abstract

Workshop on Topology: Identifying Order in Complex Systems
Topic:

Speaker:

Affiliation:

Date:

Time/Room:

Persistent homology is a central object of study in applied topology. It offers a flexible framework for defining invariants, called barcodes, of point cloud data and of real valued functions. Many of the key results of the last several years in the theory of persistent homology have been formulated in terms of a metric on barcodes called the bottleneck distance.

There is a multi-parameter generalization of persistent homology, called multi-dimensional persistent homology, which is naturally suited to the study of noisy point cloud data. We would like to develop adaptations of the theory of 1-D persistent homology to the multi-D setting. However, the bottleneck distance does not admit a naive generalization to the multi-D setting. Given this, the question arises as to what metric we should use to formulate theory in the multi-D setting.

In this talk, I will describe a result which shows that a multi-D generalization of the bottleneck distance called the interleaving distance is, in a certain sense, the optimal generalization of the bottleneck distance.