



MORE SCIENCE AT UTSA Seminar Series

Thursday, May 1, 2008

4:00 – 5:00 p.m. Loeffler room BSB 3.03.02

Guest Speaker: Cathleen Geiger

University of Delaware in Newark

Dr. Cathleen Geiger received her M.S. in Polar Physical Oceanography from the University of Bergen in Norway and her Ph.D. from the Thayer School of Engineering at Dartmouth College in Hanover, NH, USA. She is currently a Research Associate Professor in the Department of Geography at the University of Delaware in Newark, DE. Through a Cooperative Research, Engineering, and Development Agreement (CRADA) she is currently working from the Cold Regions Research and Engineering Laboratory in Hanover, NH as part of International Polar Year (IPY) activities. This is the only national laboratory in the country which focuses on cold regions engineering and research. Her main area of study is sea ice with a focus on the dynamic and thermodynamic processes as part of the complex system at the air-ice-sea interface. Her research projects often focus on research and development ideas that both support the discovery elements of science but also advance the development of operational tools necessary to facilitate scientific discovery. She is collaborating with Professor Stephen Ackley at UTSA as one of the co-investigators of an IPY project which aims to examine the Sea Ice Mass Balance of the Antarctic (SIMBA) in the vicinity of the Bellingshausen, Amundsen, and Ross Seas also known as the BeAR Massif.

Anisotropic tracking of sea ice motion along discontinuities

Sea ice is the fastest moving geophysical scale solid on earth. It moves along the surface of the polar oceans at a rate of ~10 km/day and is driven by forces from the air, sea, internal ice stresses, and land boundaries. Sea ice motion is often computed using optical flow techniques which work well when the sea ice is considered at continuum scales of 5-10 km or greater. However, many of these techniques fail at higher resolution because of discontinuities in the flow field due to the presence of leads, ridges, and other damage zones (e.g., rubble fields). Over the past few years, a research team at the University of Delaware has applied a series of new computer vision techniques constrained by geophysical principles to resolve sea ice motion below the continuum scales. The newest development is an algorithm that can compute the motion along the discontinuity itself at scales down to the pixel resolution of the imagery. This and other techniques will be explained as part of a concept we are developing called a “Map of Moving Topography” or MMT