

Exciting PhD project opportunity on “Bio-engineering of biochar for enhanced remediation of contaminated environments” at Heriot-Watt University, Edinburgh, Scotland.

Application deadline: 23rd May 2025 (17:00 UK time)

This PhD opportunity will be in the laboratory of Professor Tony Gutierrez at Heriot-Watt University, Edinburgh, Scotland.

About the project:

Based on a 2016 House of Commons report, there are ~300,000 contaminated sites in the UK with an economic value >£1 billion. Meanwhile, progress on remediation technologies has lacked momentum. This project proposes an innovative systematic approach that will marry specific physicochemical properties of biochar with selected bacterial species for enhancing the bioremediation of soils contaminated with persistent priority pollutants, such as polycyclic aromatic hydrocarbons (PAHs). The project is expected to result in a significant technological step forward in this field of soil pollution remediation because it will lead to producing new microbe-biochar composite materials (MBCs) that are tailor-made for the targeted and enhanced bioremediation of polluted soils. Specifically, the project represents the first synthesis approach taken to evaluate a range of waste feedstock source materials to match-make biochar with microbes for soil pollution remediation, with state-of-the-art techniques used to characterise the biochar materials to identify which are best suited for the colonisation of specific bioremediation microbes. The project will investigate the interaction of microbes with biochar and explore the mechanisms involved in attachment and biofilm formation. This work endeavours to take a scientific leap in demonstrating biochar as a cheap and effective, carbon negative matrix to marry with microbes for tailored and enhanced bioremediation of contaminated land, and which may form the basis of sustainable business opportunities in the UK, Europe and elsewhere on land reclamation. The successful applicant will join the Environmental Biotechnology Innovation Centre (EBIC: <https://ebicentre.co.uk>), which is a £13M project involving 10 UK institutions working on developing novel engineering and synthetic biology methods for environmental bioremediation, resource recovery and waste recycling.

Who Can Apply

This PhD is open to applicants of the United Kingdom, Europe, Asia, USA and elsewhere.

How To Apply

All applications must include a CV and the names and contact details of 2-3 referees.

All applicants must have or expect to have a 1st class MSc or equivalent degree, or at the very least a 1st class Honours degree. Selection will be based on academic excellence and research potential, and all short-listed applicants will be interviewed (in person or via Teams).

Closing Date: 23 May 2025 (17:00 UK time). The successful applicant must be available to start this PhD in September/October 2025.