Title: Designing growth factors for stem cell biology

Main Supervisor: Nicholas Harmer, **Co-Supervisor:** Austin Smith and Jonathan Phillips

Project:

In this project, you will learn the latest protein design tools and apply them to develop novel cell signalling proteins to modulate stem cell function. Stem cells require a complex combination of signalling factors to maintain them or to direct the cell types that they differentiate into. This offers exciting opportunities to develop new proteins that provide complementary signals to natural proteins and either simplify the growth factor mix or allow different patterns of cell fate. 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 protein design tools and apply them to understanding and manipulating pluripotent stem cells. As the project develops, you will have opportunities to use the designed growth factors to explore different areas of stem cell biology and how the environment controls fate. The supervisors have experience in protein structure and dynamics, protein design, and stem cell biology. As such, you will gain expertise in both protein design and in advanced eukaryotic cell biology.

This project will particularly appeal to students with interests in stem cell biology and/or structural biology who seek a project that seeks to understand the rules of life and to engineering living systems in new ways. 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.