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Seminar

Speaker: **Professor Subhashis Ghoshal**
Statistics Department
North Carolina State University

Title: **Sup-norm posterior contraction and uncertainty quantification in multivariate nonparametric regression with application to mode finding**

Time: **3:20 – 4:20pm, Wednesday, November 5, 2014**

Place: **552 Hill Center**

Abstract

In the setting of nonparametric multivariate regression with unknown error variance, we consider a Bayesian method of estimating the regression function and its mixed partial derivatives. Our prior consists of representing the function using tensor products of B-splines with normal basis coefficients, where the variance is either estimated using empirical Bayes method or is endowed with an inverse- γ prior. We establish pointwise, L₂-and sup-norm posterior contraction rates for the regression function and its mixed partial derivatives, and show that they coincide with the minimax rates for anisotropic Holder class of functions allowing the true regression function to have different smoothness in different dimensions. Using concentration inequalities for Gaussian processes, we show that for the function or its mixed derivatives, the posterior variation around the posterior mean nearly mimics the variation of the posterior mean around the true target function, which allows us to construct confidence regions for these functions that cover the function at all points and have optimal sizes. An application to estimation and uncertainty quantification for the mode of the regression function is considered. Theoretical results are supported by extensive simulations. On the way to the proofs, we also obtain some new results on tensor products of B-splines.

The talk is based on joint work with William Weimin Yoo, a doctoral student at North Carolina State University.

**** Refreshments will be served @2:50pm in Room 502 Hill Center ****