

Student Talk Abstracts

Ryan Bianconi, Ithaca College
Zachary Brehm, SUNY Potsdam
Emily Cunningham, SUNY Potsdam
Montana Earle, SUNY Potsdam
Ioherase Ranson, SUNY Potsdam
Kenneth Roffo, SUNY Oswego

Panel on Mathematics Research Experiences for Undergraduates

Abstract: Come hear what undergraduates have to say about undergraduate research: the real deal straight from the horses' mouths!

Courtney Burris, Elmira College

Exploring Sampling Strategies Using the Marvel Comic Book Universe

Abstract: The Marvel Chronology Project hosts a large data set from the Marvel Comic Book Universe. Any parameter of interest can be determined: for example, the number of issues in which Captain America appears. This allows statistical methods, including common sampling strategies, to be evaluated. Through the use of the R programming language the following methods were examined: simple random sampling, unequal sampling, stratification, clustered sampling, and systematic sampling. For each sampling method, parameters and their standard errors were computed and then compared to sample statistics.

Meghan Cornforth, Elmira College

Exploring Sampling Strategies Using the Marvel Comic Book Universe

Abstract: Last summer, I studied properties of groups by examining Cayley tables and Cayley Graphs. A Cayley tables is an operation (multiplication) table for a group. Cayley graphs show how to get from one element of a group to another using the group generators and the given relations. Graphing by hand helped me understand how the generators played a role within the group. This helped me to be able to plot Cayley Graphs in the software Mathematica in a way that effectively showed the relations.

Janelle Fredericks, St. Lawrence University

Carbon Density Loss in the Pantropical Forests

Abstract: For this project, I created an interactive web app titled Exploring Carbon Density Loss in the Pantropic Forests, to easily display different aspects of carbon loss. There has continuously been an increase in human activities, such as industry, transportation and electricity, which has caused instability in our eco-system and reduced the productivity of forests. Work on this topic uses the term edge effect to measure this reduction in productivity. Scientists at the Natural Capital Project (a research group housed at Stanford University, whose general mission is to help preserve the environment we live in) I have been provided with information on the edge effects present in pantropic forests, provided by the Natural Capital Project, a research group housed at Stanford University, whose general mission is to help preserve the environment we live in. Using this information, I created a web app (based on the statistical software program R and its subsequent packages) for this group so the ecologists and biologists who use this data have an easy way to visualize and use the information that is pertinent to them. An overview of how the web app was created along with a showcase of its features will be presented. A preview of this app can be found at <http://shiny.stlawu.edu:3838/NatCap/CarbonLoss/>

Nanjiang Liu, St. Lawrence University*Comparing Methods for Constructing Confidence Intervals*

Abstract: A confidence interval is a pair of numbers, based on sample data, designed to capture the value of some population parameter. There are several different methods for constructing confidence interval. Some methods are based on theoretical distributions (such as a t-distribution) and others use simulation techniques (such as bootstraps). We use R simulations to generate many samples from different populations and then compare the coverage rates and widths of the intervals with each method. The goal is to help determine which methods might work best in various situations.

Linh Nguyen, Elmira College*An Interactive Representation Triangle for a Three-candidate Election*

Abstract: The economist and mathematician, Donald Saari, developed a geometric representation triangle depicting numerous possible outcomes in a 3-candidate election. My work is an applet written using Mathematica which can depict the Saari Triangle for any three-candidate election. Multiple possible outcomes can be viewed using Mathematica's "manipulate" function. To present how the representation works on Mathematica, I will use the data for the 2000 Presidential Election.

Danielle Petkovsek, Elmira College*Impact of a Third-Party Candidate and the 2014 Maine Gubernatorial Election*

Abstract: In a three-candidate election, the third party is sometimes thought of as a spoiler. By being in the race, he/she steals votes unevenly from the other two candidates, making one the winner. Some might think that the outcome of the election would be different if that candidate were not present. In this paper, however, we found that that was not the case for the 2014 Maine Gubernatorial Election.

By examining two estimates of how second-place votes are distributed and coming up with a best estimate as a combination of the two, it is shown that the actual winner of the election would have won under any circumstances. Though we contradict the disputed idea of a third-party spoiler, we acknowledge that there exists a starting point where the third candidate does alter the outcome. This is a valid estimate but not the best so we rest our case upon the final model that we built. It is apparent in our study that the third party candidate is not a factor that spoils the election.

Sijia (Scarlett) Qi, St. Lawrence University*Shiny Bayes: Developing an App to Illustrate Bayesian Inference*

Abstract: Bayesian inference is a statistical method for using data to update beliefs about location of a parameter. The R shiny package allows R coders to turn a statistical analysis into an interactive web application that anyone can use. We have created a Shiny App that allows users to specify a prior, input data, and observe the resulting posterior distribution calculated by R. We discuss the process of creating this Shiny App, and how it can be used in a statistics class to investigate Bayesian ideas.

Son Vuong, St. Lawrence University*Haggle with Google Flight: Predicting Flight Prices*

Abstract: In today's internet Age, travel agent is a profession of the past. So, how do you haggle with that flight search engine to get the best price on your flight home? This talk focuses on the relationship between the percentile of flights' prices and various search options that a user can configure. The target variable, predicted percentile, shows where a particular query configuration lies in the range of historical prices. By using this variable, we would be able to determine whether that particular price is the deal of your life! Queried via Google Flights Engine on a fixed set of destinations, our data consists of over 2 millions flights. We explored this complex relationship on three different levels: a fixed trip with given origin, destination, departure date and return date; a flexible trip given a range of departure date and return date; and a vacation trip given the fixed trip length of 9 days, that occurred in the next 300 days.