

Using Microbial Networks to Quantify Transmission Dynamics of Bovine Tuberculosis

Supervisory team:

Main supervisor: Dr Xavier Harrison (University of Exeter)

Second supervisor: Prof Robbie McDonald (University of Exeter)

Non-academic (CASE) supervisor: Prof Dez Delahay (Animal and Plant Health Agency (APHA))

Host institution: University of Exeter (Penryn)

CASE partner: Animal and Plant Health Agency (APHA)

Project description:

The increasing incidence of emerging infectious disease in animals presents a challenge to health and welfare of people, as well as commercially important species such as livestock. Tackling the emergence and spread of highly infectious diseases require that we understand the major routes of pathogen transmission, and the relative contributions of direct and indirect sources of infection. This PhD will use metagenomic sequencing of faecal and environmental samples collected in a disease hotspot to build putative transmission networks for the pathogen *Mycobacterium bovis*, the causative agent of bovine tuberculosis. The student will use these networks to quantify the frequency of within-species, between-species and host-environment contact events, and their implications for the prevalence and transmission of the pathogen. These metrics will be validated with contemporaneous estimates of host contact from cattle fitted with proximity sensing collars. This work will also yield novel insights into the importance of the gut microbiome for the health of commercially important species.

The project will be a collaboration between the University of Exeter and the Animal and Plant Health Agency and will provide training in a range of important techniques. These include integration of field and laboratory studies of infection, disease transmission modelling and cutting edge genomic and disease diagnostic techniques.