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Current Post: Personal Chair in Microbial Genetics at the Roslin Institute, University of Edinburgh: since 01/08/2006

Major research activities: My research is focused on the evolution of bacterial pathogens, with a specific interest on zoonotic infections caused by enterohaemorrhagic *E. coli*. I collaborate extensively and my local group combines bioinformatics and wet science to investigate basic biological concepts, including host specificity. Key current areas are: (1) *E. coli* genomic variation accounting for differences in the severity of disease and zoonotic potential. (2) Machine-learning methods to predict zoonotic potential. (3) The co-association of antibiotic resistance genes with determinants that drive inheritance and maintenance. (4) Transcriptional and post-transcriptional mechanisms of *E. coli* colonisation factor expression. (5) Vaccine and adjuvant development in ruminants, in particular based on the use of flagella.

Biography: I hold a personal chair in Microbial Genetics at the University of Edinburgh and have been part of the Roslin Institute since 2011. My background is in Microbiology, initially bacterial physiology for my PhD and first Post Doctoral position at the University of Michigan (cell wall assembly) but I then moved into gene regulation during a second Post Doctoral post in North Carolina and then returned to the UK supported by an MRC Career Development Fellowship which was focused on the regulation of fimbrial adhesins in *E. coli*. I obtained a Lectureship in Bacteriology at Edinburgh Vet School in 1998 which soon led to a DEFRA Veterinary Fellowship on the biology of enterohaemorrhagic *E. coli* (EHEC) which has remained the main research focus of my group for nearly twenty years. We study the colonization of cattle by EHEC strains and aim to understand the genetic factors that lead to effective transmission between animals and infection in humans. Specifically, our recent work is making use of whole genome sequencing to define the subset of animal strains that are a zoonotic threat to human health. By analyzing the genome content of both human and cattle strains we are able to predict the strains more likely to cause serious human disease and ongoing work is using machine-learning methods to do this. In partnership with researchers at the Universities of Glasgow and Edinburgh; the Scottish *E. coli* Reference Laboratory (SERL); the Moredun Research Institute (MRI); Scotland's Rural College (SRUC); Public Health Scotland; Public Health England and the USDA, we are studying the epidemiology and molecular biology of EHEC strains across the UK and are developing a vaccine to limit the spread of EHEC from cattle to humans. I now lead a BBSRC Institute Strategic Programme on the 'Control of Infectious Diseases' in Livestock (2017-2022) at the Roslin Institute and have broadened my research focus to include epidemiological studies of antimicrobial resistance (AMR) in enteric bacteria and microbiome-based approaches to limit antibiotic use and AMR emergence and spread.