

Statistics Seminar
Department of Mathematical Sciences

DATE:	Thursday, March 15, 2018
TIME:	4:15pm - 5:15pm (colloquium time)
LOCATION:	WH 100E
SPEAKER:	J. S. Marron, University of North Carolina at Chapel Hill
TITLE:	OODA of Tree Structured Data Objects Using Persistent Homology

Abstract

The field of Object Oriented Data Analysis has made a lot of progress on the statistical analysis of the variation in populations of complex objects. A particularly challenging example of this type is populations of tree-structured objects. Deep challenges arise, whose solutions involve a marriage of ideas from statistics, geometry, and numerical analysis, because the space of trees is strongly non-Euclidean in nature. Here these challenges are addressed using the approach of persistent homologies from topological data analysis. The benefits of this data object representation are illustrated using a real data set, where each data point is the tree of blood arteries in one person's brain. Persistent homologies gives much better results than those obtained in previous studies.

About the speaker: Prof. James Stephen Marron is the Amos Hawley Distinguished Professor in UNC's Department of Statistics and Operations Research as well as a professor in the Department of Biostatistics at the UNC Gillings School of Global Public Health. Dr. Marron is widely recognized as a world research leader in the statistical disciplines of high dimensional, functional and object oriented data analysis, as well as data visualization. He has made broad major contributions ranging from the invention of innovative new statistical methods, through software development and on to statistical and mathematical theory. His research continues with a number of ongoing deep, interdisciplinary research collaborations with colleagues in Computer Science, Genetics, Medicine, Mathematics and Biology. A special strength is his strong record of mentoring graduate students, postdocs and junior faculty, in both statistics and also related disciplinary fields.

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