



Department of Mathematics and Statistics



Special Colloquium



Functional Analysis Under Nonlinear Constraints for Robust Artificial Intelligence and Machine Learning Applications to the Sciences

Dr. K. P. Chowdhury (Duke)
Johns Hopkins University

Abstract: Learning about the world around us based on data is fundamental to the scientific process. As such, the field of Statistical Learning has become increasingly important to answer questions of scientific interest. However, though data are ubiquitous, our scientific methods rely on a finite amount of it by necessity. Therefore, scientific decisions must often be based on unobserved (missing, unmeasured, etc.) data, which can bias our answers to scientific questions of interest. In this talk I discuss a novel Statistical Learning methodology that reduces this inherent bias in scientific modeling, utilizing foundational ideas from Analysis, such as measure and integration. I discuss various applications of the idea, estimated in a Bayesian Latent Variable framework using intuitive and interpretable models, and show its subtle and beautiful connections to many fundamental concepts in Analysis. Through it I show that the methodology may outperform current state of the art learning methodologies such as Deep Neural Networks, using a fraction of the computing resources. I also briefly discuss various extensions and future directions.

Keywords: Measure Spaces; Analysis; Unbalanced Data; MCMC; Artificial Intelligence; Machine Learning; Nonparametric Regression; Categorical Data Analysis; Bayesian Inference; Model Diagnostics.

Friday, February 4, 1:05 – 1:50 pm

For more info visit the [department website for the colloquium](#)