1093-60-126 **Konstantinos Spiliopoulos*** (kspiliop@math.bu.edu), Boston University, Department of Mathematics and Statistics, 111 Cummington Mall, Boston, MA 02215, and **Andrew Papanicolaou**. *Filtering the Maximum Likelihood for Multiscale Problems.*

In this talk, I will discuss recent work on filtering and parameter estimation under partial information for multiscale problems. Under suitable assumptions, the nonlinear filter converges in mean square sense to a filter of reduced dimension. Additionally, we establish a central limit theorem correction for the the conditional (on the observations) log-likelihood process. To achieve this we assume that the operator of the (hidden) fast process has a discrete spectrum and an orthonormal basis of eigenfunctions. Based on these results, we then propose to estimate the unknown parameters of the model based on the limiting log-likelihood, which is an easier function to optimize because it is of reduced dimension. We also establish consistency and asymptotic normality of the maximum likelihood estimator based on the reduced log-likelihood. Simulation results illustrate our theoretical findings. Partial motivation for this work is the statistical analysis of partially observed multiscale diffusion models coming from financial applications, e.g., nonpredatory high frequency trading (HFT) or detection of an increased bid-ask spread which may correspond to increased volatility. This is joint work with Andrew Papanicolaou. (Received August 08, 2013)