

PhD Project Advertisement

Project title: *Awakening the dormant soil microbiome*

Project No: FBS25-24-Edwards-aq

Lead supervisor: Dr Arwyn Edwards, Department of Life Sciences, Aberystwyth University

Email: aye@aber.ac.uk

Co-supervisors:

Dr Rachel Wheatley, School of Biological Sciences, Queen's University Belfast

Professor Luis Mur, Department of Life Sciences, Aberystwyth University

Dr Amanda Gibson, Department of Life Sciences, Aberystwyth University

Project description: Healthy and productive soils are foundational for agriculture. In turn, the microbial communities of soil are critical determinants and indicators of soil health. But life is tough for soil microbes, so many soil microbes lie dormant, awaiting better times. A teaspoon of soil can contain a billion microbes, but up to 80% of them are asleep. This project explores the topic of dormancy and activation within soil microbes to understand the rules of life, death, and in-between, within soil. In essence, for healthy and productive agri-ecosystems, is it better to let sleeping bugs lie?

This project offers an exciting opportunity at the frontiers of bioscience. We are starting to appreciate the exceptional biodiversity and importance of soil microbes, but few appreciate that most are asleep. Understanding the factors governing the balance between dormancy and activity within soil microbes has the potential to transform our understanding of soil microbiology, and ultimately unlock the full potential of the soil microbiome. While different paradigms of dormancy have been explored in laboratory cultures for decades, few studies have ventured into the real world. This PhD will take this ambitious but logical next step forward.

This PhD project will use an experimental system developed at Aberystwyth University for modulating dormancy in microbes, and apply it to the agricultural context by evaluating microbial dormancy and its interactions with soil health and plant productivity, as well as the role of dormancy in the environmental persistence in the important animal pathogen, *Mycobacterium bovis*.

You will learn how to express and purify recombinant proteins, apply them as treatments in robustly-designed experiments, and techniques for microbiome and metagenome analyses. Your development as a researcher will be supported by a multidisciplinary team of experienced microbiologists at Aberystwyth University (Dr Arwyn Edwards, Dr Amanda Gibson, and Professor Luis Mur). A component of the project will be hosted by bioinformatics experts at Queen's University Belfast led by Dr Rachel Wheatley. Successful completion of the PhD will provide you with skills in microbiology, genomics and bioinformatics, plant growth and pathogen handling.

Training opportunities: The student will gain training through the project in microbiological experimental design and execution, microbiome and metagenome analyses using DNA and RNA, protein expression and characterization and metagenomic bioinformatics. The PhD student also has specific training opportunities for CL2 work, environmental genomics, and media outreach.

Project supervision style: As a minimum the student will attend monthly individual formal meetings with the AU supervisors, with Wheatley joining as required, however the Edwards group holds a weekly lab meeting for presentation of work to celebrate progress and help overcome barriers. In common with AU practice, Edwards and Mur both have "open door" policies which welcomes frequent informal interaction as required by the student. The student will be welcome to contact any supervisor at any point. Feedback on drafts (e.g. literature review, manuscripts, presentations) will be provided as agreed between student and supervisor, and the writing up process is closely supported throughout. Standard practice within the group is to hold a project initiation meeting with all supervisors and expectations and

responsibilities confirmed for all concerned as regards working patterns, leave, meetings, feedback, authorship, data management, group citizenship and other operational factors.

Student profile: Candidates with an academic background in molecular microbiology and/or microbial ecology are sought for this PhD.

Stipend (Salary):

FoodBioSystems DTP students receive an annual tax free stipend (salary) that is paid in instalments throughout the year. For 2024/25 this is £19,237 (£21,237 at Brunel University) and it will increase slightly each year at rate set by UKRI.

Equity Diversity and Inclusion:

The FoodBioSystems DTP is committed to equity, diversity and inclusion (EDI), to building a doctoral researcher(DR) and staff body that reflects the diversity of society, and to encourage applications from under-represented and disadvantaged groups. Our actions to promote diversity and inclusion are detailed on the [FoodBioSystems DTP website](#) and include:

- Offering reasonable adjustments at interview for shortlisted candidates who have disclosed a disability or specific learning difference.
- [Guaranteed interview](#) and [applicant mentoring](#) schemes for applicants, with UK home fees status, from eligible under-represented ethnic groups.

These are opt-in processes.

Our studentships are offered on a part time basis in addition to full time registration. The minimum registration is 50% FT and the studentship end date will be extended to reflect the part-time registration.

For up to date information on funding eligibility, studentship rates and part time registration, please visit the [FoodBioSystems website](#).