PROJECT TITLE: Design, preparation and implementation of sustainable materials for heavy metal remediation in rivers

Project Science Theme: Science for Environmental Solutions
Project keywords: Metal remediation, nanoparticles, characterization, simulation

Lead Institution: University of Bristol
Lead Supervisor: Neil Allan, University of Bristol, Chemistry
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Project aims and methods:

The overall project aim is to design, fabricate and implement in the field, new composite materials for the capture and subsequent removal of recognised heavy metal pollutants in contaminated water, predicted and characterised using state-of-the art atomistic simulation and experimental techniques. Computational studies identify molecules and materials with appropriate binding affinities either in locally abundant natural resources or in some cases cheaply available. These species are then engineered to enhance their activity e.g. by increasing the surface area or incorporating magnetic materials to allow ease of separation. The initial environmental focus will be: (1) mercury pollution in Colombia where in pilot studies atomistic simulation has explored the mechanisms of adsorption of possible candidate biothiols (extracted from local foodstuffs) at different interfaces. (2) Removal of heavy metals (Pb, Cd, Zn etc.) from Chilean minewaters. This provides a clear starting point for experimental optimisation of a recyclable nanostructured composite for heavy metal removal from contaminated waters in combination with further modelling to establish relationships between surface structure and affinity for heavy metals.

There is considerable flexibility in the balance between the various strands of the project. The project partner is Professor Steve Parker (Bath University), expert in interface and contaminant modelling.

Useful recruitment links:

For information relating to the research project please contact the lead Supervisor via:

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 Monday 13 January 2025 at 2359 GMT.