

【CL8-1】

## **Injectivity results for the Persistent Homology Transform**

Katharine Turne<sup>1</sup>, Justin Curry<sup>2</sup>, Sayan Mukherjee<sup>2,3</sup>

<sup>1</sup>*Laboratory for Topology and Neuroscience and Chair of Mathematical Statistics, Ecole Polytechnique Federal de Lausanne,* <sup>2</sup>*Department of Mathematics, Duke University,* <sup>3</sup>*Department of Statistical Science, Duke University,*

The Persistent Homology Transform (PHT) was introduced in *Persistent homology transform for modeling shapes and surface* (Turner, et al. 2014) as a tool to performing statistical shape analysis with persistent homology. The PHT consists of the collection of persistence diagrams calculated from the sublevel sets of the height function in each direction. We showed that the PHT was injective over the domain of embedded finite simplicial complexes in 2 and 3 dimensional Euclidean space. In this talk I will present further injectivity results with some comments on how they are proved. In particular we will see how the PHT is injective over the domain of all semialgebraic subsets of a fixed Euclidean space, and that finitely many directions are sufficient if we restrict to finite simplicial complexes satisfying some reasonable geometric conditions.