

HGS Bulletin

Volume 57, Number 5

Houston Geological Society

January 2015



Brian Lock
University of Louisiana at Lafayette



Chris Zahm
University of Texas

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Monday, January 19

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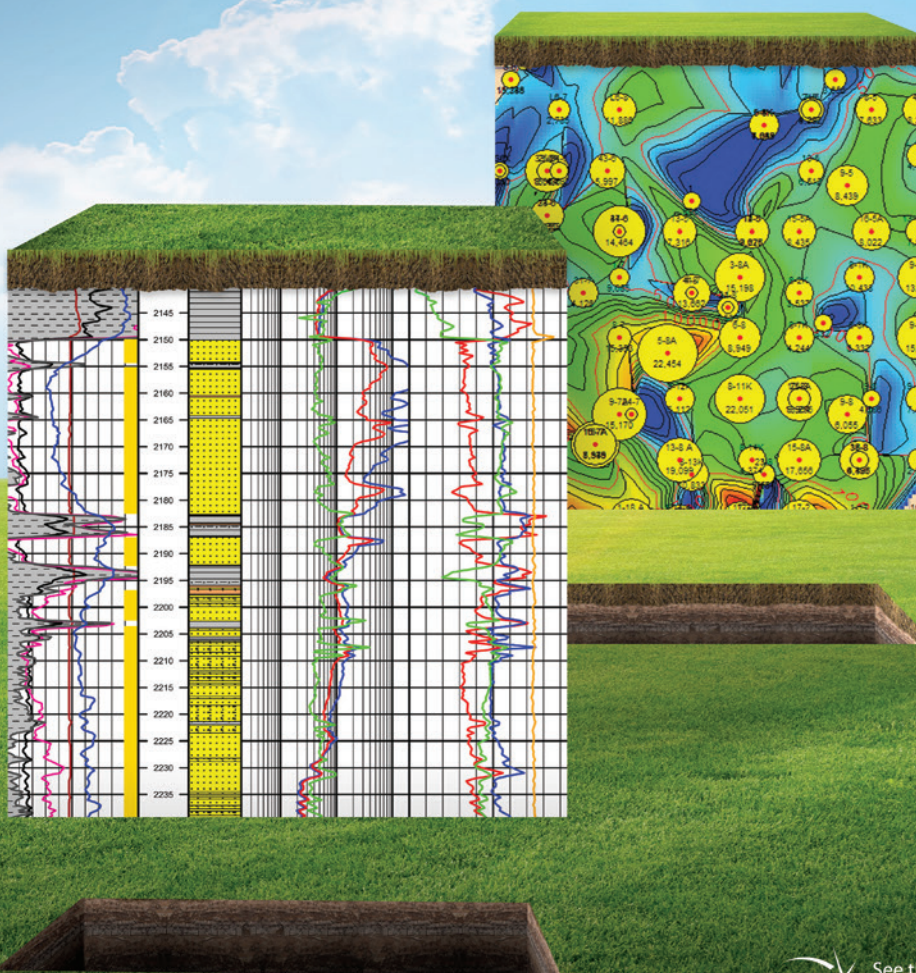
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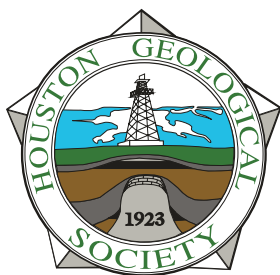
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The Bulletin

Houston Geological Society

Volume 57, Number 5

January 2015

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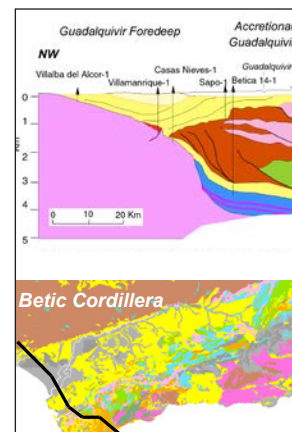
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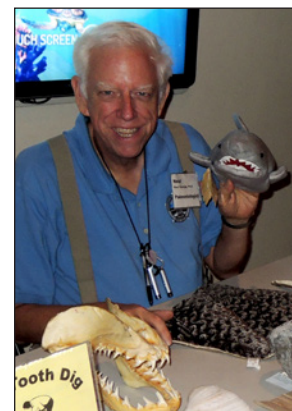
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About the Cover: Courtesy of Ashley Garcia.



The 14th PESGB/HGS Conference on African E & P

Business Design Centre, Islington, London
3-4 September 2015

Image courtesy of © Sasol

Second Announcement & Call for Papers

This annual conference, alternating between London and Houston has established itself as the primary technical E & P conference on Africa, with attendances in recent years reaching over 600, including operators, consultants, governments and academia. There will be a large poster programme in addition to the oral programme of about 25 high quality talks covering E & P in all regions of Africa.

The main conference committee for the 2015 London event will include Ray Bate (Chairman), Duncan Macgregor, Richard Dixon, Kevin Dale, Sean Akinwale and Ian Poyntz.

Theme 1 : New Exploration Hotspots, Discoveries and Prospects

Session Chair : Harry Davis (Delonex)

Includes keynotes by John Austin (OMV and past PESGB president) and Ian Cloke (Exploration Director, Tullow), plus exploration performance review by Richmond Energy

Theme 2 : New Kitchens - Geodynamics, Heat Flow and Source Rock Modelling

Session Chair : Helen Doran (Ophir)

Includes opening keynote by Prof. Andy Nyblade (Pennstate University) and Tullow/ ENI papers on East Africa on/offshore basin modelling

Theme 3 : New Insights on Trap Types and Imaging

Session Chair : Jerry Jarvis (Tullow)

Includes Tullow on Ghana and ENI on Western Desert

Theme 4 : New Reservoirs : Curious Carbonates and Challenging Clastics

Session Chair : Fabio Lotarolli (ENI)

Includes Mozambique thin bedded reservoirs by Sasol and Kenyan carbonates by BG

Interactive Session : Seismic Workshop

Session Chair : Patrick Coole (PGS)

Ongoing through conference, format will be announced in due course

Abstracts (up to 2 pages and can include diagrams) should be sent as soon as possible and no later than 15 March 2015 to Bethany Parkinson at bethany@pesgb.org.uk. Extended abstracts are normally written once your paper is accepted and are issued on a conference CD. Details of sponsorship opportunities and exhibition booths are available from bethany@pesgb.org.uk

Registration will open on 23 March 2015

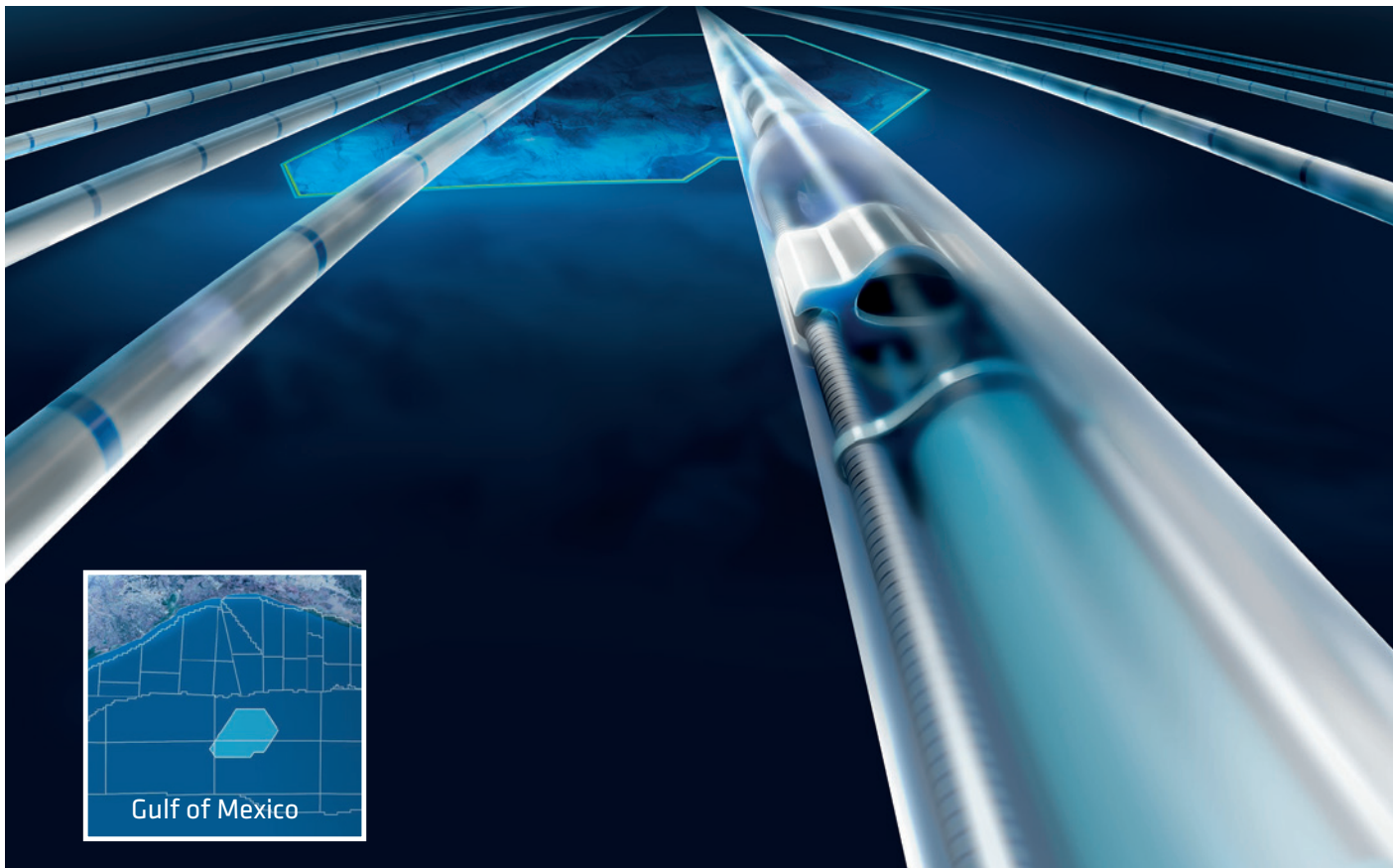
Early bird rates will be available

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Educational Outreach	Jennifer Burton	832-607-0074	jlbgeo@comcast.net	D2
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Foundation Fund	John Adamick	713-860-2114	john.adamick@tgs.com	PE
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Government Affairs	Henry Wise/Arlin Howles	281-242-7190/281-753-9876	hmwise@yahoo.com/tidenv@yahoo.com	D4
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Presidential Ponderings

Greetings and Happy New Year! The New Year brings us new opportunities, new decisions, and new ponderings. As I write this column, oil prices are hovering around \$75 per barrel. I paid \$2.69 for gas yesterday at my local station. Offshore drilling companies are stacking rigs. Companies are talking about reducing unconventional efforts because costs are not dropping in line with product prices. We will know next month what we had to be thankful for in November, 2014. The month after that we can ponder our 2014 Christmas season. Then by March we will see what early 2015 brought to the table. On the bright side, the cold and snow may do nice things for natural gas.

The HGS Board has been busy this past calendar year. The Office Committee and the Web Site Committee are to be commended on the work that they did in filling the two staff positions that became vacant. The directors are reviewing policy manuals, employee benefits, and officer guide books. Although it has been just a few years for some updates, the officer guidebooks have not been updated in nearly 10 years.

HGS is a Gold-Level sponsor for the AAPG Imperial Barrel Award (IBA). As such, we can nominate a member to serve as a judge for the Gulf Coast event.

If you are an independent with a knowledge of basin analysis, play to prospect evaluation, and willing to spend a day or two evaluating exploration team presentations, this may interest you. **Shawn Kushiya** is coordinating this effort for HGS. On that topic, this month's General Dinner Meeting is our Legend's recognition night. We will be honoring two Gulf Coast professors who have guided teams to the pinnacle of success in this event and placed first at the global IBA. I hope that you signed up for this!

This month Nominations Committee Chairman **Barry Katz** presents the candidates for office to the HGS Board. Not only is his committee responsible for getting candidates for HGS office; it also must get candidates for the AAPG House of Delegates. House of Delegates Chairman **Paul Babcock** and his fellow delegates are reviewing the AAPG Houston membership list as I write. Houston area members who have not renewed their dues have been suspended from active membership in AAPG. This reduces HGS membership and could reduce the number of delegates that we have. If you use AAPG insurance, your loss of active membership could affect your coverage! While you are renewing your AAPG membership, check out your HGS membership too. Add a picture to the directory, become a Friend of the Foundations, register for an event, and sign up for a committee.

Each year HGS loses members who forget to renew. Come October 1, those members get dropped from the HGS *Bulletin* mailing list. They won't be receiving this bulletin or reading this column unless they go online. I encourage you to ask your coworkers if they are HGS members and get them to join if they are not. Serving as a sponsor for a new young professional is a great way to encourage them to participate in the world's largest local professional geological society!

Young professionals, have you taken an experienced professional to an HGS meeting? Have you made active participation in HGS part of your career development plan?

There is no *Look Back in Time* this month; I didn't, so I have nothing to write about that subject. Jill did tell me that I had her start date wrong and I said that I would correct that. She started in September 2012. I seem to have pondered my morning away so until next month... ■

*On that topic, this month's
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two Gulf Coast professors
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Dave Miller
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Random Thoughts

I am writing this column about 10 days before Thanksgiving. This is, by far, my favorite holiday of the year. I enjoy the time that I am able to spend with family and friends, free from the giving and receiving of gifts, and the opportunity to reflect on what I am thankful for. Recent events in my life have shown me that it is very important to let the people you are thankful to have in your life know this. Don't wait until it is too late and you find yourself wishing that you had said or done something. I hope that all of you were able to enjoy the holiday in the company of the people that are important to you.

Typically I "write" my columns in my mind well before actually committing my thoughts to paper (digits?). This month, I have "written" volumes and still cannot arrive at a result that I am happy with. As I am unable to come up with a theme for the month, I decided to ramble on a bit randomly about a variety of topics.

If any of you received a November *Bulletin* that had extra pages or was missing pages, please let me know. I am aware of at least one *Bulletin* that had 8 pages duplicated. Of course, this copy went to Ken Nemeth, our HGS President. Doesn't it always seem to be the case that problems or mistakes seem to find their way to the top of the organization? I'd like to know if this problem was widespread. If it is, we can discuss with the bindery and make sure it does not happen in the future. Meanwhile, if you are missing pages, I know where they can be found.

One of the benefits of editing the *Bulletin* is the opportunity to get a preview of the articles and do some background reading on things that strike me as particularly interesting. This month, the Department of Defense 2014 Climate Change Adaptation Roadmap, referenced in the Government Update column, caught my eye. I won't comment on it, other than to say that it is interesting reading. As the link in the Government Update

column isn't functional in the printed *Bulletin*, I am including it here in case you are interested (<http://www.acq.osd.mil/ie/download/CCARprint.pdf>).

This month's *Bulletin* contains 4 articles related to HGS outreach activities – the Sally Ride Science Festival, the Earth Science Celebration at the Houston Museum of Natural History, the Houston Gem and Mineral Show and the Whiskey Bridge Field Trip. I am always impressed at the scope of activities in which the HGS is involved and the dedication and enthusiasm of the volunteers.

I have been very lucky in my career to have had the opportunity to live in various places within the United States and abroad. ...in my opinion no country/race/religion/etc. in the world has a monopoly on either idiots or geniuses, good or bad people.

I was watching the news the other night and heard a person make a very general, negative comment about another group of people. The details don't really matter, but it got me thinking. I have been very lucky in my career to have had the opportunity to live in various places within the United States and abroad. I am convinced that people everywhere are basically the same. They all want to be able to provide for their families and give their children a better life than they had. As I told someone a while ago, in my opinion no country/race/

religion/etc. in the world has a monopoly on either idiots or geniuses, good or bad people. Perhaps if everyone was required to spend some time in another culture, or at least to have some meaningful exposure to another culture, the world would be a better place.

January 19, 2015 is Legends Night. It promises to be another great event and I urge you to register early to guarantee a place. Even though I am writing this just before Thanksgiving, you will be reading this in late December or early January. Regardless of how you spent the holiday season, I hope that it was enjoyable. I would like to wish all of you a very Happy New Year and a happy, healthy, successful and prosperous 2015 and beyond.

Take care. Until next month... ■

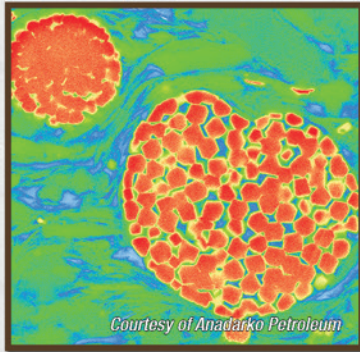


Applied Geoscience Conference

FEBRUARY 16-17, 2015



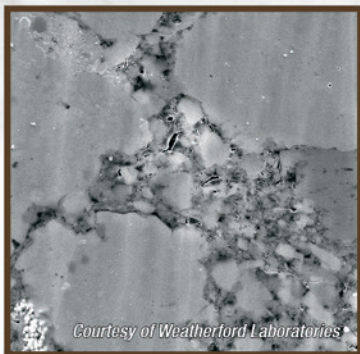
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Integrated Approaches of Unconventional Reservoir Assessment and Optimization

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- Eight-session oral technical program, featuring talks by invited experts
- Student posters highlighting industry supported research
- Core display supporting oral technical program

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- Integrated Reservoir Characterization Focusing on Macro to Micro to Nano-scale Components
- Natural Fracture Systems & Producibility
- Reservoir Characterization of Lacustrine Mudrock Systems
- Hybrid Unconventional Systems - Tight Targets

Day 2:

- Geologically-driven Completion Techniques in Unconventional Reservoirs
- Mudrock Systems Characterization - Advanced Geophysical Insights
- What's Going on Down There? Clues from Produced Fluids and Proppant
- Bringing It All Together: How Reservoir Characterization Improves Stimulation and Production

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TECHNICAL PROGRAM

2015 Applied Geoscience Conference
Westin Memorial City, Houston, Texas

MONDAY, FEBRUARY 16, 2015

7:00 am	Registration Opens.....Fourth Floor Pine Room
Breaks & Social Hour	Core DisplaysFourth Floor, Cedar and Cypress Rooms <i>Selected Cores from Emerging and Established Unconventional Reservoirs</i>
8:00 am - 5:00 pm	Technical Talks (Oral)Sessions.....Fourth Floor, Azalea Room
11:35 am - 1:00 pm	Poster SessionsFourth Floor, Pecan Room
5:00 pm - 7:00 pm	Social Hour & Poster Sessions from Invited Academic Consortia,Pecan Room

MORNING

DAY 1

INTEGRATIVE RESERVOIR CHARACTERIZATION FOCUSING ON MACRO TO MICRO TO NANO-SCALE SESSION CHAIRS: FRANK WALLES, BAKER HUGHES & MIKE VAN HORN, INDEPENDENT SESSION 1

8:00 - 8:10	Opening Remarks
8:10 - 8:45	Reservoir characterization of mudrock systems Nano to Macro, with case examples from the Horn River and Western Canadian Basins Rene Jonk, Ken Potma, ExxonMobil & Imperial Oil
8:45 - 9:20	Defining the Depositional Sweetspot of a Mudstone Play Fairway: An example from the Utica / Pt. Pleasant Jesse Melick, Jesse Koch, BP
9:20 - 9:55	Computed Tomography (CT) Scans: Frameworks for Mudstone Reservoir Characterization Joan Spaw, Marathon Oil Company
9:55 - 10:25	Coffee Break

GEOMECHANICAL CONTROLS & PRODUCIBILITY SESSION 2 SESSION CHAIRS: OBIE DJORDJEVIC, MURPHY OIL & MATT WILLIAMS, SWN

10:25 - 11:00	Control of Mechanical Stratigraphy on Bed-Restricted Jointing and Normal Faulting in the Eagle Ford Formation, South-Central Texas, U.S.A David A. Ferrill, Ronald N. McGinnis, Alan P. Morris, Kevin J. Smart et al., Southwest Research Institute
11:00 - 11:35	Limestone Frequency and Well performance, Eagle Ford Shale (Cretaceous). South Texas John Breyer, R. H. Wilty et al., Marathon Oil Company
11:35 - 1:00	Lunch Provided — Third Floor

Poster Session
Invited Presentations from Graduate Student
View During Lunch - 11:35 am - 1:00 pm
& Social Hour 5:00 pm - 7:00 pm
Fourth Floor.....Pecan Room

Core Displays - Eagle Ford, Utica, Niobrara

Selected Core from Emerging and Established Unconventional Reservoirs Supporting the Oral Technical Presentations

Open during Coffee and Lunch Breaks

Fourth Floor.....Cedar and Cypress Room

AFTERNOON

DAY 1

RESERVOIR CHARACTERIZATION OF LACUSTRINE MUDROCK SYSTEMS

SESSION 3

SESSION CHAIRS: MICHAEL CAMERON, HESS & CHRISTINA CALVIN, SCHLUMBERGER

1:00 - 1:35	Basin-Scale Controls on Lacustrine Organic-Rich Mudstone Deposition: Examples from Wyoming & China Alan R. Carroll, University of Wisconsin
1:35 - 2:10	A Depositional model and stratigraphic framework of the Uinta Basin, Utah Lauren P. Birgenheier, et al.
2:10 - 2:45	Permian lacustrine unconventional shales as hydrocarbon targets in the Cooper Basin, Australia: Rock characteristics and well and production challenges. Raphael A.J. Wurst , Anthony Hill, Quaid Jadoon, Brent R. Nassichu, Nicole Willment, Elinor M. Alexander
2:45 - 3:15	Coffee Break

HYBRID UNCONVENTIONAL SYSTEMS - TIGHT TARGETS

SESSION 4

SESSION CHAIRS: WAYNE CAMP, ANADARKO & SIMON HUGHES, WEATHERFORD

3:15 - 3:50	From the Arch to the Uplift: Depositional Changes in the Cenomanian-Turonian Interval (Eagle Ford and Woodbine) J.A. Breyer, R.A. Denne and D.A. Bush, Marathon Oil Company
3:50 - 4:25	How mobile is your total oil saturation? SARA analysis implications for bitumen viscosity and UV fluorescence in Niobrara Marl and Bakken Shale, supported by FIB-SEM observations of kerogen, bitumen, and residual oil saturations within Niobrara Marls and Chalks, Mark Sonnenfeld, Whiting Petroleum
4:25 - 5:00	Formation Evaluation and Basin Architecture of the Wolfcamp Shale in the Delaware Basin Gilles Hennenfent, Chevron

Social Hour

Monday 5:00 — 7:00 PM

With Posters from Invited Graduate Student

Fourth Floor.....Atrium

TECHNICAL PROGRAM

2015 Applied Geoscience Conference
Westin Memorial City, Houston, Texas

TUESDAY, FEBRUARY 17, 2014

7:00 am	Registration Opens.....Fourth Floor, Pine Room
Breaks & Social Hour	Core DisplaysFourth Floor, Cedar & Cypress Rooms <i>Selected Core from Emerging and Established Unconventional Reservoirs</i>
8:00 am - 5:00 pm	Technical Talks (Oral) Sessions.....Fourth Floor, Azalea Room
11:35 am - 1:00 pm	Poster SessionsFourth Floor Pecan Room <i>Invited Presentations from Academic Consortia</i>

MORNING

DAY 2

MUDROCK SYSTEMS CHARACTERIZATION - ADVANCED GEOPHYSICAL INSIGHTS SESSION 5

SESSION CHAIRS: PAUL COLLINS & LISA NEELEN, STATOIL

8:00 - 8:10	Opening Remarks
8:10 - 8:45	Microseismic Geomechanics of a Hydraulic Fracture Network Shawn Maxwell, IMA GE—Itasca Microseismic and Geomechanics Evaluation
8:45 - 9:20	A Framework for Understanding the Geomechanics of Hydraulic Fracture Induced Microseismicity, Seth Buseti, Peter Hennings, ConocoPhillips
9:20 - 9:55	The signature of shearing driven by hydraulic opening Jim Rutledge, Schlumberger
9:55 - 10:25	Coffee Break

GEOLOGICALLY-DRIVEN COMPLETION TECHNIQUES IN UNCONVENTIONAL RESERVOIRS SESSION 6

SESSION CHAIRS: GRETCHEN GILLIS, ARAMCO & JOHN BREYER, MARATHON

10:25 - 11:00	Horizontal Well Stress index estimation from Litho Scanner, Sonic Scanner and DRIFTS analysis of cuttings. Mike Herron, Schlumberger
11:00 - 11:35	The Utilization of Reservoir Characterization Data for Optimizing Well Spacing and Completion Techniques in the Eagle Ford Shale Beth McDonald, Neil Basu, Beau Tinnin, Gervasio Barzola, Pioneer Natural Resources
11:35 - 1:00	Lunch Provided — Third Floor

Poster Session
Invited Presentations from Graduate Student
View During Lunch - 11:35 am - 1:00 pm
& Social Hour 5:00 pm - 7:00 pm
Fourth Floor.....Pecan Room

Core Displays - Eagle Ford, Utica, Niobrara

Selected Core from Emerging and Established Unconventional Reservoirs Supporting the Oral Technical Presentations

Open during Coffee and Lunch Breaks

Fourth Floor.....Cedar and Cypress Rooms

AFTERNOON

DAY 2

WHAT'S GOING ON DOWN THERE? CLUES FROM PRODUCED FLUIDS AND PROPPANT

SESSION 7

SESSION CHAIRS: L. TARAS BRYNDZIA, SHELL & R. LAFOLLETTE, BAKER HUGHES

1:00 - 1:35	Controls and Origin of High Salinities in Hydraulic Fracture Flow Back Brines - An example from the Marcellus Gas Shale, USA L. Taras Bryndzia, Shell International Exploration and Production Inc
1:35 - 2:10	Proppant Stability in the Downhole Environment Randy LaFollette, Baker Hughes Pressure Pumping
2:10 - 2:45	Is that formation water or frac water being produced - what we can learn from ionic and isotopic analyses of produced waters from horizontal wells in the Permian basin? Matthew Laughland, Ph.D., Dave Nelson, and Paul Wilson, Pioneer Natural Resources, USA, Inc.
2:45 - 3:15	Coffee Break

BRINGING IT ALL TOGETHER: HOW RESERVOIR CHARACTERIZATION IMPROVES STIMULATION AND PRODUCTION

SESSION 8

SESSION CHAIRS: MARK ANDREASON, SINOCH E&P, ROBERTO SUAREZ-RIVERA, WD VAN GONTEN

3:15 - 3:50	Shale Resource Assessment & Development-A Full Life Cycle Integrated Approach P.K. Pande, Anadarko Petroleum Corporation
3:50 - 4:20	Wolfcamp Completion Optimization Tom Schickle, Shell
4:20 - 4:30	Closing Comments—Session 8 Chairs

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Dinner 6:30–7:30 p.m.

Cost: \$45 Preregistered members; \$50 non-members/walk-ups

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HGS International Dinner Meeting

Joan Flinch

Repsol USA

The Woodlands, Texas

jfflinch@repsol.com

HGS International Meeting

The Present-day Mexican-USA Gulf of Mexico: Analog for Cretaceous-Paleogene Allochthonous Salt Canopies of the Western Mediterranean

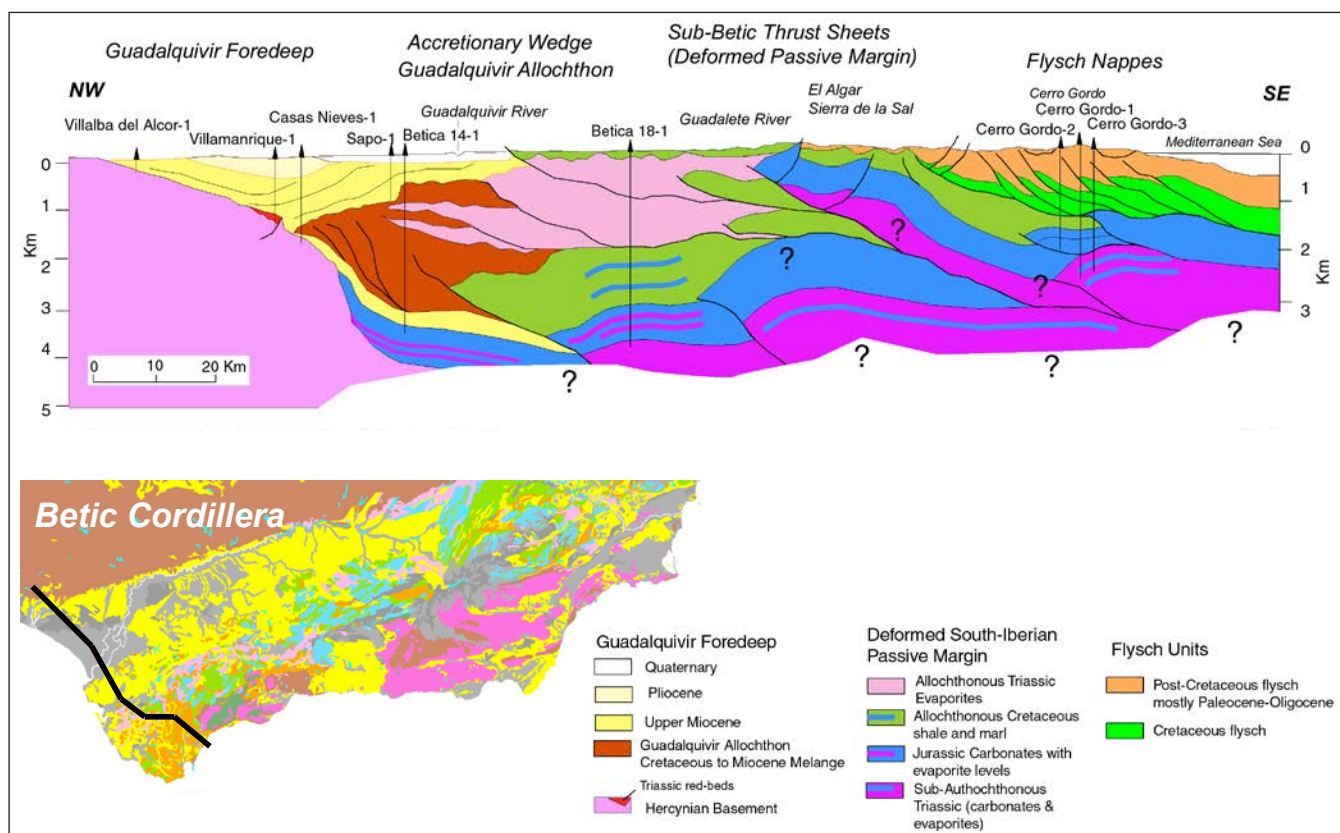


Figure 1. Cross-section through the Western Betic Cordillera, southern Spain, showing allochthonous Triassic salt canopies.

Field, seismic and well-log data along the Betic-Maghrebian fold-and-thrust belts of the Western Mediterranean (i. e. Betic, Rif and Tell Cordilleras) show the presence of allochthonous Triassic salt. Most of the allochthonous Triassic is located in the frontal tectono-sedimentary complexes of these fold-and-thrust belts (i. e. the Prerifaine Nappe in Morocco, Betic Cordillera's Guadalquivir Allochthon and Zone des Domes in Algeria and Tunisia).

In the Betic Cordillera of southern Spain, the Guadalquivir Allochthon involves deep-water pelagic facies “Capas Rojas” and deep-water pelagic marls with radiolaria, referred to as “calcaria

maiolica” in the Alpine domain. Triassic red-beds, consisting of shales, siltstones and occasional sandstones, and evaporites, mainly gypsum and salt, are directly in contact or intermixed with Upper Cretaceous-Paleogene deep-water sediments while the Jurassic is absent. Sometimes kilometric-scale Cretaceous slices are exposed between salt sheets. Several exploration wells - Beticas 14-1, Beticas 18-1, and Bornos-1, 2 and 3 - encountered thick Triassic evaporites (**Figure 1**). The Beticas 18-1 well, in the Jerez de la Frontera area of the Western Betic Cordillera, encountered more than 1 km of allochthonous salt and several hundred meters of sub-autochthonous sabkha-type interbedded

HGS International Dinner continued on page 17

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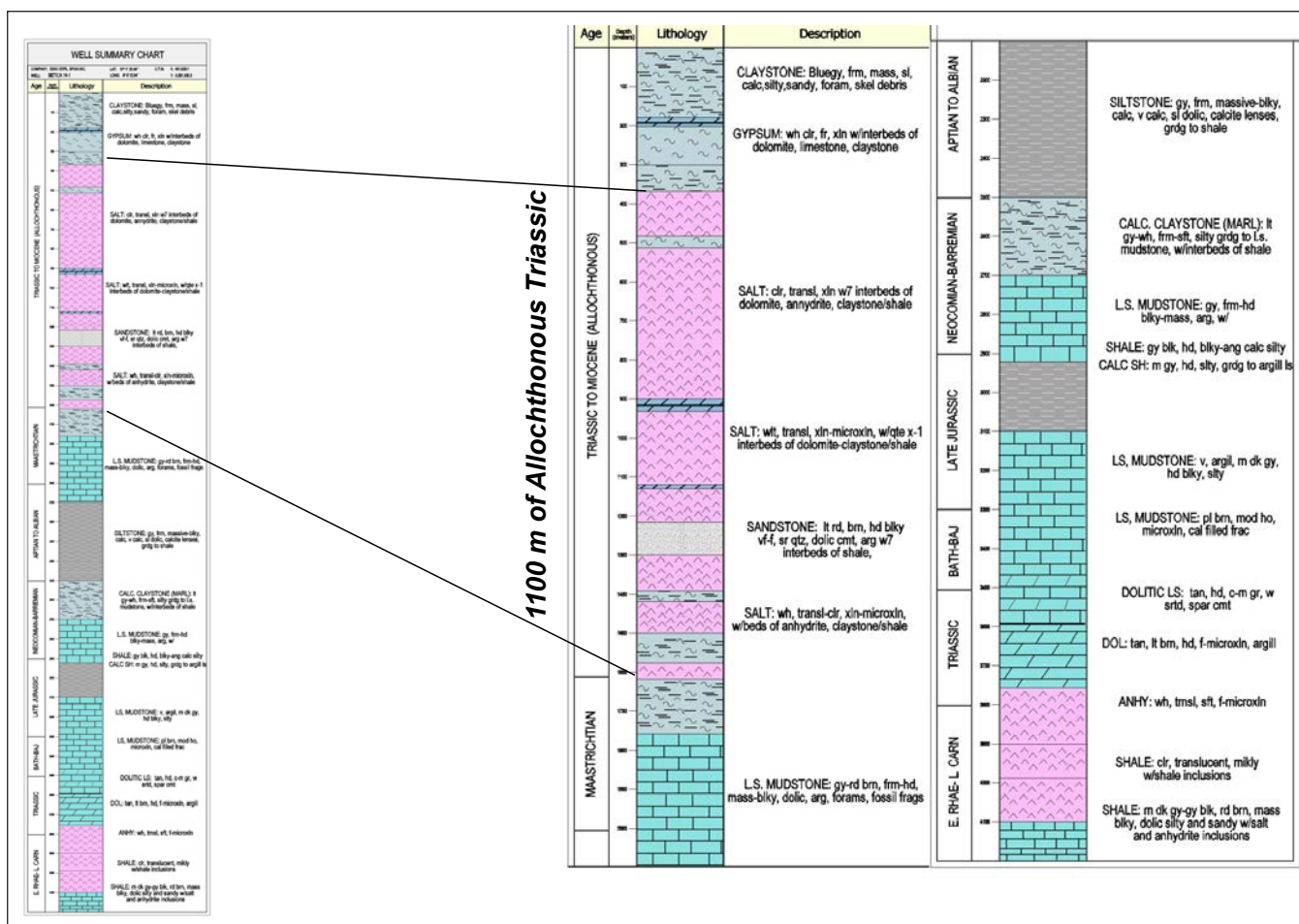


Figure 2. The Beticas 18-1 well encountered more than 3600 feet of allochthonous salt.

limestone and evaporites (**Figure 2**). Metric to centimetric salt blocks, slices or boulders are also interbedded with pelagic Cretaceous and/or Paleogene strata (**Figure 3**). Often synclinal basins with Upper Cretaceous to Paleogene strata overlies extensive masses of evaporites, they could represent minibasins emplaced during passive-margin emplacement.

The Gulf of Cadiz is a key area for an understanding of the pre-compressional (i. e. pre-Neogene) structure of the Betic Cordillera, since it represents the only preserved segment of the south Iberian Mesozoic passive margin that underlies the accretionary wedge.

In the Rif Cordillera of northern Morocco, Triassic shales and evaporites (mainly gypsum) are intermixed with deep-water Cretaceous (Senonian) marl, referred to locally as “marnes à gypsum” (**Figure 3**). Locally these sediments have a breccia character, including blocks of metamorphic and igneous rocks, “brèche polygénique à matrice gypseuse”. These deposits are well exposed in the Central Rif (Asebriy 1983, Asebriy et al. 1987, Lespinasse 1990). Lower Eocene sediments unconformably overlie Triassic evaporites, suggesting that the emplacement was

already completed at that time. In the Ouerha River valley of the South-Central Rif, the BB-1 well (Société Chérifienne des Pétroles, 1952) encountered two Triassic breccia levels, 65 and 220 feet thick, that represent the Upper Cretaceous and Eocene Prerifaine Nappes (Upper Imbricates) detached from the Jurassic Lower Imbricates (Service Géologique du Maroc, 1984;1990). Along the Western Rif and the Rharb Basin, the most frontal unit, the Prerifaine Nappe, has Triassic evaporites interbedded with Cretaceous marls. The El Fokra-1 Fo-1 well located at Souk el Arba exposes Triassic evaporitic ridges within the Cretaceous to Tertiary marls of the Prerifaine Nappe (**Figure 3**).

In the Tell Cordillera, especially on the border region between Algeria and Tunisia “Zone des Dômes”, field geologists and exploration wells have recognized Triassic salt glaciers, which suggests that this allochthonous evaporite province probably extended from the western Betic Cordillera to Algeria and Tunisia. In this area, most of the Triassic evaporites were emplaced during Cenomanian-Turonian time, a significantly older age than in the Betic Cordillera, where most of the canopies were emplaced during Late Cretaceous to Paleocene time. Allochthonous

HGS International Dinner *continued on page 19*

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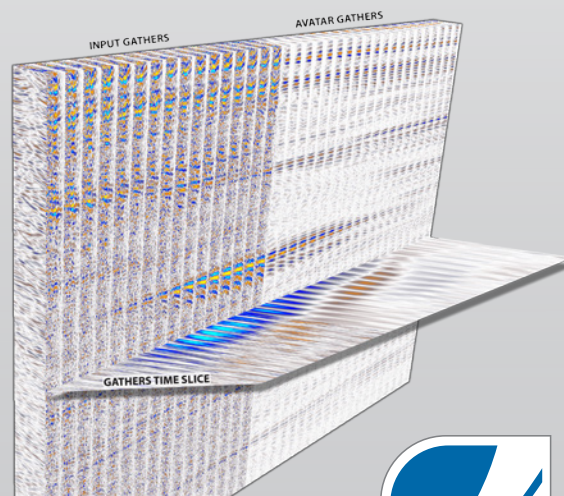
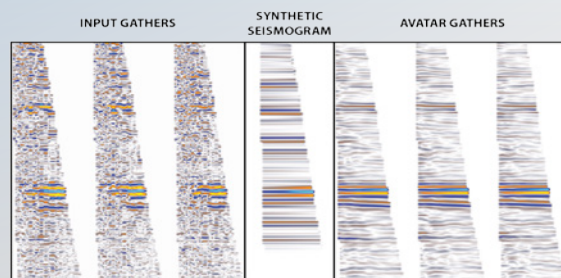
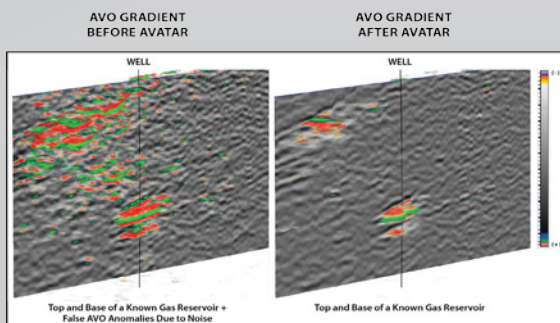
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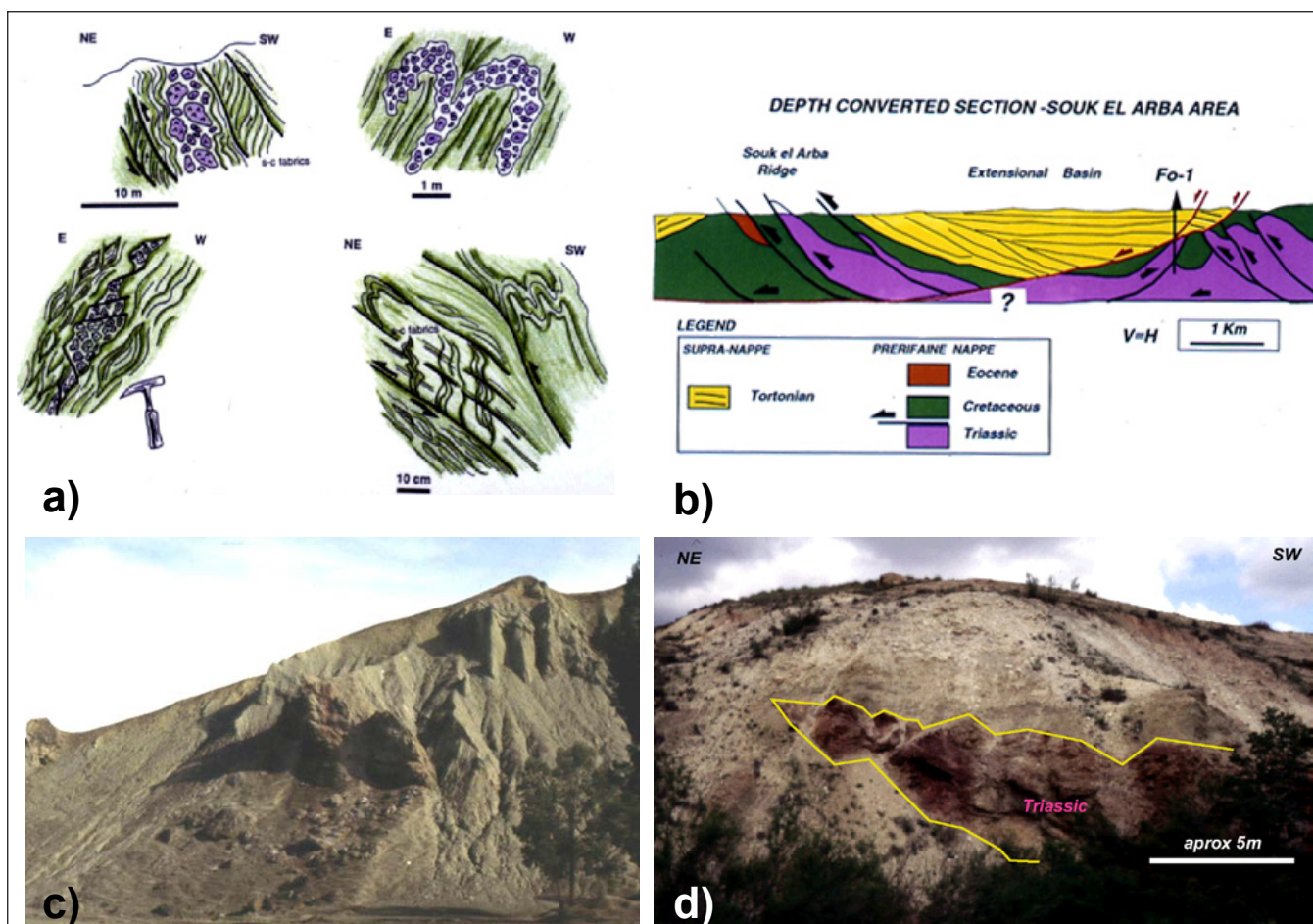


Figure 3. Re-sedimented Triassic within Cretaceous-Paleogene pelagic marls. a) Central Betic Cordillera b) Souk el Arba, Rharrb Basin, Morocco. c) Central Rif. d) Western Betic Cordillera.

Triassic is much more abundant in the Guadalquivir Allochthon of the Betic Cordillera than in the Rif of Tell; more allochthonous canopies are also present in the Betic Cordillera.

The recognition of these allochthonous salt provinces has important implications for the understanding of the present-day structure and for the paleogeography of the Western Mediterranean.

Comparison with the Mexican-USA Gulf of Mexico

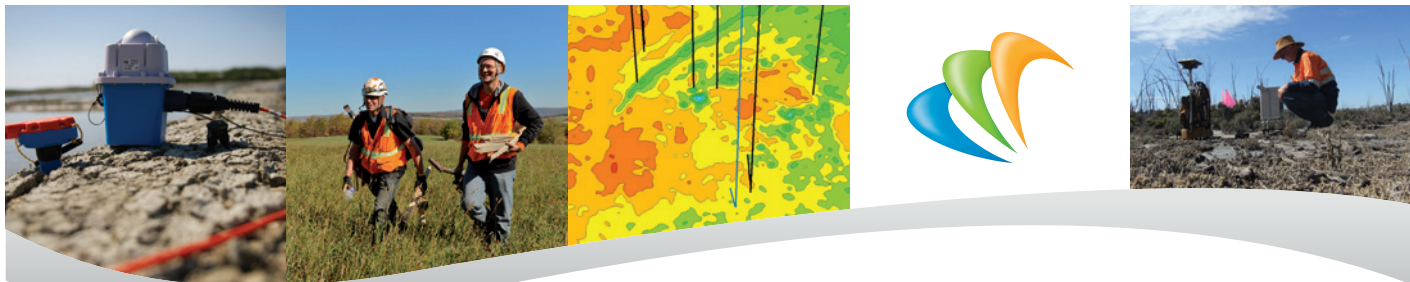
The Triassic evaporites of the south Iberian and Maghrebian domain are interpreted as passive margin type allochthonous evaporites emplaced during passive margin stage (before Neogene compression) in a way similar to the allochthonous salt of the Gulf of Mexico (Figure 4).

Allochthonous Triassic is much more abundant in the Guadalquivir Allochthon of the Betic Cordillera than in the Rif of Tell, especially allochthonous canopies. The emplacement of the Triassic salt of the Western Mediterranean within the Upper Cretaceous-Paleogene section took place during passive margin

stage before Neogene compression, in a way similar to that of the allochthonous salt of the Gulf of Mexico. In the Western Betic Cordillera, the allochthonous salt is nearly 2.5 Km thick, an order of magnitude similar to that in several areas of the present-day Gulf of Mexico. But in the offshore Louisiana area, the Sigsbee Salt Nappe can reach a thickness of around 7 Km and a length of about 200 Km (Worall and Snelson, 1989) that contrasts with the dimensions of the Guadalquivir Allochthon of the Western Betic Cordillera that is 70 Km long.

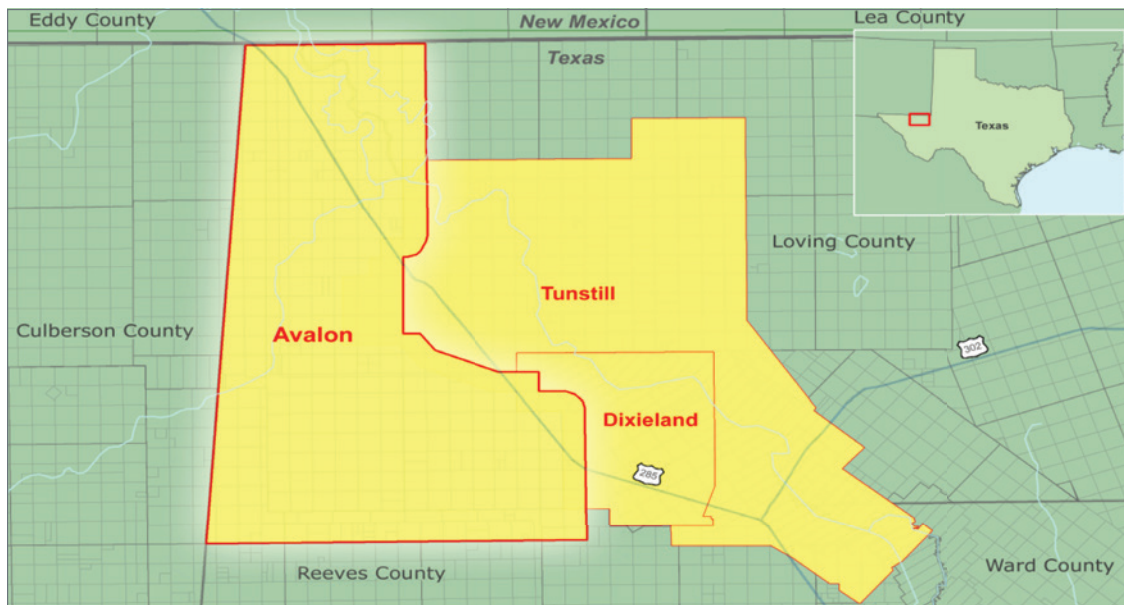
A present-day cross-section in the southern Gulf of Mexico, Mexico, from the Perdido folded belt to the offshore Yucatan would suggest a younger age of emplacement in the NW Perdido and Salina del Bravo areas than in the offshore Campeche area. A similar situation would have resembled a N to S cross-section through Iberian northern margin of the Western Mediterranean (i. e. Betic Cordillera), with salt emplaced into the Upper Cretaceous-Paleogene section, while in the south (Rif and Tell Cordilleras) the salt was mostly emplaced within the Cenomanian-Turonian section. The Betic margin is a carbonate-

HGS International Dinner *continued on page 21*



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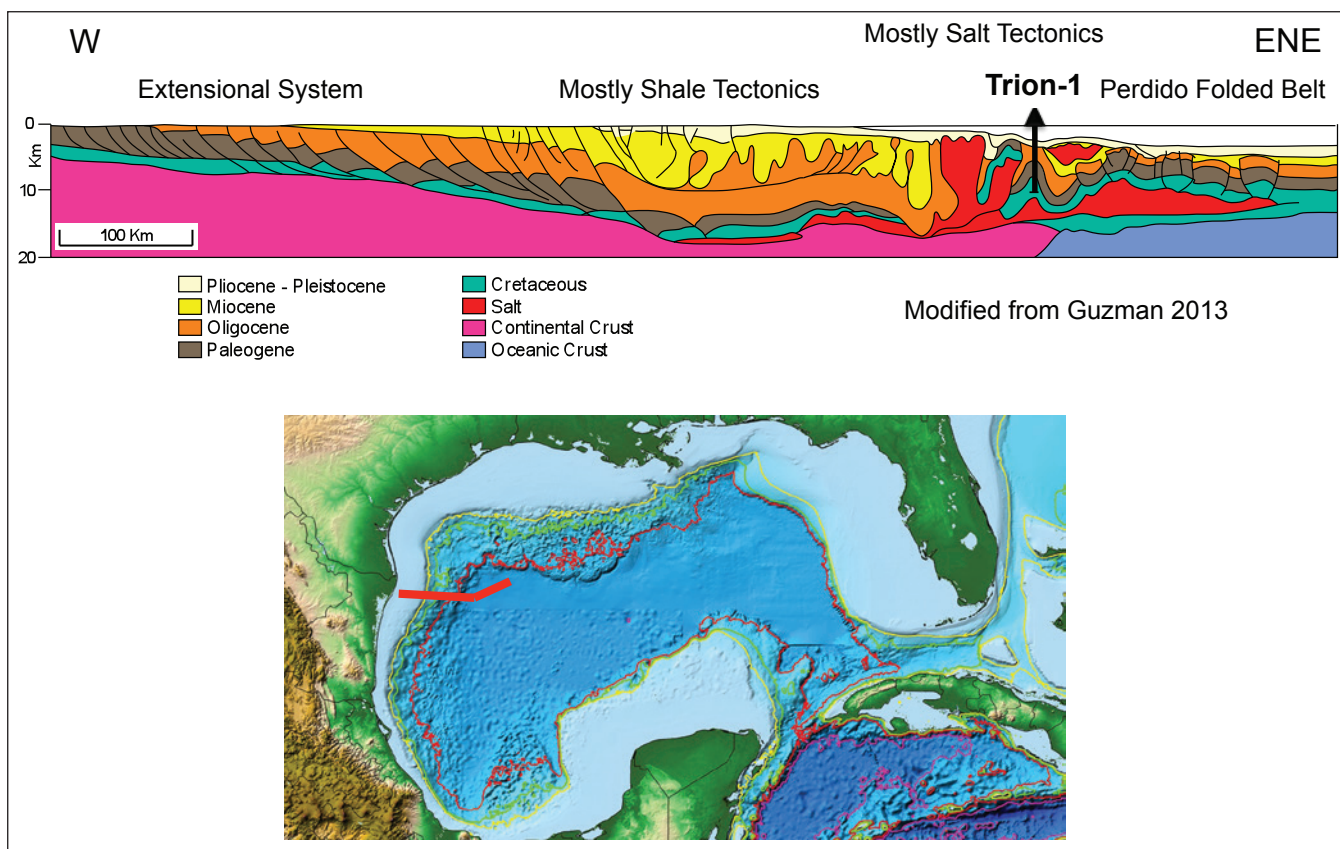


Figure 4. Cross-section through the Burgos-Perdido sector of the GOM. Modified from Guzman (2013)

dominated margin like the Yucatan margin, while the North African margin (i. e. Rif and Tell Cordilleras) is a siliciclastic-dominated margin like the Texas-Burgos sector in the GOM. The lithology of the section, as well as the structural style of each margin, was mostly controlled by the asymmetry of the extension mechanism that generated these passive margins.

Comparing the GOM with the Western Mediterranean can give clues to understanding how a salt- dominated passive margin can behave under compression and what its role is in the ulterior fold-and-thrust belt. What would happen if the Gulf of Mexico were to be incorporated into an orogenic belt? The structure of allochthonous salt of the western Mediterranean shows the importance of pre-orogenic structures, especially passive-margin allochthonous evaporates, to restoring the deformation in salt-based fold-and-thrust belts with extensive allochthonous evaporites. ■

Biographical Sketch

JOAN F. FLINCH is currently Geology Manager at Repsol USA in The Woodlands, Texas. His first Repsol assignment was in Madrid, Spain as Equatorial Guinea Team Leader, and afterwards he became West Africa New Ventures Manager, and later, Equatorial Guinea, Liberia and Sierra Leone Asset Manager. In 2010, he was transferred to Houston, Texas as Manager of the

Latin America New Ventures Group. Joan received his B.S. and M.Sc. degrees from the University of Barcelona, Spain in 1988 and 1990 respectively. His M.Sc. thesis focused on the structural mapping of the southern Pyrenees. He enrolled in the Geology and Geophysics Department at Rice University, receiving his Ph.D. in 1994, with the dissertation "Structural Evolution of the Gibraltar Arc" directed by Professor A. W. Bally. Before joining Repsol in 2004, he worked from 1994 to 1997 as a consulting geologist for Lagoven (former PDVSA affiliate company), mainly in Eastern Venezuela. Joan worked for Total in Paris and Pau, France from 1997 to 2004. He conducted numerous exploration projects in Latin American countries, such as Argentina, Bolivia, Colombia, Venezuela, Guyana, Suriname, and Trinidad, and in Nigeria. Joan has given numerous presentations in conferences and has published several papers on structural geology of the Pyrenees, structural geology and sequence stratigraphy of the Moroccan Rif and the Betic Cordillera in Spain, the Northern Colombia accretionary prism, the Eastern Venezuelan fold-and-thrust belt, the Gulf of Paria in Trinidad and Venezuela, the Bolivia Sub-Andean region, and the Sierra Leone-Liberia continental margin in West Africa.



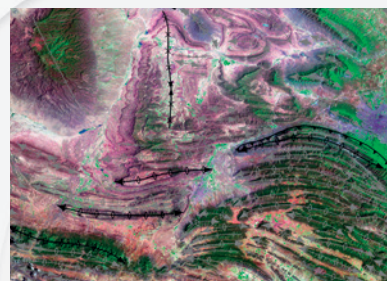


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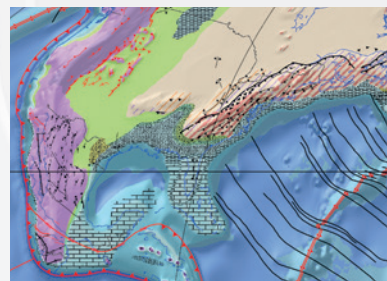
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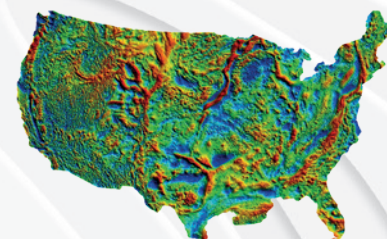
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HGS Environmental & Engineering Dinner Meeting

David Bardsley

*Directed Technologies Drilling, Inc.
david@horizontaldrill.com*

Horizontal Environmental Drilling 101 – An Introduction to Horizontal Environmental Well Installation



- History of horizontal environmental wells
- Applications and advantages of horizontal wells
- Nomenclature of horizontal drilling and well installation
- Fundamentals of drilling, installation and development
- Drilling fluids
- Well materials
- Drilling equipment
- Potential problems and challenges to successful installations
- Case studies

Biographical Sketch

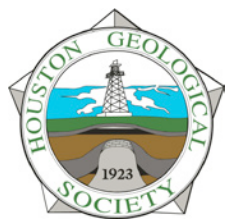
DAVID BARDSLEY has over thirty years of environmental drilling experience in a variety of settings across the United States. He started his career as a drilling rig helper, then advanced through various technical and managerial positions in both small and large companies. He is familiar with all of the drilling techniques utilized in the environmental industry, including:

auger, air/mud rotary, casing advance, sonic, dual tube, direct push and wireline coring. He was an early leader in the use of horizontal drilling to solve environmental challenges and has authored or co-authored over twenty papers on horizontal environmental drilling methodology. David has been directly involved in the design and installation oversight of over 100,000' of horizontal environmental wells, including seventy-six blind well completions. Mr. Bardsley has a Bachelor of Science degree in Geology and Geophysics, along with a Communications Minor (1984), from the University of Missouri - Rolla. He is a licensed well driller in Texas, Arizona and Louisiana and holds RG/PG certifications in Texas, Missouri, Louisiana and Tennessee. Mr. Bardsley is a strong proponent of education and has served as a short course instructor at Battelle environmental conferences and University of Wisconsin Madison, along with presenting drilling training for students at University of Arizona and University of Louisiana - Lafayette.



Horizontal well installation technology has been utilized since the late 1980's for a wide variety of monitoring and remediation activities. The horizontal/directional drilling techniques are not experimental; they are a combination of existing oilfield and utility drilling and well construction methods. Directional drilling can be used to sample soils under obstructions, extract both free phase and dissolved phase contaminants, as well as provide conduits for injection purposes. Geotechnical applications include dewatering, horizontal directional drains and slope stability wells. Consultants, site owners and regulators can be intimidated with the equipment, nomenclature and perceived high cost/risk of these innovative well installation methods. While the well materials are similar to those of traditional vertical wells, the drilling equipment, use of drilling fluids and well design/installation nomenclature are different. This presentation will provide an overview of the following important aspects of horizontal environmental wells:





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HGS invites you to join us for the next of these memorable dinner events honoring two university professors and Geology Department faculty advisors who have dedicated their time and energy to produce winning teams of the AAPG Imperial Barrel Award.

Brian Lock *University of Louisiana at Lafayette*

Brian Lock has served on the faculty of the School of Geosciences at the University of Louisiana at Lafayette (UL LFT) since 1977. He has been UL LFT's Imperial Barrel Award (IBA) Team Advisor since its inception in 2008. Over the following years, the UL LFT team has won the Gulf Coast Section competition in 2008, 2010, 2012 and 2014, and the global IBA competition in 2012 and 2014. Before joining UL LFT, Dr. Lock was a faculty member at Rhodes University in South Africa, and worked as a field geologist with a consulting group for Norsk Fina in Svalbard. He received his Ph.D. at Cambridge University in 1969.



Chris Zahm *University of Texas*

Chris Zahm is a Research Scientist at the Bureau of Economic Geology (BEG) and Adjunct Professor in the Department of Geological Sciences at the Jackson School of Geosciences at the University of Texas at Austin. Chris has taught Petroleum Basin Evaluation for six years and has been the UT's Imperial Barrel Award (IBA) Team Advisor since 2009. Prior to joining the BEG in 2007, Chris worked 5 years at ConocoPhillips in Houston. Dr. Zahm received his BS in Geology from the University of Wisconsin-Madison in 1993, MS from The University of Texas at Austin in 1998 and PhD from the Colorado School of Mines in 2002.



This HGS special event has limited seating. Please make your reservations online at www.hgs.org. Tickets are \$50 per person.

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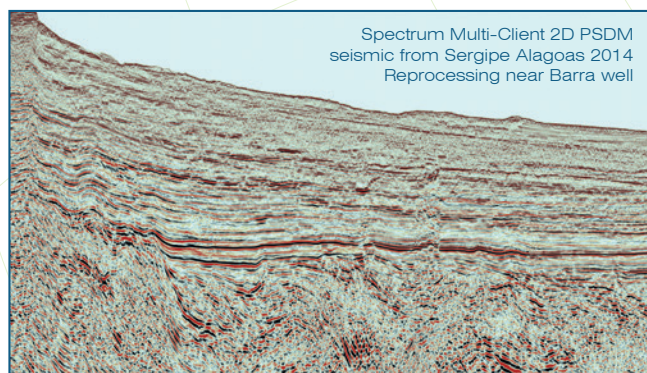
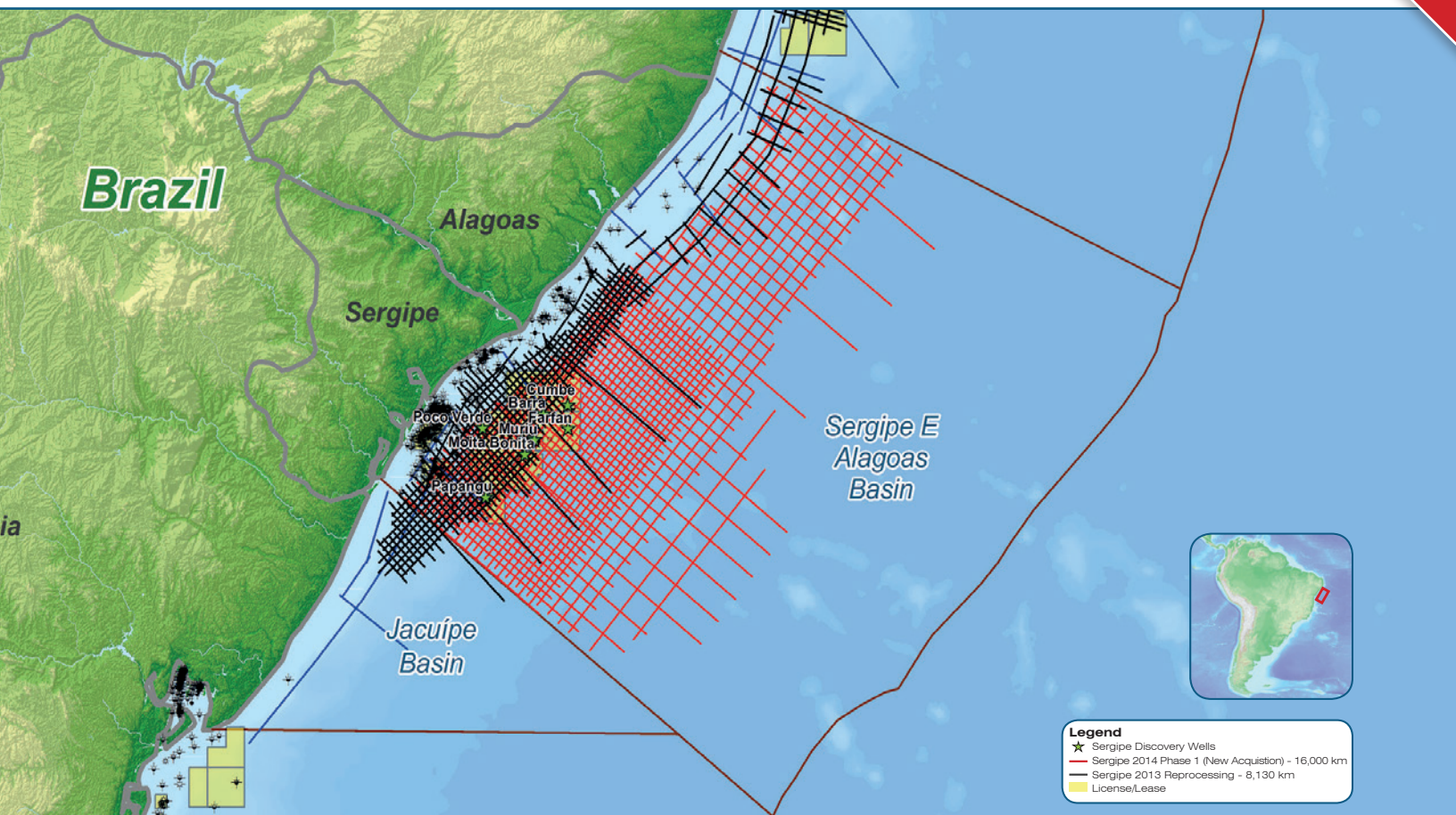
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All event profits benefit the HGS Scholarship and Calvert Memorial Funds.

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To supplement the new acquisition in this active exploration area, Spectrum has completed the reprocessing of 8,130 km of data through both PreSTM and PreSDM and is offering this data to industry in order to gain a head start on the expected upcoming round in 2015.

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Tectono-stratigraphic evolution of the Centaur 3D Survey Area, Exmouth Plateau, North West Shelf, Australia

World economics and increased LNG exports have made the Northern Carnarvon Basin, offshore North West Shelf Australia, a highly attractive exploration target in the gas sector.

This project illustrates the tectono-stratigraphic evolution of the Exmouth Plateau, a deep-water sub-basin within the Northern Carnarvon Basin. The project was completed by fully interpreting the Centaur survey, a recently acquired 3D seismic dataset located in the northwestern part of the plateau. The investigation involved detailed qualitative and quantitative seismic analysis of structural and stratigraphic elements that were then assessed on their impact to the hydrocarbon potential of the area.

The Centaur provided spectacular imaging of NNE- and NE-trending, highly-segmented rift-border faults that make up the main graben-forming boundaries formed between the Late Triassic and Early Cretaceous as a consequence of rifting of Greater India from Australia. The rifted fault blocks were affected by subsequent tectonic uplift associated with ridge push, then degradation, creating rounded eroded footwall crests and re-deposited hanging wall strata up to 50 m thick. Continued extension and displacement of the rift-border faults created long, obliquely trending intra-graben faults that intersected the rift-border fault hanging walls. Extensional fault-propagation folding helped create 1-3 km wide, asymmetric depocenter synclines in the hanging wall of the rift-border faults, while uplifting and rotating footwall strata eastwards. Since the beginning of passive margin phase in the Late Cretaceous, the plateau has been subjected to minor episodic fault reactivation, subsidence and slumping, including Neogene inversion, producing a localized anticlinal structure within the southern margin of the survey. The timing of formation is supported by mass-transport flows away from the uplifted area and onlapping of sediments onto the structural high.

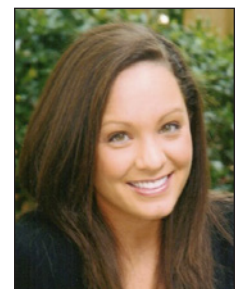
Seismic facies analysis of the Triassic strata has shown a multitude of stratigraphic elements, including deltaic channel systems, sheeted sand bodies, igneous intrusions and hydrothermal vent complexes. Amplitude extractions have identified potential structural traps in tilted Triassic fault blocks, as well as potential stratigraphic traps in intra-Triassic channels, in sand bodies and potentially in igneous intrusions.

Several lines of evidence suggest that the overall structural evolution of the rift-border faults was influenced by the reactivation of pre-existing Early Triassic structures. These include: 1) the existence of fault-propagation folding of Triassic rift-border faults, 2) along-strike variations in geometry and orientation of rift faults, and 3) the appearance of faults propagating upwards obliquely through Lower Triassic strata. Unlike the traditional orthogonal extension models of rifting that create long, linear rift patterns, the structural geometry is comparable to analogue models of offset or oblique rifting, where the rift-border faults are short, highly-segmented and curved, containing long intra-graben faults formed perpendicular to the direction of extension to create numerous asymmetric hangingwall depocentres.

The results of the project suggest various structural and stratigraphic elements that provide varying levels of risk and reward in the Triassic prospective play targets for petroleum exploration. While the Triassic strata provide potential hydrocarbon targets, fault reactivation since the Early Cretaceous, Cretaceous and Tertiary mass-transport complexes and fluid escape features of the Top Triassic pose a threat to the seal quality of trapped hydrocarbons and slope stability for drilling infrastructure. ■

Biographical Sketch

Born and raised outside of Seattle, where everyday life takes place in the shadow of both active and dormant volcanoes, Sasha has always had a love for the outdoors. After graduating with a B.S. in Geology from Southern Methodist University, she spent a year abroad as an English teacher in Prague, Czech Republic and Saint Petersburg, Russia. There, immersed in a sea of fur hats and vodka, she discovered that she would ultimately love to combine her passions for geology and travel into a career in international oil and gas exploration. After gaining invaluable mentorship in the exploration and production sector in Dallas, she went on to complete her Masters Degree in Petroleum Geoscience at Royal Holloway University of London, where she focused on developing her structural geology and problem-solving skills for a career in petroleum exploration.



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Dinner 6:30–7:30 p.m.

Cost: \$45 Preregistered members; \$50 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card.

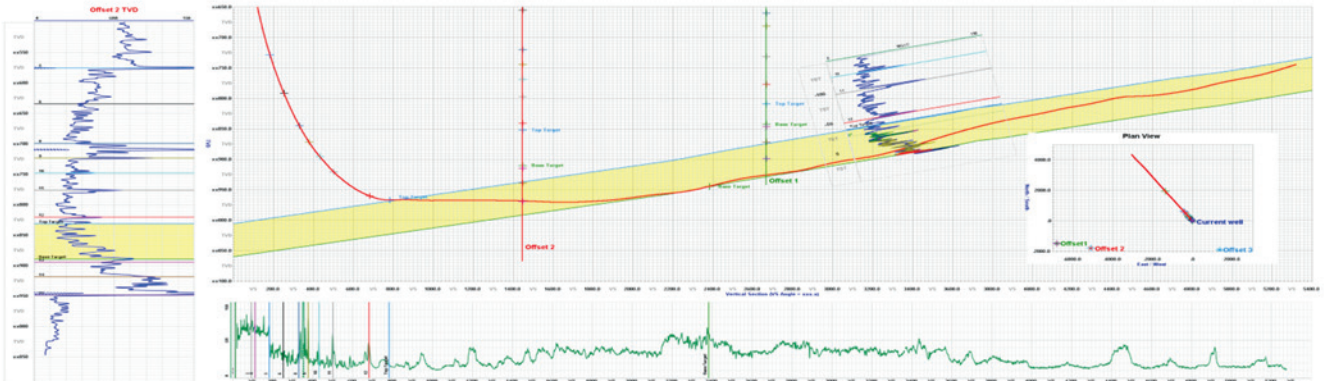
Pre-registration without payment will not be accepted.

Walk-ups may pay at the door if extra seats are available.

HGS North American Dinner Meeting

HGS North American Meeting

No information available at press time.
Please check the HGS website (www.hgs.org) for updates.

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	The HGS prefers that you make your reservations on-line through the HGS website at www.hgs.org . If you have no Internet access, you can e-mail reservations@hgs.org , or call the office at 713-463-9476. Reservations for HGS meetings must be made or cancelled by the date shown on the HGS Website calendar, normally that is 24 hours before hand or on the last business day before the event. If you make your reservation on the Website or by email, an email confirmation will be sent to you. If you do not receive a confirmation, check with the Webmaster@hgs.org. Once the meals are ordered and name tags and lists are prepared, no more reservations can be added even if they are sent. No-shows will be billed.		Dinner Meetings members..... \$45 Emeritus/Honorary members..... \$40 Student members..... \$10 Nonmembers & walk-ups..... \$50 Except - Env. & Eng. \$30 Nonmembers & walk-ups..... \$35 Emeritus/Honorary members..... \$15
4	5	6 HGS Board Meeting 6 p.m.	7
11	12 HGS International Dinner Meeting “The Present-day Mexican-USA Gulf of Mexico: Analog for Cretaceous-Paleogene Allochthonous Salt Canopies of the Western Mediterranean,” Joan Flinch, Page 15	13	14 HGS Environmental & Engineering Dinner Meeting “Horizontal Environmental Drilling 101 – An Introduction to Horizontal Environmental Well Installation,” David Bardsley, Page 23
18	19 HGS Legends Night 2015 Honoring the Legends That Mold the Geoscientists of Tomorrow Brian Lock Chris Zahn Page 25	20 HGS Northsiders Luncheon Meeting “Tectono-stratigraphic Evolution of the Centaur 3D Survey Area, Exmouth Plateau, North West Shelf, Australia,” Sasha Gumprecht, Page 27	21
25	26 HGS North American Dinner Meeting See www.hgs.org for details	27	28

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GEOEVENTS

Thursday
Friday
Saturday



1	2 Don't wait, make your reservations online at www.hgs.org	3
8	9	10
15	16	17
22	23	24
29	30	31

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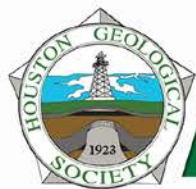
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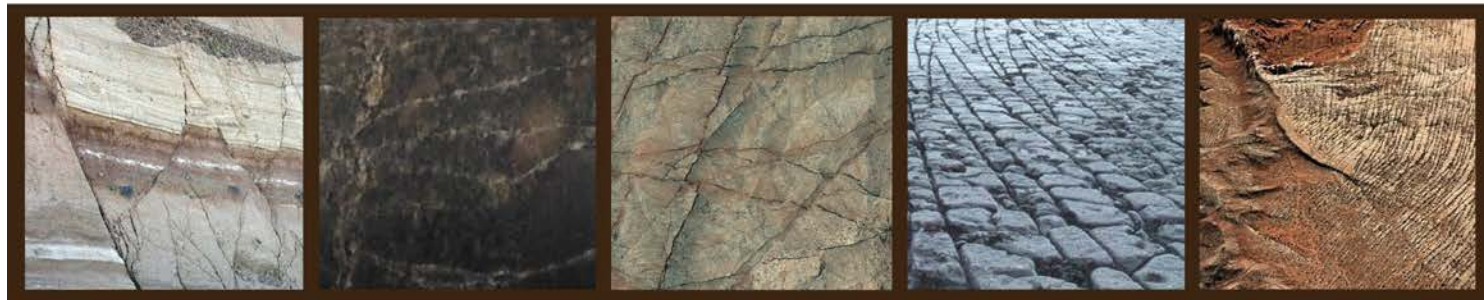
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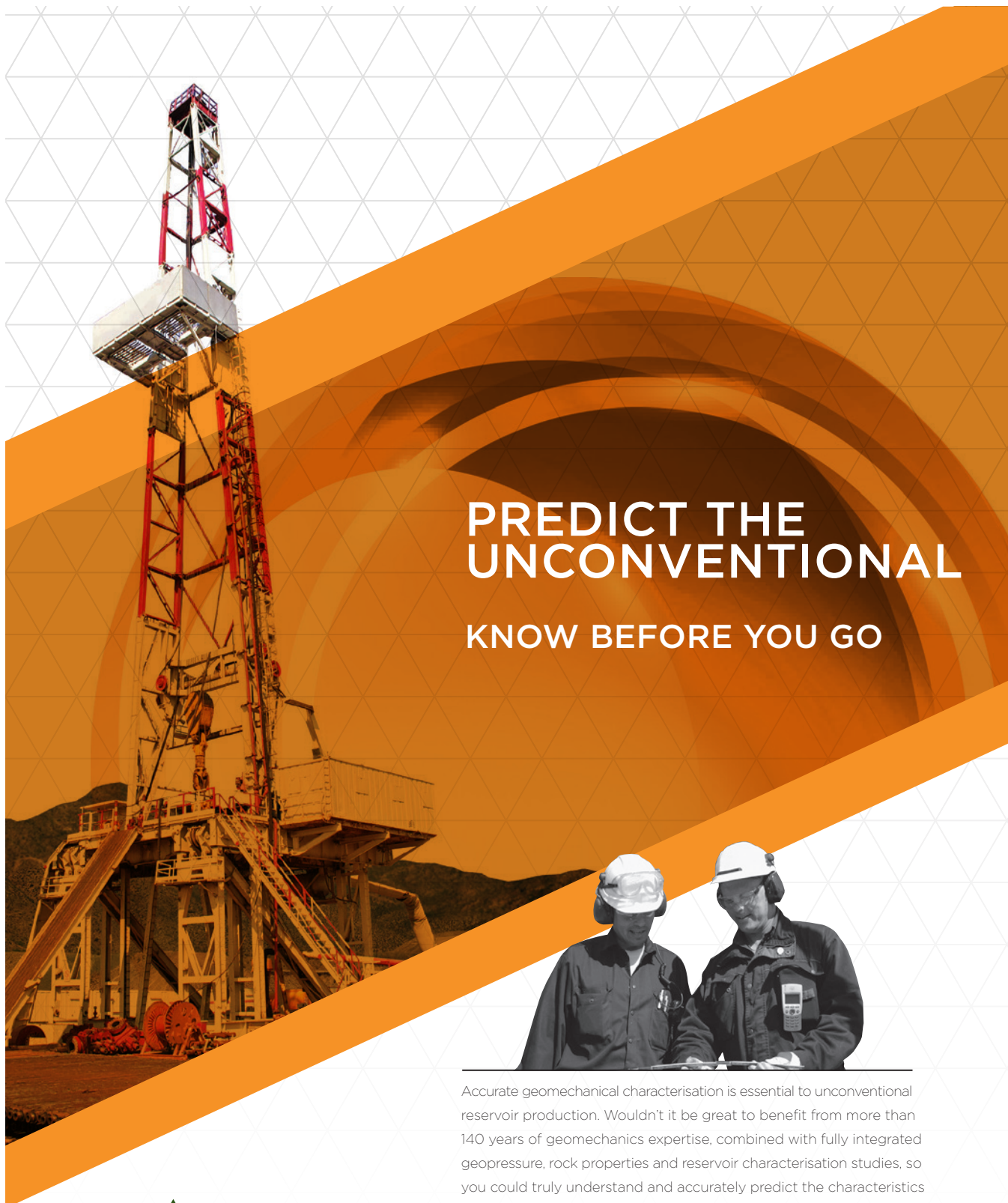
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Earth Science Celebration at HMNS

by Sharon Choens and Inda Immega



HGS Neal Immega and SJ students setting up shark table

The Houston Geological Society (HGS) and Houston Museum of Natural Science (HMNS) hosted Houston's fifteenth annual Earth Science Celebration at the Museum on October 11, 2014. This event kicks off Earth Science Week, an international celebration of earth science coordinated by the American Geological Institute.

Over 375 children completed the passport program, which guided them through "Earth's Connected Systems". As the participants went from station to station (staffed by representatives from local geoscience societies, geoscientists from energy companies, Museum volunteers and students from local colleges), they interacted with experts and asked questions about geophysics, geology and micropaleontology. The Consumer Energy Alliance and HMNS's Energy Conservation Club passed out conservation

information. Passports duly stamped, everyone returned to the "headquarters" to collect a gift bag featuring a National Geographic *Kids' Rocks and Minerals* book and labeled rock, mineral and fossil specimens.

Teachers attending the event received an AGI Toolkit for their classroom.

HGS volunteers **Sharon Choens** and **Inda Immega** served as event Chairs. Many thanks to the HMNS staff for their support and to the more than 54 volunteers who assisted with the event. A special thanks to the participating groups who organized and staffed "passport stations": CEA, Oxy Women's Group, GCSSEPM/NAMS, GSH, HGMS, and to our college student volunteers. ■ **Earth Science Celebration at HMNS** continued on page 37

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Stacy and Josh Sundgren at the Mesozoic TC



Prize station Sharon Choens and San Jac student



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Earth Science Celebration at Whiskey Bridge

by Marc Fagelman and Penny Patterson

Earth Science Celebration at Whiskey Bridge



On Sunday October 19, 2014 The Houston Geological Society (HGS) hosted a family-friendly field trip to Whiskey Bridge, located on Hwy 21 about 7-8 miles west of Bryan, TX. The field trip was part of the Earth Science Week (ESW) initiative that focuses on engaging the community to learn about the earth and its dynamic processes.

The Whiskey Bridge field trip was an opportunity to collect a wide variety of marine fossils including gastropods, bivalves, scaphopods, and corals at one of the most prolific sites in Texas. Several geologists including our own committee chair **Penny Patterson** from the HGS were on hand to help the visitors with identification of fossils and answer questions.

The Sunday afternoon of the field trip was magnificent with a clear blue sky and temperatures in the mid 80°F; it brought about a record breaking attendance of over 200 people. Field-trip attendees ranged in age from roughly 2 years old to over 70 years

young and included families as well as high school and college students who were studying the outcrops for their class exercises. Field-trip attendees were first greeted by our committee **Rock Stars: Sharon Choens, Inda Immega, Claudia Ludwig, Marc Fagelman and Martha McRae** who got folks signed in and oriented to the site. **Ken Theis** provided visitors a brief geologic overview on the stratigraphy of the Early Tertiary, Eocene, in Texas and how the geology of this site relates to oil and gas exploration for our guests just before they descended onto the river bank.

The field-trip attendees then went down to the outcrops near the embankment of the Brazos River, where they were treated to an in-depth discussion by Neil Immega regarding the sedimentary intervals and the diversity and abundance of the fossils observed in these strata. All field-trip attendees marveled at the variety of fossils present in these rocks, developed new insights into the world of geology and enjoyed a splendid afternoon. ■

Earth Science Celebration at Whiskey Bridge continued on page 41

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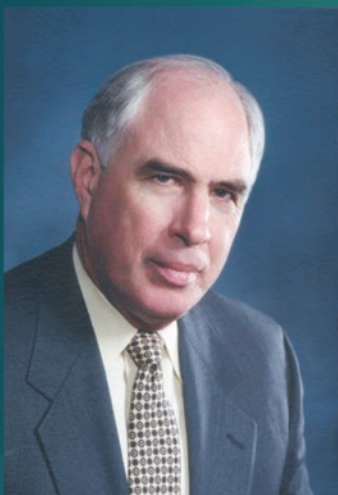




2015 G S H - S E G SPRING SYMPOSIUM & EXHIBITION



Exploration frontiers: New targets, new techniques



Leon Thomsen
Honoree

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Tuesday, 10 March**

10-11 March 2015

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Early registration is open!

More Activity for Outreach Volunteers

by Janet Combes

Sally Ride Festival

The Houston Geological Society participates in several K-12 outreach programs every fall. This year's Sally Ride Science Festival was held on Saturday, October 25 at Rice University for middle-school girls interested in science, technology, engineering and math (STEM). The event was attended by nearly a 1000 students with hundreds stopping by the HGS booth during the Festival. From the start of the event to the end, our HGS volunteers – **Alana Goycochea, Allison de Wynter, Aubrey Waddail, Cynthia Palomares, Jim Tucker, Kevo Bocco, Nick Longo, and Scott Wallace** – were all busy answering questions about petroleum exploration and environmental geology. Many of the students enjoyed the experience of observing rock samples using a magnifier and making geological observations. Attending teachers were given Texas Rock Kits, page size geologic maps of Texas and water cycle charts while all attendees were given samples of rock salt.

Requests from students for the Texas Rock Kits, assembled by the Bureau of Economic Geology and sponsored by the Association of Environmental & Engineering Geologists Texas Section (AEG), continued throughout the fair. After most of the visiting teachers received theirs, volunteers began handing them out to students who specifically asked for the Kits. A total of 100 Texas Rock Kits were distributed.

Also very popular were samples of rock salt provided by the United Salt Corporation from the Hockley Salt Mine. The kids were given samples and asked to guess what they were. When they found out they were holding rock salt that came from a mine near Houston – what a surprise. Then students were told each time they put salt on their eggs, they were eating rocks; many said they'd stop eating eggs!



THANKS TO
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for the rock salt samples



Requests were made for online resources for teachers to reference when encouraging students to take an interest in earth science; and several inquiries were regarding speakers for classroom visits. Both of these are for future consideration...

The saying "pictures are worth a thousand words" is true in this case – look at the interest and excitement of the students and the volunteers. ■



Jim Tucker shows students geologic maps and bag of salt rock.



Scott Wallace and Alana Goycochea with the rest of the street fair behind them.



Kevo Bocco explains where the salt came from.

More Activity for Outreach Volunteers continued on page 45

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Place it in your diary now,

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Peter Woodroof, Chairman



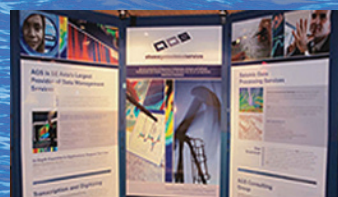
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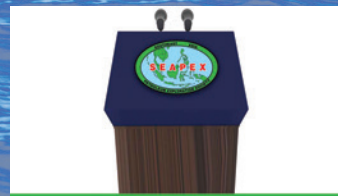
Petroleum Geology Course



Poster Panels



Social Events



Farm Out Forum



Golf & Tennis

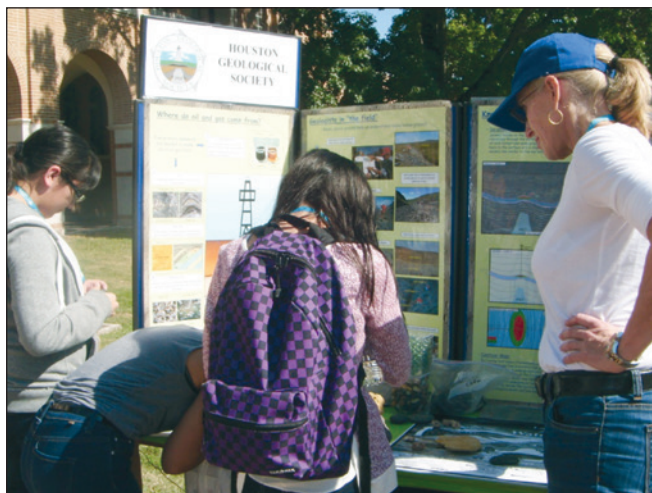


APSC

*For talk proposals, please contact
peter.woodroof@petrofac.com or chris.howells@tgs.com.
See events and register online at www.seapexconf.org



Nick Longo and Aubrey Waddail – what's next?



Allison de Wynter with students at the HGS display posters.



Cynthia Palomares describing a rock sample to the students.

**Thanks to The
Association of
Environmental & Engineering
Geologists
- AEG Texas Section -
for the Texas rock kits**



More Activity for Outreach Volunteers continued on page 47



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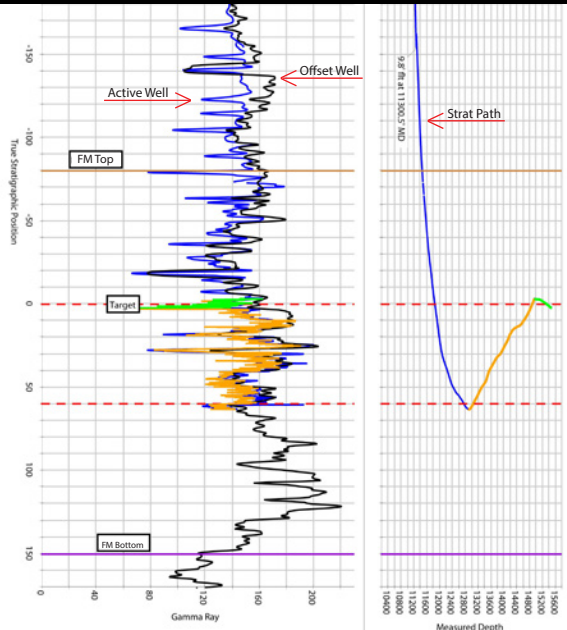
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Houston Gem and Mineral Show

Several weeks later, on November 7-9, the HGS K12 booth and multiple volunteers came to the Houston Gem and Mineral Show where 1500 school kids came through on field trips on Friday while Saturday had several hundred Boy and Girl Scouts working on geology badges. Sunday was also busy with families in attendance. The kids, the parents, and the volunteers all had fun and learned from the experience – see the grins in the photos. It was great when the kids were saying under their breaths..."I love this place!"

Volunteers included **Jim Flis**, **Huw James**, **Gerrit Wind**, **Linda Sternbach**, **Michelle Pittenger**, **Savannah Pittenger**, **Laura Lee Stanley**, **Bev De Jarnett**, **Nancy Engelhardt-Moore**, **Julia Waldsmith**, **Sara Heinlein**, **Alicia Kahn**, and **Janet Combes**. The HGS display area was shared with that of the Houston Museum of Natural Science (HMNS); **Inda Immega**, chair of the HGS Museum committee, made arrangements for the joint area, and saw that it was set up in an easy flow pattern. **Neal Immega** distributed fossil sharks' teeth at that end of the hall and **Tom** and **Melva DuBois** and **Karen Oganowski** staffed the HMNS activities.

At this event there were more rock salt samples to give away, provided by the Hockley Salt Mine; again very popular. Finding out that it was from a mine near Houston was very interesting to kids and the adults. Hand lenses, donated by OXY Petroleum, were used by the visitors on the various rock samples on display. Thanks to the United Salt Corporation's Hockley Salt Mine and to OXY Petroleum.



Another popular part of the HGS area was the display of 3-D maps – with the 3-D glasses – provided by **Jim Flis**. The HGS petroleum exploration posters were the subject of several of the questions in the students and scouts lists to answer. Undergraduate students from both Rice University and the University of Houston attended with extra-credit exercises that included questions for the HGS geologists, which frequently led to longer discussions on geology as a career.

Overall, a busy three days, with multiple groups, and many questions, and a lot of grins and excitement and interest. ■



Jim Flis, Gerrit Wind, and Linda Sternbach setting up exhibits on Friday morning.



Batman loved the rock that is salt, and the other kids did too. Thanks to the Hockley Salt Mine!

More Activity for Outreach Volunteers continued on page 49

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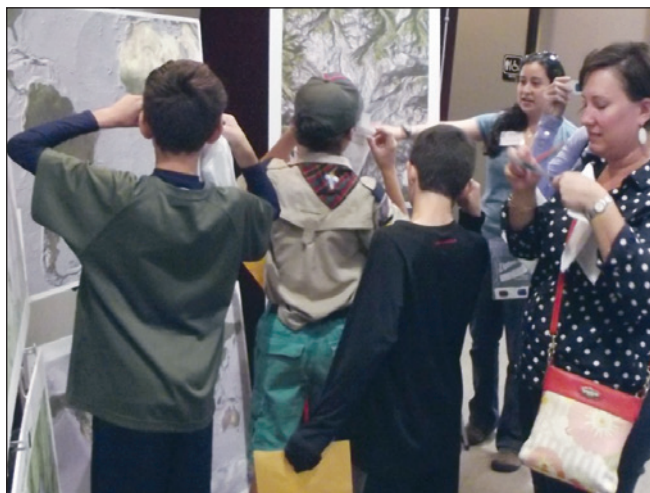
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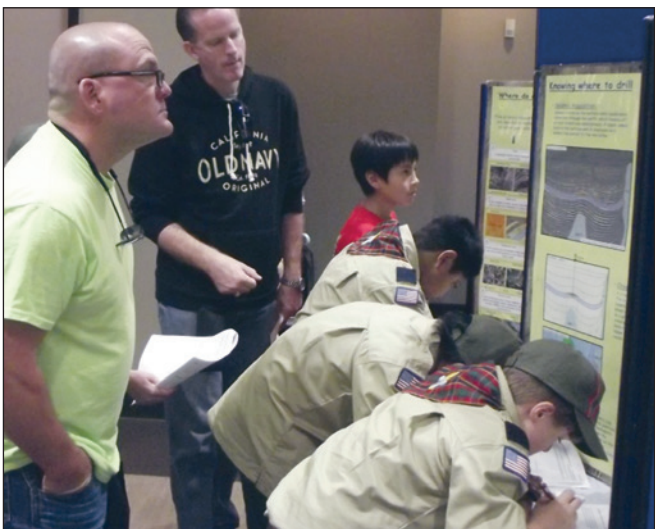
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The hand lenses provided by Oxy were popular.



Scouts and parents examining the 3-D maps.



Scouts answering questions about petroleum geology.



Savannah and Michelle Pittenger with the scouts and the rock samples.



View from the Museum station, with Neal Immega giving out sharks teeth and the HGS set-up in the background. Tom DuBois is in the blue shirt, Jim Flis is behind him and Melva DuBois is in the black sweater.



Families were interested in how to find oil and gas.

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Gulf Coast Association of Geological Societies (GCAGS): Benefits and Big Plans for 2014/2015!

by Charles A. Sternbach, President GCAGS 2014/2015



GCAGS Leadership Team photo, GCAGS Annual Meeting, Lafayette, Louisiana Oct. 5, 2014

I am frequently reminded about the importance of communication. Good communication is particularly important to the GCAGS, its approximately 9,000 members, and its 13 affiliated member societies. HGS members reading this article are also members of GCAGS. So with that in mind I want to communicate to you that important things are happening in the GCAGS in 2014/2015! This year we celebrate strength in unity with the theme “united we explore, united we learn”.

HGS is one of many bright stars in the GCAGS constellation. I think it is exciting that the affiliated societies can work together to help each other in creative ways through GCAGS.

GCAGS is sending out a Benefits of GCAGS letter to the 13 member societies, their presidents, and board members. You too can read about the many benefits GCAGS provides its member societies on the accompanying list. In addition to sharing the benefits GCAGS provides, we want to energize member societies by highlighting their most notable meetings, short courses, publications and events in 2015. By helping raise awareness of the quality of these programs through future communications, I believe we will also stimulate interest and increased participation in local programs in the broader community of GCAGS members.

As many of you know, HGS will be the Host Society for the 65th Annual GCAGS Convention at the George R. Brown Convention Center September 20-22, 2015. **Larry Bartell** is the General

Chair. We have assembled an outstanding leadership team for the conference. Many members of HGS and young professionals are leading this convention energetically. The call for papers is underway. Please consider this opportunity to present (or publish) a paper on Gulf Coast geoscience (if you have not already signed up). Whereas the flavor of last year's hugely successful



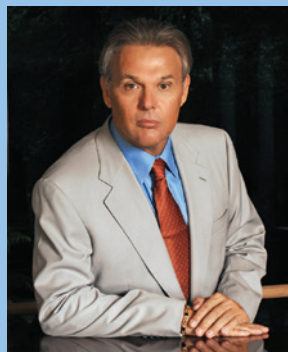
GCAGS convention in Lafayette, LA 2014 was decidedly Cajun, the upcoming conference in Houston 2015 promises to be a bit more Tex Mex!

The GCAGS 2015 Annual Convention committee is working to involve the SEG/ AAPG Student Expo jointly in creative ways. It will be especially exciting to see an estimated 800 BS, MS, and PhD geoscientists who presently are preparing to enter our industry become better involved with industry professionals attending GCAGS. Special thanks go to **Martha Lou Broussard**, **Cecilia Ramirez**, and the expo leadership team for working with the GCAGS leadership team.

Finally, GCAGS recognizes outstanding volunteers with awards at the annual convention. I would like to encourage you to nominate worthy candidates to receive their recognition in Houston. Contact **Mary Broussard**, chair of the GCAGS Awards and Nominations committee (Mary_Broussard@fmi.com). ■



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The 6th Annual AAPG Deepwater and Shelf Reservoirs Geosciences Technology Workshop will bring together the latest developments in geology, engineering, geophysics and geochemistry in order to determine the best possible ways to understand and develop fields, as well as identify bold new exploration targets.

Focus will be concentrated on the Gulf of Mexico, shelf and deepwater, including Mexico water.

Reserve your space now to learn how and where new knowledge and technology in geology, engineering and geophysics come together to make deepwater and shelf exploration and development more successful.



Visit us for more information.
aapg.to/DeepwaterGTW2015



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A JOINT AAPG/EAGE GEOSCIENCES TECHNOLOGY WORKSHOP

Carbonate Plays Around the World – Analogues to Support Exploration and Development

4-5 February 2015 – New Orleans, LA

The goal of the workshop is to improve understanding of carbonate play types around the world, and to optimize efforts by using analogues for poorly understood discoveries, and challenging reservoirs where characterization may be complex. Studies will include microbialites in Brazil, carbonate-dominated unconventional, and diagenetically altered reservoirs, along with other case studies and research.

By focusing on case studies, we will incorporate the effective technologies that can lead to a better understanding of reservoir behaviors and optimization strategies. We welcome papers that include some of the following topics:

- 3D seismic and sequence stratigraphy
- Imaging / image logs to determine fractures and fracture networks
- Carbonates behaviors in horizontals with induced fracture
- Geochemistry and geochemical processes in generation
- Geomechanical factors and transport mechanisms
- Data mining and analytics
- Petrophysical analyses and modeling
- Depositional environments and connection to reservoir characterization
- Palynology and biostratigraphic advances



Register now to reserve your seat!
aapg.to/CarbonatePlaysGTW2015



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GCAGS Benefits

1. **65th Annual Convention and Exhibition**

hosted by the Houston Geological Society, Sept 20-22, 2015, George R. Brown Conv. Center, Houston, Texas

Paper themes:

- New Oil and Gas Discoveries
- Unconventional Plays
- Development Field Studies
- GOM Shelf and Onshore Plays
- Salt Tectonics and Traps
- Mexico and Caribbean Plays
- Gulf of Mexico Deepwater
- Environmental Geology
- Coastal Geology and Surface Impact
- Geology-Geophysics-Engineering
- Portfolio Management
- Geophysical Technology

Call for Papers webpage: www.gcagshouston.com or contact Linda Sternbach, Technical Program Chair, at linda.sternbach@gmail.com.

2. **Society Representative on the GCAGS Board of Directors:**

The Gulf Coast Association of Geological Societies (GCAGS) has 13 affiliated societies. The affiliated societies are the core of the GCAGS. The President of each affiliated society (or his or her representative) is a voting member of the GCAGS Board of Directors. As such, the societies have a strong voice in the decisions made by the GCAGS Board of Directors.

3. **AAPG Advisory Council Representation:**

The Gulf Coast Section is the largest AAPG Section with close to 9000 members. Because of its size, the GCAGS has two Advisory Council Section Representatives while the other Sections have only one. "The AAPG Advisory Council serves in an advisory capacity to the AAPG Executive Committee. They report on matters involving ethics and discipline, long-range planning, constitutional review, nominations for officers and honors and awards and other special projects as requested by the Executive Committee."

4. **GCAGS Student and Faculty Grants:**

Each year the GCAGS awards \$20,000 in scholarship grant money to approximately 20 deserving graduate or PhD students in the Gulf Coast area. In addition, the GCAGS awards \$10,000 to two faculty members to support their research on Gulf Coast geology.

5. **GCAGS Scholarship Fund Matching Program:**

The GCAGS periodically initiates a Scholarship Fund-Matching Program for the societies. This is a great opportunity for the societies to double the value of donations going to their scholarship foundations, and in turn, help deserving geoscience students in their local areas. The total value of the annual donations from the GCAGS is \$195,500.

6. **Travel to Student Chapter Leadership Summit:**

Each year the GCAGS provides \$1000 in support for student travel to the AAPG Student Chapter Leadership Summit. Summit attendees participate in training, interact with AAPG leadership, and establish mentoring relationships.

7. **Advertising:**

Every year each GCAGS Affiliated Society receives a free ¼ page of advertising space (black and white) in the AAPG Explorer.

8. **Sponsorship of Section Level Imperial Barrel Award (IBA) Competition:**

If sufficient corporate funding is not raised, the GCAGS will donate \$5000 (on an annual basis) to sponsor the Gulf Coast Section IBA competition. The GCAGS also volunteers to host the Gulf Coast Section university IBA teams and administer the entire event, including one-day training for all participants. The IBA program is hugely popular with the students and industry support has grown immensely over the last few years. Two Gulf Coast universities have won the Global IBA competition: The University of Texas - Austin (1 victory), and the University of Louisiana - Lafayette (2 victories).

9. **Honors and Awards:**

Every year members of GCAGS' affiliated societies are nominated by their peers for awards for their service and accomplishments at the Society, Section and National AAPG levels. Winners are recognized with an award plaque at the GCAGS Convention.

10. **Teacher of the Year Award:**

In addition to an award plaque, the GCAGS gives \$2,000 to the winner of the Owen R. Hopkins Outstanding Earth Science Teacher Award (\$1500 for personal use and \$500 for use by their school) and an expense paid trip to the Annual GCAGS Convention.

11. **GCAGS Transactions:**

Professional registrants for the GCAGS Convention receive an electronic version (CD, flash drive) of the GCAGS Transactions with their registration fee.

12. **GCAGS Journal:**

The *GCAGS Journal* is a peer-reviewed premier publication dedicated to Gulf Coast geoscience research and concepts. Contact Barry J. Katz BarryKatz@chevron.com

13. **WWW.GCAGS.ORG:**

The GCAGS website is linked to local society websites. New material, comments, updates, etc. are welcome.

14. **Social Media:**

Ability to send out updates on GCAGS events. Contact Dianna Phu dianna.phu@intecsea.com

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Description and Interpretation of Shale Facies	March 25-26, 2015 Tulsa, OK
Basic Well Log Analysis	April 20-24, 2015 Austin, TX
Petrophysical Analysis & Integrated Approach to the Study of Carbonate Reservoirs	April 21-23, 2015 Austin, TX

FIELD SEMINARS

Field Safety Course for Field Trip Leaders	March 18-19, 2015 Houston, TX
Modern Terrigenous Clastic Depositional Systems	April 29-May 6, 2015 S. Carolina
Sequence Stratigraphy, Facies Architecture and Reservoir Characteristics of Fluvial, Deltaic and Strand-Plain Deposits	May 1-8, 2015 Utah
Geology of Grand Canyon, Bryce Canyon & Zion National Park	May 23-29, 2015 Nevada

HEDBERG CONFERENCE

The Future of Basin and Petroleum Systems Modeling <i>Call for Abstracts now open!</i>	August 9-14, 2014 Santa Barbara, CA Deadline: April 1, 2015
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Education



Government Update

by Henry M. Wise, P.G. and Arlin Howles, P.G.

If you'd like the most up-to-date Texas rules, regulations, and governmental meeting information we direct you to the HGS website to review The Wise Report. This report, which comes out as needed but not more often than once a week, offers the most up-to-date information that may be of interest to Texas geologists.

AGI Geoscience Policy Monthly Review (October 2014)

NASA Begins Sixth Year of Flights Studying Polar Ice Changes

On October 16, 2014 NASA's Operation IceBridge Mission began its sixth season of airborne studies in Antarctica. The research flights monitor ice sheets, glaciers, and sea ice conditions to provide baseline measurements before the ICE-Sat2 satellite launches in 2017.

The flights will investigate unsurveyed areas of the Antarctic, as well as rapidly changing glaciers and ice shelves. Trends in ice thickness and mass vary widely across the continent, and scientists hope that new data will help them better understand the processes controlling land and sea ice.

Ice sheets and glaciers are of particular interest because they contribute directly to rising sea levels as they melt. For example, the unstable West Antarctic ice sheet contains enough water to raise sea level by 10-15 feet over the next several centuries. Sea ice itself does not contribute to sea level rise because it already floats on the ocean, but it does provide an important buffer that protects continental ice shelves from waves and warming water temperatures. Scientists hypothesize that decreasing sea ice in the Arctic and Antarctic may have played a role in recent ice shelf collapses.

Pentagon Report Warns of Climate Change Threats to National Security

Climate change "poses immediate risks to U.S. national security," according to a Pentagon report released on October 13, 2014. The report lays out an "adaptation roadmap" that identifies challenges that may be exacerbated in the future by rising global temperatures and outlines strategies to manage them.

The report identifies climate-specific risks, such as military bases affected by rising sea level or increased demand for disaster relief after severe weather events, as well as broader issues such as climate acting as a "threat multiplier" that will complicate issues such as infectious disease and armed insurgencies. The roadmap emphasizes the importance of domestic and international cooperation in facing these challenges that will cross agency lines and national borders.

Critics of the report suggested that resolving ongoing military conflicts in Syria and Ukraine may be a more appropriate use of the Pentagon's time and resources. However, defenders of

the report point to the role climate plays in current and future humanitarian issues that can increase tensions in unstable regions, leading to unrest and potential military involvement.

House Democrats Urge BLM to Take Action on Illegal Drilling

Following the recent release of a report by the Department of the Interior's Office of Inspector General (OIG), four House Democrats sent a letter to the Bureau of Land Management (BLM) encouraging it to strengthen its policies for preventing illegal drilling for federal mineral resources, which include oil and gas resources. The report found that BLM does not adequately deter illegal drilling for minerals on federal lands and has no official policy for discovering violations.

House Natural Resources Committee Ranking Member Peter DeFazio (D-WA), Energy and Mineral Resources Subcommittee Ranking Member Rush Holt (D-NJ), and Representatives Alan Lowenthal (D-CA) and Jared Huffman (D-CA) signed the letter which identifies two key issues: trespass, or illegal productions of federal minerals, and drilling without approval. A combination of horizontal drilling practices that extend well bores for miles and patchwork land rights in many areas make it difficult to identify when companies produce minerals without authorization, whether intentionally or not. Subsequently, illegal drilling creates safety and environmental concerns and does not allow for taxpayers to receive all tax revenue. The letter reiterates the importance of developing responses to illegal drilling and acknowledges Congress' obligation to provide funding to support these activities.

In light of the report BLM is reviewing OIG's recommendations and will work to "strengthen [its] policies and procedures."

U.S. Forest Service Study Will Examine Effects of Wildfire on Watersheds

Scientists of the U.S. Forest Service (USFS) are beginning a three-year study to examine how wildfires affect water supplies. Water shortages are a major concern in the arid regions of the western U.S., and the risk of large wildfires increases as global temperatures rise. This study will help identify which watersheds are at highest risk and explore how problems could be mitigated.

Wildfires can affect both water quality and quantity downstream. For example, a large, high-intensity fire can burn most trees in a watershed, so that very little rainfall is retained by the bare

Government Update continued on page 57

The University of Texas at Austin

Research Position in Clastic Sedimentology

The Bureau of Economic Geology, Jackson School of Geosciences at The University of Texas in Austin invites applicants for a full time research position in clastic sedimentology and stratigraphy. We seek an experienced candidate to conduct cutting edge research and lead the Quantitative Clastics Laboratory (QCL), a consortium-funded research group focused on the description, analysis, and quantification (morphometrics) of clastic depositional systems that are potential reservoir analogues.

This is a senior-level position. Requirements include a PhD in geology or closely related field, five to ten years of post-PhD experience, a strong record of publishing, evidence of successful leadership, as well as the ability to acquire and retain industry sponsors.

The candidate's research focus could include, but would not be limited to, source-to-sink dynamics, process sedimentology, evolution of complex continental margin settings, basin analysis, sequence stratigraphy, and application of seismic geomorphology to reservoir characterization. The candidate should be motivated to work with colleagues in developing improved understanding of scaling issues from the core to seismic level, including the roles of outcrop description and physical modeling. A strong desire and ability to successfully sponsor PhD and Master's level students is also highly valued.

Success in this position requires a desire to lead a small team, and to craft a long-term vision that will result in growing and sustaining the QCL. Abundant opportunities exist for collaborating with industry researchers, interacting with other researchers and faculty of the Jackson School, advising graduate students, and acquiring or sharing laboratory and field equipment.

Preference will be given to candidates with deepwater clastics systems expertise, and those who have an appreciation of energy industry needs and challenges.

The Bureau of Economic Geology, with a staff of 250 including approximately 60 graduate student research assistants, is the oldest research unit of The University of Texas at Austin. The Bureau hosts ten research consortia, strongly supported by industry. We enjoy outstanding IT resources and support. The Bureau has a diverse workforce, extensive laboratory facilities, and operates the largest rock-core collection in the U.S. (~1500 miles of core). The Jackson School of Geosciences is highly ranked and is the largest U.S. geoscience program. Austin is a thriving city of about 1 million, renowned for live music and Texas Hill Country ambiance.

Candidates can apply at the Research Scientist or the Senior Research Scientist level, depending upon qualifications. Go to <https://utdirect.utexas.edu/apps/hr/jobs/nlogon/search/0/> for complete description and to apply for posting number 141111010702 (Research Scientist) or 141111010701 (Senior Research Scientist).

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soil. As a result, large volumes of water run off into drainages, leading to erosion, landslides, flash floods, and an influx of ash and sediment into the water supply. Conversely, overgrowth of vegetation due to lack of fires in an ecosystem can pull water from the soil and decrease runoff.

USFS scientists will investigate mitigation strategies like forest thinning and prescribed burns on a larger scale than in previous work. The study results will have implications for more than 180 million people that rely on watersheds under USFS management.

White House Introduces New Plan to Protect Federal Lands from Climate Change

On October 8, 2014 the White House unveiled a new agenda to protect federal lands against the impacts of changing climate by conserving and restoring natural resources and carbon sinks. The agenda is part of President Obama's Climate Action Plan and details strategies to promote climate resiliency, community preparedness, and natural carbon sequestration.

The new agenda, "Enhancing the Climate Resilience of America's Natural Resources," outlines partnerships between federal agencies and local communities to monitor ecosystems and improve land-use management, and it identifies four key strategies to protect federal lands. These include fostering climate-resilient lands and waters, managing and enhancing carbon sinks, enhancing community preparedness through natural resource management, and modernizing federal programs to improve climate resilience.

The agenda is accompanied by climate-related programs and reports from several federal agencies. The Department of Agriculture announced a new competition to promote sustainable use of wood, and the National Oceanic and Atmospheric Administration announced plans to enhance resilience in coastal economies. The Army Corps of Engineers also released a report demonstrating that a third of its coastal projects will be impacted by sea level rise resulting from climate change.

Alaska Commission Asks That Resource Development be Priority for Arctic Council

The Alaska Arctic Policy Commission has asked the U.S. State

Department to prioritize Arctic resource extraction during the 2-year U.S. chairmanship of the Arctic Council starting in 2015. The Arctic Council is an intergovernmental committee composed of eight member countries with territory in the Arctic Circle as well as Arctic Indigenous communities and a number of non-Arctic observer states. The U.S. will chair the Council from May 2015 to May 2017.

The Commission's letter expresses concern for jobs and economic stability in Alaska and discourages expanding wilderness areas or regulation. Alaska relies on oil industry revenues for 90 percent of the state's discretionary budget, so resource development is of particular interest. The Commission also requested that the White House form an Arctic Council Advisory Committee, composed of state, local and Alaska Native representatives, to increase stakeholder involvement in the U.S. chairmanship.

The Commission requested federal assistance for Native communities affected by climate change, including villages along the northwest coast of Alaska where changing shorelines and melting permafrost threaten infrastructure.

UK Opens Space Weather Forecasting Center

The United Kingdom (UK) opened its first space weather forecasting center, the Met Office Space Weather Operations Center, on October 9, 2014 in Exeter, England. The center will work in conjunction with its U.S. counterpart, the National Weather Service's Space Weather Prediction Center (SWPC) to improve global predictions of space weather impacts.

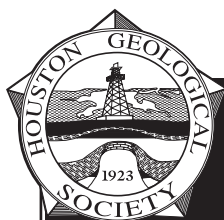
Space weather refers to magnetic fields and radiation, as well as particles, and matter ejected from the Sun that interact with the Earth's upper atmosphere and surrounding magnetic field. This interaction can lead to interruptions in satellite communications and global positioning systems (GPS), disruption of power grids, and damage to spacecraft. Cooperation between the two centers will allow scientists to gather more data and improve predictions as to when space weather may cause disruptions and how to mitigate those issues. ■



HOUSTON GEOLOGICAL SOCIETY presents

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HGS Welcomes New Members

New Members Effective November 2014

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Timothy Shin
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Bruce Handley

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Hang Deng
Eric Gottlieb
Ningjie Hu
Brian Jordan
Sydney Steele
Jillian Stockton
Tengfei Wu

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loydtuttle@comcast.net

Bob Liska

liska.bob@gmail.com

Jim Thorpe

thorpejim@comcast.net

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Meet Brittany Davis-Morris

Please join us in welcoming Brittany Davis-Morris as our new Web Content Manager. Working with us since early October, Brittany has already significantly improved how the HGS website looks and works.

After earning her B.S. in Computer Science at Southern University and A&M College in Baton Rouge, Brittany went to work for Raytheon Company in Massachusetts. After two years as a software engineer, she became an information systems (IS) security officer and acquired a "Secret" security clearance. Among her projects, she administered IS security procedures for the Department of Defense and helped to ensure that IS practices were meeting standards in the Defense Security Service. Moving with her husband to Houston in early 2013, Brittany interned in photo editing for PaperCity Magazine and in digital marketing for Memorial Herman. She has also freelanced in web design and development and in content writing.



Brittany is now applying her experience in social media, content writing, and content management to the HGS website and email blasts. She has quickly resolved many issues with our website appearance and processes.

Throughout the year, Brittany will join our new Office Director Andrea Peoples and our Administrative Assistant Jill Kimble at HGS events. We encourage you to get to know all three members of our HGS Staff. ■



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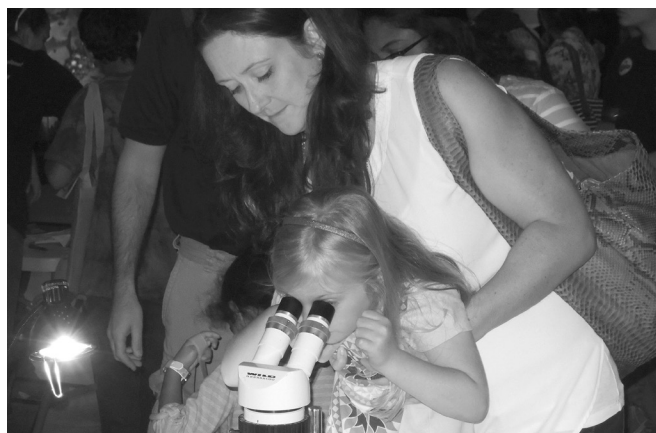
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More Earth Science Celebration at HMNS



HGS passport table: Mike Quintero and Neal Immega.





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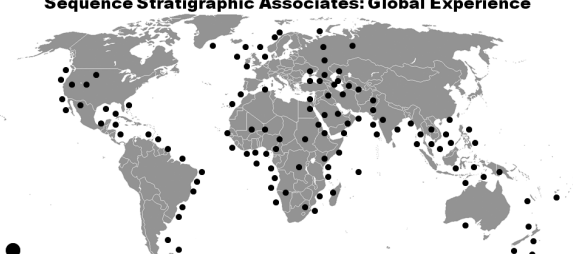
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please contact **Audrey Tompkins**, 713-581-0005. The **Petroleum Club Bridge Group** will be on hiatus until February 18. They are looking forward to their new venue as the Petroleum Club moves into the Total Building at 1201 Louisiana. In October there were 16 players; the winners were **Tommy Morrow, Daisy Wood** and **Norma Roady**. To join in the fun contact **Daisy Wood**, 832-581-3231.

On February 2 the Book Club will discuss Jennifer Chiaverini's book *Mrs. Lincoln's Dressmaker*. This is the true story of how a former slave became a friend and confidante to the wife of a president. There's still time to get the book and be ready for a stimulating morning. Call **Mickey Murrell** at 281-469-2272 for details. Future selections are *The Goldfinch* by Donna Tartt and *The Invention of Wings* by Sue Monk Kidd.

The next HPAC Exploring Houston event will be on February 19. Your committee is very busy exploring ideas for this special day. They promise to take us to places to which we have never been. Save the date and look for details in the next issue. We know you will want to participate.

Game Day will be here before you know it. The date is easy to remember – March 17, St. Patrick's Day! Be sure to wear something green. There will be all kinds of games – bridge, dominoes, kings on the corner, or bring the game of your choice. Bring your husband and friends so they can join in the fun and have a delicious lunch too. The place is the Braeburn Country Club. **Daisy Wood** and her committee will guarantee you a fun day.

Be sure to save the date of May 14 for our Annual Style Show and Luncheon at Maggiano's Little Italy. Fashions will be furnished by "It's All About You". This is always a special day. Under the chairmanship of **Kathi Hilterman**, this year will be no exception.

If you would like to join HPAC please contact **Susan Bell**, 11431 Legend Lane, Houston, TX 77082. Please include your name, address, telephone number, your husband's name and affiliation and a check for \$20. We hope to see you at our next event. ■

Directory of Oil Company Name Changes

24th Edition (April 2014)

New Edition

A new 24th edition, of the HGS publication, "Directory of Oil Company Name Changes," is now available through the Bureau of Economic Geology. This publication is a cross-referenced list of domestic oil and gas, exploration and production companies that have sold major assets or have changed their names due to a merger, acquisition or reorganization. The purpose of this directory is to provide an oil company road map that may assist geologists in tracking down logs, samples, test information, cores, paleo, drilling reports, production histories and other well data that may be obscured by these numerous name changes.

The cost of the directory is \$20.00 and it can be obtained from the BEG.

The contact information is as follows:

Bureau of Economic Geology

University of Texas in Austin

Attn: Publication Sales

University Station, Box X

Austin, Texas 78713-8924

Phone: (888) 839-4365 • www.beg.utexas.edu



HGS *Bulletin* Instructions to Authors

All materials are due by the 15th of the month, 6 weeks before issue publication. Abstracts should be 500 words or less; extended abstracts up to 1000 words; articles can be any length but brevity is preferred as we have a physical page limit within our current publishing contract. All submissions are subject to editorial review and revision.

Text should be submitted by email as an attached text or Word file or on a clearly labeled CD in Word format with a hardcopy printout to the Editor.

Figures, maps, diagrams, etc., should be digital files using Adobe Illustrator or Adobe Photoshop. Files should be saved and submitted in .ai, .eps, .tif or .jpg format. Send them as separate attachments via email or CD if they are larger than 5 MEGs each, accompanied by figure captions that include the file name of the desired image. DO NOT EMBED them into your text document; they must be sent as separate files from the text. DO NOT USE POWERPOINT, CLIP ART or Internet images (72-DPI resolution) as these do not have adequate resolution for the printed page and cannot be accepted. All digital files must have 300-DPI resolution or greater at the approximate size the figure will be printed.

Photographs may be digital or hard copy. Hard copies must be printed on glossy paper with the author's name, photo or figure number and caption on the back. Digital files must be submitted in .tif, .jpg or .eps format with 300-DPI or greater resolution at the printing size and be accompanied by figure captions that are linked by the file name of the image. The images should be submitted as individual email attachments (if less than 5 MB) or on CD or DVD.

Advertising

The *Bulletin* is printed digitally using InDesign. Call the HGS office for availability of ad space and for digital guidelines and necessary forms or email jill@hgs.org. Advertising is accepted on a space-available basis. **Deadline for submitting material is 6 weeks prior to the first of the month in which the ad appears.**

Random Inside Ad Placement Black & White Prices Shown Color add 30% to prices shown below					Specific Page Color Ad Placement					
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9	\$823	\$1,387	\$2,488	\$4,734						
8	\$750	\$1,260	\$2,242	\$4,307						
7	\$665	\$1,123	\$2,014	\$3,834						
6	\$590	\$990	\$1,782	\$3,392						\$1,890
5	\$497	\$837	\$1,503	\$2,860	\$4,698	\$4,536	\$4,466	\$4,104		
4	\$405	\$683	\$1,223	\$2,326						
3	\$327	\$550	\$990	\$1,886						\$1,080
2	\$232	\$392	\$704	\$1,339						
1	\$146	\$246	\$443	\$842	\$1,404	\$1,296	\$1,313	\$1,080	\$1,296	\$810
Professional Directory Section Business Card Ad 10 Issues – \$160 (\$30 for each additional name on same card)										

Website Advertising Opportunities

HGS has multiple website advertising opportunities for your company! We've expanded our offerings to include a 275 x 800 pixel, rotating banner ad on the front page of the website. We have kept the popular Event Calendar and Geo-Job Postings advertisement locations!

	Home page Banner	Home Page (200 x 400 pixels)	Event Calendar (200 x 400 pixels)	Geo-Jobs (120 x 90 pixels)	Website Business Card (Members Only)	Personal Resumes (Members Only)
One year	\$3,000.00	\$2,800.00	\$2,500.00	\$1,400.00	Free	Free
6 months	\$2,000.00	\$1,800.00	\$1,500.00	\$750.00	Free	Free
3 months	\$1,500.00	\$1,300.00	\$1,000.00	\$450.00	Free	Free
Monthly	\$700.00	\$500.00	\$400.00	\$200.00	Free	Free

We still offer Geo-Jobs - where your company can post job openings for 14 days at \$50.00 or 30 days at \$100.00.

For more information regarding website advertising visit HGS.org or email jill@hgs.org.



Application to Become a Member of the Houston Geological Society

January 2015

Qualifications for Active Membership

- 1) Have a degree in geology or an allied geoscience from an accredited college or university; or
- 2) Have a degree in science or engineering from an accredited college or university and have been engaged in the professional study or practice of earth science for at least five (5) years.

Qualifications for Associate Membership (including students)

- 1) Be involved in the application of the earth or allied sciences.
- 2) Be a full-time student enrolled in geology or in the related sciences.

Apply online at www.hgs.org and click on Join HGS

**Annual Dues Expire Each June 30. (Late renewals – \$5 re-instatement fee)
Annual dues are \$28.00; emeritus members pay \$14.00; students are free.**

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Telephone: 713-463-9476 Fax: 281-679-5504

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To the Executive Board: I hereby apply for ☐ Active or ☐ Associate membership in the Houston Geological Society and pledge to abide by its Constitution and Bylaws. ☐ Check here if a full-time student.

Name: _____

Address: _____

Home Phone: _____ Spouse's Name: _____

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Professional Interest:

☐ Environmental Geology ☐ North American E&P (other than Gulf Coast)

☐ International E&P ☐ Gulf Coast E&P (onshore & offshore)

School _____

Degree _____ Major _____ Year _____

School _____

Degree _____ Major _____ Year _____

Earth Science Work Experience _____

Applicant's Signature _____ Date _____

Endorsement by HGS member (not required if active AAPG member)

Name: _____

Signature _____ Date _____

Membership Chairman _____ HGS Secretary _____

revised 7/30/14

Houston Petroleum Auxiliary Council News

Janet Steinmetz, 281-531-7204

ATTENTION ALL HUSBANDS! Please share this article with you wife. All spouses of geologists, geophysicists, landmen and engineers are invited to join HPAC, an organization designed especially for you.

Happy New Year! Here we are in the year 2015! The ladies of HPAC are enjoying all their activities as they continue in fun and fellowship with other petroleum wives. In many cases this camaraderie has been welcome support during frequent transfers; we have an instant connection with new friends and renewing past friendships.

This month it is my pleasure to highlight longtime member **Linnie Edwards**. After reading her story, I think you'll agree she enjoys a full and adventuresome life.

Linnie grew up in West Tennessee. She graduated from Byars-Hall High School in Covington, TX. She then moved to Memphis where she lived with a cousin, went to work for one of the major worldwide cotton merchants, and took classes at the University of Tennessee at Memphis. Several years later, the company transferred her to their Houston office where she worked for another five years and took courses at the University of Houston-Downtown. Then she went to work for Standard Oil Company of Texas, which later became the Chevron Corporation. She became secretary to Chief Geophysicist Chuck Edwards and worked with him at three time intervals during the next 20 years. Chuck was widowed in 1979; Linnie and he were married in 1980. His job required extensive worldwide travel, and Linnie retired so she could travel with him. She joined the Geophysical Auxiliary of Houston, the Houston Geological Auxiliary and GeoWives in 1982. She was very active in each group, holding various offices in each one. She is the only member in the Houston who served as President of all three organizations. She currently is co-chair of HPAC's "Exploring Houston." In 2001 she was honored as the recipient of the annual HGS/HGA Distinguished Service Award.

As a child Linnie was very interested in geography and had a desire to travel to faraway places. Today she looks back to recall that she and Chuck have been fortunate to have visited six of the seven continents. Some of their experiences have included being chauffeured by friends from London through northern England into Scotland, visiting the Waterford factory in Ireland, and looking at graffiti on the Berlin wall shortly before it fell.

They have visited Denmark, Norway, Sweden and Finland. While enjoying brunch with friends in Paris, they had a great view of the Eiffel Tower; they went to casinos in Monaco and to the beach in Nice, drove along the Amalfi coast of Italy, and took the train through the Swiss Alps. Also, they admired the beauty of the Sydney Opera House and went fishing in Lake Rotorua on the north island of New Zealand. That night the hotel chef prepared their catch for their dinner. They visited a kiwi winery in

Australia, rode in a water taxi on the Grand Canal in Venice, ate wonderful pastries in Vienna, and visited a newly-drilled producing oil well in Hungary. Other experiences include visiting the pyramids in Egypt, coping with a three-day dust storm in Khartoum, having a crazy ride on an

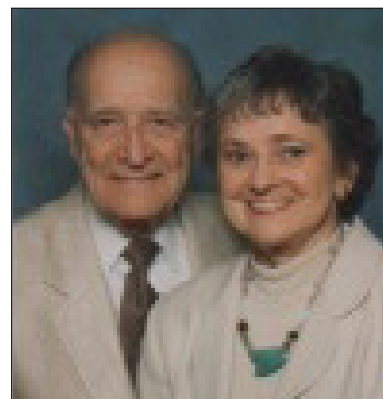
outdated train from Kiev to the Black Sea and picnicking in the desert outside Riyadh when an unexpected rain shower occurred and the windshield wipers didn't work! They visited Tiananmen Square, climbed the steps of the Great Wall of China, shopped in Hong Kong, had high tea with friends in Singapore, and stood on the equator in Sumatra. They went around the Horn on a cruise ship at the tip of South America, visited the Falkland Islands, counted penguins and flew over the research camps in Antarctica. They have been salmon fishing at Campbell River, B.C., and drove the length of Vancouver Island, stopping along the way to pick wild raspberries.

Although Linnie and Chuck do not travel very much anymore, Chuck still works while Linnie stays busy with her activities. She is an active member of Memorial Drive Presbyterian Church (the late Dolores Humphrey called it "Linnie's church"), serving as treasurer of their Sunday School class and Arrangements Chair for Venturers, the seniors group; she is also a member of a women's circle for Bible study and fellowship. In addition, she is on the Board of Directors for Holly Hall, a Christian Retirement Community, as well as an active member of the Harris County Master Gardeners Association and a monthly book club. Linnie and Chuck have an affinity for Chinese Pug doggies. They now have their sixth one - a rescue dog named Lindy. We are honored to have Linnie as one of our most loyal members.

The year 2014 went out with a bang at our Holiday luncheon. "Elvis" had a full house at the Junior League and put everyone in a festive mood; he knows how to work a crowd. The atmosphere was joyful; the food, delicious. Thanks again to **Shirley Gordon** and her committee.

Our Bridge Groups are always open to new members. **Cinco Más** will meet at the Westlake Marriott on January 8; to attend

HPAC News continued on page 61



You are invited to become a member of

HPAC

2014–2015 dues are \$20.00 Mail dues payment along with the completed information

to **Susan Bell** • 11431 Legend Manor • Houston, Texas 77082

YEARBOOK INFORMATION


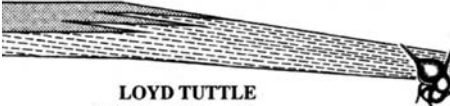










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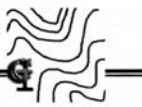
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www.petrophysicalsolutions.com



ROBERT BEAL
Director of Operations

Agile Seismic LLC
10590 Westoffice Dr.
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Houston, TX 77042
Office: 713-334-5091
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Kyle Hill
SALES REPRESENTATIVE

EMAIL
kyle.hill@zbytedata.com

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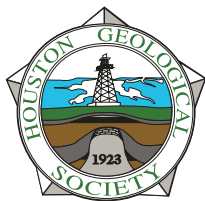
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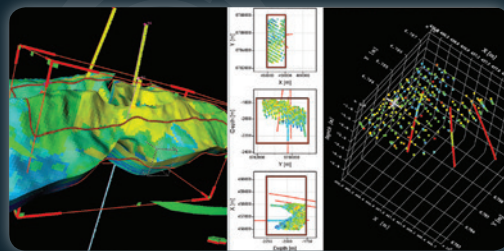
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