

# Math 499 Senior Project Proposal

Bryce Kaline  
Spring 2019

## Personal Background

This is my final semester and I have completed all courses required for the degree in Mathematical Sciences (with Emphasis in Statistics), including: Math 335, Math 425, CS 450. I have also partially taken Math 488, however, this course was not completed. This project will be focused in the Finance and Data Science domains, the latter being the general field I am pursuing after graduation, and the former being in consideration.

## Project Proposal Background

I intend to research the stock and other investment markets for this project. Using market data that is widely available as well as additional, more specific data that may be obtained by web-scraping or other means, I would like to explore whether I can find predictors of these markets in the data, or in the very least, design an interface that summarizes important descriptors of individual stocks. This will be accomplished using either general statistical practices such as time series analysis, machine learning, or graphical analysis. Other questions I might explore include: Can we predict the best times to buy and sell a stock? If so, how much can we increase the frequency of transactions before these predictions become unreliable? Are there any new predictors of the market that we can uncover, or new ways to analyze the market that are not already in wide use by analysts? Can a technical analysis tell us which investments lend themselves better to predictions and estimates?

## Proposed Deliverables

In the very least I expect to produce an interactive dashboard that informs the user about the market and their investments and aids them in their investment strategies. The dashboard will include various visual representations of the investments' performances and potentially additional visual aids designed to inform and predict. I anticipate this to be presented in the form of an html webpage or Shiny app, although other options may be explored. Another potential deliverable that I hope to explore is an automated system that will buy and sell based on my analysis of the data. There are other free or paid-for dashboards such as this available around the web, as well as other automated systems. If I design an automated component, it will be used to simulate investments to see if it is useful, and I can present my results. Regarding the dashboard, I hope to be able to offer something more than what is already available from other financial institutions, whether it be new predictors of stock trends or new ways of recommending a stock's viability. However, if this proves infeasible, I wish to build a product that is unique and distinguishable from other variants.

## Faculty Request

Br. Hathaway and Br. Woodruff have agreed to be my mentors for this project.