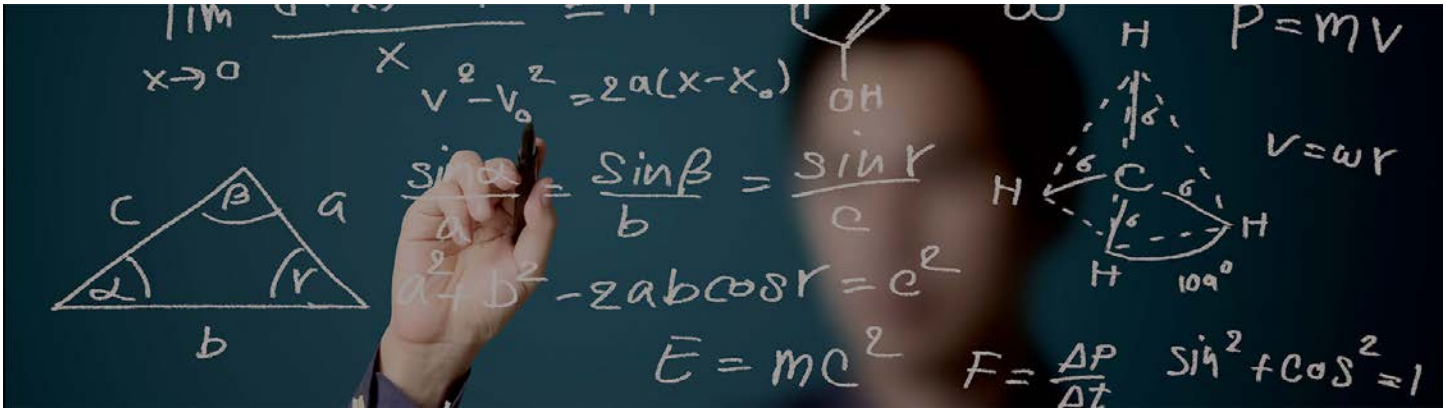

Spring 2020

RENSSELAER POLYTECHNIC INSTITUTE

DEPARTMENT OF MATHEMATICAL SCIENCES COLLOQUIUM

Graph Regularized Models for EEG Source Imaging and Hyperspectral unmixing

Abstract: Graph regularization plays an important role in electroencephalography (EEG) source imaging and hyperspectral unmixing, both are challenging and ill-posed inverse problems. Specifically for EEG brain source localization, we develop a graph Laplacian-based model that explicitly takes into account the label information (happiness, sadness, surprise, etc). We also incorporate some modern regularizations, such as the L1 norm, total variation, and nuclear norm (low rank) to further improve the accuracy. On the other hand, we consider the use of the graph total variation (gTV) regularization for blind hyperspectral unmixing, which is about identifying the pure spectra of individual materials (i.e., endmembers) and their proportions (i.e., abundances) at each pixel. To further alleviate the computational cost, we apply the Nystrom method to approximate a fully-connected graph by a small subset of sampled points and adopt the Merriman-Bence-Osher (MBO) scheme to solve the gTV-involved subproblem by decomposing a grayscale image into a bit-wise form. A variety of numerical experiments on EEG and hyperspectra data are conducted, showcasing the potential of graph regularized models in terms of identification accuracy and computational efficiency.

Yifei Lou (University of Texas)

Thursday, March 26, 2020 4-5pm

Location: TBA

Refreshments served 3:30-4pm Amos Eaton 4th Floor Lounge