



SU2P Entrepreneurial Fellowship

Case Study:- Roger Jarvis

Title: Imaging of pluripotent stem cells

Introduction

Roger's SU2P Fellowship involved working across the Centre for Regenerative Medicine and the Applied Physics departments at Stanford University, with the UK host being the Department of Physics at St Andrews University. I was involved in the SU2P program from October 2009 to October 2010, with the remit of the project broadly involving the development of temporal and spatial imaging methods to observe differentiation of pluripotent embryonic stem cells.

The Project

One of the challenges that arise in the development of stem cell treatments for human disease is in the directed culture of pure cells from a starter culture of pluripotent stem cells which have the ability to differentiate into any cell lineage. Consequently, a biomedical imaging method that allows for qualitative and quantitative observations to be made over time from cells cultured under normal laboratory conditions would be beneficial to the field. This approach presents opportunities to learn more about the mechanisms that direct stem cell differentiation and also develop quantitative models fed by data obtained extracted from the images to predict differentiated stem cell lineages from starter cultures. The benefit of this technology would be that it could lead to an understanding of how to direct stem cell culture for the establishment of libraries of specific cell types for disease modelling and treatment.

Results/deliverables

Whilst the approach was successful in tracking the cells and extracting quantitative measurements from each, the resultant datasets were extremely large, in the order of 250,000 x 20 elements. Again, due to time constraints Roger only managed to run these data through a hierarchical clustering algorithm, outputting dendrograms and correlation heat maps that could be used to observe similarities and differences between each cell. Further work will be needed to understand the best approach for modelling these data.

Personal Development

Roger's experience on the SU2P Fellowship programme provided him with a broader insight into the commercial possibilities can extend from fundamental science research. Working with experienced scientists who had also been successful in commercialising research, meant that he was regularly having discussions on what opportunities existed to gain individual funding from various initiatives to further a commercial idea, engage and persuade possible investors to buy into an idea and also what the benefits and pitfalls there might be in taking a more commercial track in science.

