

WEEKLY CALENDAR

20 February 2006



Department of Physics and Astronomy
202 Nicholson Hall
Louisiana State University and A&M College
Baton Rouge, Louisiana 70803-4001
Tel: 225-578-2261 / Fax: 225-578-5855
<http://www.phys.lsu.edu>



Material Science & Engineering Seminar

3:40PM / Wednesday, 22 February 2006 / Room E-130 Howe-Russell

Host: John DiTusa, PhD

Capacitance Probes of Interface Physics in Thin Film Structures

Arthur F. Hebard, PhD

University of Florida

General Seminar

3:40PM / Thursday, 23 February 2006 / Room 109 Nicholson

Host: Ken Hogstrom, PhD

[Refreshments served at 3:15 PM in Room 229 Nicholson]

Development of CT System and Methods - Clinical Application Oriented Image Reconstruction and Image Analysis

Xinagyang Tang, PhD

General Electric Healthcare Technologies
Applied Science Laboratory

The past three decades has witnessed the revolutionary breakthroughs and the rapid growth of CT as one of the most popular clinical imaging modalities. The most recent milestone is the commercial cone-beam volumetric CT (VCT) scanners with 64 detector rows. In this seminar presentation, the design and development of CT systems will be first reviewed as a brief introduction. Then, the image reconstruction and analysis methods, which are extremely important among all the components contributing to the cutting-edge CT technology, are discussed. Given the fact that the 2D image reconstruction algorithms in fan-beam geometry are theoretically exact, 3D image reconstruction algorithms are expected to be theoretically exact, since the exactness is desirable for all diagnostic imaging tasks. However, with the advent of helical scanning mode, virtually all the reconstruction algorithms adopted by leading CT scanner manufacturers have been approximate, because the current exact solutions suffer from intrinsic constraints and cannot provide well-balanced performance in clinical applications. In addition to diagnostic imaging, CT has also been extensively employed in image guided radiation therapy, in which the tracking of tumor motion in an extended field of view (FOV) brings in more technological challenges. With a focus on my own research experience in developing image reconstruction and analysis methods for clinical applications, the evolution of approximate image reconstruction algorithms will be explained, and the representative image analysis algorithms will be surveyed as well. Clearly, the development of CT image reconstruction and analysis algorithms has been driven by clinical and pre-clinical needs. Hence, the challenges and opportunities in the field of CT and its integration with other imaging modalities, such as PET and SPECT, will be envisioned in the context of existing and potential biomedical applications. Finally, the possibility of using CT alone or combined with other imaging modality for molecular imaging will be touched upon.

Reminder:

The Office of Motor Vehicles "mobile unit" will be on campus (Tower Drive, between Union and Coates Hall) from 8:30am to 3:00pm on the following dates: February 22, March 22, April 20, June 21, and July 19.
