

Department of Applied Mathematics and Statistics
The Johns Hopkins University

SEMINAR

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October 26, 2006
304 Whitehead Hall
Refreshments: 3:30 p.m.
Seminar: 4:00 p.m.

**MULTISCALE ANALYSIS OF DIFFUSION PROCESSES ON GRAPHS
AND ANALYSIS OF HIGH-DIMENSIONAL DATA**

ABSTRACT

We present novel ideas and constructions that allow the multiscale organization of graphs and data sets. These constructions are based on ideas related to diffusion processes on data sets, and use different time and space scales associated with diffusion to infer multiscale hierarchical organizations of a graph. This is a generalization of Fourier and wavelet analysis to graphs and manifolds, which leads to an organization of complex data sets and a generalization of signal processing tools to graphs. In order to emphasize the wide applicability of these techniques we will touch upon their applications to the organization of document corpora, dimensionality reduction for dynamical systems, nonlinear image denoising, and semi-supervised and reinforcement learning.