Engineering Optogenetic Systems in Rice Blast Fungus to Elucidate the Role of Timing in Effector Delivery and Pathogenesis.

Supervisory team:
Main supervisor: Prof John Love (University of Exeter)
Second supervisor: Dr George Littlejohn (University of Plymouth)
Dr Jon Ellis (University of Plymouth), Dr David Studholme (University of Exeter)

Collaborators: Dr Kirsty Matthews Nicholass (University of Plymouth,)

Host institution: University of Exeter (Streatham)

Project description:
Are you interested in cutting-edge research at the intersection of synthetic biology and fungal biotechnology? This exciting PhD project aims to explore how specific wavelengths of light can be used to fine-tune biosynthetic pathways in filamentous fungi through optogenetic regulation.

This project offers a unique opportunity to develop a broad skill set in molecular biology, bioinformatics, synthetic biology and plant pathology while contributing to innovative research with real-world applications.

You will aim to characterise and investigate the potential of light-sensitive promoters to control gene expression in fungi, with the ultimate goal of understanding the timing of effector delivery during pathogenesis in Magnoporthe oryzae, the causative agent of Rice Blast disease. In addition to increasing our understanding of metabolic regulation and timing in the establishment of fungal pathology, this research has wide-ranging implications for developing alternative solutions to countering crop diseases globally.

Research requires adaptability and resilience, and this PhD will enable you to develop these traits as you navigate the diverse challenges of this project. You will acquire a wide range of cutting-edge skills that will prepare you for success in a wide range of career paths in Academia or Industry, including experimental design, genetic sequencing, bioinformatics, recombinant DNA technologies, fungal culture and engineering, advanced biological imaging and analysis by flow cytometry and confocal microscopy, and communication skills. Additionally, this PhD will help you develop strong problem-solving abilities and refine your project management skills, learning how to plan, prioritize, and manage multiple tasks and deadlines effectively. You will regularly present your research findings, both in written and oral formats, to diverse audiences, improving your ability to convey complex ideas clearly and confidently. Working within an interdisciplinary research team and at two Universities, will enhance your collaboration and teamwork skills helping you to exchange ideas effectively.

The technical and professional skills acquired in this project will prepare you for success in a wide range of careers in science, industry, or other sectors.

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.