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

Where: **Loeffler room (3.03.02) in the BioScience Building**
When: **4:00 PM – 5:00 PM on September 22, 2006**

Snack and drinks will be served

Speaker: Dr. G. Randy Keller

G. Randy Keller is a Professor in the School of Geology and Geophysics at the University of Oklahoma and holder of the Edward Lamb McCollough Chair in Geophysics. His research interests stress the geological applications of geophysics and span a variety of techniques at a variety of scales. His philosophy is that most geophysical methods are largely scale independent, and thus, the study of groundwater, the search for energy resources, and the study of the deep crust and upper mantle are based on the same physical principles as well as similar data acquisition, processing and interpretation techniques. He has conducted many studies of the structure and evolution of the lithosphere using gravity, magnetic, remote sensing, and seismological measurements integrated with geological data often as part of large international cooperative efforts. He has also regularly used geophysical methods to study issues such as ground water resources, earthquake hazards, the geometry of specific geologic structures, and site characterization. He has been very involved in the Geoinformatics initiative and is interested in the development of databases, techniques that foster data integration, software tools, and web services. In addition, he has helped organize numerous large cooperative research efforts and has regularly received funding from sources that include NSF, NASA, Department of Energy, U. S. Geological Survey, Department of Defense, and industry. Dr. Keller has published over 250 scientific papers, reports and book chapters as well as many maps. He also has directed 22 doctoral dissertations, and 63 master's theses and has mentored and advised many undergraduate students. He has served numerous governmental agencies, professional societies and scientific bodies as an editor, officer, or committee member. In addition to his research interests he is particularly concerned with issues such as involving information technology and data sharing, diversity, science education, and professional development of students and those already in the work force.

Topic: Integrated geological and geophysical studies of basins in the Rocky Mountain region

The Rocky Mountains have intrigued researchers and explorationists ever since the gold rush days. These mountains are a tectonic puzzle because of their complex history and their distance from plate margins that usually make driving mechanisms for deformation evident. The region's crustal formation in the Precambrian, the formation of the Ancestral Rocky Mountains in the late Paleozoic, the Laramide orogeny, and late Cenozoic extension and uplift are topics of great current scientific interest. There has been an increasing emphasis on the use of gravity, magnetic and remote sensing data in studies of this region, and these data have been particularly effective when used in an integrated fashion with seismic and drilling data. Rifting during the late Precambrian and Cambrian effected large areas of the southwest and created sedimentary basins that have in many cases survived to the present. In addition, younger structures such as those associated with the Ancestral Rocky Mountains have often been affected by older rift structures preserving Cambrian and older strata. Integrated studies have played a major role in efforts to reveal the deep manifestation of Ancestral Rocky Mountain structures including the deep basin structure and structure of the uplifts, and these efforts show that the scale of these structures is impressive in a global context. The deformation that formed the Ancestral Rocky Mountains is a massive inversion of these rift structures and is due to a plate collision in the late Paleozoic. The Laramide orogeny also produced considerable crustal scale deformation in the form of large basement uplifts and deep basins. Finally, late Cenozoic uplift and extension formed the Rio Grande rift whose surface manifestation is a series of basins, and our integrated studies show that these basins are deep and are underlain by complex subsurface structures. These basins are bounded by large active faults that pose a moderate level of seismic hazard, and the basin fill contains large but dwindling groundwater resources.