

The Medical College of Wisconsin

Division of Biostatistics

Proudly Presents:
A Statistical Research Seminar
Talk By:



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Title: Multilevel variance components model in functional data with applications to minute-level accelerometry measures

ABSTRACT: The emergence of mobile technologies, such as physical activity assessed via wearable actigraphy devices has provided an unprecedented opportunity to obtain objective evaluations of multiple physiological systems in real-time over weeks or months. However, the complexity of the devices and the high-dimensionality of the data also pose many analytic challenges to time-dependent measures. Most of the current approaches are based on summary statistics of activity that neglect the important time effects. Motivated by the collaborative efforts with the Motor Activity Research Consortium for Health (mMARCH), we developed multilevel functional data analysis approaches that integrate multiple domains of complex measurements and reduce the dimensionality of the data while accounting for correlations in the repeated observations. In particular, we extended the traditional ACE model for a single univariate trait to functional outcomes based on an earlier work of structured functional principal component analysis (SFPCA) and applied them to analyze the minute-level activity measures observed from the Brisbane adolescent twin study. The methods simultaneously: 1) handle various levels of correlation in the data; 2) identify interpretable traits via dimensionality reduction based on principal components; and 3) estimate relative variances that are attributed by additive genetic, shared environmental and unique environmental effects. Within-family similarities of those complex measures could also be effectively quantified.

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3:30 PM – 4:30 PM

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Light refreshment provided 3:10 PM