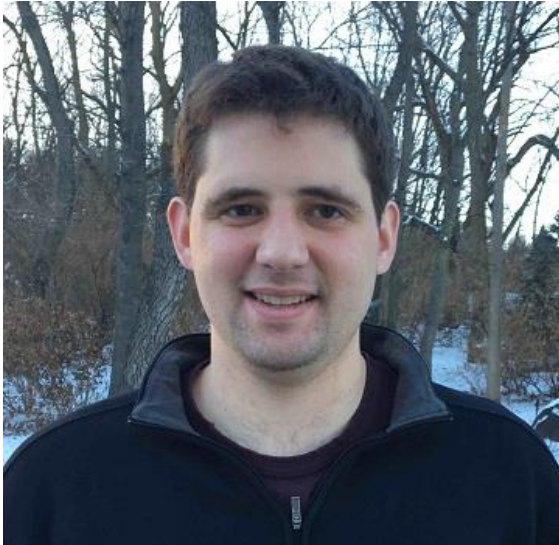# Computational Frameworks for Higher-Order Network Data Analysis

Graphs or networks are a fundamental abstraction for complex relational data throughout the sciences. The flexibility and simplicity of graphs has made them the basis for much analysis in, for example, social networks, recommender systems, and protein interactions. However, the focus on pairwise relationships, as encoded by edges in a graph, inherently limits such models. Much of the structure in complex data involves higher-order relationships that take place among more than two entities at once. For instance, people communicate in groups over email or text message, students gather in small groups, and biological interactions occur between a set of molecules rather than just two. This talk will discuss several new data analyses based on higher-order connectivity patterns, such as clustering, predicting group interactions, and low-dimensional embeddings. The algorithmic ideas will be organized around two models for higher-order data—hypergraphs and simplicial complexes—which offer complementary viewpoints and different mathematical tools.

Austin Benson, Ph.D.
Assistant Professor
Department of Computer Science
Cornell University

Date: Friday, October 23
Time: 1:00 – 2:00 p.m. US Central Time
Zoom Meeting ID: 998 4499 3279
Passcode: 724615
Faculty host: James Caverlee, CSCE

Biography

Dr. Austin Benson is an Assistant Professor of Computer Science and a Field Member of Applied Mathematics at Cornell University. His research develops numerical methods and algorithmic frameworks that enable new, better, or bigger analyses of complex data coming from relationships (e.g., social networks) and decision-making (e.g., discrete choice). Dr. Benson's research has appeared in *Science*, the *Proceedings of the National Academy of Sciences*, and *SIAM Review*, and has been recognized with a KDD best paper award and the Gene Golub doctoral Dissertation Award. Before joining Cornell, he received his PhD in computational and mathematical engineering from Stanford University.

You can also click this link to join the seminar https://tamu.zoom.us/j/99844993279?pwd=TkJodWFVRURyMmkwakI4SWZGeVJTQT09

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