

Seminar Announcement

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Friday, January 22, 2016
Green Hall, Room 0120
1:30 PM

Gibbs Distribution for Statistical Analysis of Graphical Data with a Sample Application to fMRI Brain Images

Abstract: On this talk, I will introduce object-oriented data analysis (OODA) statistical methods that are novel and complementary to existing methods of analysis of human brain scan connectomes, defined as graphs representing brain anatomical or functional connectivity. OODA is an emerging field where classical statistical approaches (e.g., hypothesis testing, regression, estimation, and confidence intervals) are applied to data objects such as graphs or functions. By analyzing data objects directly we avoid loss of information that occurs when data objects are transformed into numerical summary statistics and, thus, new insights into neurology and medicine may be achieved. Several new OODA methodologies will be presented including a location-scale probability measure to model population of graphs, a regression framework to model graphs as a function of covariates, and a mixture model to cluster set of graphs. We will discuss on the performance of these methodologies using simulation experiments, and will show an application to analyze connectomes from fMRI brain scans collected during a serial reaction time task study.

Bio: Patricio S. La Rosa received his PhD in Electrical Engineering from Washington University in Saint Louis (WUSTL) in 2010 under the guidance of Professor Arye Nehorai. Between 2010 and 2013 he was a postdoctoral researcher in Biostatistic at the General Medical Sciences Division, WUSTL- School of Medicine, working with Professor William Shannon. Since 2013 he joined the Research & Development group of the Information Technology Division at Monsanto Company, where he is currently a Research Data Scientist and Technical Lead. Dr. La Rosa's research interests are in the areas of statistical signal processing and bio-physical modeling and their applications to Biological, Environmental, and Agronomical Sciences. For more details on his research work please visit his website at <https://sites.google.com/site/patricioslarosa/home>

Host: Dr. Arye Nehorai