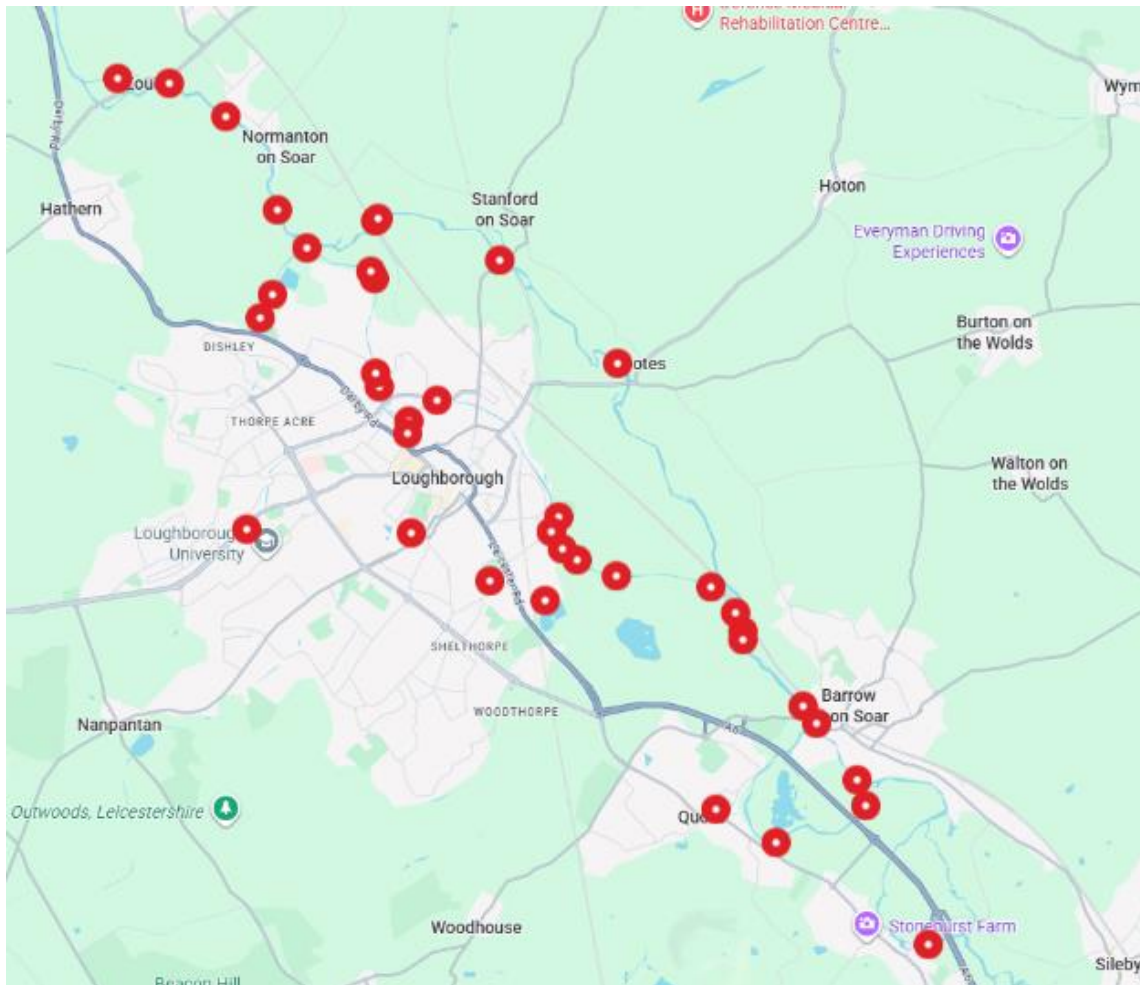
Fieldwork will be undertaken to contextualise the canal field site (Figure 1), to learn the sampling methodology and to see first-hand the macroinvertebrates that live within the canal. Alongside this, knowledge of ecological fieldwork techniques and INNS will also be enhanced through the opportunity to participate in fieldwork on a long-term project on the invasion of Pitsford Reservoir, Northampton by the demon and killer shrimp (Clinton et al. 2018; Mathers et al. 2023). There is also likely to be opportunities to undertake trapping of signal crayfish in August 2026 to understand their distribution within Loughborough's Grand Union Canal and at selected sites in Northampton.



**Figure 1:** Example field sites.

### Methodology

This project will contribute to the development of a dataset identifying the optimal time to sample canals. The project will employ pre-existing samples from the Grand Union Canal, and it's connected in / outflowing waterbodies in Loughborough (Figure 2). Data already exists from sampling undertaken in Summer 2025 and the successful candidate will first participate in a site selection process and subsequently undertake the processing and identification of macroinvertebrates samples from Autumn and Spring.



**Figure 2:** The location of sampling sites along the Grand Union Canal, River Soar and smaller in / outflowing waterbodies in Loughborough. This project will focus on a reduced number of sites selected from these locations. Map Reference: What3Words, 2026.

Following the fieldwork, work will commence in the laboratory with macroinvertebrate samples washed through 4 mm, 1 mm and 250  $\mu$ m sieves and placed into white trays. Macroinvertebrates will be manually picked from the trays and identified to species level (where possible) using a stereomicroscope and identification keys. This project has been designed to allow the successful candidate to actively participate in field and laboratory work, providing a diverse range of activities and opportunities to learn ecological sampling and processing techniques through the duration of the project. The successful candidate will also have the opportunity to work within a

lab group where a diverse array of ecological projects are being undertaken including those on invasive non-native species, fine sediment, ponds and river restoration.

**Project timeline:**

**Week 1:** Introduction to supervisors and project, laboratory induction, and Health & Safety details. Discussion of which sites to choose for processing. Fieldwork to visit chosen sites.

**Week 2:** Begin macroinvertebrate processing in the laboratory. This involves washing the samples through sieves, placing the samples into white trays, picking the invertebrates from the trays and placing them into vials where they will be stored until identification.

**Week 3:** Continue the process of picking invertebrates, once picking is completed, begin macroinvertebrate identification to species level using a microscope and identification keys

**Week 4:** Continue macroinvertebrate identification. Between weeks 4-6, there is the potential opportunity to join one to two days of fieldwork to Northampton, alongside potential signal crayfish trapping in Loughborough.

**Week 5:** Continue macroinvertebrate identification.

**Week 6:** Complete macroinvertebrate identification. Once complete, enter data into Excel and undertake basic exploration and preliminary analysis of the data alongside the provided Summer 2025 dataset such as exploring the differences in the abundance of species between the three seasons.

**Candidate requirements:**

Essential:

- Ability to work from Loughborough when required for laboratory work
- Willingness to work outside undertaking fieldwork
- Willingness to undertake repetitive tasks
- Excellent written and oral communication skills
- Ability to work independently and as part of a team and to collaborate with others
- Excellent interpersonal, and organisational skills
- Self-motivated with ability to meet deadlines

Desired:

- Experience of working with freshwater organisms, in particular macroinvertebrates
- Experience of working in laboratories / in the field

**Background reading and references:**

Bibi, H., Raffaelli, D., Sharif, M., (2022), The variation of size distributions of benthic communities across a range of irrigating ponds and canals of North Yorkshire, UK. *Sarhad Journal of Agriculture*. 38(1), 137-148.

Canal & River Trust, (2026a), *Our canal & river network*. Available at: <https://canalrivertrust.org.uk/canals-and-rivers> [Access Date: 9/3/2026].

Canal & River Trust, (2026b), *Canal habitats*. Available at: <https://canalrivertrust.org.uk/things-to-do/canal-and-river-wildlife/canal-habitats-for-nature> [Access Date: 9/3/2026].

Clinton, K.E., Mathers, K.L., Constable, D., Gerrard, C., Wood, P.J., (2018), Substrate preferences of coexisting invasive amphipods, *Dikerogammarus villosus* and *Dikerogammarus haemobaphes*, under field and laboratory conditions. *Biological Invasions*. 20, 2187-2196.

Gurnell, A., Bennett, R., Craddock, S., Chilton-Wilson, M., (2025), Assessing the physical habitat condition of navigable canals and rivers in England. *River Research and Applications*. 1-15.

Hill, M.J., Sayer, C.D., Wood, P.J., (2016), When is the best time to sample aquatic macroinvertebrates in ponds for biodiversity assessment? *Environmental Monitoring and Assessment*. 188(3), 194.

Hulme, P.E., Bacher, S., Kenis, M., Klotz, S., Kühn, I., Minchin, D., Nentwig, W., Olenin, S., Panov, V., Pergl, J., Pyšek, P., Roques, A., Sol, D., Solarz, W., Vilà, M., (2008), Grasping at the routes of biological invasions: a framework for integrating pathways into policy. *Journal of Applied Ecology*. 45, 403-414.

Jackson, MC, Jones, T, Milligan, M, Sheath, D, Taylor, J, Ellis, A, England, J, Grey, J, (2014), Niche differentiation among invasive crayfish and their impacts on ecosystem structure and functioning. *Freshwater Biology*, 59(6), 1123-1135.

Keller, RP, Geist, J, Jeschke, JM, Kühn, I, (2011), Invasive species in Europe: ecology, status, and policy. *Environmental Sciences Europe*, 23, 1-17.

Mathers, K.L., Clinton, K., Constable, D., Gerrard, C., Patel, C., Wood, P.J., (2023), Invasion dynamics of Ponto-Caspian amphipods leads to changes in invertebrate community structure and function. *Ecosphere*. 14(7), e4593.

Office for National Statistics, (2022), *Habitat extent and condition methodology, natural capital, UK: 2022*. Available at: <https://www.ons.gov.uk/economy/environmentalaccounts/methodologies/habitatextentandconditionmethodologynaturalcapitaluk2022> [Access Date: 4/3/2026].

The Ponds Conservation Trust: Policy & Research, (2003), *A spring survey of the aquatic macroinvertebrates of the Montgomery Canal*. Available at: <https://freshwaterhabitats.b-cdn.net/app/uploads/2023/09/MontInvertSpringReport3.pdf> Access Date: 9/3/2026].

Walker, J.R., Hassall, C., (2021), The effects of water chemistry and lock-mediated connectivity on macroinvertebrate diversity and community structure in a canal in northern England. *Urban Ecosystems*. 24. 491-500.

What3Words, (2026), <https://what3words.com/outsmart.placed.repelled> Available at: [Access Date 4/3/2026].

## 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 25<sup>th</sup> 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: 13<sup>th</sup> March 2026

Position: Loughborough University CENTA point of contact