James Arps
The Clique Covering problem is an invariant in Graph Theory which concerns finding the minimum number of complete subgraphs (cliques) in a given graph such that the set of these subgraphs contains all of its vertices. In this presentation, I will describe the origins of the problem, give a few example solutions, and then explain its significance — including its relevance to the P vs. NP problem and how it relates to the chromatic number of a graph.

Maria Mazza
The cover time is an invariant of a graph defined as the expected number of steps for a random walk to visit all vertices of a graph starting from the worst vertex. In this talk I will present exact results for the computation of cover time of a few simple graphs and show how known relations between random walks and electrical network theory can be used to obtain tighter bounds on cover time of more complex graphs.

Nicole Wang
The independence number of a graph G, denoted alpha(G), is the maximum cardinality of an independent set of vertices in G. It is one of the most fundamental and well-studied graph parameters. Although computing the independence number of a general graph is an NP-hard problem, we are able to compute the independence number of some group families, such as star graphs, cycle graphs, path graphs, complete graphs and bipartite graphs. I will also introduce the lower bound of the independence number in any connected graphs.

Nathan Arndt
The tree width is a measurement that can be taken for any connected graph that is the maximal node of the minimal tree decomposition. Biologists have begun to apply the measurement of tree width to biological compounds and it can give insight into the given compounds. The discussion will cover the computation of tree width and giving some insight into just why tree width matters for a biologist.

Lunch will be available during the talks.