Fall 2025 Departmental Seminar

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12:00 PM
Wagar Building Rm 133

Random Domain Partition Models for Clustering, Nonparametric Regression, and Density Estimation of Spatial Data

Abstract

In this talk, we introduce a Bayesian spatial domain partition model based on predictive random graph partitions. The method provides a flexible framework for modeling latent spatially contiguous clusters with irregular shapes and unknown cluster numbers while accommodating complex spatial domains. We prove that the method ensures partition consistency under very mild assumptions of true cluster boundaries. We further demonstrate how this method can be extended to construct spatially aware Bayesian additive tree models for spatial nonparametric regression, classification, and intensity estimation for point pattern data on complex domains. We will illustrate its usage and advantages over conventional latent Gaussian process–based methods using various spatial regression and point pattern real data examples.