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

Where: **UC 2.03.06-ASH (top of the University Book Store)**
When: **2:00 PM – 3:00 PM on October 13, 2006**

Snack and drinks will be served

Speaker: Professor Stephen F. Ackley

Stephen has recently been appointed Research Associate Professor in the Earth and Environmental Sciences Department at UTSA. He is also Visiting Research Professor at Clarkson University, Potsdam NY. He retired in 1999 from the Cold Regions Research and Engineering Laboratory, Hanover NH where he worked for thirty years and held positions as a Research Geophysicist, Chief of the Snow and Ice Branch, and Senior Research Geophysicist. He has participated in over a dozen expeditions, working on the geophysics, physics and biology of sea ice covers of both polar regions, primarily in the Antarctic, including on the first Antarctic sea ice drifting station, Ice Station Weddell in 1992. He is Chair of the Science Steering Group of the Autosub-Under-Ice program in the UK, Co-Chair of the SCAR/WCRP program Antarctic Sea Ice Processes and Climate (ASPeCt), and coordinator for the International Polar Year combined project, Antarctic Sea Ice in IPY.

Topic: **AUTOSUB-UNDER-ICE: Exploration of the environment under sea ice and an ice shelf using an Autonomous Underwater Vehicle**

Since 2000, the UK government's environmental science agency, NERC, has sponsored a thematic program, Autosub-Under-Ice. The program was a combined technology development of a versatile autonomous underwater vehicle and ship-based science projects using that vehicle in both the Arctic and Antarctic. The program development described is perhaps unique in the polar sciences since it required the concurrent development of a new technology and nearly simultaneous application of that technology to conduct science in previously unreachable areas under sea ice and an ice shelf. Management of the program was conducted by a Science Steering Group composed about equally of independent appointees as well as several of the projects' Principal Investigators. Three ship expeditions were conducted, two to the Antarctic and one (split into two legs) to the Arctic. The vehicle's capabilities included ability to navigate over long distances(400km) and return to a position with less than 0.1% error and used inertial navigation combined with either top or bottom surface tracking to achieve this accuracy. Other technical advances successfully trialed include the capability to launch in heavy ice conditions, detect and avoid obstacles, and return to a homing beacon (when the original location programmed became inaccessible because of ice cover). New sensors fitted into the AUV included an up or down looking swath bathymeter, a water sampler, and digital camera, along with continuous CTD and up and down looking ADCP previously used. Results presented include the currents and ice shelf bottom topography obtained from under the Fimbul Ice Shelf, Antarctica; morphology of the sea ice cover, ocean currents and water properties under fast ice off NE Greenland; water sampling from a Greenland fjord; and sea ice thickness distributions and concurrent krill swarm densities observed under Antarctic sea ice. New efforts of the project are to transfer the technology internationally, educate students in AUV technology, and development of risk assessment procedures for use by equipment owners and investigators to evaluate potential missions.