# Department of Applied and Computational Mathematics and Statistics Colloquium


## Ankita Jain

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will give a lecture entitled:

## *Sub-sampling in Parametric Estimation of Effective Stochastic Differential Equations from Multi-scale Data*

## Abstract


It is often desirable to derive an effective stochastic model for the physical process from observational and/or numerical data. Particular examples include observations of averaged quantities in experimental setups, averaged or filtered observational data in the atmosphere/ocean application, volatility process in stochastic volatility models in mathematical finance, and high frequency stock price data with microstructure noise, etc.

Various techniques exist for performing estimation of drift and diffusion in stochastic differential equations from discrete data sets. In this talk, I will give a brief introduction to stochastic differential equations and discuss the question of sub-sampling of the data when it is desirable to approximate statistical features of a trajectory by a stochastic differential equation. Through a basic example, I will show that the estimation of stochastic differential equations would yield incorrect results if the data set is too dense in time. Therefore, the data set has to sub-sampled (i.e. rarefied) to ensure estimators' consistency. Favorable sub-sampling regime is identified from the asymptotic consistency of the estimators.


**Tuesday, March 20, 2012**
**4:00 p.m. to 5:00 p.m.**
**129 Hayes-Healy Center**