



Mathematical Sciences



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Colloquium Series

Friday, April 28, 2017 at 3pm in Bell Hall 143

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**Confidence regions for spatial excursion sets
from repeated random field observations, with
an application to climate**

The goal of this work is to give confidence regions for the excursion set of a spatial function above a given threshold from repeated noisy observations on a fine grid of fixed locations. Given an asymptotically Gaussian estimator of the target function, a pair of data-dependent nested excursion sets are constructed that are sub- and super-sets of the true excursion set, respectively, with a desired confidence. Asymptotic coverage probabilities are determined via a multiplier bootstrap method, not requiring Gaussianity of the original data nor stationarity or smoothness of the limiting Gaussian field. The method is used to determine regions in North America where the mean summer and winter temperatures are expected to increase by mid 21st century by more than 2 degrees Celsius.