MORE Science at UTSA
Environment Science and Engineering
Fall 2006 Seminar Series

Where: **UC 2.01.26 (PECAN) in the University Center (UC) Building**
When: **4:00 PM – 5:00 PM on November 10, 2006**

Snack and drinks will be served

Speaker: Dr. Fang Qiu

Dr. Fang Qiu is currently Associate Professor of GIS and Remote Sensing at the University of Texas at Dallas, where he teaches graduate classes in the Program in Geographic Information Sciences. He received his B.Sc. from the East China Normal University in 1990, M.Sc. from the Chinese Academy of Sciences in 1993, and Ph.D. from the University of South Carolina in 2000.

Dr. Qiu's research and instructional areas are remote sensing digital image processing, spatial analysis and modeling, GIS application software development, and web-based mapping and information processing. His research work at the University of Texas at Dallas is being funded by major federal government agencies, such as NSF, NASA, EPA, and Centers for Disease Control and Prevention (CDC), etc. Dr. Qiu has also served as a reviewer for numerous academic journals, book publishers, and as a panelist for National Science Foundation proposal review.

Topic: **Synergy of LIDAR and High-Resolution Digital Orthophotos to Support Urban Feature Extraction and 3d City Models Construction**

The development of automated algorithms for urban feature extraction and 3D city models (3DCMs) construction is of great importance, because traditional surface reconstruction based on manual digitization and photogrammetry is both costly and time consuming. LIDAR (Light Detection and Ranging), a relatively new technology based on high density surface sampling, can expedite the obtaining of accurate digital surface models (DSMs) with less expense. This research focused on the extraction of urban features (e.g. buildings and trees) and construction of 3D city models (3DCMs) on the basis of integrated usage of LIDAR data and digital orthophotos. For urban feature extraction, three methods were compared and applied in the city of Dallas: first, the object oriented image classification of high spatial resolution digital orthophotos utilizing not only spectral, but also edges, texture and spatial context information; second, the analysis of LIDAR data to derive urban features using digital terrain model; and third, the fusion of object oriented image classification results with the normalized digital surface model (nDSM) drawn from LIDAR data. It was demonstrated that the third method built upon the synergy of LIDAR and digital orthophotos data greatly improved the accuracy of urban feature extraction. To construct 3DCMs, this research first classified the buildings to those of flat roof and pitched roof using the roof slopes derived from LIDAR nDSM. The heights of flat roof and pitched roof buildings were then calculated using zonal majority and zonal maximum, respectively, where the zones are obtained from the feature extraction process.