Searching for Sub-populations in Flowers Using the EM Algorithm

Nathan Blyler

Everyone likes flowers, especially when they bloom. However, just because within one species of flower plants look the same, does not mean each individual plant has the same probability of blooming. In nature, plants transition between periods of dormancy and flowering for reasons that are not completely understood. Previous literature suggests a link between the dormancy and flowering states of numerous plants, but in this talk we focus on the wild flower Silene spaldingii. After evaluating the appropriateness of the Expectation Maximization Algorithm, we use it to test the hypothesis of the existence of multiple sub-populations within the wild flower Silene spaldingii distinguished by the dormancy or flowering characteristics of a plant.

A Talk on Graph Theory: Finding Maximal Independent Sets

Katie Timmerman

Many graph theorists battle with the problem of finding large independent sets within a graph. In this talk, we will discuss strategies for tackling this problem. An independent set is a subset of a graph $G=(V, E)$ with $V$ vertices and $E$ edges such that no two vertices share an edge. We will explore how the “Timmerman Algorithm” is used to find the maximum size of an independent set. Then we will look at some examples, present a theorem, and discuss its applications to scheduling problems. Over the course of the talk we will understand how the algorithm works and why it is useful.

The Hunt for October:
A Mathematical Examination of the Major League Baseball Playoffs

Eric Weil

Baseball is America’s pastime, but over time there have been some changes. Major League Baseball has changed their playoff format and the effects are not fully understood. In 2012, an extra Wild Card was added. In 2013, the Astros switched leagues. Now, how many wins does a team need to expect to make the playoffs? Win the World Series? In this talk we explore how expanded playoffs and realignment affects parity in the majors. Using Markov chains, we look at theoretical teams’ likelihood of success in the playoffs. The hunt for October begins here.