

## **Statistics Seminar**

Friday, March 1, 12:00 – 1:00 pm DERR 325 and Zoom

Cognitively consistent decision making via clusterability ranking.

Lucas Rusnak, Texas State University

**Abstract**: I will outline the basics of balance theory and its relationship to cognitively consistent outcomes that are usually missed by spectral methods. We will examine a series of new metrics that are able to discern between outcome, intent, and reliability of prediction. Synthetic signed networks are generated to drive a baseline understanding of the metrics before we examine real world data sets. The talk will include some of the exciting new data sets from recent undergraduate research projects that will hopefully stimulate undergraduate interest and collaboration. Time permitting, I will discuss any open studies, computational bottlenecks, generalizations of the model, and applications to metamaterial construction in spintronics, based on interest.

**Bio:** Dr. Rusnak is an Associate Professor at the Department of Mathematics, Texas State University. He has a PhD in Mathematics from Binghamton University. Dr. Rusnak introduced oriented hypergraphs and hypergraphic balance theory, through which he has generalized the Matrix-tree theorem, Kirchhoff's Laws, and graph grammars to oriented hypergraphs. He has developed new IP for anomalous data discovery and recently served as both a Translational Health Research Scholar and CHERR Fellow where he consulted on the detection and improvement of healthcare deserts in the State of Texas. His research interests include anything that challenges the boundaries of classical graph theory, matrix theory, and matroid theory.