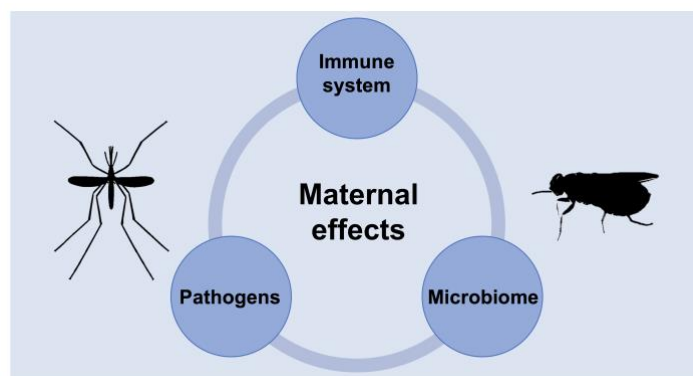


PhD studentship:

Maternal effects and host-microbiome-pathogen interactions in disease vectors

Supervisors: Dr Sinead English (University of Bristol), Dr Fleur Ponton (Macquarie University)



The aim of this PhD project is to develop a formal framework to understand the role of maternal effects in host-microbiome-pathogen interactions, using important insect vectors of disease (mosquitoes, tsetse) as exemplars. Most organisms harbour a community of microbes that interact with pathogens, either by direct resource competition or indirectly through by affecting the host immune system. In insect vectors of disease, there is increasing interest in manipulating these microbes to decrease the vector population size or interfere with pathogen transmission. Formal mathematical models are important tools to show how perturbing one aspect of host-microbe-pathogen system (e.g. removing microbes) changes the overall dynamics.

The condition of the mother – her age and nutritional state – can shape the microbial community and immunity of her offspring. How these transgenerational effects change the predictions of host-microbe-pathogen interactions is yet to be explored. The student will build on recent modelling work (King & Bonsall 2017, *BMC Evol Biol*) **to incorporate maternal effects into the host-microbiome-pathogen system**, and how this differs across insect disease vectors. Maternal effects may be particularly important in vectors such as tsetse flies which produce one enormous larva at a time compared to mosquitoes which produce batches of many small eggs.

The PhD position will be jointly hosted at the University of Bristol, Bristol, UK and Macquarie University, Sydney, Australia. The PhD position is fully funded for 3.5 years and will cover research costs, tuition fees, stipend and flights between UK and Australia. The student will be supervised by [Dr Sinead English](#) (Bristol) and [Dr Fleur Ponton](#) (Macquarie), as well as benefiting from guidance from [Professor Mike Bonsall](#) (Oxford) and [Dr Antoine Barreaux](#) (Bristol). The student will spend 2 years in Bristol and 1.5 years in Sydney during the project, developing models (Bristol/Oxford) and testing predictions from these models in empirical systems such as tsetse flies and mosquitoes (Bristol/Macquarie). Start date is flexible in the 2020-21 academic year, with suggested dates being 1 January or 1 April 2021.

The project would fit a student with strong quantitative skills, particularly in mathematical biology, and a background in, or demonstrable enthusiasm for, evolutionary ecology and entomology. The student will have to be willing to live in two different countries (2 years in Bristol, UK, and 1.5 years in Sydney, Australia). Conditions of funding mean that the position is available only to UK/EU students and an MSc qualification is desirable. If you are interested in the position yet do not feel you meet the subject-area qualifications, please apply anyway, or get in touch first.

To apply, please email Dr Sinead English (see below) with a 1-page cover letter describing your motivation and eligibility for the position, a CV (max 2 pages) and contact details for two academic (or other relevant) referees by **15 July 2020**. Video-conference interviews will take place in the week commencing 20 July.

Please direct any informal enquires to Dr English, sinead.english@bristol.ac.uk