# Capstone Project

After meeting with my mentor and learning about the R ecosystem, I have decided to use propensity score matching to predict a student’s readiness level for Calculus I after completing STEM Precalculus (CMAT 107). The control group includes students that did not take STEM Precalculus (CMAT 107), and the treatment group comprises students that earned at least a C in STEM Precalculus (CMAT 107). In this study, cognitive and non-cognitive variables are observed, and propensity score matching is used to reduce the bias of confounding variables. The analysis presented in the study provides Clark Atlanta University with information regarding the necessity of support services for the academic and social enhancements for particular students that can lead to an increase in retention and graduation rates.

The data used for this project will be requested from the Office of Planning, Assessment & Institutional Research at Clark Atlanta. Additional data is collected from the adaptive learning courseware, Assessment and LEarning in Knowledge Spaces (ALEKS). Variables in the study are a combination of cognitive and non-cognitive student characteristics. Particular data include but are not limited to, GPA, ACT or SAT mathematics score, ACT or SAT composite score, time students spent learning in the platform, initial percentage of content mastered in ALEKS, and final percentage of content mastered in ALEKS. Noncognitive attributes include professor, whether a student repeated or have taken any Precalculus course, and classification.

To perform the analysis, the MatchIt package will be installed, loaded, and used into R. Propensity score matching will control for differences in the treatment and control groups to make the groups more comparable. Various subsets of the control group will be documented to determine the group of students that are more likely to achieve in Calculus I. A poster presentation displaying propensity score matching as a data analysis tool for reducing bias and predicting a student’s success in Calculus I.