

CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES
COLLOQUIUM

Friday, December 1

3:15 – 4:15 PM

Maria Sanford, Room 101

**THE JOURNEY TO IMPROVE AN R
PACKAGE FOR ORDINAL REGRESSION**

**ROLAND DEPRATTI AND
GURBAKHSHASH SINGH**

CENTRAL CONNECTICUT STATE UNIVERSITY

Abstract: Ordinal Logistic Regression has often been used to relate ordinal outcomes to predictor variables using the logit link. Unfortunately, this results in the interpretation of the log of cumulative odds, which has led to misinterpretations of odds as probabilities. Recently, consideration for the log link has been made to permit the interpretation of cumulative probabilities of an outcome. An algorithm that efficiently builds these models is a valuable resource because they are applicable in many settings and its output is easy to interpret. Dr. Singh has produced such an algorithm as part of the lcpm R package, which to date has been downloaded 17,000+ times.

Like all software, it has its time and space complexity limits. The goal of our work together was to determine how we might improve the algorithm so that it can process more input in less time using less memory. To improve overall performance, we attacked the problem from two fronts: a) changing the optimizer and b) rewriting the algorithm's code not part of the optimization. We also needed to explore how any of our changes impacted any boundary issues that existed on the original algorithm.

This presentation will discuss our journey to examine and discover the limitations of the original solution, how the algorithm was changed, and our current findings. For those not familiar with R performance tools, the first section will go through available libraries and how we used them to hunt down our problems and measure our improvements.

This talk is for an audience with an introductory understanding of probability, linear regression models, and computing.

To join us online use the following link: <https://ccsu.webex.com/meet/gotchey>
For further information: gotchevi@ccsu.edu; 860-832-2839; <http://mathcolloquium.sites.ccsu.edu/>