

## School of Mathematics and Statistics:

<b>Academic Researcher:</b>	<a href="#">Dr Ellis Patrick</a>
<b>Project Title:</b>	<b>Analytical tools for high-parameter imaging cytometry data</b>
<b>Project Summary:</b>	Understanding the interactions between multiple cell-types and how these change for different phenotypes is a fundamental objective of much biological research; this includes the study of human disease. Cutting-edge technologies can now characterize cells with upwards of 50 proteins providing an unprecedented depiction of cellular heterogeneity in a tissue environment. This has created an urgent and exciting need to develop the analytical tools that are required to extract meaningful, informative and interpretable summations of the rich spatial and protein information that is now measurable. In this context, you will devise novel scalable statistical methods that will be included as key components to any data analysis framework used to analyse this data.
<b>Project Synopsis:</b>	The primary objective of this project is to deliver new tools and statistical approaches to enable scientific research that benefits from the investigation of multiple cell-types in situ. These tools will address the challenging task of identifying and annotating different cell-types from high-parameter imaging cytometry data and characterizing the relationships between them in a meaningful way. The increase in size and high-dimensional nature of the images necessitates tools that are more complex, computationally efficient and require an increased need for interpretability than those currently used in standard imaging microscopy.
<b>Additional Information:</b>	A suitable candidate for this project will have experience in statistics, bioinformatics or data science. Knowledge of basic immunology will help but is definitely not required. Through this project you may have opportunities to collaborate with researchers in Cambridge University, Harvard University and University of Washington.