

**Abstract for: Dr. Mokshay Madiman  
Yale University**

**Visiting: Monday, January 30, 2012**

Title: Some recent themes in the intertwining of information theory and probability

The recognition that probability theory and information theory are intertwined at a fundamental level goes back to Kolmogorov, Pinsker, Shannon, and their contemporaries, but the breadth and depth of this intertwining has been uncovered further over the subsequent decades. Rather than discussing well known aspects of connections between probability and information theory such as the theory of large deviations, we will focus on outlining some relatively new directions. First, we will outline how classical limit theorems (particularly the central limit theorem) can be viewed as phenomena of entropy increase (like the "second law of thermodynamics"). Second, we will discuss an information-theoretic approach to the study of log-concave measures, particularly in high but finite dimension, which is also closely related to geometric functional analysis and the theory of concentration of measure. In particular, we will describe a quantitative Shannon-McMillan-Breiman type phenomenon for log-concave (not necessarily stationary) measures, as well as a reverse entropy power inequality for the more general class of convex measures. [We will present joint work with A. Barron and S. Bobkov in the talk, but we will also survey relevant literature by other scholars when appropriate.]