**Designer proteins to rewire living systems**

Supervisors: Nicholas Harmer, JJ Phillips, Benjamin Housden, Austin Smith

In this project, you will learn the latest protein design tools and apply them to re-wire specific cell signalling interactions to understand spatial and temporal rules of cell decision making. De novo design of proteins is an emerging technique that offers us the opportunity to study entirely new questions in living systems. In this project, you will learn the latest generative AI protein design tools and apply them to important challenges in understanding how cells signal. The core supervisors have experience in GenAI protein design and will teach this, whilst co-supervisors will guide the research challenges. We will ask important questions about how cellular signalling pathways cross-talk; how poorly understood signalling pathways are triggered and deliver their signals; and how spatial and temporal effects of signalling affect the overall output. We will use the results from this project in our research on drug discovery against rare diseases and the latest stem cell research. As such, you will gain expertise in both protein design and in advanced eukaryotic cell biology.

This project will particularly appeal to students with broad interests who are happy to use both GenAI and laboratory-based methods in their research, and who value the opportunity to work with other groups to influence diverse research areas. LSI has a strong structural and cell biology groups 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 in this area.