Title of PhD project	**Accelerating the development of effective mucosal vaccines for protection against *Mycobacterium tuberculosis***
Primary Supervisor	**Dr Helen Fletcher**, LSHTM
Associate Supervisor	**Dr Rajko Reljic**, SGUL
Brief description of project	Tuberculosis (TB) remains a global public health problem. Immunisation directly into lung mucosal tissue may lead to better protection against TB through direction of the immune response to the site of initial exposure. The Reljic group at St Georges are leading a major European effort to develop mucosal TB vaccines. Testing TB vaccines in animal models is lengthy and expensive. In addition, recent research suggests that vaccines may confer variable protection against diverse clinical strains of M. tuberculosis (Mtb). There are seven major lineages of Mtb worldwide and the implication is that new vaccine candidates should be tested for their efficacy against a range of clinical isolates as early as possible during the development phase. This project would adapt an ex vivo mycobacterial growth inhibition assay (MGIA) developed by the Fletcher group to evaluate the ability of mucosal vaccines to inhibit the growth of 18 diverse clinical isolates of Mtb. Flow cytometry, ELISPOT, ELISA and transcriptional analysis will be used to investigate the underlying host immune mechanisms leading to reduced growth of Mtb. The transcriptome of Mtb clinical isolates able to evade immunity will be sequenced to understand mechanisms of pathogen immune evasion and to identify potentially better vaccine targets.
Particular prior educational requirements for a student undertaking this project	None
Skills we expect a student to develop/acquire whilst pursuing this project	This study will involve a range of immunological and microbiological assays and will also enable the student to acquire highly-specialised skills such as i) working with class 3 pathogens in containment ii) *in vivo* work with animals and iii) highly specialised MGIA assay. The student will join a dynamic research group involved in a major TB vaccine study funded by the EU H2020 and will therefore be able to acquire many scientific as well as transferable skills.