

**EART 271 – Advanced Seismology Class  
Winter 2013**

**MWF 11:00-12:10 C332 E&MS**

**Course description**

**“Fundamentals of Modern Seismic Imaging –With Global and Local Transforms”**

This lecture course is focused on fundamental aspects of seismic wave propagation, scattering and imaging (with exposition on the relation between imaging and inversion), emphasizing the theory and methods in global and local transform domains (e.g., local Fourier domain, local angle domain, wavelet and beamlet domains, Gabor frame domain, etc.). The lecture is based on a book draft with the same title, coauthored by R.S. Wu and Y. Zheng. The book has ten chapters and each chapter will serve as the basis for a lecture:

1. Fourier transform and wavelet transform; 2. Wave equation and approximate solutions; 3. Reflection and Transmission of Seismic Waves; 4. Huygens principle and representation integrals; 5. Scattering of volume heterogeneities; 6. Scattering of irregular interfaces; 7. One-way propagators and one-return modeling; 8. Beamlet and beam propagations; 9. Backpropagation integral and imaging in the local angle domain; 10. True-reflection imaging; illumination analysis and acquisition aperture correction.

The Lectures will be given by Ru-Shan Wu and Yingcai Zheng, hosted by Thorne Lay.