VIGRE Project for Philip Benge

Philip Benge's project is to identify the equilibrium submanifold and its stability in a two-compartment model of a vesicle trafficking system. A lot of the intracellular activities, in particular the moving around of nutrients, are carried out by vesicle trafficking. In a joint work with Kato, we construct a model to target the pollen growth in plants. In this model, we show that there are at most 4 possible connected equilibrium submanifold. Biologically, this could imply that pollen tube can be genetically engineered to grow at 4 different rates. Benge's project is to explore the dissociation rates involved in the fusion and budding process and identify the four possible branches.

In the project, Philip Benge was able to computationally identify one equilibrium of a two-compartment vesicle traffick system. This equilibrium we believe is the one that occurs in biology. Checking the stability of the equilibrium was not finished. This semester, Philip will work on the three-compartment systems, without the backward fusion. The goal is to determine the equilibrium using conservation laws.