

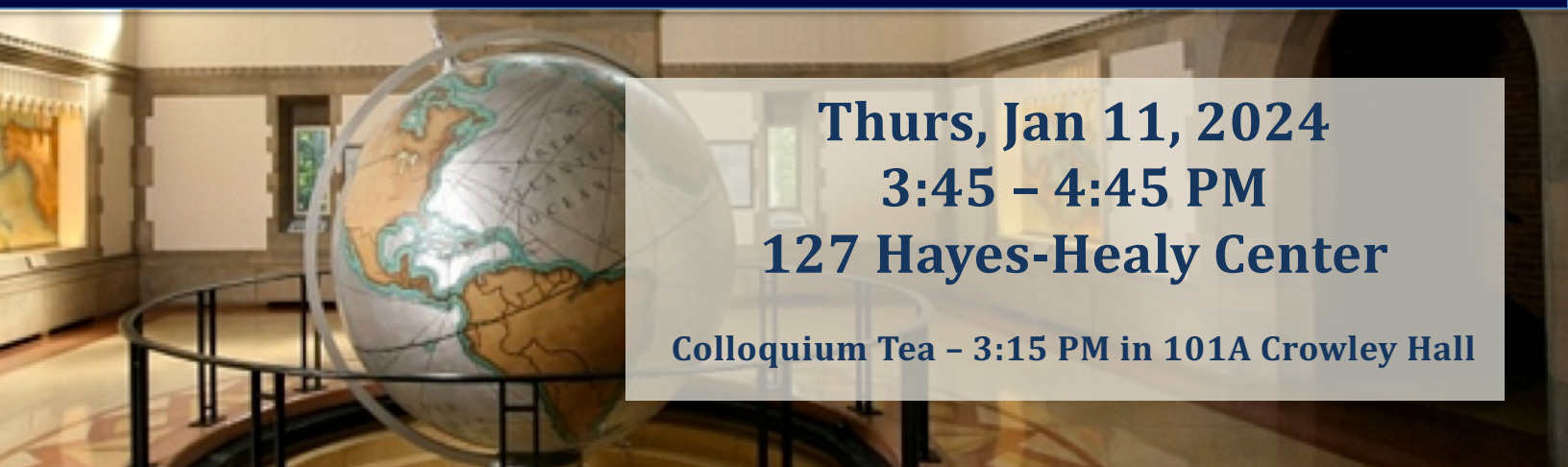
Department of Applied and Computational Mathematics and Statistics Colloquium



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Topological Data Analysis for Shape Comparison

The goal of the field of topological data analysis (TDA) is to quantitatively encode and measure shape in data using Algebraic Topology. The available tools encompass both algebraic constructions (such as persistence diagrams and Euler characteristics) as well as graph based representations (such as Reeb graphs, mapper graphs, and merge trees). Applications of TDA have exploded in recent years, finding use in a diverse array of domains including plant biology, neuroscience, mechanical engineering, and many more. This increased interest is due to its now extensive theoretical foundation, and more recently due to the increased availability of more efficient algorithms and software making TDA pipelines more readily accessible to domain scientists. In this talk, we will review some of the tools available with a particular focus on encoding embedded shapes in d -dimensional Euclidean space (with most of our applications living in the setting of $d=2$ or 3), and for creating metrics between these representations to allow for access to tools such as statistics and machine learning.

A photograph of a large globe on a stand in a museum or gallery setting. The globe is the central focus, showing the Americas. The background shows a well-lit room with other exhibits and architectural details.

Thurs, Jan 11, 2024
3:45 – 4:45 PM
127 Hayes-Healy Center

Colloquium Tea – 3:15 PM in 101A Crowley Hall