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Yuriy Mileyko* (ymileyko@lavabit.com), **Sayan Mukherjee**, **Katharine Turner** and **John Harer**. *Probability measures on the space of persistence diagrams.*

Persistence diagrams are topological summaries that provide useful information about the topology and geometry of data and play a crucial role in topological data analysis. However, the problem of quantifying the uncertainty, noise, and reproducibility of these topological summaries, which is a fundamental aspect of the classical data analysis, has not been well studied. In this talk, we shall show that the space of persistence diagrams has properties that allow for the definition of probability measures which support expectations, variances, percentiles and conditional probabilities. This provides a theoretical basis for a statistical treatment of persistence diagrams, for example computing sample averages and sample variances of persistence diagrams, and allows us to extend the theory of topological persistence to a much larger set of applications. We shall also present an algorithm for computing sample averages of persistence diagrams. (Received September 24, 2012)