

## PhD Project Advertisement

**Project title:** *Optimising above and belowground ecosystem services for sustainable crop production*

**Project No:** FBS25-26-Garratt-rc

**Lead supervisor:** Prof Michael Garratt, Sustainable Land Management, University of Reading

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**Co-supervisors:**

Dr Alice Johnston, School of Water, Energy and Environment, Cranfield University

Professor John Hammond, Crops, University of Reading

Dr Mark Ramsden, , ADAS

**Project description:** UK agriculture could play a central role in reaching NET ZERO by 2050 and halting biodiversity loss. Agriculture is a significant contributor to UK emissions (10%), and intensive farming practices and habitat loss are key drivers of species declines. There is an urgent need for more sustainable approaches to crop production, particularly those that promote ecosystem services rather than degrade them.

For many UK arable crops the majority of greenhouse gas emissions result from nutrient management, particularly nitrogenous fertilisers. Improving nitrogen use efficiency by promoting soil health and carbon sequestration has considerable potential, in combination with better management for aboveground ecosystem services including pollinators to maximise yield. Optimising these ecosystem services can deliver beneficial outcomes in terms of improved yields and lowering the carbon footprint of food production by reducing the need for high fertiliser inputs.

This exciting PhD project involves conducting controlled field experiments to examine how insect pollination and healthy soils interact to shape the yield of important flowering crops. You will develop and deploy techniques for assessing and manipulating above and below ground ecosystem services to understand how more biodiversity-based farming approaches can deliver better crop yield without relying on unsustainable inputs of fertiliser. Working between the University of Reading and Cranfield University you will have access to long-term experiments, controlled environment facilities and state of the art laboratory capability in order to complete the project. In addition, you will collaborate with ADAS who will provide key expertise, an important link to industry and dissemination opportunities linking your research to real-world issues.

The research will provide new insights into the role of ecosystem services – both above and below ground – in shaping crop yield and identify best management practices to promote more sustainable crop production. By integrating ecology, agronomy and soil science, this PhD provides an excellent training opportunity and will generate impactful research addressing one of the key challenges of our time.

**Training opportunities:** The project is interdisciplinary and you will receive supervisor-led training in all relevant areas, including designing experiments, managing and analysing data, pollination and soil ecology, and agronomy. Based at the University of Reading you will be able to take part in your choice of training modules and external training courses as fits your learning needs. Cranfield University will provide training and access to cutting edge equipment for crop and soil analysis. You will also have a placement with ADAS gaining a broad experience of their broader agricultural research and engagement activities.

**Project supervision style:** We have a clear supervisory plan to support the student through their PhD: •Weekly 1:1 meetings with the lead supervisor (joined by particular co-supervisors as necessary). Working with the student, and based on their preferences, we will develop a plan for subsequent years. •Online meetings with the full supervisory team - once a month during year 1. Working with the student, and based on their preferences, we will develop a plan for subsequent years. •In person meetings at UoR or Cranfield with all supervisors – Kick-off meeting and then aiming to do this at least every 6 months. The student will be assigned an independent 'Monitor', to discuss their wellbeing and

progress and join respective lab groups at UoR and Cranfield providing an opportunity to discuss progress with fellow PhD students. During the kick-off we will agree guidelines for sharing work and providing timely feedback.

**Student profile:** We are looking for a student with a relevant degree in ecology, agriculture or environmental science. You will have a demonstrable understanding of ecology or agronomy, and a clear interest in work that spans different disciplines to address food system problems. Experience in fieldwork or laboratory work is desirable but not essential, as training will be provided and we do not expect candidates to have experience in all areas of this project.

**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](#).**