Statistics Seminar

Department of Mathematics and Statistics

DATE:	Thursday, December 1, 2022
TIME:	1:15pm – 2:15pm
LOCATION:	WH 100E
SPEAKER:	Yangsheng Wang, Binghamton University
TITLE:	Manifold Data Analysis with Applications to High-Frequency 3D Imaging

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. This paper 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 paper. The proposed framework is used to understand how individual characteristics, such as age and genetic ancestry, influence the shape of the human face.