Lehigh University
Department of Mathematics

Probability and Statistics Seminar

The Department of Mathematics has the pleasure to announce that its own

Prof. Soutir Bandyopadhyay

will give a talk intitled

Multiresolution Gaussian Process Model for the Analysis of Large Spatial Data Sets.

in the Probability and Statistics Seminar on

Thursday, October 25, 2012 at **4.10 pm** in room **XS 201**.

Abstract

The recent breakthroughs in Bayesian hierarchical models have added new classes of models for handling nonstationary spatial data and indirect measurements of the spatial process. This development in spatial statistics is coincident with emerging challenges in the geosciences involving new types of observations and comparisons of data to complex numerical models. For example, as attention in climate science shifts to understand the regional and local changes in future climate there is a need to analyze high resolution regional simulations from climate models and to compare them to surface and remotely sensed observations at fine levels of details. These kinds of geoscience applications are characterized by large numbers of spatial locations and the application of standard spatial statistics techniques is often not feasible or will take an unacceptably long time given typical computational resources. Moreover, geophysical processes tend to be nonstationary over space and there is also the need to apply statistical methods that do not assume a constant spatial dependence across a region. In this work we develop a new statistical model that addresses both of these features of geophysical data and so fills a gap in current statistical methodology. Our approach combines the representation of a field using a multiresolution basis with statistical models for processes on a lattice and introduces sparsity into the computations in a way that does not compromise covariance models with large scale correlations and models with many degrees of freedom.

D.Conus