STATISTICS SEMINAR

UW-Department of Statistics www.stat.wisc.edu

TITLE:

Analyzing Data Full of Holes: Topological Data Analysis

Abstract: Data exhibiting complicated spatial structures are common in many areas of science (e.g., cosmology, biology), but can be difficult to analyze. Persistent homology is an approach within the area of Topological Data Analysis (TDA) that offers a framework to represent, visualize, and interpret complex data by extracting topological features which may be used to infer properties of the underlying structures. For example, TDA is a beneficial technique for analyzing intricate and spatially complex web-like data such as the large-scale structure (LSS) of the Universe. The output from persistent homology, called persistence diagrams, summarizes the different order holes in the data (e.g., connected components, loops, voids). I will introduce persistent homology, present a unified framework for inference or prediction using functional transformations of persistence diagrams, and discuss how persistent homology can be used to locate cosmological voids and filament loops in the LSS of the Universe.

Speaker:

Jessi C. Kehe
Assistant Professor
Of Statistics and Data Science Yale University

Time & Place:

Friday, February 7, 2020 **4pm**,
Room 133 SMI
Cookies & Coffee @ **3:30**, Rm 1210 MSC

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