# DECEMBER 2008

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 Technical Lunch @ Omni | 10 Technical Breakfast @ Fugro<br>Technical Lunch @ Petroleum Club | 11 GSH Board Meeting<br>Multi-Component SIG at WesternGeco | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 CHRISTMAS DAY | 26 | 27 |
| 28 | 29 | 30 | 31 | JANUARY 1 Happy New Year | 2 | 3 |

# JANUARY 2009

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY |
|---|---|---|---|---|---|---|
| 4 | 5 | 6 | 7 Technical Breakfast | 8 | 9 | 10 |

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# Geophysical Society of Houston

VOL. 43, NO. 4 NEWSLETTER DECEMBER 2008

## Technical Luncheon

### The Same Talk, Two Locations

**Date 1**
**Date:** Tuesday, Dec. 9, 2008
**Time:** 11:30 a.m.
**Location 1:** Omni Palace (Salon A)
12121 Westheimer Rd.
Houston, TX 77077

**Date 2**
**Date:** Wednesday, Dec. 10, 2008
**Time:** 11:30 a.m.
**Location 2:** Petroleum Club
800 Bell St. (43rd Floor)
Houston, Texas 77002
Downtown Houston

**Register Online:** www.gshtx.org
**Cost:** $25/members pre-registered
$30/members nonregistered
$35/non-members

**Title:** ***"Seismic Attributes For Stratigraphic Feature Characterization"***

**Speaker:**
**Satinder Chopra**, *Manager*
*Reservoir Services*
*Arcis Corp., Calgary*

Technical Luncheon continued on page 14.

## Technical Breakfast

**Date:** Wednesday, Dec. 10, 2008
**Time:** 7:00 a.m. Social
7:30 a.m. Presentation
8:00 a.m. Q & A
**Location:** Fugro
6100 Hilcroft, Suite 100
Houston, TX 77274
**RSVP:** Liz Ivie at Fugro
713-369-5863
or livie@fugro.com
**Title:** ***"Reservoir-Prone Mass Transport and Slump Deposits"***

**Speaker:** **Dr. Trey Meckel**, *Woodside Energy (USA), Inc.*

**Abstract:**
Mass-transport deposits are common in the deepwater stratigraphic record, but are rarely considered to contain reservoir-quality sands. However, several recent publications have documented sand-prone mass flows and slumps, including reservoirs in prolific oil and gas fields, as well as shallow drilling hazards. These observations suggest that such remobilized sands are more common than previously suspected, and may be a more significant component of deepwater hydrocarbon systems than has been generally acknowledged.

Technical Breakfast continued on page 12.

## President's Column

*By George Marion, Past President*

**AN EXCITING CAREER and MONEY**

This is intended for those college students who are deciding on a career path, but you long-timers can read it too. Unfortunately, very few of the college students will be reading the GSH NEWSLETTER, because our membership are mostly working professionals, so your assignment is to pass this Newsletter to college students, college advisors, and guidance counselors.

Consider this a testimonial of sorts. I've been a professional for 31 years and I'm having so much fun that I'm looking forward to the next 31. That's no joke. I'm a consultant, so I don't have to retire. Why would I want to leave the party? Seriously, this career has been fun and there's no reason for it to end now. Why isn't everyone rushing to join the energy industry?

*"Join the Navy and See the World"* is a slogan that most everyone knows. After college I considered the Navy, for that very reason. The Navy offered to pay for my graduate degree in nuclear physics,

President's Column continued on page 6.

*Happy Holidays!*

## Inside This Issue

# GEOPHYSICAL SOCIETY OF HOUSTON

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# Editor's Note:

To ensure your information reaches the GSH society members in a timely manner it must appear in the appropriate newsletter issue. Please note the following deadlines and plan your function's publicity strategy accordingly. Items must be received on or before the corresponding deadline date. Please send any obituary or memorial articles of recently deceased members to Glenn Bear, editor, at glenn.w.bear@exxonmobil.com. If you have any questions please call Glenn Bear at 713/431-6583.

## 2008 GSH Newsletter Deadlines

Issue.....January 2008
Deadline..... December 1, 2008

Issue..... February 2008
Deadline.....January 2, 2008

## Announcements

**Technical Lunch 1**
@ Omni
Tues., December 9

**Technical Lunch 2**
@ Petroleum Club
Wed., December 10

**Technical Breakfast**
@ Fugro
Wed., December 10, 2008

**Multi-Component SIG**
@ WesternGeco
Wed., December 11

# January Technical Breakfast

**Date:** Wednesday, January 7, 2008

**Time:** 7:00 a.m. Social
7:30 a.m. Presentation
8:00 a.m. Q & A

**Location:** Fugro
6100 Hilcroft, Suite 100
Houston, TX 77274

**RSVP to:** Liz Ivie at Fugro
713-369-5863 or
livie@fugro.com

**Title:** ***"The Kaleidoscope Project: Breaking the Sound Barrier in Seismic Imaging"***

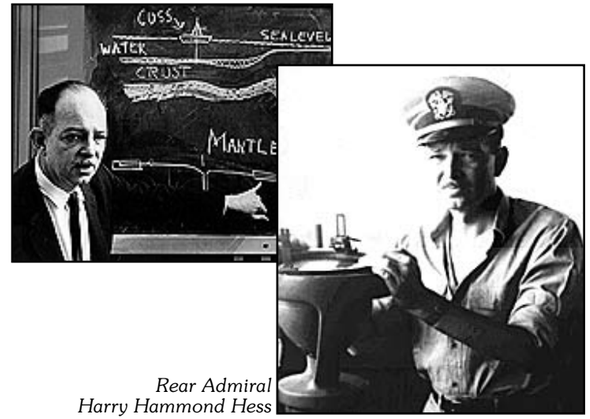
**Speaker: Francisco Ortigosa**, *Repsol*

**Abstract:**
The subsalt exploration targets in the deep waters of the Gulf of Mexico have changed through time following maturation of new geological play concepts closely related to the evolution of seismic imaging algorithms. Current seismic imaging technology is not yet good enough to image properly the geological structures below the salt. Reverse Time Migration (RTM) is the imaging technology expected to fulfill the demands of the existing exploration challenges.

January Technical Breakfast continued on page 17.

# Item of Interest...

In 1962, Harry Hess published a paper entitled, *"The History of Ocean Basins"*, which was a follow up to a widely circulated report to the Office of Naval Research. He advanced the theory that there was sea floor spreading away from the mid Atlantic Ridge. Hess's work triggered a scientific revolution in earth science, resulting in the modern concept of Plate Tectonics.




*Rear Admiral*
*Harry Hammond Hess*

Harry Hammond Hess was born May 24, 1906. After two years in Electrical Engineering at Yale, he shifted to Geology and received a B.S. degree in 1927. After two years as an Exploration geologist in Rhodesia, he completed his graduate work at Princeton where he received a doctorate degree. He joined the faculty at Princeton in 1934 and remained there for the rest of his career. He joined the U. S. Navy during WWII where he served as Captain of the USS Cape Johnson. He modified the fathometer to profile the trips across the Pacific. Those profiles resulted in the discovery of many flat topped sub sea volcanoes that Hess called guyots. He stayed in the Naval Reserve and rose to the rank of Rear Admiral.

# Book/Subject Review of Seismic/Sequence Stratigraphy, Part 2

*By Dan Heinze*

The usefulness of sequence stratigraphy was underscored at the June 2008 EAGE meeting in Rome by Exxon Mobil Executive VP, Johnny Hall, where in his keynote address at the awards banquet, he identified it as one of the three most important oil finding methodologies to emerge in the past ten years.

Sequence Stratigraphy by Emery and Myers (1996) and Principles of Sequence Stratigraphy by Catuneanu (2006) are bookends in this historical development. The earlier of these two well written texts was the first reasonably complete account of this newly emergent discipline and the latter represents a more systematic and comprehensive handling of the now more mature but still rapidly developing field.

Both of these books do an excellent job of achieving their authors' objectives. Sequence Stratigraphy by Emery and Myers (1996) is essentially an upgrade and formalization of the text of an oil company's (BP's) training course. As such it assumes a good bit of geologic background. It is well organized and loaded with relevant concepts, concisely described and illustrated with many helpful graphics and real world examples. It does tend to be written from a single point of view of the subject but it is not as tightly integrated as an academic text, perhaps because its chapters were written by several different authors. This book was my first significant exposure to sequence stratigraphy and was an effective and efficient means to come up to speed on the subject.

Principles of Sequence Stratigraphy by Catuneanu (2006) is consciously an academic text, thoroughly and systematically laying the historical and conceptual background of the discipline. It then does an excellent job of leading the reader through the why's and how's of applying sequence stratigraphy with many well executed graphics and clear field examples, the vast majority of which are from the oil industry. This text has the advantages of not only ten years of development in the field but now also, the almost ubiquitous availability of 3D seismic for the further refinement of sequence stratigraphy and its illustration. Extensive material is presented on applicability and relevance to industry problems, especially in the chapter on "systems tracts". This text, I believe successfully, also tries to evenhandedly recount the major competing models of sequence stratigraphy. In his summary Catuneanu concludes that they all are valid in their appropriate context and suggests directions that would lead to their synthesis.

The first major step in this direction has just been made: Towards the Standardization of Sequence Stratigraphy (in press); O. Catuneanu, V. Abreu, J.P. Bhattacharya, M.D. Blum, R.W. Dalrymple, P.G. Eriksson, C.R. Fielding, W.L. Fisher, W.E. Galloway, M.R. Gibling, K.A. Giles, J.M. Holbrook, R. Jordan, C.G.St.C. Kendall, B. Macurda, O.J. Martinsen, A.D. Miall, J.E. Neal, D. Nummedal, L. Pomar, H.W. Posamentier, B.R. Pratt, J.F. Sarg, K.W. Shanley, R.J. Steel, A. Strasser, M.E. Tucker and C. Winker. Earth-Science Reviews.

From my start as a neophyte, I would have been aided in both books by a glossary, especially of geologic terms, since most of my experience is in geophysics, specifically seismic imaging.

As usual with a breakthrough technology, the historical reviews in both texts point to a long history of insightful, even visionary work by many in academia and industry. These earlier efforts pointed to but did not quite capture the revolutionary core of seismic stratigraphy as it emerged in the 1970's and sequence stratigraphy as it developed into the 1980's. I would like to point out two groups, however, that were critical in bringing seismic/


sequence stratigraphy to the forefront of industry awareness: the Exxon group (Vail et al., 1977, AAPG Memoir 26; Sarg, 1988, SEPM Spec. Pub. 42, p 155; Van Wagoner et al., 1990, AAPG Methods in Exploration Series #7) and the BP group of Sequence Stratigraphy by Emery and Myers (1996). Even the differences between these two models of sequence stratigraphy were part of the rich development and usefulness that has subsequently flourished. I believe this is one more example of how the sharing of technology by larger oil industry companies improves their technology by independent, outside scrutiny and makes the whole industry advance more rapidly.

*As I enjoyed soaking in this material, an application to crustal imaging occurred to me:* A foundation of sequence stratigraphy is the prediction that the facies change laterally is incrementally related to the facies change vertically within each "systems tract" of a "stratigraphic sequence". Therefore once a sequence stratigraphy interpretation has been made, assuming it is correct, these facies gradients and their directions could be useful in further constraining velocity and other physical parameter inversions in seismic and electromagnetic processing. Such inversions may of course also feed back into sequence stratigraphy, reducing the likelihood of or perhaps even excluding certain interpretations.

*The third and last part of this review of seismic/sequence stratigraphy will focus on additional texts that add more detail or wider breadth to the subject.*

President's Column continued from page 1.

which was a serious option as my degree was in physics. But then I realized that if I did my graduate work in Geophysics, that I could "Join an Oil Company and Get Paid to See the World." That's a better deal. I've been paid handsomely to live and work (not just visit) in eight states and nine nations, and in the process I've visited several others. I know others who've traveled a lot more than that. Some of you may not want to travel. Fine. There are jobs in all companies that don't transfer. But for those of you who want to see the world, the best way is to get paid to travel. I started my career with Chevron. Chevron paid me a "hardship" bonus to live in Perth, Australia for one year and work all over the "out back" of Western Australia and South Australia. How great is that? Another great assignment was when Chevron essentially doubled my salary to live in Khartoum, Sudan and oversee geophysical operations in the Sudd. While in Sudan I'd pass spare time by hanging out at the bar at the Grand Hotel, over looking the Blue Nile (the White Nile was on the other side of town) and would talk with guys who were going South on safari. These guys were paying a prince's ransom for the privilege of going to the same area that I got paid to visit. I'm telling you, this can be a great job! What other industry does this? Well, the CIA, but then you can't talk about your experiences.

Have you read Moby Dick, or Omoo or Typee? Why do I ask? Because Herman Melville went on one whaling trip and wrote three novels from the adventure. There are a lot of us who could write novels from our travels, if we were inclined to write novels. That's another opportunity which can come out of a career in the energy industry.

What are you college students waiting for? Have you been frightened by the "feast and famine" nature of the energy business? Don't be. There are opportunities during an "up" cycle, and there are opportunities during a "down" cycle. Just plan for a cycle and be versatile enough to take advantage of the opportunities in change. Remember that all modern civilizations live on energy consumption, so there will always be another "up" cycle. Think of it as a roller coaster ride, and remember that people stand in line and pay good money for the privilege of riding the roller coaster. I said it was an exciting career in the title.

Those of you who have bright ideas and want to create new technology, consider that some energy companies have budgets larger than some nations' GNP. They promote new technology as a means for staying successful. The point is that energy companies can fund big projects and push applied physics which means you can do applied research. We do projects every year that are the equivalent of a graduate degree.

Do you feel that "Big Oil" has a poor environmental image? I claim that image is wrong, but if you feel that way, then there are jobs in Energy in alternative sources, such as wind, solar, tidal, and/or geothermal. And all forms of energy need environmental advisors, so that's another way to have a "green" position in the energy industry.

You can make a career in the energy industry be just about anything you want it to be.

By the time this gets to print, the SEG Annual Meeting in Las Vegas will be past, so, start now planning to attend the SEG Annual Meeting 2009 in Houston and go by The Living Legends booth (I'm not one of them) and talk with which ever Legend is there. I'm betting that all of the Legends will expand on what I said about a career in the energy industry being a great choice of careers.

Last month Jackie Ming wrote the President's Column. We have different ways of phrasing it, but we both are saying that there are good opportunities for long, enjoyable careers in the energy industry. This industry allows one to have as exciting a career as one chooses. It's great.

**Professional Society**

Once upon a time, one could get a job out of college and reasonably expect to work an entire career at that company. Now it's more typical for one to change companies every five years or so. This makes having a professional membership even more important because the Society becomes the common thread that will span the entire professional career. If you're a member, thanks, and please actively participate. If you know someone who isn't a member, tell them how great GSH is and that they can apply online at www.gshtx.org.

**Corporate Relations Committee**

Money. I finally get to a topic that is of interest to all. I don't have to tell anyone in the business world that a cash flow is needed to stay in business. A Professional Society is the same. We have to have a steady cash flow from our membership and from companies within our industry who support forward-thinking advancements to keep our workers on the leading edge of the industry. One way to support the GSH is to encourage employees to attend the events, such as the Technical Breakfasts, Technical Luncheons, DISC, Symposium, etc. Give them time to attend and encourage them to expand their knowledge. Enlightened employees are good for the company. Another way to support the GSH is via cash sponsorships. The GSH is working to form contacts with companies so that they can include sponsorships in their annual budget. You'll be hearing more on this from the GSH Corporate Relations Committee, which is co-chaired this year by Past President George Marion and Past 2nd VP Haynie Stringer.

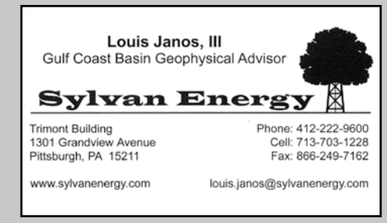
**Calendar of Events:**

December events are clearly listed in the Newsletter and on the GSH web site. GSH will send emailed reminders to those who are listed with GSH. If you are not getting emailed reminders, please send an email to Lilly Hargrave at GSH office and ask to be added to the list.

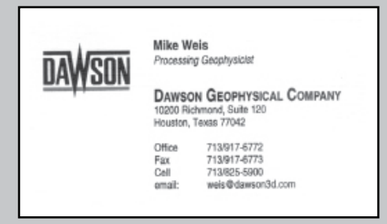


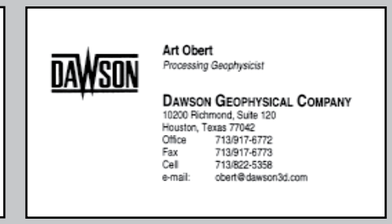
# . . . Here's My Card . . .





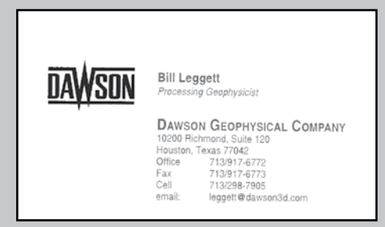




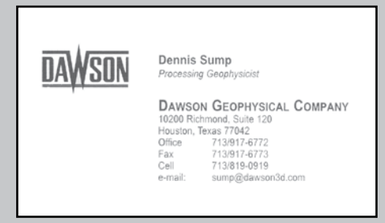





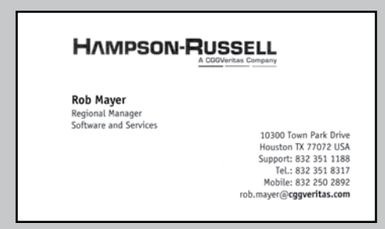




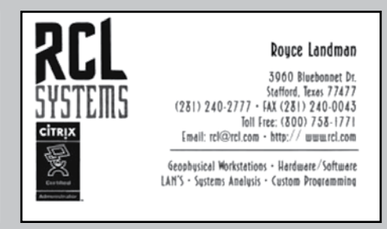








# Items of Interest...

**By Lee Lawyer**

## The Poulter Method

Thomas C. Poulter was the Scientific Director of the Armour Institute at the University of Illinois at Chicago when he created the Antarctic snow cruiser (a.k.a. "Penguin 1").

While he was a a physics professor at Iowa Wesleyan College he recognized James Van Allen as a student and put him to work, at 35 cents an hour, preparing seismic and magnetic equipment for the Antarctic Expedition.

He was second in command on the Second Byrd Antarctic Mission to the South Pole with Richard E. Byrd. The Poulter Glacier was named after him by Admiral Byrd, as were the Poulter Research Laboratories at the Stanford Research Institute (SRI).

In 1948 he joined SRI in Menlo Park, California, where he remained until his death in 1978. While at SRI he did research involving dynamic phenomena of explosives. His paper, "The Poulter Seismic Method of Geophysical Exploration" was printed by Geophysics as a Silver Anniversary Classic. Poulter was trying primarily to measure the thickness of ice sheets.

The Poulter method involves placing small explosive charges a few feet above the ground, usually in patterns. Charge sizes vary but two pounds/shot are common with as many as 36 shots per pattern. The method is used in remote areas, such as the Rockies, where normal seismic operations are difficult and environmental considerations are a high priority.

## SOFAR & SOSUS

In the early 1940's, the U. S. Navy was experiencing difficulties with its sonar equipment. The Navy asked Maurice Ewing and J. Lamar Worzel to investigate. They discovered that temperature effects were bending the sound waves in such a way as to create a "shadow zone" - a region in which sonar transmissions went undetected. This discovery had enormous implications for submarine warfare in that a submarine could "hide" beneath it.

Moreover, Ewing and Worzel discovered that sound waves could be focused into a narrow region, in which they traveled for great distances. They called this phenomenon sound channeling, and it became the basis for SOFAR (Sound Fixing and Ranging), which the Navy used during the war to locate downed airmen and SOSUS (Sound Surveillance System), the navy's Cold War Underwater acoustic array established to detect Soviet submarines.



January Technical Breakfast continued from page 3.

Seismic imaging improvement largely depends on compute power and on the correct implementation on the hardware of the algorithms used for processing. The evolution of imaging algorithms has largely depended upon the evolution of hardware. In fact, during the last eight years, the computing power needed for seismic imaging in the oil industry has increased by two orders of magnitude, and the storage requirements, and therefore I/O needs, have increased by three orders of magnitude.

Seismic Imaging has evolved very fast due to the astonishing price/performance characteristics of Commodity Off-the-Shelf (COTS) Technology High Performance Computing (HPC) that made Linux PC Clusters affordable during the last decade. However, the hardware technology that favored the seismic imaging revolution has hit the power wall when it is most needed, i.e. when RTM is the next chapter in the evolution of seismic imaging. New hardware alternatives like FPGA's, GPGPU's and heterogeneous multicore processors (Cell/B.E.) are constantly scrutinized as the replacement of the homogeneous processor technology. However, there is no clear consensus about the path to follow and there are currently several initiatives in the industry.

The Kaleidoscope Project is a "dream team" partnership of top geophysicists, computer scientists and organizations from around the world that are creating a major advance in computerized techniques for seismic imaging. The Kaleidoscope Project now makes possible the full realization of the next generation seismic imaging technology that accelerates and streamlines oil and gas exploration. The algorithms being developed are tailored to the new generation of IBM's Cell/B.E. processors. Project benchmarks show that the Cell/B.E. processors perform the computation of RTM algorithms one order of magnitude faster than leading brand processors.

**Biography:**

Francisco Ortigosa is Director of Geophysics at Repsol. Francisco has dedicated 21 years to the petroleum industry holding geophysics related positions in Spain, Venezuela, Colombia, Russia, Kazakhstan, Egypt and currently USA. He is particularly focused on the value added to the E&P Business by new technologies in the field of Geophysics.

Recently he has created the Kaleidoscope Project that has been awarded by IEEE Spectrum as one of the most innovative projects for 2008. The Kaleidoscope Project is also finalist for the Petroleum Economist awards 2008, Project Innovation of the Year.

Francisco has authored or coauthored numerous technical papers presented in International Conferences. Francisco is affiliated with the SEG, EAGE and AAPG.



**GSH MEMBERSHIP REPORT**

As of November 8, 2008

| | |
|---|---|
| Active | 783 |
| Associate | 150 |
| FT Students | 4 |
| Emeritus | 51 |
| Honorary | 28 |
| Lifetime | 29 |
| Total | 1045 |

# Geoscience Day 2008
## *The Life of an Oilfield*

Geoscience Day 2008, jointly sponsored by the Geophysical Society of Houston and the Houston Geological Society, was held at the University of Texas' Bureau of Economic Geology facility in northwest Houston on October 23. This yearly educational event focuses on introducing industry new hires to areas of the business that they may not normally experience with the goals of showing how their work fits into the greater picture and creating enthusiasm for the geo-scientific workplace.

Approximately 90 students attended the event which was composed of 4 main track sessions on the life of an oilfield from the first geologic idea through development and production and retirement decisions. The main track was supplemented by related break-out sessions which focused on a particular subject. The attendees were able to choose from a selection of several presentations at each break-out period based on their interest. Technical and non-technical sessions were available to accommodate everyone's interest.

### Main Track Sessions:

* Geologic Idea to Lease Acquisition * Prospect to Drill Site * Drilling * Development and Production

### Break-out Sessions:

* **Seismic Acquisition** - Field demonstration of an operating vibroseis truck and geophone spread with actual recording.
* **Seismic Processing** - How field shot records are processed to remove noise, stacked and migrated to generate a final volume ready for interpretation.
* **3D Visualization** - This presentation illustrated how new automated techniques, which enable geoscientists to more fully exploit the available information within 3D seismic data, are applied to a complex fault system within the Gulf of Mexico.
* **Well Logging** - A real-time demonstration of a logging operation including logging truck, tools, acquisition and related wireline logging technologies.
* **Core (Rock) Discussion** - The various analyses that can be performed on cores and cuttings in order to better understand a reservoir and how critical it is to integrate the study of rock material (core and cuttings) with other indirectly derived data (seismic, geophysical logs, etc.).
* **Fracturing and Monitoring** - How microseismic and tiltmeter monitoring provide methods to achieve some degree of observation capability of induced fracturing to improve oil production.
* **Tools of the Trade** - Docents explained several current tools used in the industry such as GIS mapping, air guns, streamer cables & birds used in marine seismic acquisition.
* **Politics of Oil** - The history and projected future for the world oil market and the supply and demand balance between the countries who have oil and those who need it.
* **Geophysical Society of Houston Museum Tour** - A bit of history of geophysical tools and how they were used to find oil and gas on a docent led tour.

### *Thanks To All The Presenters and Their Companies:*

| | | |
|---|---|---|
| *Jerry Coggins* | Geologic Idea to Lease | Shell |
| *Daniel Lanier* | Prospect to Drill Site | Geoscience Earth & Marine Services |
| *Keith Grimes* | Drilling | Hamilton Group |
| *Laurel Gandler* | Development & Production | Hess |
| *Laurie Geiger* | Seismic Processing | TGS |
| *Norm Warpinski* | Monitoring & Fracturing | Pinnacle Technologies |
| *Arthur Berman* | Politics of Oil | Consultant |
| *Beverly DeJarnett* | Core Discussion | Bureau of Economic Geology |
| *Les Denham* | Museum Tour | Interactive Interpretation & Training |

### *Thanks To Our Demonstrators:*

| | |
|---|---|
| *Global Geophysical* | Seismic Acquisition Demonstration |
| *Schlumberger* | Well Logging Demonstration |
| *Paradigm* | 3D Visualization Demonstration |
| *ION* | Marine Seismic Cable Display |
| *Seismic Exchange* | GIS Demonstration & Historical Films |
| *Buckley Powder* | Explosives display |

Technical Luncheon continued from page 1.

Seismic attributes are used to extract information from seismic reflection data. Such attributes can be used for both quantitative and qualitative interpretation. Some attributes such as seismic amplitude, envelope, RMS amplitude, spectral magnitude, acoustic impedance, elastic impedance, and AVO measures are directly sensitive to changes in seismic impedance. Other attributes such as peak-to-trough thickness, peak frequency, and bandwidth are sensitive to layer thicknesses. Both of these classes of attributes can be quantitatively correlated to well control using multivariate analysis, geostatistics, or neural networks. Seismic attributes such as coherence, Sobel filter edge detectors, amplitude gradients, dip-azimuth, curvature, and gray-level co-occurrence matrix texture attributes provide images that allow interpreters to qualitatively use geologic models of structural deformation, seismic stratigraphy, and seismic geomorphology to infer the presence of fractures or the likelihood of encountering sand-prone facies.

In order to extract accurate information from seismic attributes, the input seismic data must be optimally processed. The term 'optimally' essentially means that any distortion is minimized or removed during processing. In practice, the resulting pre-stack or poststack data will still show a certain amount of left-over "noise". This noise might include acquisition related artifacts, processing artifacts and random noise. In this presentation we focus our attention on conditioning such data for the derivation of attributes. We also discuss some of the procedural steps for noise filtering and dip-steering options for computation of some geometric attributes like coherence and curvature. Finally in this context, we also discuss the impact the choice of algorithm can have on the final results. All these factors ensure that the seismic attributes yield more accurate information for interpretation.

Examples will be presented for the application of curvature and coherence attributes to 3D seismic volumes. These examples illustrate the use of these attributes to aid the geophysicist in making more accurate interpretations. Finally we'll provide an update on emerging trends in attribute research and discuss the directions in which seismic attributes are headed.

**Biography:**
Satinder Chopra received MS and M.Phil. degrees in physics from Himachal Pradesh University, Shimla, India. He joined the Oil and Natural Gas Corporation Limited (ONGC) of India in 1984 and served there until 1997. In 1998 he joined CTC Pulsonic in Calgary, which later became Scott Pickford and Core Laboratories Reservoir Technologies. Currently, he is working as Manager, Reservoir Services at Arcis Corporation, Calgary.

In the last 24 years Satinder has worked in regular seismic processing, and interactive interpretation, but has spent more time in special processing of seismic data involving seismic attributes including coherence and textures, seismic inversion, AVO, VSP processing and frequency enhancement of seismic data. His research interests focus on techniques that are aimed at characterization of reservoirs. He has published 5 books and more than 12 dozen papers and abstracts and likes to make presentations at any beckoning opportunity.

Satinder is a member of the SEG 'The Leading Edge' Editorial Board, is the editor of the CSEG RECORDER and the Ex-Chairman of the SEG Publications Committee. He received several awards at ONGC, and more recently has received the 'Best Poster' Award for his poster entitled 'Seismic attributes for fault/fracture characterization' that he presented at the 2007 SEG Convention. He received the 2007 'Best Paper' Award for his paper entitled 'Curvature and iconic Coherence-Attributes adding value to 3D Seismic Data Interpretation' presented at the CSEG Technical Luncheon, Calgary in January 2007 as well as the 2005 CSEG Meritorious Services Award. He and his colleagues have received the CSEG Best Poster Awards in successive years from 2002 to 2005. He is a member of SEG, CSEG, CSPG, EAGE, AAPG, APEGGA (Association of Professional Engineers, Geologists and Geophysicists of Alberta) and TBPG (Texas Board of Professional Geoscientists).





# Geoscience Day 2008

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Technical Breakfast continued from page 1.

Given that such 'degradational' reservoirs are not uncommon in nature, identifying and characterizing them accurately is critical, but can be controversial. For instance, understanding whether a reservoir is in a mass-transport deposit or a turbidite system can have dramatic implications in terms of understanding reservoir potential and spatial distribution, and in terms of generating models with representative rock properties away from control points. These implications become increasingly important given ever-increasing costs associated with the development of deepwater fields. Moreover, this underappreciated play type provides potential green- and brownfield exploration potential in many continental slope trends.

This presentation will use examples from producing fields, the seafloor and shallow subsurface, outcrop, and flume tank experiments to illustrate specific criteria that aid in the recognition of sand-prone mass-transport deposits in the subsurface. None of these criteria is probably sufficient by itself to distinguish between a mass-transport deposit and a turbidite system; however, in aggregate, these criteria are sufficiently diagnostic to identify mass-transport deposits that are likely to be reservoir-prone.

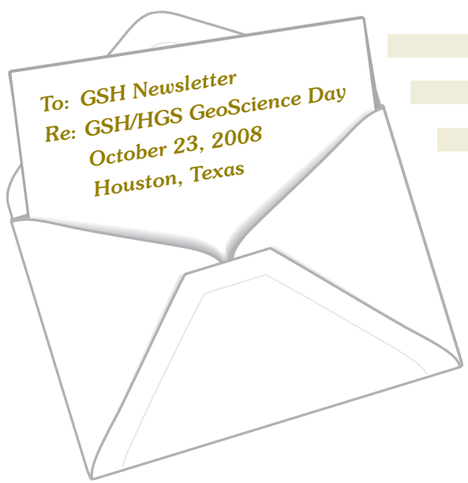
**Biography:**

Dr. Lawrence D. Meckel, III (Trey) is the Chief Geologist of Woodside Energy USA. Previously, he was the Coordinator of Reservoir Modelling and Geoscience Technology at Woodside Energy Ltd. in Perth, Australia. He specializes in integrated depositional systems analysis, sequence stratigraphy, and risk assessment.

With Woodside, and previously with Shell International E&P, Trey has been involved in research, exploration, development, and production projects in the Gulf of Mexico, West Africa, Australia, New Zealand, Malaysia, West of Shetlands, and South America, as well as onshore developments on the Texas Gulf Coast and the Anadarko Basin.

Trey received a PhD in earth sciences from the Swiss Federal Institute of Technology (ETH-Zürich), an MA in Geology from The University of Texas at Austin, and a BA with honors in Geology from Williams College in Massachusetts.

Among his numerous papers and presentations, he won the New Orleans Geological Society's 2002-2003 Best Paper Award. Next year, Trey is convening an AAPG Hedberg Research Conference on deepwater foldbelts.




On October 23rd, 2008 the second annual GSH/HGS Geoscience Day was held at the UT Bureau of Economic Geologic (BEG) Houston Research Center.

For people new to the seismic world, but not new to the oil and gas industry, this was an excellent event. The full-day program covered so-called main track courses (lectures) encompassing topics ranging from the initial geologic concept, to lease acquisition, through the development of prospects to drill, and finally field development and production. It also provided the attendees with individual break-out sessions. Participants were able to choose topics of particular interest from the extensive offering of sessions. These included sessions on seismic acquisition, seismic processing, 3D visualization, displays of industry tools, and even discussions of the politics of today's oil industry both in the United States and in the worldwide arena.

I particularly enjoyed the seismic processing break-out session. The speaker, Laurie Geiger – an Advising Geophysicist at TGS, was able to explain all the "buzzwords" (source, receiver, noise attenuation, velocity model, time & depth migration, and many more) in use within the industry in a fun presentation that made the topic understandable to laymen.

Overall, the event provided me with a greater understanding of the seismic domain of knowledge, the geological and geophysical methods currently used in the market, and how we apply all of these in the life of an oilfield from prospect to retirement.

It was also an excellent occasion to meet and mingle with my counterparts and/or clients in the industry. The food was great. The presentations were well prepared and delivered in an admirable facility. Kudos and many thanks to everyone involved, especially to those involved in the overall organization of this event.

*See you next year!*
**Mike Zyglicki**
**PGS Data Processing, Houston**



# MULTI-COMPONENT SIG

**Date:** December 11, 2008

**Time:** 5:30 p.m. to 6:30 p.m.

**Location:** WesternGeco Richmond Campus
Q-Auditorium
10001 Richmond Ave.
Houston, TX 77042

**Speaker:** **Dr. Leon Thomsen,** *Delta Geophysics*
*( SEG President, 2006-2007 )*

**Topic:** ***"The Fluid Dependence of Seismic Anisotropy"***

**Abstract:**

All exploration geophysicists know of the work of Biot and Gassmann, which established the fluid dependence of the bulk modulus and the shear modulus of isotropic elastic media. But, few know of the extensions of this work to anisotropic media. In fact, both Biot and Gassmann treated this subject, but subject to restrictive assumptions, so these works are not well known. Brown and Korringa provided a clean derivation, free of objectional assumptions, but the implications for the seismic anisotropy parameters epsilon, delta, and gamma were not spelled out. Here we present those implications explicitly.

**Biography:**

Leon Thomsen holds titles of Scientist for Delta Geophysics, Executive Advisor for KMS Technologies-KJT Enterprises Inc., and Visiting Scientist for Lawrence Berkeley National Laboratory. He holds a B.S. in geophysics from California Institute of Technology (Pasadena), and a Ph.D. in geophysics from Columbia University (New York). He held postdoctoral positions at Centre Nationale de la Recherche Scientifique (Paris), International Business Machines (Palo Alto), and Caltech. He was Assistant, then Associate Professor at the State University of New York (Binghamton), with sabbatical positions at Goddard Institute for Space Studies (New York) and the Australian National University (Canberra).

Leon's industrial career began in 1980, at Amoco's famous research center in Tulsa, where he was the Amoco inventor of what we now call seismic AVO. He led significant revisions to the exploration seismic paradigm, helping to establish the basic ideas of polar anisotropy and azimuthal anisotropy. His 1986 paper, establishing the modern field of seismic anisotropy, is the single-most-cited paper in the history of Geophysics; a recent Google of the term 'Thomsen parameter' returned over 600,000 hits. In 1995, he moved to Amoco's Worldwide Exploration Group in Houston, where his 1997 paper established the modern field of converted-wave exploration, defining such concepts as "C-waves", "registration", "gamma-effective", "diodic velocity", etc.

As Principal Geophysicist (and Senior Advisor, following the BP-Amoco merger), he had the opportunity to investigate unconventional topics in geophysics; this led him, beginning in 2002 to CSEM. Working together with KMST, BP acquired and processed the world's first successful at-scale tCSEMTM survey. In 2008, Leon retired from BP, and established Delta Geophysics.

Leon has served the Society of Exploration Geophysics as Chair of several committees, as Distinguished Lecturer, Distinguished Instructor, Vice-President, and President (2006-07). He holds the SEG's Fessenden Award, and the Russian Academy of Natural Sciences' Kapitsa Medal. He is an Honorary Member of the Geophysical Society of Houston, and of the European Association of Geoscientists, and a Foreign Member of the RNAS.