

Liu Bie Ju Centre for Mathematical Sciences  
City University of Hong Kong

## Mathematical Analysis and its Applications Colloquium

Organized by Prof. Ya Yan LU and Prof. Wei Wei SUN

### Wavelets, Shearlets, and Mathematical Imaging by

Dr. Xiaosheng Zhuang  
City University of Hong Kong, Hong Kong

Date : Mar 12, 2013 (Tuesday)  
Time : 4:30 pm to 5:30 pm  
Venue: Room B6605 (College Conference Room)  
Blue Zone, Level 6, Academic 1 (AC1)  
City University of Hong Kong

#### ABSTRACT:

One of the main tasks in modern imaging and applied harmonic analysis is to construct suitable representation systems along with fast implementable algorithms for efficient decomposition and analysis of multidimensional data. It is by now well-known that a large class of multidimensional images is governed by anisotropic features which can be modeled as the so-called "cartoon-like" image. In this talk, we shall focus on sparse approximation of cartoon-like images using directional multiscale representation systems, and mathematical imaging using  $l_1$  minimization techniques. We shall discuss about one of the directional multiscale representation systems, namely shearlets, its optimality in  $N$ -term approximation of cartoon-like images, and its digitization based on the fast pseudo-polar Fourier transform on pseudo-polar grids. We will also discuss about the application of compressed sensing and  $l_1$  techniques in image inpainting. As an application of the  $l_1$  minimization, we provide a quantitative result for comparison between wavelet inpainting and shearlet inpainting based on an appropriate model for seismic inpainting.

Light refreshments will be provided at Room B6605 before the colloquium from 4:00 pm to 4:30 pm. Please come and join us!

\*\* All interested are welcome \*\*

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