

Time-resolved kinetic and structural understanding of essential enzymes to develop novel herbicides

Supervisory team:

Main supervisor: Prof Nicholas Harmer (University of Exeter)

Second supervisor: Prof Jim Spencer (University of Bristol)

Non-academic (CASE) supervisor: Dr Christian Noble (Syngenta)

Prof Jenny Littlechild (University of Exeter)

Host institution: University of Exeter (Streatham)

CASE partner: Syngenta

Project description:

This project offers the existing opportunity to use the latest structural biology methods to impact the development of new herbicides to help crop security. In this project, you will determine a structural movie of the enzymatic action of two herbicide targets. These exciting results will highlight the optimal strategies for designing new herbicides and provide a new level of detailed understanding of the enzymes. The project will offer the opportunity to learn techniques at the cutting edge of structural biology and to make a significant impact on food production. As a student on the project, you will learn a strong range of techniques. Key methods will be protein production and purification, crystallisation and structure determination, and enzyme studies to complement the structural results. The supervisors are experts in all stages of this work and have strong experience of developing similar projects. This project will have expert supervisors in Exeter and Bristol, offering the opportunity to experience two different research environments, access a wider range of expertise, and interact with other DTP students more extensively.

This project will be undertaken in collaboration with Syngenta, and as part of the project you will take a three month placement at Syngenta's site at Jealott's Hill. This placement will be timed to obtain maximum benefit from the opportunity and will most likely be taken once results are established for one enzyme and can be followed up effectively with Syngenta. Syngenta will provide an additional supervisor to give insight into the herbicide development process and further support your development. The project will be hosted at the Living Systems Institute in Exeter. LSI is a vibrant interdisciplinary environment combining mathematical and biophysical approaches with experimental biology to decode the complex mechanisms of life. LSI arranges specific ECR training in relevant topics. LSI has a strong structural biology grouping using the latest techniques to gain a molecular understanding of life. You will join an integrated PhD community who organise their own programme of scientific and social events. LSI provides an ideal environment for a successful PhD.

Our aim as the SWBio DTP is to support students from a range of backgrounds and circumstances. Where needed, we will work with you to take into consideration reasonable project adaptations (for example to support caring responsibilities, disabilities, other significant personal circumstances) as well as flexible working and part-time study requests, to enable greater access to a PhD. All our supervisors support us with this aim, so please feel comfortable in discussing further with the listed PhD project supervisor to see what is feasible.