BOSTON UNIVERSITY

BOSTON UNIVERSITY STATISTICS AND PROBABILITY SEMINAR SERIES

Modeling longitudinal spatial periodontal data: A spatially-adaptive model with tools for specifying priors and checking fit

Brian Reich,

Department of Statistics,

North Carolina State University

Thursday, January 24, 2008, 3:30-4:30pm,
Mathematics and Computer Science (MCS) Building, Room B46
111 Cummington Street, Boston

Tea and Cookies at 3:00pm in MCS 153

Abstract: Attachment loss (AL), the distance down a tooth's root that is no longer attached to surrounding bone by periodontal ligament, is a common measure of periodontal disease. In this paper, we develop a spatiotemporal model to monitor progression of AL. Our model is an extension of the conditionally autoregressive (CAR) prior, which spatially smooths estimates towards their neighbors. However, since AL often exhibits bursts of large values in space and time, we develop a non-stationary spatiotemporal CAR model that allows the degree of spatial and temporal smoothing to vary in different regions of the mouth. To do this, we assign each AL measurement site its own set of variance parameters and spatially smooth the variances with spatial priors. We propose a heuristic to measure the complexity of the site-specific variances, and use it to select priors that ensure parameters in the model are well-identified. In data from a clinical trial, this model improves the fit compared to the usual dynamic CAR model for 90 of 99 patients' AL measurements.

For directions and maps, please see *http://math.bu.edu/research/statistics/statseminar.html.*