

PROJECT TITLE: Radioactive archives of global carbon cycling in rivers

Project Science Theme: Earth Science and Hazards

Project keywords: Carbon; radiocarbon; hydrology; freshwater; bivalves

Lead Institution: Bristol

Lead Supervisor: Joshua Dean, Bristol, Geographical Sciences

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Webpage: <https://watershedcarbonlab.weebly.com/>

Project aims and methods:

Rivers are an important pathway in the global carbon cycle, moving carbon between land, atmosphere and the ocean. A large component of this is inorganic carbon which, despite the name, is a mixture of both organic and inorganic processes on land. This represents a globally significant flux of carbon to the atmosphere as carbon dioxide (CO₂), and a sink of carbon in the ocean. Recent work has shown that ancient carbon sources are important contributors to these fluxes, but we lack any real knowledge of how the magnitude and source of river inorganic carbon export has changed through time. This has profound implications for attempts to engineer global carbon sequestration through enhanced weathering and river alkalinity – two promising negative carbon emissions technologies. This project will explore the use of radiocarbon archives contained in the shells of freshwater bivalves to quantify past magnitudes and carbon sources to river inorganic carbon export. This is a collaboration between the Universities of Bristol and Exeter with opportunities to work in the world-leading carbon facilities at both institutions. The student will have the opportunities to participate in international fieldwork using river isotopes to trace the global carbon cycle.

Useful recruitment links:

For information relating to the research project please contact the lead Supervisor via:
josh.dean@bristol.ac.uk

Bristol NERC GW4+ DTP Prospectus:

<https://www.bristol.ac.uk/study/postgraduate/research/great-western-four-doctoral-training-partnership-nerc/>

How to apply to the University of Bristol:

<http://www.bristol.ac.uk/study/postgraduate/apply/>

The application deadline is Thursday 8 January 2026 at 2359 GMT