PhD Project Advertisement

Project title: ***Future-proofing livestock health by quantifying the burden of disease and benefits of sustainable interventions***

Project No: FBS25-02-Prada-sq

Lead supervisor: Dr Joaquin Prada, Comparative Biomedical Sciences, University of Surrey

Email: j.prada@surrey.ac.uk

Co-supervisors:

Professor Eric Morgan, School of Biological Sciences, Queen's University Belfast

Dr Martha Betson, Comparative Biomedical Sciences, University of Surrey

Project description: Parasitic worms (helminths) have been infecting humans and animals for a very long time, causing disease, loss of productivity and, in some cases, death. When these parasites infect livestock, they can cause acute or chronic disease and incur huge costs due production losses and partially effective control measures. The economic burden of these infections to the UK livestock industry was recently estimated to be €299 million annually. Rising temperatures globally tend to favour parasite transmission, which has already been seen in sheep farming, but to date no robust projections for the future have been developed. Furthermore, current control strategies rely on the use of deworming drugs, but the rapid development of drug resistance in these parasites and persistence of drug residues in animal products and the environment are making the use of drugs alone unsustainable for control.

This project aims to examine the impact of parasitic worms on the UK agricultural sector and evaluate the economic and environmental benefits of different intervention strategies considering projected changes in climate and growing resistance to deworming drugs. Specific objectives are as follows:

1) Project impact of worms in UK livestock over the next decade under different climate change scenarios through mathematical modelling.

2) Evaluate the economic and environmental costs of worm infections under different control strategies and integrate with model outcomes to identify an optimal portfolio of interventions that is sustainable long-term.

3) Provide a portfolio of recommendations to stakeholders, from farmers to government, to improve sustainability and food security.

Are you passionate about livestock diseases? Or do you love developing technological solutions that are useful in the real world? In this project, you will first integrate and extend state-of-the-art mathematical models to generate a framework that can explore the impact of different control interventions under changing environmental conditions. You will then combine your model projections with economic and environmental impact data, such as costs, emissions, etc. You will work in collaboration with industry stakeholders at UK and European levels and determine their preferences for different control approaches. Your project will ultimately generate timely evidence to support real world policy.

Training opportunities: This project is a collaboration between the University of Surrey and Queen's University Belfast, and you will have multiple training opportunities at both institutions, with a broad offering throughout the year, including transdisciplinary skills such as scientific presentations and writing skills, grantsmanship skills, career development, and transition to independence. A well-established Researcher Development Programme is available at Surrey (https://research.surrey.ac.uk/guidance-and-support/researcher-development-programme). You will also gain a wide range of technical experience, from laboratory skills, advanced computer programming and manipulation of data to economic evaluation. You will have access to externally-run courses on mathematical model development and multilevel modelling as required. The supervisors as part of several research consortia that provide networking and training opportunities, including through short term scientific missions and training schools.

Project supervision style: You will join the PradaLab, a research group with currently two Postdocs, two full-time PhD students, and two part-time PhD students based at the University of Surrey. The group meets weekly, but you will also have 1:1 regular meetings with the supervisory team as necessary. There is an additional wider interdisciplinary research group meeting, every fortnight, where PhD students and early career researchers present their progress in a relaxed and friendly environment. A formal progress review with the whole supervisory team will take place every 6 months. Feedback to you will be provided in 1:1 meetings as required. For reviewing documents, such as manuscript drafts and thesis chapters, the usual timeframe is within 1-2 weeks, depending on workload and urgency (i.e. a deadline for a journal collection or an abstract for a conference would be prioritised more).

Student profile: For this project, you either have a strong quantitative background (e.g. Mathematics, Computer Science, Engineering) or you have a Biology, Veterinary Medicine or related discipline background and are willing to learn how to code and develop those quantitative skills further. You must be keen on applying your research to real problem affecting the livestock sector.

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.