

# COLLOQUIUM ANNOUNCEMENT

## “Longitudinal High-Dimensional Data Analysis”

Presented by

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Monday, January 16, 2012

300 Seitz

3:30 p.m.

**Abstract:** In this talk we will discuss how to do longitudinal analysis when instead of a scalar, such as systolic blood pressure, one measures a highly multivariate object, such as a brain image composed of millions of voxels. We develop a flexible framework for modeling high-dimensional functional and imaging data observed longitudinally. The approach decomposes the observed variability of high-dimensional observations measured at multiple visits into three additive components: a subject-specific imaging random intercept that quantifies the cross-sectional variability, a subject-specific imaging slope that quantifies the dynamic irreversible deformation over multiple visits, and a subject-visit specific imaging deviation that quantifies exchangeable or reversible visit-to-visit changes. The proposed method is very fast, scalable to studies including ultra-high dimensional data, and can easily be adapted to and executed on modest computing infrastructures. The method is applied to the longitudinal analysis of diffusion tensor imaging (DTI) data of the corpus callosum of multiple sclerosis (MS) subjects. The study includes 176 subjects observed at 466 visits. For each subject and visit the study contains a registered DTI scan of the corpus callosum at roughly 30,000 voxels.



Hosted by the

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Please join us after the colloquium for refreshments at  
Top of the Stairs (217 College Ave.)