

Applied Topology in Albany (ATiA) Seminar

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A SHEAF-THEORETIC CONSTRUCTION OF SHAPE SPACE

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11:00 a.m. on Zoom

ABSTRACT. In this talk I will present a sheaf-theoretic construction of shape space—the space of all shapes. We do this by describing a sheaf on the poset category of o-minimal sets, where objects of this category are mapped to their Persistent Homology Transforms (PHTs). A recent result that builds on work of Schapira, showed that this transform is injective, thus making the PHT a good summary object for each shape. Our sheaf result allows us to “glue” PHTs of different shapes together to build up the PHT of a larger shape. Furthermore, by a new approximation result I will show that degree 0 information, i.e. PHT^0 , is sufficient to compute PHT^n for any n up to some tolerance.

This is joint work with Justin Curry and Sayan Mukherjee.