Applied Topology in Albany (ATiA) Seminar

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Discussion on Persistent Homology Transforms

Friday, March 13, 2026
12:00 p.m. Hudson 0110

Abstract. *Persistent Homology Transforms* (PHTs) are a generalization of applying persistent homology to level-set filtrations of height functions. Given a subset of Euclidean space M, the PHT on M is a function from a sphere of appropriate dimension to the product of persistent diagrams, one for each dimension. I will be discussing basic definitions and results from the first paper on the subject *"Persistent Homology Transform for Modeling Shapes and Surfaces"* by Katharine Turner, Sayan Mukherjee, and Doug M Boyer. The main focus of the talk will be the proof that the PHT is injective when restricted on shapes representable as finite simplicial complexes in 3-space. I will conclude with what work still needs to be done in the field and what I hope to accomplish in it.