

**University of California, Irvine  
Statistics Seminar**

***Effective semiparametric modeling for ultra-sparse,  
unsynchronized and imprecise longitudinal data***

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4-5 PM  
2011 Bren Hall  
(Bldg #314 on campus map)**

Some advantages of using functional data analysis tools in the analysis of longitudinal data will be outlined. These advantages include new modeling approaches as well as new estimation procedures to address design challenges in longitudinal data. More specifically a functional varying coefficient model is proposed that provides a versatile and flexible analysis tool for relating longitudinal responses to longitudinal predictors. This approach provides a novel representation of varying coefficient functions through suitable auto- and cross-covariances of the underlying stochastic processes, which is particularly advantageous for sparse and irregular designs, as often encountered in longitudinal studies. Existing methodology for varying coefficient models is not adapted to such data. The proposed approach extends the customary varying coefficient models to a more general setting, in which not only current but also recent past values of the predictor time course may have an impact on the current value of the response time course. The influence of past predictor values is modeled by a smooth history index function, while the effects on the response are described by smooth varying coefficient functions. The resulting estimators for varying coefficient and history index functions are shown to be asymptotically consistent for sparse designs. In addition, prediction of unobserved response trajectories from sparse measurements on a predictor trajectory is obtained, along with asymptotic pointwise confidence bands. The proposed methods perform well in simulations, especially when compared with commonly used local polynomial smoothing methods for varying coefficient models, and are illustrated with multiple applications.

For directions please refer to <http://www.ics.uci.edu/about/visit/>  
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