



College of Science and Mathematics

Big Data Lecture Series

FRIDAY, April 29, 2016

12:00-1:30pm in Clendenin Building, room 2003 (Kennesaw Campus)

Lunch will be served



Andrew Dewar is a current Master of Science in Applied Statistics (MSAS) candidate at Kennesaw State University (KSU). Prior to attending KSU, he worked in small business and HR consulting. He earned his undergraduate degree in Economics from the University of Florida. His prime role these days is as a stay-at-home dad and he also works in Dr. Herman Ray's lab in the area of education research. After earning his degree Andrew hopes to find meaningful opportunities for analytical problem solving, research, and teaching.

STEM Education Trends: 1987 – Present:

Dramatic growth in the areas of scientific research and technological development has driven a universal need to prepare students for careers in various STEM disciplines. To this end, national initiatives have been geared towards growing the STEM workforce. However, in order to encourage subject specific change and guide specific policy, a more targeted approach is needed. To this end, teachers responsible for Biology, Chemistry, Physics, and Math, were analyzed utilizing survey data from 1987 to 2011. The National Center for Education Services School's and Staffing surveys over these years provide a nationally representative sample of secondary teachers from which to analyze overall trends, assess preparedness in each field over time and ultimately model teacher effectiveness for every school district in the United States. This endeavor has also lead to a case study in data visualization, which explores the most effective ways to communicate multidimensional data.

Among High School Biology, Chemistry, Math, and Physics teachers from 1987 to 2011:

- 1) How has the composition of teachers in each of these fields changed?
- 2) How prepared are teachers of these disciplines to teach their given subject in terms of having a related degree, teaching certification, and experience?
- 3) How has the age and experience of teachers of these disciplines changed over time?

Data Visualization Case Study:

Advancements in data science in recent years have enabled complex analysis of multidimensional data in increasingly interesting and novel ways. With these advances, the challenge of actually communicating this data or insight in a meaningful way remains. A case study of High School teachers (age, experience, gender) for the aforementioned subjects was used as a vehicle for exploring the variety of ways in which this challenge can be met.

- 1) What methods for data visualization are effective for communicating multi-dimensional data in the given context?
- 2) With digital consumption increasing over print, novel tools are now available to allow for more dynamic, interactive and engaging visuals such as those offered in R's shiny package.
- 3) Effective data visualization is not only the key to communicating research findings, but may also inform the research itself.