

MICHIGAN STATE UNIVERSITY
Department of Statistics and Probability

COLLOQUIUM

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Manifold Data Analysis with Applications to High-Resolution 3D Imaging

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10:20 a.m. - 11:10 am

Refreshments 10:00 am

C405 Wells Hall

Abstract

Many scientific areas are faced with the challenge of extracting information from large, complex, and highly structured data sets. A great deal of modern statistical work focuses on developing tools for handling such data. In this work we presents a new subfield of functional data analysis, FDA, which we call Manifold Data Analysis, or MDA. MDA is concerned with the statistical analysis of samples where one or more variables measured on each unit is a manifold, thus resulting in as many manifolds as we have units. We propose a framework that converts manifolds into functional objects, an efficient 2-step functional principal component method, and a manifold-on-scalar regression model. This work is motivated by an anthropological application involving 3D facial imaging data, which is discussed extensively throughout. The proposed framework is used to understand how individual characteristics, such as age and genetic ancestry, influence the shape of the human face.

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