

## **abstract**

WORKSHOP ON TOPOLOGY: IDENTIFYING ORDER IN COMPLEX SYSTEMS

Topic:

Speaker:

Affiliation:

Date:

Time/Room:

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High-dimensional data sets often carry meaningful low-dimensional structures. There are different ways of extracting such structural information. The classic (circa 2000, with some anticipation in the 1990s) strategy of nonlinear dimensionality reduction (NLDR) involves exploiting geometric structure (geodesics, local linear geometry, harmonic forms etc) to find a small set of useful real-valued coordinates. The classic (circa 2000, with some anticipation in the 1990s) strategy of persistent topology calculates robust topological invariants based on a parametrized modification of homology theory.

In this talk, I will describe a marriage between these two strategies, and show how persistent co-homology can be used to find circle-valued coordinate functions. This is joint work with Dmitry Morozov, Primož Skraba, and Mikael Vejdemo-Johansson.