

Imaging Seminar - Department of Mathematics

Date and Time: Monday April 6, 2015, 2-3 PM

Location: PGH 646

Title: *Predicting brain functional network and disease from structure*

Speaker: Farras Abdelnour, Imaging Data Evaluation and Analytics Laboratory, Department of Radiology, Weill Cornell Medical College

Abstract: The relationship between anatomic connectivity of large-scale brain networks and their functional connectivity is of immense importance and an area of ongoing research. Previous attempts have required complex simulations which model the dynamics of each cortical region, and explore the coupling between regions as derived by anatomic connections. While much insight is gained from these non-linear simulations, they can be computationally taxing tools for predicting functional from anatomic connectivities. We show that a simple linear model based on graph diffusion whereby the diffusing quantity undergoes a random walk on a graph appears to be superior to previous non-linear approaches in capturing the brain's functional connectivities. We show that the functional network can be fully described by the eigenvalues and eigenvectors of the structural network. We will additionally describe a related model predicting neuronal loss in two types of temporal lobe epilepsy.

Upcoming talks at: <http://www.math.uh.edu/~dlabate/ImSeminar.html>