

Applying next generation structural biology methods to bacterial vaccine production

Supervisory team:

Main supervisor: Prof Nicholas Harmer (University of Exeter)

Second supervisor: Prof Christiane Berger-Schaffitzel (University of Bristol)

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Collaborators: Prof Peijun Zhang (Diamond Light Source), Prof Brendan Wren (London School of Hygiene and Tropical Medicine), Prof Rob Field (University of Manchester), Dr Jon Cuccui (London School of Hygiene and Tropical Medicine)

Host institution: University of Exeter (Streatham)

Project description:

This project will offer an exciting opportunity to learn upcoming structural biology methods, and to apply these to a vaccinology project. The key methodological focus of the project will be micro electron diffraction (micro-ED), a method of determining protein structures that will become a mainstream method over the next five years. The training from this PhD will make the student very competitive for industry and academic positions at the end of the project. The project will allow the student to learn methods for preparing samples, collecting data, and using this data to determine protein structures, as well as complementary experimental and computational methods for understanding the experimental data.

The project will determine the structure of proteins from *Coxiella burnetii*, a human pathogen that also causes economic losses in cattle worldwide. The Harmer group are part of a consortium aiming to develop a polysaccharide based vaccine against *C. burnetii*. We are determining the structures of important polysaccharide biosynthesis proteins to aid the production of a recombinant vaccine. This project will contribute to this programme and offer opportunities to work with others in the consortium. Structures will also be interrogated using modelling techniques to determine whether any proteins might act as drug targets.

This project will be based in the recently established Living Systems Institute in Exeter, which houses a diverse group of leading interdisciplinary researchers. You will join a vibrant group of young researchers with interests across a range of diseases.