STUDENT POSTER SESSION COMPETITION

The Poster Committee and Awards Committee have worked together to find student presenters for a poster session to be held immediately prior to our April 22nd dinner meeting. The Awards Committee will select the best posters and present cash awards totalling $250. The following students will present posters:

University	Student	Title
Rice	Pablo Eisner	Tectonostratigraphic Evolution of the Neuguean Basin, Argentina
Lamar	Pamela F. Borne	Monitoring Changes in a Sediment-Starved Texas Beach Following the Removal of an Erosion-Prevention Structure
UT	K. D. Apperson	Mechanical Models of Compressional Fault-Related Folds: Controls on Deformation and Internal Stress
UH	A. M. Therriault W. U. Reimold	Field Studies of Bronzite Granophyre, Vredefort Structure, South Africa
UH	R. T. Beaubouef P. F. Rush	Diagenetic Framework for Chemical Remanence Acquisition in Lower Paleozoic Carbonate Rocks from W. Newfoundland

STUDENT POSTER SESSION COMPETITION ABSTRACTS

MECHANICAL MODELS OF COMPRESSIONAL FAULT—RELATED FOLDS: CONTROLS ON DEFORMATION AND INTERNAL STRESS

By K. D. Apperson

Plane strain finite element models were used to investigate how rock properties and layering control the sequential development of fault-bend and fault propagation folds and their internal stress state. The models use an elastic-plastic rheology, displacement boundary conditions, and special elements for frictional surfaces and fault tips. Layer deformation and stress and strain distribution are computed at discrete intervals of displacement for models that vary ramp angle (10°-30°), layer thickness (500-1000 m.), and material properties (e.g., yield stress, 50-200 MPa). A comparison of our results to those based on geometric models illustrates the strengths and weaknesses of each method for modeling the deformation and stress state in fault-related folds.

The results for fault-bend folds are: 1) fold shape and amplitude are little affected by material contrasts between layers; 2) fold geometries are smooth rather than kinked; 3) the strength of the layer at the ramp controls stress and strain distribution in the structure; 4) deformation is very sensitive to the relative magnitudes of the frictional coefficient and yield stress. In fault propagation folds, the stress state results from superposition of fault tip stresses and the shortening and buckling of the upper plate. The mechanical models of fault-bend and fault propagation folds do not reproduce the distinct dip domains predicted by geometric models. However, the external fold shape is similar to that predicted by geometric models involving flexural slip. Flattening of the fault ramp and foot wall deformation with increasing displacement in finite element models accounts for the smooth profile of these folds.