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**Christopher Anthony Oballe\*** (coballe@vols.utk.edu), 1405 Pannell Drive, Aberdeen, MD 21001, and **Farzana Nasrin** and **Vasileios Maroulas**. *Bayesian Inference with Persistent Homology*.

Persistence diagrams offer a way to summarize topological and geometric properties latent in datasets. While several methods have been developed that utilize persistence diagrams in statistical inference, a full Bayesian treatment remains absent. In this talk, I'll describe the foundation for Bayesian inference with persistence diagrams. In essence, one models persistence diagrams as Poisson point processes with prior intensities then computes posterior intensities by adopting techniques from the theory of marked point processes. I'll then propose a family of conjugate prior intensities via Gaussian mixtures and proceed with classification applications in materials science and neuroscience using Bayes factors. (Received January 25, 2019)