Available PhD Project:

**Supervisor:** Dr Lucy Weinert

**Supervisor profile page:** [https://www.research.vet.cam.ac.uk/research-staff-directory/principal-investigators/disease-dynamics/lucy-weinert](https://www.research.vet.cam.ac.uk/research-staff-directory/principal-investigators/disease-dynamics/lucy-weinert)

**Second supervisor:** Prof Stephen Baker

**Project Title:** Mutation dynamics in *Shigella*

**Description:** Emerging bacterial epidemics are a major threat to human health, particularly multi-drug resistant lineages that are refractory to treatment. Therefore, a better understanding of the drivers of bacterial pathogen emergence is needed. One intriguing pattern is that bacterial pathogens often have smaller genomes than their nearest non- or less-pathogenic relatives. However, the cause of this association is not fully understood. As there is a near universal scaling between the rate of new spontaneous mutations per generation and genome size in bacteria (so called Drake’s rule), understanding mutation dynamics in bacteria can help us tease apart hypotheses about genome reduction and pathogenicity. This project will examine mutation dynamics in *Shigella*, which are a leading cause of diarrhoeal disease in young children, with an estimated 165 million annual cases. Despite having a separate species name, *Shigella* have evolved from less pathogenic *Escherichia coli* on at least three separate occasions and in each case with substantial genome reduction. This project will combine laboratory and state-of-the-art bioinformatics approaches to examine the mutation rate and mutation spectrum in four separate *Shigella* species, principally via both mutation accumulation experiments along with high fidelity duplex sequencing.


**Funding:** This project is subject to competition funding through the MRC DTP scheme

**How to apply:** Contact the Supervisor to discuss before submitting an application. More details on how to apply here:

[https://mrcdtp.medschl.cam.ac.uk/prospective-students/how-to-apply/](https://mrcdtp.medschl.cam.ac.uk/prospective-students/how-to-apply/)