Application for KRMP

Student name: Trevor Pentzien, UNO-Mathematics

Project start date: October 2016

Project end date: June 30, 2017

Title of project: Properties of Cellular Networks and Determinative Power of Nodes

Abstract: The focus of this project is to identify attributes and properties of nodes in certain biological networks that have an impact on the amount of information they provide. The information gain is quantified by the so-called determinative power of the nodes (DP), a concept originating in information theory. The networks are logical representations of several cellular signal transduction networks, such as protein networks, and will be taken from the cell collective, a free online data base (www.thecellcollective.org). I will be looking at other properties of nodes, such as bias and in/out degree of the nodes, average sensitivity, clustering coefficient, to name a few. The purpose is to find if there is a relationship between the DP of the nodes of each network and other intrinsic properties of the nodes or the network. This information could be used as a baseline for identifying characteristics that may be common to all networks, as well as possible differences. I will use suitably chosen statistical procedures to identify any dependencies.

Purposes of the project:

- 1. Writing codes to find properties and attributes of nodes.
- 2. Running the program on several different networks and solving any unforeseen errors.
- 3. Exploring the mathematical and biological importance of the findings.
- 4. KRMP report.

Timetable:

Month	Purpose items
2016	1, 2
January-May 2017	2, 3, 4
June 2017	4
July 2017-forward	Writing results for publication.