Pramita Bagchi, PhD

Assistant Professor, Department of Statistics

Education

PhD, Statistics, University of Michigan

Key Interests

Spatial Data | Spatio-Temporal Data | Time Series | High Dimensional Data | Image Analysis | Spectral Analysis | Curve Estimation | Climate Data | Dynamic Modelling | Non-Stationarity

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SELECT PUBLICATIONS

- Bagchi, P. and Dette, H. (2019). A test for separability in covariance operators of random surfaces. T*he Annals of Statistics*, forthcoming.
- Bagchi, P., and Subhra Sankar Dhar. (2020). A study on the least square estimator of multivariate isotonic regression function. *Scandinavian Journal of Statistics*, forthcoming.
- Bagchi, P., *et al.* (2018). A simple test for white noise in functional time series. *Journal of Time Series Analysis,* 39, 54-74.
- Bagchi, P., *et al.* (2016). Inference for monotone functions under short- and long-range dependence: Confidence intervals and new universal limits. *Journal of the American Statistical Association,* 111(516), 1634-1647.

Research Focus

My research focuses on developing methodology for analyzing high dimensional dependent data. Dependence is a natural phenomenon occurring in several real-life scenario, specifically in data observed over time or in a spatial context. Ignoring this underlying spatial and temporal dependence structure leads to incorrect result in inference and prediction problem. The severity of dependence may drastically affect the behavior of the estimators. Moreover, the behavior of the observations may change over time or based on geographical location. Often spatial and temporal dependence affect each other. I am interested in such interesting dynamics. With modern technology, we now have access to high resolution data. The classical set-up allows analysis only for the case where the sample size is larger than the dimension of the observation, which is not realistic for complex object. I incorporate the natural smooth structure of the data generating process and treat the data as functions. Some interesting examples include satellite images, daily weather curve, demographic curves etc. I develop computationally efficient statistical methodologies to analyze such data.

Current Projects

- Adaptive frequency band estimation for spatio-temporal data: Spectral density is an important tool in understanding and modelling time series. The spectral density is often summarized by frequency bands, averaged over specified frequency range. We are developing a data-driven method to estimate the band structure that best summarizes variability in spatio-temporal data.
- Detection of heterogeneous regions in spatial-spectral domain.
- Modelling and inference for high dimensional time series with changing variance.
- Spatio-temporal modelling of urban transport system for better prediction and inference.