



## Math Factor/Math Department Seminar

**Title:** Topology of Artificial Neuron Activations in Deep Learning

**Speaker:** Bei Wang Phillips, Associate Professor of Kahlert School of Computing and Adjunct Associate Professor of Mathematics, University of Utah

**Abstract:** In this talk, I will present recent work on exploring the topology of artificial neuron activations in deep learning, spanning applications from images to word embeddings. I will first discuss the topology of activations in convolutional neural networks, which reveals semantic structure in how these models organize hierarchical class knowledge across layers. I will then turn to the topology of word embeddings from transformer-based models, examining how their structure evolves during fine-tuning and how model confusions manifest in embedding spaces. If time permits, I will conclude with recent efforts in Explainable Artificial Intelligence (XAI) aimed at interpreting the topology of word embedding spaces.

**Refreshments will be served.**