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Seminar

Speaker: **Prof. Luo Xiao**
Department of Biostatistics
Johns Hopkins University

Title: **Quantifying the lifetime circadian rhythm of physical activity: a covariate-dependent functional data approach**

Time: **3:20pm – 4:20pm, Wednesday, February 18, 2015**

Place: **552 Hill Center**

Abstract

Objective measurement of physical activity using wearable devices such as accelerometers may provide tantalizing new insights into the association between activity and health outcomes. Accelerometers can record quasi-continuous activity information for many days and for hundreds of individuals. For example, in the Baltimore Longitudinal Study on Aging (BLSA) physical activity was recorded every minute for 394 women for an average of 4.5 days per person. An important scientific problem is to separate and quantify the systematic and random circadian patterns of physical activity as functions of time of day and age. To capture the systematic circadian pattern we introduce a practical bivariate smoother and two crucial innovations: 1) estimating the smoothing parameter using leave-one-subject-out cross validation to account for within-subject=correlation; and 2) introducing fast computational techniques that overcome problems both with the size of the data and with the cross-validation approach to smoothing. The age-dependent random patterns are analyzed by a new functional principal component analysis that incorporates both covariate dependence and multilevel structure. Results reveal several interesting, previously unknown, circadian patterns associated with human aging.

***** Refreshments will be served @3:00pm in Room 502 Hill Center***