



The University of Chicago

Department of Statistics

Seminar Series

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**“Nonparametric Estimation of Correlation Functions  
In Longitudinal And Spatial Data, With Application  
To Colon Carcinogenesis Experiments.”**

**MONDAY, February 13, 2006 at 4:00 PM  
133 Eckhart Hall, 5734 S. University Avenue**

*Refreshments following the seminar in Eckhart 110.*

**ABSTRACT**

In longitudinal and spatial studies, observations at a particular time or location within one subject could have complicated structures, e.g. vectors or even functions. Measurements within the same subject usually demonstrate strong correlations that are stationary in time or distance lags. The times or locations of these data being sampled may not be homogeneous. We propose a nonparametric estimator of the correlation function in such data, using kernel methods. We show that the proposed estimator has a pointwise asymptotic normal distribution, when the number of subjects is fixed and the number of vectors or functions within each subject goes to infinity. Based on the asymptotic theory, we propose a weighted block bootstrapping method in making inferences on the correlation function, where the weights account for the inhomogeneity of the distribution of the times or locations. The method is applied to a data set from a colon carcinogenesis study, in which colonic crypts were sampled from a piece of colon segment from each of the 12 rats in the experiment and the expression level of p27, an important cell cycle protein, was then measured for each cell within the sampled crypts. A simulation study is also provided to illustrate the numerical performance of the proposed method.

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Please send email to Mathias Drton ([drton@galton.uchicago.edu](mailto:drton@galton.uchicago.edu)) for further information. Information about building access for persons with disabilities may be obtained in advance by calling the department office at (773) 702-8333.