

SPECIAL COLLOQUIUM

Speaker:	Damian Brzyski, Indiana University Bloomington	
Title:	Brain Connectivity-Informed Regularization Methods for Regression	
Date:	Thursday, February 22, 2017	
Room/Time:	11:00 a.m.	Room 224 MM

ABSTRACT:

One of the challenging problems occurring in brain imaging research is a principled incorporation of information from different imaging modalities. Frequently, each modality is analyzed separately using, for instance, dimensionality reduction techniques, which result in a loss of mutual information. In my talk, I will introduce a novel regularization method to estimate the association between the brain structure features and a scalar outcome within the linear regression framework.

This regularization technique provides a principled approach to use external information from the structural brain connectivity and inform the estimation of the regression coefficients. Our proposal extends the classical Tikhonov regularization framework by defining a penalty term based on the structural connectivity-derived Laplacian matrix. The extension of the method, which let to analyze the binary response variables, will be presented. In the last part of my talk, I will also briefly discuss the usefulness of the tensor regression approach in brain imaging applications.

SPEAKER BIO:

Damian Brzyski is a second year Post-Doctoral Fellow at Department of Epidemiology and Biostatistics at Indiana University Bloomington. He is supervised by Dr. Jaroslaw Harezlak. In his research, Damian focuses on discovering the association between the human brain's structure and HIV disease. The main tools he uses are penalized methods which employ the brain connectivity information. Recently, he also investigates the tensor regression approach and uses it to reveal the response-related brain networks.