Title: Optimal Spatio-Temporal Sampling Designs for Monitoring Dynamic Systems

Author: Mevin B. Hooten
Department of Mathematics and Statistics
Utah State University

Abstract: The optimal design of experiments is a long-standing area of research in statistics. In the environmental and ecological sciences, there has also been a strong research emphasis on network design for monitoring spatial processes, and lately, on adaptive designs. An additional complication presents itself in situations where the spatial process is changing in time; thus, we seek to find the optimal design, dynamically, so that information from the previous times at which there were observations plays a role in determining the optimal designs for future monitoring. A hierarchical formulation is utilized to incorporate the latent dynamical process of interest. Such a model specification allows for the estimation of design criteria (based on prediction error variance) that indicate optimal future spatial monitoring designs given the previous designs and observed data.