

## **HGS General and International Dinner – R.E. Sheriff Lecture**

Sponsored by University of Houston Department of Geosciences and UH Geoscience Alumni Association

November 6, 2006 Westchase Hilton, 9999 Westheimer

Poster Judging 4:30-5:30PM

Poster Viewing during Social Hour 5:30-6:30PM

Dinner 6:30-7:30PM

*Thanks to Swift Energy for their Financial Support*

### **Robert E. Sheriff Lecture Series:**

The lecture series is sponsored by the University of Houston Department of Geosciences and UH Geoscience Alumni Association in association with the Houston Geologic Society International Group.

Current president of the University of Houston Geoscience Alumni Association (UHGAA) will serve as Master of Ceremonies. Dr. John F. Casey, Department of Geosciences Chairman, will present an overview of current activities at UH. There will be posters and presentations on current thesis and dissertation research of UH graduate students. Volunteers from the professional geoscience community judge student posters.

Come and meet the next generation of geoscientists from UH!!

The Robert E. Sheriff Lecture Series was initiated in 1999 by the UHGAA. For the past several years it has been co-sponsored by the International Explorationists Group of the Houston Geological Society.

The series honors Dr. Sheriff as an educator, scholar, and a proponent for the geosciences.

Its mission is to:

1. Bring some of the best known geologists and geophysicists in the world to the Houston community in order to share highly relevant ideas to exploration geology and geophysics and,
2. Showcase geoscience activity at the University of Houston.

### **SPEAKER:**

**Henry W. Posamentier** is a Distinguished Advisor at Anadarko Petroleum Corporation. Prior to joining Anadarko in 2001, he was with Veritas Exploration Services (2000-2001), the Atlantic Richfield Co. (1991-2000), Exxon Production Research Co. and Esso Resources Canada, Ltd. (1979-1991), and at Rider University, Assistant Professor of Geology (1974-1979).



Dr. Posamentier's research interests have been in the fields of sequence stratigraphy and depositional systems analysis, where he has published widely. Most recently, he has employed an interdisciplinary approach to geologic prediction using 3D seismic visualization integrated with borehole data to interpret depositional systems and develop basin fill histories, in particular with reference to deep-water depositional settings. His current responsibilities involve ensuring integration of appropriate technologies into the exploration process. In 1971-1972, Dr. Posamentier was a Fulbright Fellow to Austria. He has served as an AAPG Distinguished Lecturer to the United States (1991-1992), to the former Soviet Union (1996-1997), and to the Middle East (1998-1999). Most recently (2006) he has served as a Distinguished Lecturer to Europe.

# Seismic Geomorphology and Seismic Stratigraphy from Shelf to Deepwater: Implications for Exploration and Development

**Henry W. Posamentier**

*Anadarko Petroleum Corporation, 1201 Lake Robbins Drive, The Woodlands, Texas 77380*

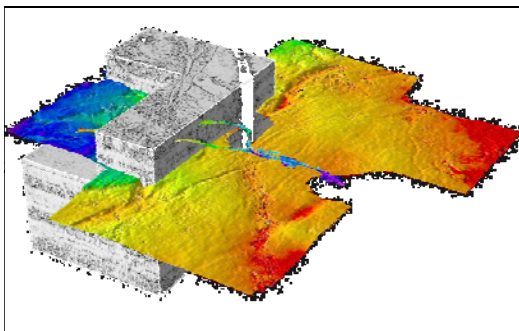
## ABSTRACT

3D seismic data can play a vital role in hydrocarbon exploration and development especially with regard to mitigating risk associated with presence of reservoir, source, and seal facies. Such data can afford direct imaging of depositional elements, which can then be analyzed by applying seismic stratigraphic and seismic geomorphologic principles to yield predictions of lithologic distribution, insights to compartmentalization, and identification of stratigraphic trapping possibilities. Benefits can be direct, whereby depositional elements at exploration depths can be identified and interpreted, or they can be indirect, whereby shallow-buried depositional systems can be clearly imaged and provide analogs to deeper exploration or development targets.

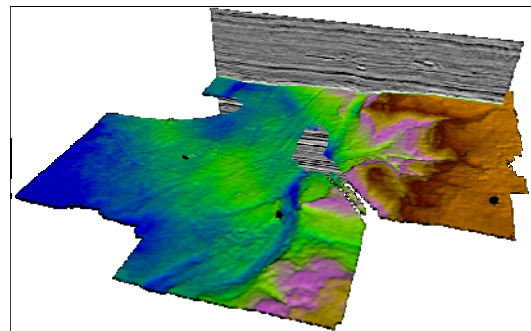
Examples of imaged depositional elements from both shallow- and deeply-buried sections are presented. Deep-water deposits, in particular, have benefited greatly from analyses of 3D seismic data. The understanding of the stratigraphic and geomorphological evolution of these deposits has increased by orders of magnitude since the advent of 3D seismic-based analyses. In high-cost deep-water exploration settings, insights derived from such analyses are critical to reduce risk with regard to reservoir presence and reservoir compartmentalization to ensure economic success. Depositional elements in settings such as shoreface, shelf, estuarine, and fluvial, as well as in carbonate environments also benefit greatly from 3D seismic analyses.

Common techniques for geologic visualization include 1) visualizing and illuminating stratigraphic horizons, 2) time slicing and flattened time slicing, 3) interval attribute analysis (including seismic waveform analysis), 4) voxbody interpretation and mapping, 5) 3D perspective rendering, and 6) opacity rendering. The key to successful application of this approach lies in the correct interpretation of geologically significant patterns revealed by these techniques. Workflows in conjunction with numerous examples from a variety of geologic settings will be shown.

*The two figures below both show the base Cretaceous unconformity from the same Canadian data set. This unconformity surface separates Cretaceous clastic sediments from underlying Devonian carbonate sediments*



*Figure 1. Coherence cube with illuminated horizons showing Cretaceous channels from the western Canadian sedimentary basin. The illuminated horizon, with time structure attribute draped on the surface, represents the base Cretaceous unconformity*



*Figure 2. Seismic amplitude section and base Cretaceous unconformity from the western Canadian sedimentary basin. With the two-way travel time draped on this horizon, the paleo-drainage of the basal Cretaceous is clearly shown.*