

**Analysis and Applications:  
A Conference in Honor of Elias M. Stein  
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Speaker: Ingrid Daubechies (Princeton University)

Date/Time: Friday, May 20, 2011 / 10:45-11:45 am

Talk Title: Adaptivity and Sparsity in Harmonic Analysis.

Abstract:

The difference between the pre-2000 JPEG standard for image compression and JPEG-2000 corresponds, mathematically speaking, to a transition from linear to nonlinear approximation. In both cases, images are viewed as superpositions of building blocks picked from a pre-assigned basis; in JPEG-2000 the choice of the most useful elements within the basis depends on the individual image. This adaptivity implies that a different basis leads to for (near) optimal results (wavelets rather than Fourier modes) and that different coding techniques are used, incorporated into JPEG-2000. At present, this change of paradigm is being pushed even further, and we are looking to "learn", from families of images (or data) themselves, (redundant) families of building blocks that are optimal for sparse, adaptive representations. The talk will give an overview of these developments, and sketch recent mathematical developments and applications.