Cameron Harvey – 2011 Summer Report

This summer was a combination of computational model development and running experiments on *Myxococcus xanthus*. We are in the process of developing and refining the simulation for M. xanthus using Subcellular Elements (SCE) on Graphics Processing Units (GPUs). The simulations will be used to explore the role of flexibility and adhesion in groups of cells moving as clusters and forming multiple layers of cells. Current simulations have simplified motility algorithms, but can simulate hundreds of cells in three dimensions.

There were two types of experiments focused on during the summer. The first was using Optical Coherence Tomography to take 3D scans of fruiting bodies that are formed by *M. xanthus*. This work was a continuation of work that began last summer and focused on improving data acquisition and developing image analysis methods to process the three-dimensional scans of the fruiting bodies. The second set of experiments focused on developing a protocol for imaging single layers of cells. By using imaging chambers that consist of microscope slides, silicon gaskets, thin agar discs, and cover slips, high-magnification oil-immersion microscopy can be performed on swarms of *M. xanthus*. This technique allows us to make high quality movies of hundreds of cells gliding where individual cells can be tracked within dense flows of cells. Data from these movies will be able to provide the information needed to both calibrate the computer model as well as test predictions made by simulations.