

HGS Bulletin

Volume 60, Number 10

Houston Geological Society

June 2018

**HGS GUEST NIGHT
EXPLORE THE NEW WIESS ENERGY HALL**

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Volume 60, Number 10

The Bulletin

Houston Geological Society

June 2018

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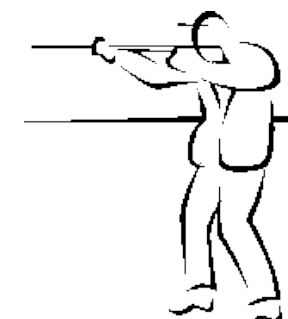
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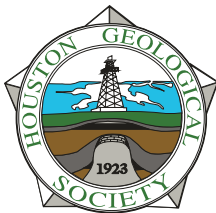
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The HGS Foundation Fund is a scholarship program designed specifically for undergraduate geoscience students from area universities.

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The 17th HGS-PESGB Conference on African E&P



Oral Presentations – Tuesday, September 11, 2018

7:30	Registration and Coffee	
8:15	Welcome and Opening Remarks: Brian W. Horn , <i>General Chair</i>	
8:20	Session 1 Chairs: Paul Haryott , <i>Rose & Associates</i> and Brian W. Horn , <i>Ion</i>	
	Theme 1 - African Exploration in the Evolving Business Environment - Above Ground Risks and Rewards	
8:25	Opening Keynote Address	Tim O’Hanlon (Tullov)
8:50	The Golden Age of Super Basins - An Afican Perspective	Charles Sternbach (AAPG Past President)
9:15	Entering the Next Phase of the Oil Price Cycle: What It Means for E&P in Sub-Saharan Africa	Emma Woodward (Drilling Info)
9:40	Coffee and Posters	
10:00	Theme 2 - New and Emerging Exploration Trendss	
10:25	Why is Everyone Excited About the Sao Tome and Principe EEZ; the Four Key Reasons Why This Has Been One of the Hottest Areas for Exploration in 2017	Matt Tyrrell (PGS), J. May, E. Mueller, O. D’Abreu
10:50	Compelling Evidence for Oil Offshore Angoche, Mozambique	Neil Hodgson (Spectrum), R. MacDonald, P. Hargereaves, K. Rodriguez
11:15	Chasing the TAGI Play into Morocco: Assessing the Contribution of Local Versus Regional Drainage Systems on the Character and Provenance of Upper Triassic Fluvial Deposits	Jonathan Redfern (University of Manchester), J. Lovell-Kennedy, J. Argent and J. Canning
11:40	Palaeozoic to Present: Assessing the Petroleum Potential of the Offshore Sirt Basin, Libya, Using Newly Reprocessed Regional-scale 2D Seismic Data	Lisa Fullarton (Ion), E. C. A. C. Gillbard, K. G. McDermott, N. Clarke, P. Bellingham
	Special Session: Exploration in Africa Past, Present and Future – Keys to Exploration Success and Disaster Avoidance	
12:05	Exploration in Africa Past, Present and Future – A Historical Perspective	Bob Fryklund (IHS)
12:20	Lunch and Special Session: Round Table Panel Discussion	
	Exploration in Africa Past, Present and Future – Keys to Exploration Success and Disaster Avoidance <i>Moderator:</i> Paul Haryott (Senior Assoc., Rose & Associates) <i>Panel:</i> Ernie Leyendecker (EVP Worldwide Exploration, Anadarko), Bob Fryklund (Chief Upstream Strategist, IHS), Dorrie McGuinness (VP Geology, Kosmos), Tim O’Hanlon (VP African Business, Tullov)	
13:30	Session 2 Chairs: Bill Dickson , <i>DIGS</i> and Pratt Barndollar , <i>Consultant</i>	
	Theme 2 - New and Emerging Exploration Trends (continued)	
13:35	Break-up Processes in the Presence of Plume Magmatism: New Insights into the Tectonostratigraphic Development and Petroleum Potential of the Austral South Atlantic	Ken G. McDermott (Ion), E. C. A. C. Gillbard, P. Bellingham, B. W. Horn
14:00	The Austral South Atlantic: Early Formation and Crustal Structure of the Orange and Cape Basins	Dale E. Bird (Bird Geophysical), S. A. Hall, D. J. McLean, P. J. Towle, J. V. Grant, and H. A. Danque
14:25	Post-rift Potential Source Rock Correlations and Prospectivity of the Deep Atlantic Conjugate Margins South of the Walvis Ridge	Ian Davison (Earthmoves), Duncan Wallace
14:55	Offshore Somalia: Source Rock Identification in a Frontier Margin	Neil Hodgson (Spectrum), H. Kearns, K. Rodriguez, B. Allen, D. Paton, and A. Abiikar Hussein (Spectrum)
15:20	Coffee and Posters	
15:45	Hunting the SNE in Guinea Bissau	Neil Hodgson (Spectrum), A. Intawong, and K. Rodriguez
16:10	Gabon’s Wild West Frontier Promises a Golden Age of Discovery for the Deep Offshore	Tony Younis (Impact Oil & Gas), M. Clutterbuck, P. Birch
16:35	Gabon Deep Offshore: New Petroleum System Insights from the Full Integration of Geology and Geophysics	Rob Crossley (CGG) and G. Duval
17:00	Evening Reception	

The 17th HGS-PESGB Conference on African E&P



Oral Presentations – Wednesday, September 12, 2018

8:00	Registration and Coffee	
8:40	Session 3 Chairs: Ana Krueger, University of Houston and Onochie Okonkwo, Anadarko	
	Theme 3 - Developing and Integrating Geological Concepts: Impact on Exploration in Africa	
8:45	Entrenched slope channel complex systems: reservoir opportunities through understanding architectural element distribution and application to West Africa E&P	Bryan Cronin (Tullow)
9:10	Towards the Development of an Integrated Central Atlantic Tectono-Stratigraphic Framework	Max Casson (University of Manchester), J. Redfern, L. G. Bulot, J. Jeremiah
9:35	Reservoir Modeling of a Deep-Water West African Reservoir: A Fully Integrated, Multi-Scenario Approach	Monica Miley (Anadarko), A. Dufournet, J. Villa, M. Bentley
10:00	Sedimentological Characteristics of Deepwater Sandstones Associated with Transgressive-Regressive Cycles Offshore Ghana	Luisa Man (CoreLab), Tom Wilson, Simon Greenfield
10:25	Coffee and Posters	
10:50	Magmatic Modification of African Crust: Implications for Strain Localization and Basin Subsidence	Cynthia Ebinger (Tulane University)
11:15	Dynamic Topography: How Mantle Convection Generates Accommodation Space and Leaves a Trace in the Geologic Record	Lorenzo Colli (University of Houston), S. Ghelichkhan, H.P. Bunge
11:40	Tracing the West and Central African Rift and Shear Systems Offshore onto Oceanic Crust: a “Rolling” Triple Junction	William Dickson (DIGS) and J. W. Granath
12:05	Influence of Proterozoic Heritage on Development of Rift Segments in the Equatorial Atlantic	Ana Krueger (University of Houston), M. Murphy, I. Norton, K. Casey, R. D. de Matos
12:30	Lunch and Posters	
14:00	Session 4 Chairs: Luis Baez Shell and Ian Davison, Earthmoves	
	Theme 4 - What We Thought We Knew: Exploration Concepts to Production Reality	
14:05	Keynote - The Evolution of the Pre-Salt Play in the Kwanza Benguela Basins, Angola	Andrew Witt (BP), A. Bump, T. Love and F. Setzer
14:30	A New Beginning: Remaining Potential and the Case for Investment in the Niger Delta	Paul Bellingham (Ion), J. Deckleman, B. W. Horn
14:55	Play Fairway and Petroleum Systems Analysis of Nigeria’s Cretaceous Benin (Dahomey) Basin: Key to Unlocking Additional Hydrocarbon Volumes from an Emerging Exploration Trend	Olusanmi O. Emmanuel (Acetop Energy), K. Taiwo, O. Mojisola and E. Enu
15:20	Coffee and Posters	
16:00	Jubilee Field: From World Class Exploration Discovery to Producing Asset. Learnings from 7 Years of Production	Kathryn E. Dawson (Tullow Ghana Ltd)
16:25	Closing Keynote/Future Perspective - Jubilee to Liza: Lessons From a Decade of Exploration in the Central Atlantic	Keith Myers (Westwood Energy), E. Zanella, J. Collard, H. Doran
16:50	Awards and Closing Remarks	

The 17th HGS-PESGB Conference on African E&P



Poster Session Agenda

Using Generative Adversarial Networks to Improve Deep Learning Fault Prediction Networks	Matt Morris, Ping Lu, Anadarko
South Gabon 3D Unprecedented Prospectivity Revelations	Dr. Anongporn (Yen) Intawong, Neil Hodgson, Karyan Rodriguez, Spectrum Geo Multi-Client Seismic Imaging
Data-Driven Transformation in Geology, Geophysics and Engineering	Mik Isernia, Paul Endresen, Ana Krueger, Bluewarre, University of Houston
Is Namibia Really An Oil Province?	W. Wornardt, Micro-strat
The influence of Shale Ridges on Reservoir Development and Implications for Exploration – A Case Study from Onshore Niger Delta, Nigeria.	Syed Dabeer, Umar Ngala, PetroVision
Evolution of East African Rift System (EARS)	Sadat Sembatya, Makerere University – Kampala, Uganda
Understanding Controls on Cretaceous Reservoir Quality Along the West African Transform Margin	Magenta McDougall, African Petroleum
An Atlas of Character: A Model For the Control of Passive Margin Development	Neil Hodgson, and K. Rodriguez, Spectrum Geo
Visualization of Vertical Hydrocarbon Migration Pathways in Seismic Data: Toward the Quantification of Seal and Charge Risk for African Exploration Plays	David Connolly, dGB Earth Sciences USA
JMA – The Hidden Treasure Below the Basalt	Neil Hodgson, K. Rodriguez, J. Watson, Spectrum Geo
Hidden Boundary Fault at East African Rift Basin Revealed with FALCON® Airborne Gravity Gradiometry Data	Janine Weber, Ivonne M, Araujo, R. Yalamanchili, S. Maduhu, CGG Multi-Physics, TPDC
Enhancing Gas Production in Nigeria’s Marginal Field. A Case Study of Ughelli-X field	Kemi Taiwo, O. O. Emmanuel, O. Aworanti, T. Ologun and U. Olorunmola, ND Western Limited, Acetop Energy
Hybrid Break-up: Spanning End-member Models Towards a Full Tectonostratigraphic Understanding of the Central South Atlantic	Ken G. McDermott, N. Hurst, P. Bellingham, B. W. Horn, ION, E & P Advisors
Cape Fold Belt Fractured Basement Play Fairway	Neil Hodgson, K. Rodriguez, and H. Kearns, Spectrum Geo
The Underexplored Shelf-Edge Plays of the West Africa Transform Margin and the Opportunity to De-Risk These on Merged 3D Seismic and Well Datasets Through Togo, Benin and Western Nigeria.	Matt Tyrrell, M. Martin, A. Ashfield, A. Maioli and B. Biaoou, PGS, Société Béninoise des Hydrocarbures (Sobeh)
An Animated Model for the Mesozoic-Recent Tectonic Evolution of Sub-Saharan Africa: From Plates And Structures to Basins and Paleogeography	Jon Teasdale, C. Reeves, Geognostics International Limited, Earthworks BV
Hydrocarbon Potential of the Onshore Dahomey Embayment of Benin; Exploration of Devonian, Jurassic, Cretaceous and Tertiary Plays Using Integrated Seismic and High Resolution Airborne Gravity and Magnetic Data.	Emma Tyrrell, P. Elliot and M. Lofgran, Elephant Oil Ltd
Conjugate Margin Chronostratigraphy--Comparison of Cretaceous-Tertiary Petroleum Systems in Namibia and Uruguay	Katie-Joe McDonough, K. Reuber, B. W. Horn, K. G. McDermott, E. C. Gillbard, F. Brouwer, KJM Consulting, Pine, ION, 3 GEO
Regional Reservoir Quality Trands in Cretaceous Sandstone Reservoirs in the Transform Margin Basins of Ghana	Simon Greenfield, Dr. P. Cox, Core Laboratories UK
Using Broadband 3D Seismic to Validate and Upgrade Satellite Seepage Data, Gabon	Rowan Edwards, M. King and G. Duval, CGG



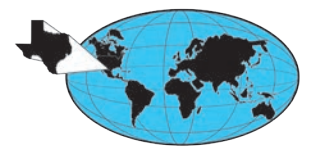
HGS Guest Night Explore the New Wiess Energy Hall

How the Weiss 3.0 Was Created Presentation by Paul Bernhard, 3D Model Designer

Saturday, June 9, 2018
Houston Museum of Natural Science
7:00pm to 10:30pm
Free planetarium shows at 6:15pm and 6:45pm
Buffet dinner and cash bar inside the museum
Purchase tickets online – HGS.org
Adults \$60
Children under 17 \$30

Activities:
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John A. Adamick
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A Ramble...

I must apologize in advance for the President's column this month. It is a bit of a ramble but I hope it will make sense to you by the end.

It seems like only yesterday that I took the HGS rock hammer gavel from retiring President **John Jordan** and began my year as President. Now I find myself about to hand that same rock hammer to our incoming President **Cheryl Desforges**. My how time flies!

I would like to take you through the year and review the challenges we've had to face as an organization and the progress we have made.

In the Beginning, a Flood. We had bright plans for kicking off the year on the right foot. The Board had developed an ambitious agenda, a strong budget, moved our dinner meetings to a lower cost and better venue at the Norris Center, and had a popular speaker for our first meeting. Then came Hurricane Harvey. Harvey disrupted our lives, some drastically so, and HGS and its members were no exception. The HGS office on St. Marys Lane was flooded and not accessible for almost two weeks. Our office itself escaped major damage but most items stored in the basement were destroyed. Somewhat amazingly, we were still able to hold our first dinner meeting on schedule on September 11th and 67 hardy souls made it to the event. I was very impressed at the members who came to that meeting despite the difficulties getting around Houston at that point in time.

Energy for Harvey Relief. One of the first ad hoc items addressed by HGS post-Harvey was to help organize and participate in a charity event to raise funds for Harvey victims. **Sean Kimiagar**, an HGS member, helped spearhead this event with support from the NeoGeos (HGS young professionals sub-group). The Energy for Harvey Relief event had over 100 attendees and raised \$21,000 for the Houston Food Bank to help feed people who had lost the use of their homes to the flood.

Declining, then Rising Membership. HGS membership renewals are due and payable each September. Because of Harvey many members did not renew on schedule and were lost from membership roles in October. To address this issue the HGS established a new membership growth committee and recruited an energetic young geoscientist to lead it. He has brought

innovative ideas to our membership campaign and successfully added almost 450 members back to our rolls since October. Current membership as I write this stands at approximately 2,850 members.

Digital Bulletin. The *HGS Bulletin* became a digital publication this year. Editor **Brian Horn** and his committee have worked very hard to maintain the quality of our flagship publication with excellent results. The decision to go digital significantly lowered the cost structure for HGS, an important goal for the Society. Note that we do still create a hard copy version for members who elect to pay an extra fee to receive it and about 2% of you do. One other benefit has been that our publication deadlines are considerably shorter than in past years.

New Website. The HGS website was revamped this year and modernized. In the past we struggled to get re-dos of the website completed on time and budget but the latest iteration went quite smoothly and had few bugs. By all accounts, membership is happy with the fresh look, feel, and functionality of their website.

Advertising. The Board recruited an advertising chairman to try and better promote the *HGS Bulletin* and website as an attractive marketing channel for oil and gas activities. Separately, a "prospect corner" was developed to help individuals/companies promote their prospects. This idea is still in its infancy but companies are already utilizing the site for this purpose.

Actual vs Budget. The HGS financial situation year-to-date is doing quite well this versus budget. Our total revenue is slightly less than budgeted but our expenses are also quite a bit lower. The Society will have positive net income this year and expects to finish above budget in terms of income.

Meeting Attendance. The HGS Board has been trying to develop new ways to increase attendance at our lunch and dinner meetings. This was part of our goal to get members more engaged with the society. We have added a "Rice University Night" to our program this year and it experienced significantly higher attendance than "normal" dinner meetings. We are trying to add a similar event for another Texas university. In addition, we have re-established ties with the Geophysical Society of Houston

From the President continued on page 15



Flooding in Southeast Texas: The Science Behind the Floods

An educational conference bringing together stakeholders, including business, scientists, engineers, citizen coalitions and government agencies to exchange current knowledge and ideas for the future.

June 6 – 7, 2018

7:30 a.m. – 5:00 p.m.

University of Houston Student Center • 4455 University Dr, Houston, TX 77204

Organized by the Houston Geological Society in Cooperation with:
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Texas A & M University: Dr. John Nielsen-Gammon (TX State Climatologist), Dr. Gretchen Miller, Dr. Christopher Mathewson

Harris County Flood Control District: Jeff Lindner, Matthew Zeve

Texas Water Development Board: Dr. Leyon Greene

Harris County Subsidence District: Michael J. Turco

City of Houston: Stephen Costello

Army Corps of Engineers: Sherri Willey

Elected Officials: Senator Paul Bettencourt, Judge Ed Emmett, Congressman John Culberson

Industry: Keith Owens, Mike Allison, Viktor Hlas, Davis Tolman

Greater Houston Flood Mitigation Consortium: Christof Spieler; Houston Stronger: Auggie Campbell

From the
Editor

From the
Editor



Brian W. Horn

Brian.Horn@iongeo.com

Tell the Story Simply

I have come to realize over the past year that much of what we do as geoscientists is evaluate disparate data types and reconstruct a vision of the subsurface based on how we interpret what is recorded in the rock record. What we may spend less time doing is thinking about how to communicate and demonstrate the concepts that have fomented in our mind. I have also learned that speaking in public to a small or large audience is a vital skill. It can also be an exhilarating or frightening experience. I recall my first technical talk at AAPG in 1989. I had practiced the presentation for days and could not seem shorten it to the required 18 minutes. As I stepped up to the podium the session chair Frank Sonnenberg, could tell I was nervous. As he put on the lapel microphone he gently reassured me that I would be fine. When I stood to face the audience to present my talk, the original 30 people in the room had grown to 300. I also realized that two gentlemen sitting in the front row had studied and probably forgotten more about the subject matter of my talk than I had learned. The presentation only took me 15 minutes and yes, it's safe to say, I talked a little fast.

That event was a great learning experience for me. At the time it didn't feel like it, but I remind myself of that day quite often before giving talks and it has given me perspective on learning from experience. As I looked back at the Editor's Letter from June of 2017, the feeling of most people in the industry seemed like doom and gloom. Oil prices that were floating between \$40-50 was the "new normal" we seemed to have found ourselves in. Today WTI is near \$70 and there is concern that the continued drilling in the unconventional plays of North America won't meet the demand. Time will tell. There are predictions that the U.S. will produce close to 12 million barrels of oil a day by 2019. That is nearly 20% greater than any time in the history of the industry. Truly amazing.

In the coming years, our industry is poised to potentially have its greatest contribution to the world economy. After listening to several talks at the AAPG Super Basins Presentations in March and May, I was amazed at the untapped potential across the world. Peak Oil is no longer a pending reality. Technology, efficiency and innovation have replaced this idea with Peak

Demand. Continued efficiency, innovation and change in energy demand will lead to a world where electricity is the fuel of the next century.

Scott Tinker's presentation and recent work describes the progress of civilization and the elimination of poverty will be perhaps one of the greatest contributions the oil and gas industry has and will continue to provide for the next 100 years. It is easy to draw a direct correlation between countries that have abundant energy and those that do not. The common denominator is affluence where energy is abundant and poverty where it is scarce. The challenge we have as an industry is to tell this story simply. To communicate to the public the quality of life, freedom, mobility and creation of wealth for multiple generations in the past and for the future.

There are many voices in the world that believe our industry is fueling the continued problem of climate change. What is lost in many of these discussions is the contribution of our industry to begin the switch to a new energy economy. The United States has reduced its carbon emissions by ~20% since 2005. This is more than any other developed country. The cause of this is efficiency and moving toward natural gas as fuel that have been developed from unconventional reservoirs and yes, fracking!

I believe that our industry must be involved in the solution to this important topic. The demand for energy has and will only continue to increase for the foreseeable future. Developing countries need energy to create wealth and a higher standard of living for their population. But the voices of "keep it in the ground" don't seem to recognize the need for a comprehensive solution to world energy demands, the correlation between energy and poverty, and how a transition from a hydrocarbon economy to a renewable energy economy has significant environmental challenges as well.

The creation and utilization of all energy has a cost. Developing clean energy requires mining of lithium, steel, copper and rare earth metals to manufacture wind turbines, batteries and the

From the Editor continued on page 17



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June 6 & 7, 2018

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Flooding in Southeast Texas: The Science Behind the Floods

Day 1 – Wednesday, June 6, 2018 – Science

7:30		Registration and Breakfast	
8:30		Welcome and Opening Remarks: Cheryl Desforges, <i>Houston Geological Society President-Elect</i> Introduction and Overview: Bob Traylor, <i>Texas Railroad Commission Geologist (retired)</i>	
Session 1			
8:45	1	Hurricane Harvey’s Impact on Harris County	Jeff Lindner , <i>Harris County Flood Control District – Director Hydrologic Operations Division/Meteorologist</i>
9:15	2	Formula for Resilience & Bond Proposal	Judge Ed Emmett , <i>Harris County Judge</i>
9:45	3	Hydrology and Hydraulics of Flooding and Flood Management in an Urban Environment	Dr. Christopher Mathewson , <i>Texas A&M University, Department of Geology & Geophysics, Regents Professor Emeritus</i>
10:15		Coffee Break	
Session 2			
10:45	4	Expected Frequency of Extreme Rain: Before and After Harvey	Dr. John Nielsen-Gammon , <i>Texas State Climatologist, Regents Professor at Texas A&M University</i>
11:15	5	Evolution of Southeast Texas Rivers and Bayous over Time	Dr. Bill Dupre , <i>University of Houston, Professor Emeritus</i>
11:45		Lunch	
		Economic Impact of Flooding	Senator Paul Bettencourt , <i>Texas State Senator, District 7</i>
Session 3			
1:15	6	River Flooding and Reservoir Capacity: Case Studies from USA and China	Dr. Jeff Nitttrouer , <i>Rice University, Department of Earth, Environmental and Planetary Sciences, Assistant Professor</i>
1:45	7	Coastal Impacts from Inland Flooding: Examples from Bolivar Roads and San Luis Pass of Sediment Erosion and Deposition	Dr. Julia Wellner, Dr. William Sager, and Carolina Ramon , <i>University of Houston, Department of Earth and Atmospheric Sciences, Professors</i>
2:15	8	Towards “Smart” and “Green” Flood Control	Dr. Arturo Leon, Ph.D., P.E., D.WRE. , <i>Florida International University, (formerly University of Houston) Associate Professor Water Resources Engineering</i>
2:45		Coffee, Posters, Exhibits	
3:15	9	Detention Storage: A Vital Element for Flood Control in Houston	Dr. Philip B. Bedient , <i>Rice University, Herman Brown Professor of Engineering and Director, SSPEED Center</i>
3:45	10	Update on Corps Flood Risk Management Studies and Projects	Sheri Willey , <i>U.S. Army Corps of Engineers, Galveston District, Project Manager</i>
4:15	11	Harvey Recovery and Flood Resilience	Stephen Costello , <i>City of Houston Mayor’s Office Chief Resilience Officer “Flood Czar”</i>

From the President

continued from page 9

and will jointly host a meeting in Fall 2018. Last, but not least, the Board held a separate brainstorming session with members to try and better understand why many do not regularly attend our events. Our hope is to consider revamping some of our events to try and appeal to a larger cross-section of our membership in future years.

Applied Geoscience Conferences. The HGS held two successful Applied Geoscience Conferences this year. The first event (Fall 2017) focused on Geomechanics in Unconventionals. The second event (Spring 2018) focused on Mudrocks. Both events were well attended, financially successful, and helped introduce many undergraduate and graduate geoscience students to the HGS.

Scholarship Night. The HGS held its annual Scholarship Night in February 2018 and had AAPG President **Charles Sternbach** as the keynote speaker for the event. This event is a key fund-raiser for our undergraduate and graduate scholarship programs and is popular with sponsors. Over \$38,000 in proceeds were given to our two programs for their use in funding scholarships.

Making Geoscience Relevant and Fun to Children. With the help of Chairman **Letha Slagle** and her committee, the Board has been able to re-establish the “Bones in School” program with local Houston schools. Also, Chairman **Shannon Lemke**’s Outcrop Family Campout event has occurred a second time successfully at YMCA’s Camp Cullen to introduce kids to geology and to have other fun, too! See below for the connection of this program with Volunteer Day.

Volunteer Day. The HGS developed the concept of a “Volunteer Day” in collaboration with YMCA Camp Cullen. Camp Cullen is located on Lake Livingston where many Houston kids attend summer camp. The camp has many geologic components including an onsite quarry field trip and a geology lab. The Volunteer Day project consisted of building a shaded “gold-panning” area and Old West “storefront” for kids. The NeoGeos and some other HGS members attended to work on this community service project. The Board hopes to make it an annual event.

In the End, a Flood (Conference). Since HGS started the year with a flood, we thought we should end with one, too. HGS member **Cheryl Desforges** and other HGS members have been hard at work developing a Flood Conference to help educate the Houston community on how to better understand the science behind floods and hopefully minimize damage from future flooding events. The event is scheduled for June 6–7 and will be hosted at the University of Houston campus. We believe that the community at large, not just HGS members, will find this conference of interest.

The one goal that we did not make a lot of progress on this year was related to planning for the HGS 100th anniversary events in 2023. However, AAPG President Charles Sternbach and I did discuss ideas during the year and we both plan to devote more attention to this program next year when we both have a little more time on our hands!

If you have read my “From the President” columns over the course of the year you know that I like to recognize members who go the extra mile for the Society. This time, I’d like to recognize HGS employees **Andi Peoples** and **Jacky Jordan**. While they are employees of HGS, these two ladies consistently go above and beyond the normal call of duty. The HGS simply would not be the same without them. Thank you, ladies!

I’d like to close my column by thanking you for the opportunity to serve as President of your society. It has been exciting and a lot of fun. I encourage each and every one of you to consider running for a leadership position with HGS. You won’t regret it! ■

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Editor – Jim Tucker

Editor-Elect Fang Lin

Flooding in Southeast Texas: The Science Behind the Floods

Day 2 – Thursday, June 7, 2018 – Engineering and Mitigation

7:30		Registration and Breakfast	
Session 4			
8:30	12	The Past, Present, and Future of Subsidence in the Houston Region	Michael J. Turco , <i>General Manager, Harris-Galveston Subsidence District, Fort Bend Subsidence District</i>
9:00	13	Coastal Texas Lidar: Lidar Data Collection and Processing Specifications and Deliverables	Keith Owens , <i>Technical and Business Development Manager Fugro USA Land, Inc.</i>
10:00		Coffee Break	
10:30	14	White Oak Bayou Drone Aerial Survey	Mike Allison , <i>Raptor Aerial Services, President</i>
11:00	15	Visualizing Houston’s Drainage Systems – An Intuitive Assessment of Flood Risk	Davis Tolman , <i>D Tolman Interests LLC; Principal Geoscientist</i>
11:30		Lunch	
		Planning for a Resilient Region	Jeff Taebel , <i>FAICP, Houston-Galveston Area Council (H-GAC) Director, Community & Environmental Planning</i>
1:00	16	Preventing Flooding through Intelligent Stormwater Management	Viktor Hlas , <i>OptiRTC, Inc, Business Development Lead</i>
1:30	17	Sustainable Development and Management of Floodplains in Urban Areas: a Comparative Analysis of Brays Bayou to Buffalo Bayou	Dr. Lester King , <i>Research Scientist and Lecturer in the School of Natural Sciences, Rice University</i>
2:00	18	Prioritizing Flood Mitigation and Recovery Aid in Congress	Congressman John Culberson , <i>United States Congress</i>
2:10	19	Texas Statewide Mesonet (TexMesonet) Overview, Status and Challenges	Dr. Kantave (Leyon) Greene , <i>Texas Water Development Board, Texas Mesonet Program, Hydrologist/Meteorologist</i>
2:40		Coffee Break	
3:10	20	HCFCF Activities Post Harvey	Matthew Zeve , <i>Harris County Flood Control District Director of Operation</i>
3:40		Panel Discussion: Resilience, Community Action, and Getting Involved Moderator: John Suter	Christof Spieler, PE, LEED AP , <i>Greater Houston Flood Mitigation Consortium, Project Manager (Vice President and Director of Planning at Huitt-Zollars) and</i> Auggie Campbell , <i>Houston Stronger (President/CEO of WHA)</i>

From the Editor

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necessary infrastructure to deliver this energy on a massive scale. In addition, batteries, metal from turbines and solar panels eventually must be disposed in landfills which requires discarding of materials that are not biodegradable. My point is not to say these technologies are not solutions, but to highlight the issue that all energy has a cost and an environmental footprint that should be part of this discussion.

I prefer the idea of the “radical middle” as proposed by Scott Tinker at the Bureau of Economic Geology. There is very little dialogue regarding the cost and benefit of energy. The voices that seem to be the loudest are those that have no connection with our industry and what the data show us. Data matters and it is important for our industry and geoscientists as individuals to

direct the conversation to the radical (data driven) middle. We should point out that methane has only one carbon molecule and a resource base and nearly a 300-year of supply. Energy is vital to the development of all countries and a transition to a balanced and pragmatic solution is a viable course of action we should all embrace. If you wish to learn more about this I would direct you to Switchon.org to learn more about how we as an industry can direct the discussion in a productive way.

So in the coming days and months remember that as geoscientists our contribution, impact and perspective are vital to this discussion. We need to remind the public that the data matter. We must direct the dialogue toward the data and strive to tell this story simply. ■

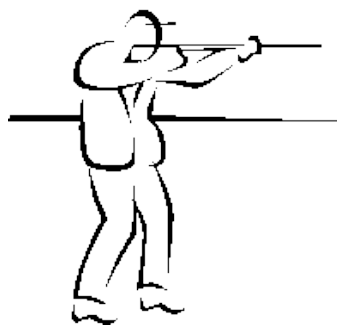
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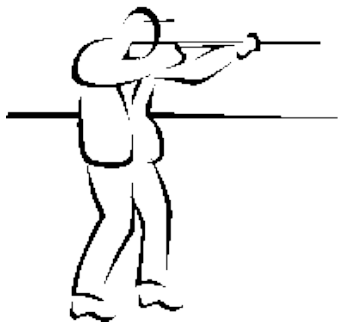
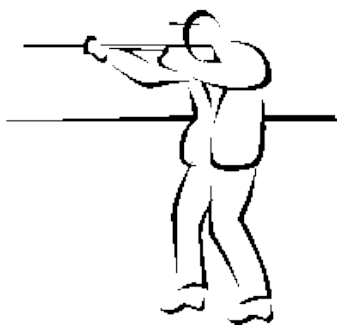


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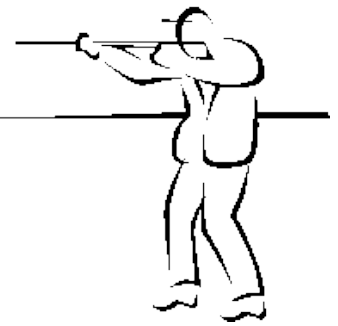
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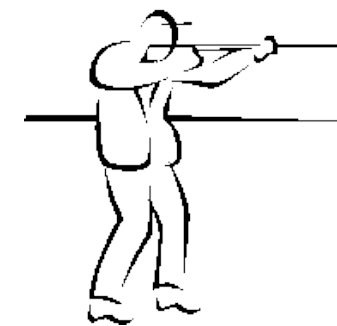
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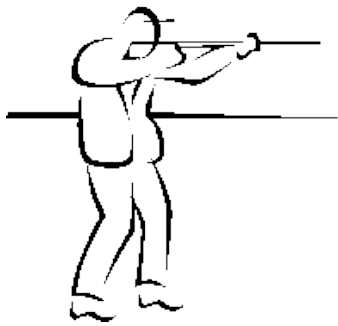
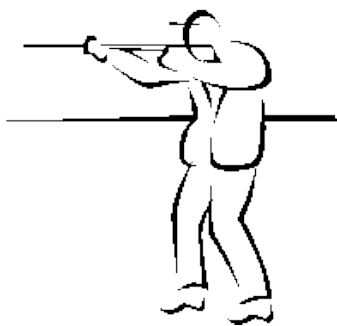
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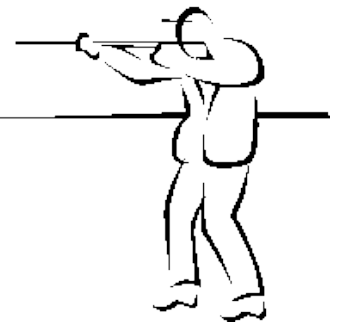
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HGS recognizes that 2018 is a lean year in the oil patch, and sponsorship for events like this is hard to find. **For \$150, you'll receive paid entry for one shooter and one guest (total value of \$120) and be listed as a platinum sponsor on the webpage and at the event.**

We are limited to 160 shooters in four rotations. Entry fee is \$90 per shooter for registrations received by FRIDAY, JUNE 1st. After June 1, registration will be strictly on a "space available" basis and the entry fee will be \$120 per shooter. **Register early!!**

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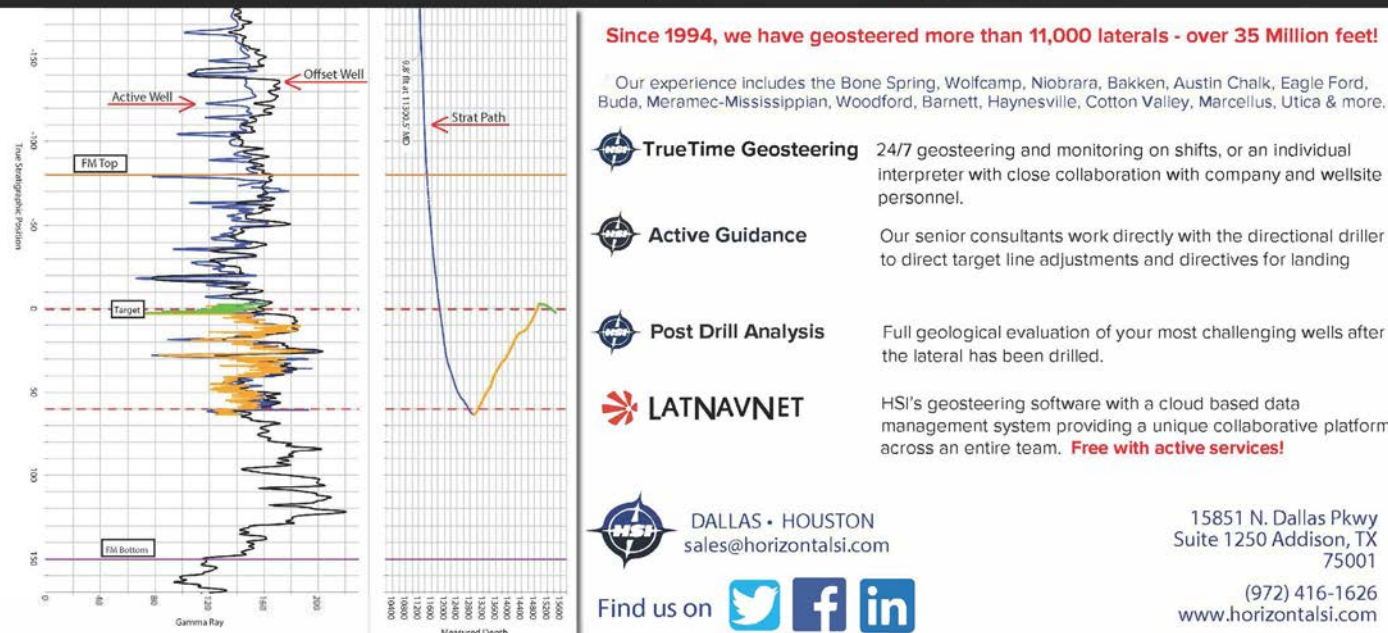
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Guest Night Saturday, June 9

Adventure Awaits Inside the New Wiess Energy Hall!



Saturday, June 9, 2018

Houston Museum of Natural Science

7:00pm to 10:30pm

Purchase tickets online – HGS.org

Adults	\$60
Children under 17	\$30

Get your tickets now for the upcoming HGS Guest Night at the Houston Museum of Natural Science at the new Wiess Energy Hall for the evening of June 9. Wiess Energy Hall was remodeled in 2017 and opened to the public last year and features oil and gas exhibits but interactive TV and touch screens that show onshore and offshore drilling, seismic technology, plate tectonics and new energy concepts in wind, solar and energy efficiency. The Wiess Energy hall is touted as the most contemporary, comprehensive and technologically advanced exhibition on the science and technology of energy anywhere in the world and is currently the most visited exhibit at the museum.

Guest Night attendees will have an immersive experience inside the 30,000 square foot exhibit. Paul Bernhard the exhibit mastermind and lead designer, will be the featured speaker during the dinner inside the Wiess Energy Hall. He will discuss the behind-the-scenes story of how the exhibits were created. Guest Night Sponsors are Thunder Exploration and Walter Light, Shell Exploration, Schlumberger, Walter Oil and Gas, TGS, Subsurface Consultants SCA, and ConocoPhillips.


Guest Night begins with two free planetarium shows at 6:15pm and 6:45pm. Guests can get in line for the planetarium shows at 6:00pm. At 7:00pm attendees will enter the Wiess Energy Hall by elevator and enjoy a buffet dinner, drinks and dessert with time to look around the hall. Guest Night Chair Dave Orchard will introduce the winning 2018 ECH Science Fair students and summer student HMNS museum interns, and then Paul Bernhard will talk about the design of the Wiess Exhibits.

The Wiess Energy hall is open for free range exploration on foot from 8:30pm to 10:30 pm, after the dinner and speaker comments. A floor plan guide to the exhibits will be distributed. Here are a few highlights and attendees explore the sights and sounds and interactive touch screens:

- Get a selfie under replica of a tri-cone rotary drill bit—fourteen feet in diameter—which spins vigorously overhead in the center of the hall

Guest Night continued on page 23

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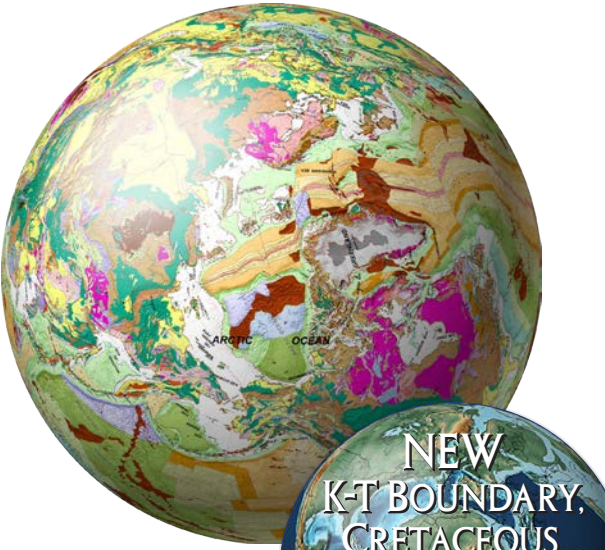
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Contact Walter S. Light Jr.
President/Geologist
713.823.8288
EMAIL: wthunderx@aol.com

Guest Night continued from page 21



- Get inside the reinvented GEOVATOR. The exhibit takes visitors on a reimagined fantastic voyage plunging down through the museum floors into the Earth, then back in time to the Cretaceous Period for an attack by hungry flying prehistoric raptors, and finally experience the meteor impact from 65 million years ago
- A crowd pleaser is the "Energy City," a 2,500-square-foot 3-D landscape representing Houston, the surrounding Gulf coastal waters and the terrain of southeast and central Texas. This projection of laser light on models uses projection mapping technology to bring to life the energy value chain. It's a surreal experience, set to music, which follows day to night in a 20 minute timeline.
- Don't miss the Unconventional Resources Gallery featuring the jaw dropping Eagle Ford Shale Experience, a.k.a. the "EFX 3000," which beckons visitors to step aboard for a wild ride out to prime Texas shale oil and gas drilling country. Strap in to the seats and go visually down into the borehole of an oil well, made real with curved projection techniques, and mechanical motion effects. The ride goes underground and ventures into the narrow spaces of a hydraulic micro-fracture, surrounded by seemingly massive grains of proppant

Tickets are \$60 for adults and \$30 for children under 16. Adult tickets can be purchased on the HGS website calendar at <https://www.hgs.org/civicism/event/info?id=1946>

Call the HGS office at 713-463-9476 to make reservation for children's tickets. Guest Night tickets are only available in advance, no walkups at the door, please. ■

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June 2018



GEOEVENTS

Sunday Monday Tuesday Wednesday Thursday Friday Saturday

	Members Pre-registered Prices: Dinner Meetings members..... \$40 Emeritus/Honorary members..... \$40 Student members \$10 Nonmembers & walk-ups \$45 Except - Env. & Eng. \$30 Nonmembers & walk-ups \$35 Emeritus/Honorary members..... \$15	Reservations: 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 office@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.			1	2
3	4	5 HGS Board Meeting 6 p.m.	6 Flooding in Southeast Texas: The Science Behind the Floods Conference University of Houston Page 10	7	8	9 HGS Skeet Shoot Greater Houston Gun Club Missouri City Page 18 HGS Guest Night “Explore the New Weiss Energy Hall” Houston Museum of Natural Science Page 8, 20
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30 <div>Don't wait, make your reservations online at hgs.org</div>

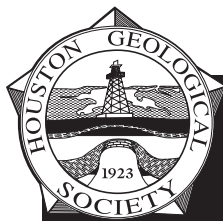


September 11-12, 2018
The 17th HGS-PESGB Conference
on African E&P
Houston, TX (Page 4)

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HGS Welcomes New Members

New Members Effective May 2018

ACTIVE MEMBERS

Jack Holton
Lacie Knight
Beau Langla
Edwin Lindgren
Ted Mirenda
Patrick Murphy
Romina Myrtaj
Adam Nielson
Jun Tamura
Larissa Wheeler
Michael Zdenek

ASSOCIATE MEMBER

Brent Propst

EMERITUS MEMBERS

William Green
W. Rand Turner
Nigel Payne

STUDENT MEMBERS

Mohamed Abdelfatah
Adedoyin Adeyilola
Vince Dreyer
Danielle Minter
Jonathon Pelton
Maziar Zarea

Welcome New Members

Houston Geological Society Awards

2017-2018 Gerald A. Cooley Award

The Gerald A. Cooley Award honors the memory of the man we remember as the personification of dedication, service and leadership continuing long after official office terms expire. It recognizes true dedication to the profession of petroleum geology in general, and to the Houston Geological Society in particular. The award honors those who have continued to serve the society well above and beyond the call of duty over many years. A candidate must have received both the Distinguished Service and Honorary Life Membership Awards to be eligible for consideration.

It is the Society's highest award.

HGS is proud to present its highest award, the Gerald A. Cooley Award, to **Richard S. Bishop**. The HGS recognizes that outstanding members continue to serve well above and beyond the call of duty. This award honors the memory of Gerald Cooley, the man we remember as the personification of dedications, service and leadership continuing long after official office terms expire. The award recognizes true dedication to the profession of petroleum geology in general and to the HGS.



Richard S. Bishop

Dick Bishop has been an active member of the Houston Geological Society for many years serving as editor of the HGS Bulletin in 1981-83, as President in 1989-90 and has served on the HGS Advisory and Nomination committees. He has presented multiple talks to the HGS on topics ranging from mechanics of salt diapirism, origin of abnormal pressures, source over-charge, world oil supply and production from US shales.

Since 2005 he has been treasurer of the Warren L. and Florence W. Calvert Memorial Scholarship Fund. A noteworthy accomplishment is that he has twice persuaded the GCAGS to offer a 1:1 matching for scholarship donations which brought more than \$300,000 into the several scholarship foundations within GCAGS. He received the HGS Distinguished Service Award in 1990, Honorary Membership in 2004 and was recognized as a Legend in 2011 for his service to HGS and the AAPG.

These accomplishments have been possible due to the encouragement, patience and flexibility from his wife Edie, who has also held a diverse group of professional positions from the oil business to private and public education, including Past President of the HPAC and its predecessor, the HGA,

Dick is a geologist who has worked the spectrum of research, exploration and production for Unocal (2 years), ExxonMobil (29 years) and as a consultant / independent since 2003. Most recently he has been consulting for RSK[UK] Ltd. focusing on Africa, South America and Alaska in which they evaluate investment opportunities on a scale from undrilled basins to producing fields. During this time he has 'seen the world' both as an explorationist and as a synthesizer of global exploration opportunities.

Dick is a Past President of the American Association of Petroleum Geologists and simply enjoys being around geologists. He has helped to organize several AAPG Hedberg Conferences (assessment, foldbelts, tight gas sands, world oil supply), was General Chairman of the 1988 AAPG annual convention in Houston as well as being the co-founder of the AAPG GIS committee and chair of the Houston SIPES chapter. He has been recognized with the AAPG Sproule Award, is a Distinguished Alumnus of the University of Missouri, a Fellow of the Geological Society of America and an Honorary Member of both the AAPG and HGS. He is also a certified geologist of both AAPG and SIPES.

His technical history includes developing geological 'yardsticks' for play and prospect evaluation, developing economic and geological criteria to compare diverse exploration opportunities for new business development, contributing fundamental concepts of hydrocarbon accumulation and diapir mechanics, mapped at the reservoir to multi basin scale, has done extensive work on world oil supply and is a guy who has a grand time doing petroleum geology.

Dick earned his PhD from Stanford University, his MA from the University of Missouri, and BSc from Texas Christian University. ■

Loyd Tuttle
loydtuttle@comcast.net

Bob Liska
liska.bob@gmail.com

Jim Thorpe
thorpejim@comcast.net

Paleo Control, Inc.

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- \$6,000,000 Future payout projected for settlement to widow with ORRI recovered under husband's consulting contract after company contended no payments due after death.
- \$5,800,000 Combined cash settlement for UPRC East Texas and Central Louisiana royalty owner class action cases for underpaid royalties. Court approved fee of 1/3.
- \$4,700,000 Jury verdict, oil company violates geologist non-compete contract. Settled later on confidential terms.
- \$2,000,000 Settlement for downhole failure of casing results in loss of well bore, net to client \$1,372,411.79.
- \$1,175,000 Settlement for geologist and family where oil company drilled too close to geologist property. Case filed 18 years after well drilled. Net to client \$664,822.51.
- \$986,000 Cash settlement, net to clients \$657,207.60, plus future mineral interest valued at \$500,000.00. Dispute over mineral interest ownership from thirty year old contract.

Robert A. Chaffin
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2017-2018 Honorary Life Membership

Honorary Life Membership honors members who have distinguished themselves in the science of geology or have contributed outstanding service to the success and welfare of this organization. The honoree must have received the HGS Distinguished Service Award.

Sharie Sartain is awarded the HGS Honorary Life Award for her outstanding service to the success and welfare of the Society.



Sharie Sartain

Sharie joined HGS as an Active Member in 1983. She served as a Director on the HGS Executive Board from 1999-2001 and as Secretary and Volunteer Coordinator during 2001-2002. She chaired the Awards Committee for 3 years and was the AAPG HoD liaison for one year. Since 2009, Sharie has been Chairman of the Membership Committee, reviewing all new HGS Membership applications and Emeritus status requests, which includes making approval recommendations to the Executive Board on a monthly basis. She has previously received a Houston Geological Society President's Award in 2010, the HGS Chairman's Award in 2015, and the HGS Distinguished Service Award in 2016.

Sharie also represented the HGS as a Delegate to the AAPG House of Delegates (HoD) from 1995-2016. During that time she served on several standing and ad hoc committees for the HoD, and in 2008-2009 she was the elected Foreman for the Houston area AAPG HoD delegation.

Sharie is originally from North Canton, Ohio. She received a BSc in Geology from the University of Akron and a MSc in Geology from Kent State University. She began her career with Phillips Petroleum in Houston in 1981 where she worked on Gulf of Mexico Shelf & Deepwater, Permian Basin and Regional Studies exploration projects. In 2002 she became a consultant for Knowledge Reservoir working on exploration and development projects in numerous domestic and international basins. Since 2014 she has been working for Focus Exploration doing field development and prospect generation in the Gulf Coast, GOM Shelf and GOM Deepwater areas.

Sharie and her husband Bob have two college-aged children. She has made many geology presentations in their HISD schools and has volunteered with PTO's, bands, and art departments. She has mentored foreign exchange high school students and their host families since 2011 and is a volunteer for the Interfaith Ministries of Greater Houston (IMGH) Meals on Wheels program. ■

2017-2018 Honorary Life Membership

Honorary Life Membership honors members who have distinguished themselves in the science of geology or have contributed outstanding service to the success and welfare of this organization. The honoree must have received the HGS Distinguished Service Award.

Thom Tucker is a hard-working, ethical geoscientist who has selflessly volunteered thousands of hours to the HGS and helped make it a better Society. Technically he is one of the "go to" geologists if you want detailed log correlations and a clear, honest evaluation of a prospect. He brings that concentration and clarity of thought to his volunteer work, often working in the background, seeing that events are seamlessly executed. He is dependable, always ready to help and steps forward when he sees a need, often before others recognize it. Since his freshman year of college Thom has provided leadership in community and professional organizations. For 30 years the HGS has benefitted from his generous contribution of that most valuable commodity, his time.



**Thomas A. Tucker,
CPG, PG**

Thom started working with HGS in 1989 when the International Explorationists group needed someone to help at the registration table. He subsequently handled the arrangements for that meeting from 1990-1992. When chair Pinar Yilmaz was stepping down she asked Thom to serve admitting that everyone else had declined. This was the first Co-Chairmanship in HGS. Thom handled the HGS and administrative issues and Lyle Baie obtained the speakers from 1992-1994.

In 1994, HGS President Clint Moore asked Thom to form an Emerging Technologies Committee. They decided to bring topics, speakers and poster sessions to the regularly scheduled meetings, rather than start a new monthly meeting. Thom organized the effort for an HGS booth to engage additional contributors from both the Geophysical Society of Houston and the GCS Society of Petroleum Engineers. From 2010 to 2014 he served as Host and M.C. for the lecture portion of the annual GSH-HGS Geoscience Day.

Thom currently serves as the Co-Chairman of the HGS Continuing Education Committee (CEC). His involvement

with the CEC began when he attended their January 1995 monthly meeting, and his friend, occasional co-worker and chair Frank Huber was looking for someone to publish and get the notebooks printed and delivered to the venues. He and Frank agreed on a printer, but true to his character, Thom has been executing that role ever since. Perceiving these Continuing Education and notebooks functions as applicable to the entire society, Thom has led the Committee in coordinating and executing short-courses at GCAGS and AAPG conventions and the 2014 HGS-PESGB Africa Conference, with current plans for the 2018 Africa conference. Thom brought these 'event skills' to the International Exploration

Symposium 2000: "International Business of Exploration" where he served as General Co-Chair. Since the late 2000's he has ensured the printing and delivery of programs for the HGS-PESGB Africa Conference bi-annual occurrence in Houston. Thom is always looking for ways to benefit HGS Members. In order to provide guidance and skills during the recent economic downturn, he led the CEC to develop and execute 2015 "Getting Started as a Self-Employed Geoscientist – Consultant" and "Free, Low-Cost, and Open Access Data and Software for Petroleum Exploration and Production" which has been promulgated through Social Media. Thom continues to lead the CEC in providing low cost continuing education courses to keep our members skills current, which has included no less than nine short courses during the past two years.

Thom is always quick to point out the contributions of others, but he is the "glue" that makes committee work with him a pleasure for volunteers. Thom previously received the HGS President's Award in 2006, and the Distinguished Service Award in 2016. It is now with much pleasure and gratitude that HGS awards Thom our Honorary Life Membership Award. ■

2017-2018 Distinguished Service Award

HGS Distinguished Service Award honors members who have given long-term valuable service to the Society.

Rosemary Laidacker is a long-time and active member of the Houston Geological Society. She grew up in the oil patch and attended a high school in the middle of Sour Lake Oil Field where she developed a keen interest in science and the oil business. Rosemary obtained a Bachelor's Degree in Mathematics from Lamar University and a Master's Degree in Geology and Geophysics from the University of Houston.



Rosemary Laidacker

She began her career as the first female geophysicist hired by Pan American Petroleum (Amoco). While her career started with Pan American, she went on to work with several oil companies most notably Cities Service Oil and Total Petroleum. She is currently a Geophysical Consultant in Houston.

Rosemary has been an active HGS volunteer for many years and is always willing to lend a hand wherever help is needed. She makes HGS a better organization for all members by suggesting ideas of improvements that serve the whole organization. This type of contribution was clearly demonstrated by her idea for the Communications Committee, which she envisioned would help make the HGS responsive to our members as well as give HGS greater visibility to the Houston area.

Rosemary currently serves as the Co-Chairman of the Communications Committee. She has also served as Chairman of the Continuing Education Committee and has worked on the Website Committee. She has been a representative from HGS to the AAPG by serving in the AAPG House of Delegates, from 2016-2019. She has also co-led the HGS sponsored Spindletop Field Trips as part of the AAPG Conventions in 2014 and 2017. Rosemary has previously received the HGS Rising Star Award and the HGS President's Award for her volunteer work and is being honored for her distinguished service to the HGS. ■

HGS is pleased to present **Evelyn Medvin** the HGS Distinguished Service Award for her long-term commitment to the Society. Evelyn has been an HGS member since moving to Houston in the mid-1990s. She was actively involved in the Continuing Education Committee from 2000-2007 and served as a Co-Chair of the Dry Hole Seminar #2 and Geopressure workshop.



Evelyn Medvin

In 2005 Evelyn became a trustee on the Undergraduate Scholarship Foundation Committee and continues to serve the Foundation today. She assumed the role of Chairman for the Foundation in 2017. Evelyn has served the HGS through AAPG's HOD representation since 2007, AAPG convention committees including Chairing the International Pavilion and convention fundraising committees and Division of Professional Affairs Gulf Coast Councilor.

She is also a member of IPAA, AAPG, SPE, and NOIA professional industry organizations; a member of the board for IPAA's Petroleum Academies, and NOIA Membership Committee. She enjoys mentoring women & young people and creating networking opportunities in the Oil & Gas Industry.

Evelyn has over 38 years of experience as a geoscientist and has been with Core Laboratories for over twenty years. She currently holds the position of Vice President of Strategic Projects. A graduate of the University of Oklahoma with Bachelor of Science in Geology, Evelyn began and continued her career in geoscience positions holding a number of leadership roles within our industry to include working on international projects to find and develop hydrocarbon reserves. She has made numerous presentations and published several articles on oil and gas technology & their applications.

Evelyn has been married to Roger for over 30 years and is a proud mother and grandmother. ■

2017-2018 Distinguished Service Award

HGS Distinguished Service Award honors members who have given long-term valuable service to the Society.

Carl E. Norman has been selected to receive the Distinguished Service Award for his many years of volunteerism and leadership for the HGS.



Carl E. Norman

Through the urging of Mr. Warren Calvert, Carl became secretary of the HGS Warren L. and Florence W. Calvert Scholarship Fund in 1974. He served in that position until his appointment as chairman of the Calvert Scholarship Fund board in 2001 and continues to serve in that position. This represents an amazing 44 years of continued dedicated service to this important HGS committee. This fund has awarded \$519,850 in scholarships to 178 graduate students from 25 universities.

Carl holds a BS in geology from the University of Minnesota, and an MS and PhD in geology from The Ohio State University. Carl served 4 years in the Air Force working as an aircraft and engine

mechanic, enlisting shortly after the outbreak of the Korean War in 1950. After completion of his Masters degree in 1959, Carter Oil (soon after Humble Oil and Refining) employed him. Carl returned to pursue his PhD in the early 1960's.

Following the completion of his PhD in 1967, he accepted a permanent faculty position as a professor of geology at the University of Houston. He remained at the university until his retirement in June 2000. Carl led the university summer field camp for 12 years. He taught physical geology to over 6500 students during his career. He was honored with the Outstanding Educator Award by the GCAGS in 1992.

Carl has guided numerous HGS field trips and is sought to do so because of his extensive knowledge of active faults in the Gulf Coast region. His 44 years of commitment to the Warren L. and Florence W. Calvert Scholarship Fund, along with numerous hours of additional service to the HGS, deem Carl E. Norman an honored recipient of the Distinguished Service Award. ■

2017-2018 President's Award

President's Award honors members whose extraordinary efforts or unique contributions in a fiscal year or over a short period of time deserve special recognition.

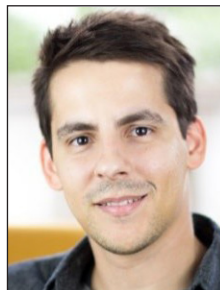
HGS is pleased to present **Stephen Adeniran** with the HGS President's Award. He is a recent member to HGS (2016) but has quickly become an active participant. Stephen has participated in the NeoGeos group and is currently Co-Chairman of the Exhibits Committee. Stephen is responsible for traveling to various conventions and events, setting up the HGS booth and discussing HGS with potential new members. Over the past year he has attended Winter NAPE, AAPG ACE, Summer NAPE, the HGS Geomechanics and Mudrocks Conferences, and the UH EAS SRD event on behalf of our Society.



Stephen Adeniran

Stephen currently works as an Independent Geologist with emphasis on West and South Texas. He previously worked for ExxonMobil and BP. His exploration and development experience covers both conventional and unconventional plays in onshore and deep-water settings across multiple basins in North America, Africa and Europe. Stephen completed his undergraduate studies in Applied Geophysics with a thesis on Offshore 3D Seismic Interpretation and later received his Masters degree in Petroleum Geoscience (Geology) from Imperial College of London. ■

Gustavo Carpio is presented the Houston Geological Society President's Award. He became an HGS member in 2016 and has been active since this time. He is co-chairman of the Exhibits Committee and in 2017 he took on the additional role of Membership Growth Chairman. In this important role, Gustavo has brought energy and new ideas to bear retaining members and securing new memberships. He has already been successful in this role and we look forward to his continuing leadership and success in the future.



Gustavo Carpio

Gustavo received his Bachelor of Science degree in Geology from the University of Houston in 2007 and currently works for Ingrain Services, a Halliburton company. ■

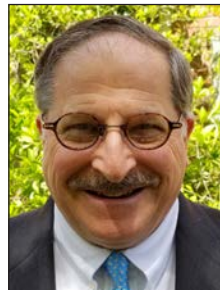
Sean Kimiagar is presented the HGS President's Award for his initiative in organizing a relief effort for Hurricane Harvey victims. The "Energy for Harvey" fundraiser event raised over \$20,000 for the Houston Food Bank and helped provide nutritious meals for flood victims. Sean views volunteering and public service through professional and civic societies as an essential part of one's career and responsibilities. His HGS activities over the last year certainly reflect that commitment.



Sean Kimiagar

Sean is currently a geologist at Detring Energy Advisors, an advisory firm offering acquisitions & divestitures services to the upstream oil & gas industry. He is a graduate of University of Texas at Arlington and an active member of HGS and AAPG. ■

Walter Light is a long-time supporter of the HGS with his enthusiasm and financial support for multiple projects throughout the years. As a great HGS supporter he has sponsored multiple events in 2017-2018 and is always available to make connections for speakers and events. Walter currently owns Thunder Exploration with concentrated operations in the Eagle Ford play of South Texas. In addition, Walter actively generates and markets oil and gas drilling projects and participates in outside generated deals. Walter is a graduate of the University of Texas at Austin and has prior work experience with Sohio Petroleum and JWR Exploration, Inc. ■



Walter Light

2017-2018 President's Award

President's Award honors members whose extraordinary efforts or unique contributions in a fiscal year or over a short period of time deserve special recognition.

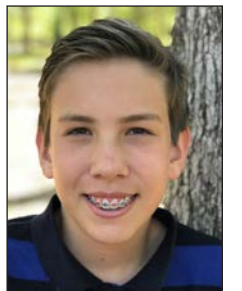
John Tubb, Jr. deserves the President's Award solely for his unflagging dedication behind the scenes as Chairman of the Office Management Committee. But as they say in the late-night television infomercials, "that's not all!" He also turned in award-winning performances as Chairman of the Scholarship Night Committee and the Directory Committee this year.



John Tubb, Jr.

John is no stranger to the HGS awards podium, having received a Distinguished Service Award in 2012 and the Society's highest honor, the Gerald A. Cooley Award in 2013 for his service as Treasurer-Elect in 2007-2008, Treasurer 2008-2009, President-Elect in 2009-2010 and finally as HGS President in 2010-2011. You would think after a run like that he would sit back and rest on his laurels, but John is a gift to the HGS that keeps on giving. Speaking of gifts, his fellow HGS Board members awarded him a Taurus Judge 45-caliber handgun at President's Night 2011 to help him keep the varmints at bay at his place in the country and it was a fitting gift indeed, because this man is a pistol! May he continue to serve our Society for many years to come. ■

The Harvey Cleanup Crew Award is awarded to **Owen** and **Jace McWhirter**. This award is meant to reward young people who aid HGS and to encourage volunteerism. This year Owen and Jace provided valuable assistance to HGS after Hurricane Harvey flooded the basement of our office. Along with their dad **Scott McWhirter** they recovered many boxes of fossils that HGS uses in its "Bones in Schools" program. They took the boxes home and then scrubbed and cleaned each fossil so it could continue to be used in the program. Last, they re-boxed the specimens and brought them back to the office.



Owen McWhirter

Owen McWhirter (14) is an 8th grade homeschool student. He is active in Conroe Theater and karate and enjoys studying chemistry, aerodynamics in bottle rockets, algebra, and geometry.



Jace McWhirter

Jace McWhirter (12) is a 6th grade homeschool student. He is active in football, basketball, and karate and enjoys reading classical literature and learning about Theodore Roosevelt. ■

2017-2018 Chairman's Award

Chairman's Award honors members whose extraordinary efforts or unique contributions to their committee deserve special recognition.

Luis Baez is presented the HGS Chairman's Award for his years of continuous contributions and organization support of the HGS Mudrocks Applied Geoscience Conference. These roles include Technical Session Chairing and member of the Poster Program Committee. Luis has also been instrumental in obtaining Shell and BG's corporate support. Luis's contribution also includes the recruitment and development of key subject matter experts (SME) talks and contacts with numerous university and government subject matter experts within the field of unconventional reservoir characterization.



Luis Baez

Luis brings a serious and professional review to the committee and makes the planning of the annual conference a knowledgeable place to be because of his clearly open, and intelligent personality. He continues to be an important technical advisor for the society and has always represented the ideals of a very dedicated professional society volunteer and contributor.

Luis is the International Unconventional Lead at Shell Exploration & Production Company and has a degree in geology from the University of Liverpool. He has been working in coal seam gas, tight rocks/shale, and other unconventional plays for the last 17 years. In addition to his HGS activities, Luis is also an active contributor to the national AAPG (URTEC) and SPE organizations. ■

Diane Britt is a well-known and long-time member of the HGS. She has served in various capacities with the HGS, most notably as Editor of the *Bulletin*. Diane has been a participant in the planning and operation of the Environmental and Engineering Group for nearly 20 years. She has arranged for monthly speakers and ensured equipment was gathered for the monthly meetings. She has promoted and brought many new faces to the



Diane Britt

meetings through her outreach to the Geoscience community. Her guidance has been of great help to the Environmental and Engineering Group.

The Chairman's award is in recognition of her extraordinary help she has provided this year. When the Chairman of the Environmental and Engineering Group became ill in late 2017 speakers were needed for the months January through May. Within a few weeks Diane had all the speakers for the remainder of the 2018 programs identified. A huge relief to the Chairman of the Environmental and Engineering Group. Without her efforts the spring of 2018 session would not have been successful.

Diane received her BS in Geology from Ball State University in 1984 and completed engineering course work at the University of Florida in Gainesville, Florida. Her professional work has focused on environmental geology and hydrogeology primarily in the consulting industry. Diane is a Licensed Professional Geoscientist in Texas, Louisiana, and Florida; and currently practices as a Risk Consultant for AIG supporting the Casualty-underwriting teams. ■

Obie Djordjevic is presented the HGS Chairman Award for his years of continuous contributions and organization support of the HGS Mudrocks Applied Geoscience Conference event. These roles include Chairing Technical Sessions and being a key member of the Core Program Committee. Obie has also been instrumental in obtaining Newfield's corporate support. Obie's contribution roles also include the recruitment and development of key petrophysical subject matter experts (SME) talks and contacts with numerous university and government subject matter experts within the field of unconventional reservoir/petrophysical characterization considerations.



Obie Djordjevic

Obie brings extraordinary enthusiasm to the committee and makes the planning of the annual conference fun because of his

2017-2018 Chairman's Award

Chairman's Award honors members whose extraordinary efforts or unique contributions to their committee deserve special recognition.

clearly gracious and gregarious personality. He continues to be an important technical advisor for the society and has always represented the ideals of a very dedicated professional society volunteer and contributor.

Obie is an active contributor to the Houston Geological Society as well as to the local and national AAPG, AAPG Hedberg, RMAG, SEG, SPWLA organizations. His representation is truly of a professional geoscientist / petrophysicist that contributes his valuable skills and efforts to the greater good of the profession.

Obie is a graduate of Texas Tech University with a BSc in Electrical Engineering and has 37 years of industry experience. He has lived and worked in Latin America, Africa, Australia, Indonesia, Mexico and the USA and is currently a Petrophysical Advisor at Newfield Exploration. ■

HGS is proud to present a Chairman's Award to **Bryan Guzman**. Bryan has been a solid contributor to the HGS for more than 10 years in Committee chair roles and in multiple terms as a Board officer.



Bryan Guzman

Through a span of 7 years (2011 to 2017), Bryan was the Chair of the Exhibits Committee, ensuring HGS representation at many Oil and Gas conferences. He has also spent long hours handling the logistics of transporting the HGS booth and arranging booth volunteers to local and out of town conference venues. He kept the look of the booth up-to-date with design changes and other creative ideas and his group was instrumental in enhancing the visibility of HGS and in adding many new members by generating interest in HGS and on-site applications.

Bryan was also an active member of the HGS Board, serving as Secretary (2013), Treasure Elect (2015) and Treasurer (2016). He is currently Chair of the Advertising Committee.

He performed all these activities while working on his recently completed MS in Analytics at Texas A&M, adding to his BS degree in Geology at UT San Antonio.

Bryan has been employed in the O&G industry since 2007. He was a Geo-tech at Balcones Energy Library in 2007-08 and since 2008 has been with Ingrain Inc. in Geologist and Geoscience roles as well as other positions including Product Champion-Drill Cutting Technologies, Geological Advisor and Technical Advisor.

In addition to his active commitment to HGS, Bryan is a member of AAPG, SPE, and SPWLA. We are pleased to recognize Bryan's many contributions to Houston Geological Society. ■

Arlin Howles is nominated for the HGS Chairman's Award for his many years of continuous contributions and organization support of the HGS Mudrocks Applied Geoscience Conference event. These roles include Technical Session Chairing and the critical Keynote Luncheon Speaker. Arlin was also instrumental in obtaining SM Energy's corporate support. Arlin's contribution roles also include the recruitment and development of key talks and contacts with numerous university and government subject matter experts within the field of unconventional reservoir characterization and environmental considerations.



Arlin Howles

Arlin brings an extraordinary passion to the committee and makes the planning of the annual conference very enjoyable because of his clearly gracious, and caring personality. He continues to be an important technical advisor for the society and represents the ideals of a very dedicated professional society volunteer and contributor.

Arlin is an active contributor to the local HGS as well as to the national AAPG organization. He is an AAPG certified Petroleum Geologist. His representation is truly of a professional geoscientist that contributes his valuable skills and efforts to the greater good of the profession. Sincere appreciation for his multiple efforts is well deserved. ■

2017-2018 Chairman's Award

Chairman's Award honors members whose extraordinary efforts or unique contributions to their committee deserve special recognition.

Troy Meinen has been a member of the HGS for many years. He has served as treasurer of the Environmental and Engineering Group but it is his work as the Co-chair for the EE group that is being recognized for the Chairman's Award. Troy has been in the environmental industry for more than 20 years addressing soil and groundwater issues at a variety of industrial facilities and upstream oil and gas projects.



Troy Meinen

His involvement with the Environmental and Engineering Group has been invaluable. He has made sure that registrations and financial aspects have been tended to and ensured that the required materials have been gathered for the monthly meetings. In essence, Troy insured that the details of making these meetings and this group possible were addressed. In addition, he has stepped in and been a monthly speaker on a variety of topics from health and safety to highlighting the need for sustainable water development in developing countries. He has participated with Living Waters International doing charitable work of drilling water wells in Guatemala, Nicaragua, and Haiti.

This chairman's award is in recognition of all the hard work Troy has done for nearly 10 years with the Environmental and Engineering Group. A recognition that is long overdue. ■

Letha Slagle was educated in Environmental Science at University of Virginia and earned her MSc degree in Geology at Stanford University, specializing in Stratigraphy and Sedimentology. During her career at Shell Oil Company, she served as an Exploration Geologist and Manager.



Letha Slagle

Since her retirement she has volunteered in educational outreach and is currently the Chairperson for the Educational Outreach Committee. She formed strategic partnerships with other organizations and began training students of the four HISD petroleum academies in geologic skills and in professional development. In 2012, she brought this effort under the umbrella of the Houston Geological Society by working together with related committees. Events touch some 500 public school students a year, including rock labs, museum days, geologic map labs and outcrop field trips. All of these events include technical content, such as exercises and videos, which she produced to introduce students to opportunities in the study of geology. Several graduates of the Petroleum Academies have now gone on to graduate bachelor's programs and begun graduate studies in geology, and credit these exposures to their career choices. This past year she was able to get the "Bones in Schools" program re-introduced into the classrooms at the Middle School and Elementary Levels.

Letha's lifelong hobby is "birding" and she is a frequently contributor to the Cornell University database, "ebird." She is a Gulf Coast Master Naturalist and teaches the geologic section of this program. She also serves as a Director of Municipal utility District 355, where she takes a special issue in local drainage engineering issues.

For Letha's continued efforts to provide high-quality earth science education to Houston area students and, in particular, for her efforts to re-introduce the Bones in Schools program, she has been selected to receive the Chairman's award for 2017-2018. ■

2017-2018 Rising Star Award

Rising Star Award honors individuals who are relatively new to the HGS and have made significant and promising contributions to the enhancement and success of the society.

Nicole Arres is presented the HGS Rising Star Award for her volunteer activity within HGS. Nicole is currently the SWN Liaison for the HGS Northsiders' Luncheons. She has volunteered with the HGS Northsiders' Luncheon Committee since 2016 and has served as treasurer, event coordinator and is currently Committee Co-Chair. She has devoted hours of her time and energy and has been instrumental in making Northsiders' a resounding success. With such dedication Nicole certainly contributes a prominent role in the future advancement of geology.



Nicole Arres

Nicole received her BSc Earth and Environmental Science from the University of New Orleans in 2008. She began working full-time in consulting where she conducted soil characterization and groundwater sampling having spent the majority of her time working in South and East Texas. In 2013, Nicole graduated from the University of Houston with her MSc in Geology. She has been with Southwestern Energy since 2013 where she is currently responsible for regional and sub-regional studies, asset specific technical analyses, prospect identification and evaluation of business development opportunities. ■

Lisa Neelen is presented the HGS Rising Star Award for her years of continuous contributions and organization support of the HGS Mudrocks Applied Geoscience Conference event. Her contributions have been as the Technical Session Chair in the Geophysical Portion of the Program and has also been instrumental in obtaining Statoil's corporate support. Lisa's contributions also include the recruitment and development of key talks and contacts with numerous university and government subject matter experts in the field of unconventional reservoir characterization as related to geophysical inversion applications of reservoir characterization and for subsurface diagnostics for SRV determinations.



Lisa Neelen

Lisa always brings an extraordinary interest in sharing geophysical advances to the committee and provides excellent insight into planning the annual conference because of her technical knowledge and opinions. She continues to serve as an important technical advisor for the society and exhibits the characteristics of a dedicated professional, volunteer and contributor. Sincere appreciation for her efforts is well deserved.

Lisa is currently Principal Geophysicist in Exploration at Statoil. She began her career as a depth imaging geophysicist with Advanced Data Solutions in Houston. Through many mergers and acquisitions, she has worked with Core Laboratories, Paradigm, 3DGeo and Fusion Petroleum in various roles including depth imaging, technical writing, software commercialization, technical marketing, sales and technical services provider. ■

Judy Schulenberg is awarded the HGS Rising Star Award for her service to the HGS as Secretary on the Calvert Memorial Scholarship Board and as a member of Video committee that is responsible for recording presentations at luncheons and special events. She is also serving on the CEC Flooding Conference and Communication Committee as Academic Liaison Co-chair recruiting speakers. Judy has served on the Continuing Education committee and as a special awards judge for HGS at the High School Science and Engineering Fair held each year at the University of Houston.



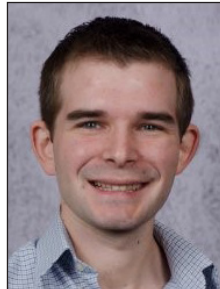
Judy Schulenberg

Judy has been involved with the AAPG, SEG, HGS and GSH since she graduated from the University of Houston. She continues to work with University of Houston and numerous other colleges to target and encourage the best applicants for the HGS Calvert Scholarship applications. Judy was a founding member of the University of Houston College of Natural Science and Mathematics Alumni Organization and served as Scholarship Committee chair for several years. This experience continues to be a benefit in the effort to build bridges between industry, universities and the HGS. ■

2017-2018 Rising Star Award

Rising Star Award honors individuals who are relatively new to the HGS and have made significant and promising contributions to the enhancement and success of the society.

HGS is pleased to present the Rising Star Award to **Tim Shane**. He has been a core committee member of NeoGeos over a long period and during the past year has served as the Chair of that committee.



Tim Shane

Tim has been instrumental in bringing a more professional and education-oriented focus to the NeoGeos group. Along with others in the committee working under his leadership, the group has expanded. The use of social media has made NeoGeos specifically and HGS in general more visible to the early-career segment of Society members as well as potential members. His efforts to discern relative technical topics of interest and locate speakers have added a new dimension to the Happy Hour for young professionals. His efforts in this area have led to Tim's involvement in the Continuing Education committee, as well.

Tim's work with Alicia Staszyc in promoting NeoGeos led to their appearance on the *Mini-Geology* radio program hosted by Daniel Minisini of KPFT, where they were able to further promote the Houston Geological Society to the Houston community.

Tim holds a MSc degree in geology from the University of Louisiana at Lafayette and a BSc degree in the same discipline from Texas A&M University. He is also involved with the American Association of Petroleum Geologists, the Society of Petroleum Resource Economists and is a volunteer with the Big Brothers-Big Sisters Program.

We are pleased to recognize Tim's work with the NeoGeos and we look forward to his continued leadership within HGS. ■

HGS is pleased to present the Rising Star Award to **Alicia Staszyc**. Her work with the NeoGeos indicates her commitment to the viability of HGS by increasing the early involvement of new members in the activities of the Society.



Alicia Staszyc

Alicia has been instrumental in the evolution of the NeoGeos young professional group from a social orientation to a more professional networking and educational focus. Her level of enthusiasm is seen in successfully reaching out to the early-career segment of Society members and especially employing the use of social media in advertising NeoGeos events. She is said to be "plugged in" to the early career professional geologist group.

Alicia has been key in locating interesting venues to hold the popular Happy Hour get-togethers and in making the arrangements for their success. Her work in promoting NeoGeos and HGS to the community at-large led to the appearance of herself and NeoGeos chair Tim Shane on the Mini-Geology radio program hosted by Daniel Minisini at KPFT.

Alicia received her BSc with Honors in 2012 and her MSc in Geology from the University of Houston in 2014. She also received her BA in French Language from the University of Houston in 2017. Her graduate work concentrated on sequence stratigraphy, terrigenous depositional systems, and petroleum geology. Her master's thesis focused on a sedimentological analysis of glacial marine sediments. She has experience in the industry in basin modeling, well log correlation, and seismic interpretation. Alicia currently works for Total E&P Americas applying her knowledge of geology and skills in data management and ArcGIS. ■

2017-2018 Corporate Stars

The Corporate Star Award honors companies who have made significant contributions to the Houston Geological Society. These contributions can be monetary (cash) or in kind (donation of services, materials, or an individual's time).



Anadarko Petroleum Corporation is among the world's largest independent oil and natural gas exploration and production companies. The company has been a generous sponsor to many HGS programs over the years. Anadarko has donated their venue to HGS for our Mudrocks Applied Geoscience Conference for the last three years and will do so again in 2019. This support greatly aids in making Mudrocks a successful event for HGS. Anadarko has also been a student initiative sponsor since 2015 and paid for all HGS student memberships for the past four years. ■



Chevron Corporation is an American multinational energy corporation active in more than 180 countries. The company is being awarded an HGS Corporate Star Award this year for their long-term and continued support of the HGS scholarship programs and events. ■



Baker Hughes, a GE company is an international industrial service company and one of the world's largest oil field service companies. The company has a century-long track record as a top-tier oilfield service provider. Baker Hughes is awarded a Corporate Star Award this year for their significant sponsorship of both the HGS Mudrocks and HGS Geomechanics Applied Geoscience Conferences. ■



Southwestern Energy Company (SWN) is a natural gas exploration and production company headquartered in Spring, Texas. The company is one of the largest independent producers of natural gas in the US Lower 48 and is responsibly developing America's abundant supply of natural gas to fuel economic development and job growth. SWN is receiving a Corporate Star Award from HGS for its generosity to the Society in providing a venue for the HGS monthly Northsider's Lunch meetings and for the Applied Geoscience Geomechanics Conference. This support greatly aids in making these successful events for HGS. ■

2017-2018 HGS Teacher of the Year

This award has been established to honor individuals whose extraordinary efforts or unique contributions are in earth science education.

It is a great honor to be awarded Houston Geological Society's 2017-18 Teacher of the Year. As someone who has been teaching for only eight years I am quite humbled and accept this award in recognition of my service to all of the students who have taken my classes.

I was born and raised in Greenville County, South Carolina. At an early age my family took me to the mountains to enjoy nature while hiking, picnicking and swimming or simply viewing the fall foliage. I consider myself fortunate to have experienced these things as they played a large part in the adult I am today.

After high school I enrolled at Clemson University as a Physics major. At the end of the first semester I realized that Geology was a better choice, not because I disliked Physics, but because I loved my Geology coursework. I will never forget how my Geology 101 professor explained the difference between *pahoehoe* and *aa* (two kinds of solidified lava); the first was smooth and ropy and the second originated from the Hawaiian exclamation "Aa" as they walked barefoot on the rock. Every day was fun with this professor because he had a way of transporting us to some of the most amazing and distant places while we sat in a classroom. We did have field trips as well and to this day I consider the caving excursion to Tennessee as one of my life's great adventures.

I attended graduate school at Penn State University and earned an MSc in Geoscience where I completed my thesis analyzing climate-induced changes to Chesapeake Bay. During a hiatus from graduate school a friend and I drove from Seattle to Alaska and back where I subsequently started a PhD program in Soil Science at Penn State University. While this course of study represented big change for me at the time, it's now clear the decision was simply an expression of my overall interest in everything Earth Science. I went on to present my work at gatherings of the American Geophysical Union (AGU) and the Soil Science Society of America (SSSA) and was fortunate enough to be invited to present at a very small conference in Spain where the focus was applications of fractal mathematics in pedology.



Jody Gibson

I guess it should not be surprising that I married a geologist! In fact she is the reason why I ended up in Houston, although we did spend a few years in Bakersfield, California. It was in Bakersfield that I made the critical decision to go into teaching. I was working as an Environmental Geologist but the job lacked a critical element preventing it from becoming a career. While the thought of teaching teenagers was quite frightening at first it was a decision that proved to be one of the best I have made.

After serving as a long-term substitute for a seventh grade Life Science class my first full-time teaching position was at a high school in Bakersfield where I taught Earth Science to ninth graders. Despite the typical new teacher trials and tribulations, I thrived and it's amazing how I still keep up with some of my students from that first year.

Currently I work at Energy Institute High School in Houston. This is the engineering magnet campus in HISD. I have taught Environmental Science, 8th grade Physical Science, Environmental Sustainability (an engineering course), and Earth and Space Science to students that come from all parts of the city. Every day is an adventure and it satisfies my great desire to make a difference in the lives of ordinary teenagers. I use the word *ordinary* intentionally because I know that some of my students have and will go on to do *extraordinary* things. For example, our students partnered with Air Alliance Houston and Houston Public Media on one cross-curricular project in 2017. The result was a suite of podcasts that were shared with local policymakers ensuring that they could make decisions informed by science and student voice regarding the city's transportation sector problems. Some of these students went on to present at a town hall meeting where a decision of how to allocate money received from the VW clean diesel settlement.

I would like to thank the Houston Geological Society for considering me as a candidate and for selecting me as Teacher of the Year as well as all of my students. You are the reason why I teach and I want to give a special thanks to them! ■

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 (February 2018) President Trump's FY 2019 Budget Request Proposes Cuts to Many Federal Science Agencies

President Donald Trump released his \$4.4 trillion budget proposal for fiscal year (FY) 2019 on February 12, 2018 prioritizing defense, border security, infrastructure, and the opioid crisis, while proposing significant cuts to many domestic programs, including science agencies.

The President's FY 2019 Budget was released along with a last-minute addendum outlining additional spending priorities, developed after Congress passed the Bipartisan Budget Act of 2018 on February 9, 2018 to raise the defense and non-defense discretionary spending caps for FY 2018 and 2019. The addendum effectively rolled back some of the initially proposed cuts to a few science agencies, such as the Department of Energy's (DOE) Office of Science and the National Science Foundation (NSF). However, even with the addendum additions, the President's budget request for non-defense discretionary spending remained \$57 billion below the caps agreed upon by Congress. White House Budget Director Mick Mulvaney explained that "the Administration does not believe these non-defense spending levels comport with its vision for the proper role and size of the Federal Government."

Many of the proposed changes are a reprise of last year's spending plan from the White House, which congressional appropriators had largely rejected in developing their individual spending bills for FY 2018. Congress is currently finalizing the FY 2018 budget process with a deadline of March 23, while also considering priorities for crafting FY 2019 appropriations bills.

Environmental Protection Agency (EPA): EPA was initially slated for a 34 percent cut compared to FY 2017, but the addendum directed an additional \$724 million in spending for the agency, bringing the total EPA request to \$6.15 billion, a 25.5 percent cut, for FY 2019. The addendum provided an additional \$327 million to the Hazardous Substance Superfund account to advance the cleanup and reuse of contaminated sites on the National Priorities List, and an additional \$397 million for the Clean Water and Drinking Water State Revolving Funds to largely support investment in wastewater and storm water infrastructure. According to EPA's Budget in Brief, thirty-nine programs would be eliminated along with reductions to many

other programs across the board, such as the Chesapeake Bay and Great Lakes Geographic Programs which would be cut by 90 percent. The Clean Air and Global Climate Change accounts would be abolished to create two new accounts: Core Mission and Rule of Law and Process. The budget also outlines plans to reshape the EPA workforce, reducing the number of full-time employees from an estimated 15,408 in FY 2018 to 12,250 in FY 2019.

U.S. Geological Survey (USGS): The President's FY 2019 budget request for the Department of the Interior proposes drastic reductions to the majority of functions within the USGS. These proposed cuts would severely impact most fundamental activities conducted by the agency, as well as funding for state geological surveys and other nongovernmental partners. The proposed cuts would reduce direct staffing levels by 25 percent, or 1,029 direct full-time equivalents (FTE).

The FY 2019 budget request for the USGS includes a total of \$859.7 million – a 20 percent decrease from FY 2017 enacted levels. This includes \$117.3 million – roughly an 18.5 percent cut – for the Natural Hazards Mission Area that provides early-warning alerts and supports efforts to reduce societal risks to hazards. The proposal would entirely eliminate the Environmental Health Mission Area, which studies contaminants and toxic substances on water and the environment, transferring only \$200 million for Harmful Algal Bloom work to the National Water Quality Program in the Water Mission Area. Under the Core Science Systems Mission Area, the National Cooperative Geologic Mapping Program would be cut by about \$2 million, or 8 percent, from FY 2017 enacted levels. The proposal also includes a cut of almost 50 percent to the USGS Libraries, which have already experienced reductions in 2017.

The President's FY 2019 budget emphasizes science supporting energy and mineral independence and security, and provides an increase of \$11 million, or 15 percent, for the USGS Energy and Minerals Mission Area at \$84.1 million, above FY 2017 enacted levels. Specifically, the budget proposes a new initiative called the Three Dimensional mapping and Economic Empowerment Program (3DEEP) to improve the topographic, geological, and geophysical mapping of the United States pursuant to President Trump's executive order

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on critical minerals. The budget proposal also supports efforts to launch Landsat 9 by investing \$75.5 million in the National Land Imaging program, including funding for resources needed to develop the Landsat 9 ground and flight systems.

Other Interior Agencies: The President’s request would cut the Bureau of Land Management (BLM) by nearly 24 percent and the National Parks Service (NPS) by about 7 percent compared to the amounts provided in FY 2017. The NPS would have received steeper cuts from the original request, but the addendum provided additional spending for the management, operation, and maintenance of park areas and facilities. The budget request for the Bureau of Safety and Environmental Enforcement (BSEE) is \$199.9 million, a 28 percent increase from FY 2017 enacted levels, and the Bureau of Ocean Energy Management (BOEM) request is a 9 percent increase from FY 2017 at \$179.3 million.

The FY 2019 Interior budget request also provides \$18 million to help initiate the Department of the Interior’s internal reorganization plan.

National Oceanic and Atmospheric Administration (NOAA): The President’s budget outlined \$4.56 billion total funding for NOAA, posing a \$1 billion or 20 percent decrease compared to FY 2017 levels. Within the agency, thirty-four programs face proposed reductions and thirty-one programs are slated for termination, including many of the same programs that were zeroed out in the FY 2018 request, such as Coastal Management Grants, the National Estuarine Research Reserve System, the National Sea Grant College Program, and the Office of Education, and many climate, weather, and air research programs. In its Congressional Justification, NOAA said that the FY 2019 budget prioritizes core functions, including development of its new polar orbiting satellites to aid in weather forecasting, but the proposal consolidates the Polar Follow On into the Joint Polar Satellite System resulting in cuts to their combined budget of \$238 million. The justification also outlines the elimination of 355 jobs at the National Weather Service (NWS), including 248 forecasters, even though a 2017 Government Accountability Office report indicated that the NWS should be working harder to fill vacancies and reduce a hiring backlog.

National Aeronautics and Space Administration (NASA): NASA would receive a 1.3 percent increase of \$240 million from FY 2017, providing for a total budget of \$19.9 billion, after the addendum added \$300 million to the agency’s original FY 2019 budget request, mostly for exploration activities. The agency’s budget overview states that it would redirect Office of Education funding to new initiatives supporting NASA’s core mission of exploration. The budget proposal would cut funding for NASA’s

Earth Science research program by approximately 6 percent, resulting in the termination of five of its Earth Science missions: PACE, OCO-3, RBI, DSCOVR Earth-viewing instruments, and CLARREO Pathfinder. The budget also proposes ending funding for the international space station (ISS) by 2025 and increasing reliance on commercially-operated satellites, in addition to renaming and restructuring of the NASA mission areas: Space Technology to Exploration Research and Technology, Exploration to Deep Space Exploration Systems, and Space Operations to LEO and Space Operations.

Department of Energy (DOE): The FY 2019 budget request for DOE is \$30.6 billion, providing essentially flat funding compared to FY 2017. The original budget would have cut DOE’s Office of Science by 22 percent, but the addendum restored \$1.2 billion for fundamental scientific research resulting in flat funding for the Office of Science at \$5.4 billion. Within the Office of Science, the budget request includes \$1.9 million for the Basic Energy Sciences (BES) program, and a \$112 million or 18 percent cut to Biological and Environmental Research. The Advanced Research Project Agency-Energy (ARPA-E) is zeroed out and posed for termination similar to the FY 2018 budget request.

The FY 2019 request provides \$2.5 billion for the DOE’s Energy programs. This includes \$696 million for Energy Efficiency and Renewable Energy, which is a \$1.3 billion or 66.7 percent decrease from FY 2017. It includes \$502 million for Fossil Energy Research and Development (R&D), a notable 19.2 percent increase from FY 2017. The budget request also proposes creating a separate account for Cybersecurity, Energy Security, and Emergency Response (CESER) that would be funded at \$96 million to support the Administration’s commitment to protecting energy infrastructure security.

Bipartisan Climate Solutions Caucus Introduces Prize
The bipartisan House Climate Solutions Caucus introduced their first piece of legislation, the Challenges & Prizes for Climate Act (H.R.5031), on February 15, 2018. Sponsored by Representative Dan Lipinski (D-IL-3) with five other caucus members signed on as original cosponsors, the bill aims to establish a Climate Solutions Challenges program within the Department of Energy to fund clean energy prize competitions and consequently spur innovation in key areas critical to combating climate change. In carrying out the program, the bill would authorize \$10 million and require the Secretary of Energy to include at least one prize competition on each of the following areas: carbon capture and beneficial use, energy efficiency, energy storage, climate resiliency, and data analytics. According to Representative Lipinski, this legislation encourages public-private partnerships, pays only for performance, and has the potential to yield major technological

advances and accelerate market development – a tactic that has proven successful in the past by leading to developments in hydrogen fuel cell technology.

Bipartisan Expansion of Tax Credits for Carbon Dioxide Sequestration Signed into Law

The Bipartisan Budget Act of 2018, signed into law by President Donald Trump on February 9, 2018, contained language that provides tax incentives for carbon sequestration under a section of the Miscellaneous Provisions. The legislation expands the carbon capture, utilization, and storage (CCUS) tax credits and allows new CCUS technologies, such as direct air capture (DAC), to qualify. The bill amends Section 45Q of the Internal Revenue Code to eliminate the tax cap on qualifying projects, make credits available to claim for 12 years, and increase credits to \$50 per ton of carbon dioxide for utilization and \$35 per ton for permanent storage. This language was initially proposed in the Furthering carbon capture, Utilization, Technology, Underground storage, and Reduced Emissions (FUTURE) Act (S.1535), which was introduced by Senator Heidi Heitkamp (D-ND) on July 12, 2017, and received no committee action before it was enacted as part of the Bipartisan Budget Act.

Some coal industry leaders believe increased tax credits will help bring down the cost of clean coal technology, the commercialization of which they believe is imperative to the survival of their industry. Oil and gas industry leaders view the increase in utilization tax credits for Enhanced Oil Recovery (EOR) as an incentive for an environmentally friendly practice that helps their bottom line. The renewable energy sector also benefits from the FUTURE Act incentives because the new Section 45Q tax credits are greater than the preexisting Renewables Production Tax Credit (PTC). Some environmentalists argue that EOR tax credits are perpetuating fossil fuel reliance rather than paving the way to cleaner, renewable energy. Furthermore, some view the omission of energy storage technologies within FUTURE Act as a blow to renewable energy and ultimately a clean electrical grid.

U.S. District Court Overrules Suspension of Methane Venting and Flaring Rule as BLM Proposes Revisions

On February 22, 2018 the U.S. District Court for Northern California issued a preliminary injunction against suspension of the Bureau of Land Management’s (BLM) 2016 rule on Waste Prevention, Production Subject to Royalties, and Resource Conservation. The Obama-era rule seeks to reduce methane waste from venting, flaring, and leakage during oil and gas production on onshore federal and Indian lands.

The latest court decision is one in a series driven by legal sparring between proponents and opponents of the measure, which began

almost immediately after the rule was finalized in November 2016. Within a few weeks of rule finalization, western states and industry groups filed legal challenges in the U.S. District Court of Wyoming arguing that the BLM did not have the authority to regulate air pollution. Although the court denied their request in January 2017 for a preliminary injunction to suspend the rule, or to effectively halt the rule’s implementation pending court proceedings, litigation is still ongoing.

Congressional attempts to undo the rule began on February 3, 2017, when the House passed H.J.Res.36 to overturn the rule in perpetuity using provisions of the Congressional Review Act. Shortly afterward, President Donald Trump issued the Executive Order for Promoting Energy Independence and Economic Growth (E.O. 13783) on March 28, 2018, followed by Interior Secretary Ryan Zinke’s Secretarial Order on American Energy Independence (S.O. 3349) issued the next day, prompting administrative review of the rule by the BLM. However, the Senate narrowly rejected the congressional resolution on May 10, 2017.

Despite the Senate’s rejection of H.J.Res.36, BLM temporarily delayed the implementation dates of certain aspects of the rule, pursuant to Section 705 of the Administrative Procedure Act (APA), in light of the ongoing litigation in Wyoming. California, New Mexico, and 17 environmental and tribal groups swiftly responded and filed two lawsuits against the BLM in July, challenging BLM’s overly-broad use of the APA. The U.S. District Court for Northern California sided with the states and overturned BLM’s rule delay on October 4, 2017. An appeal was filed on December 4, 2017 by the Department of Justice on behalf of the Department of the Interior and is currently pending review.

On December 8, 2017 BLM issued a broad one-year implementation delay of certain rule provisions, citing undue compliance costs associated with provisions that “may be rescinded or significantly revised in the near future.” This once again prompted California, New Mexico, and the same 17 environmental and tribal groups to file another suit against BLM on December 19, 2017. On February 22, 2018, the California court once again sided with the plaintiff and issued a preliminary injunction against the rule suspension, stating that the BLM did not provide a reasoned analysis for the rollback.

This recent court ruling casts doubt on the legal foothold for the BLM’s newest proposed rule, which relies on a similar arguments relating to excessive financial burden and duplicative regulatory measure. The proposed revisions would effectively repeal the current venting and flaring requirements altogether, replacing them with pre-2016 requirements, which have remained unchanged for over 30 years (NTL-4A).

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Secretary Zinke Proposes Reorganization Plan for the Department of the Interior

Interior Secretary Ryan Zinke is moving forward with major plans to reorganize his department, which includes agencies such as the Bureau of Ocean Energy Management, the National Park Service, the Bureau of Land Management, and the U.S. Geological Survey. The reorganization plan could potentially affect tens of thousands of federal government employees who may be required to relocate.

Each of the nine agencies within the Department of the Interior (DOI) currently operate under separate and unique regional structures. The Secretary’s proposal would change this management structure by establishing unified regional boundaries for all Interior bureaus in an effort to reduce administrative redundancy, shift resources to the field, and improve interagency coordination. According to the DOI’s Reorganization Q&A webpage, they are still evaluating options and may decide to treat the Bureau of Ocean Energy Management and Bureau of Safety and Environmental Enforcement differently, since those agencies are mainly concerned with offshore areas.

Secretary Zinke first laid out details of his widely-anticipated reorganization plan in a two-day meeting with senior officials on January 14 and 15, 2018. He later defended the proposal during a town hall meeting for all DOI employees on February 1, 2018 explaining that the plan will not cut jobs or bureaus but will improve the efficiency, effectiveness, and accountability of DOI and help streamline its mission. Additional details of the reorganization were provided in the President’s Fiscal Year (FY) 2019 Budget Request released on February 12, 2018 which included \$18 million to help initiate the Department’s internal reorganization plan.

The initial proposal included a new organizational map (dated January 3, 2018) that defined 13 common regions based on geographic basins and watersheds, rather than state boundaries. The plan would designate regional directors to serve two-year terms, with the position rotating between the different Interior bureaus. State directors and field managers from all bureaus inside a given region would be required to report to the regional director.

Following push-back from numerous Western state governors and members of Congress from both parties, the Secretary revealed in an interview with the Associated Press on February 23, 2018 that he is revising his original plan to better incorporate their stakeholder feedback. The redrawn map (as of February 15, 2018) still divides the Interior into 13 regions, but avoids splitting up states like Colorado, Wyoming, and Utah into multiple regions.

National Academies Release Second Decadal Survey for Earth Observations From Space

Last month, on January 5, 2018 the National Academies of Sciences, Engineering, and Medicine released a report titled *Thriving on Our Changing Planet: A Decadal Strategy for Earth Observation from Space*. Commissioned by the civilian agencies involved with space-based Earth observations – the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Geological Survey (USGS) – the study identifies key science and application priorities for 2017-2027 and highlights the ways in which U.S. Earth observation programs are an integral part of the nation’s information infrastructure. The report calls for the overall U.S. government’s program of Earth observations from space to be robust, resilient, and appropriately balanced, and for federal agencies to ensure efficient and effective use of U.S. resources.

The report identifies gaps and opportunities in the “Program of Record” – the series of existing or previously planned observations that must be completed as planned – at NASA, NOAA, and USGS. The “Designated” or cost-capped medium- to large-size missions should address five target observables identified in the report: aerosols, mass change, surface biology and geology, surface deformation and change, and clouds, convection, and precipitation. Earth System Explorer, a new program element involving competitive opportunities for medium-size Earth science missions, should target three of the following seven observables: greenhouse gases, ice elevation, ocean surface winds and currents, ozone and trace gasses, snow depth, terrestrial ecosystem structure, and atmospheric winds. Another new “Incubation” program element would invest in instruments, missions, or other technologies for priority observation opportunities that need to be advanced prior to cost-effective implementation. The report also recommends the addition of a new Venture-Continuity component known as “Earth Venture” to provide opportunity for low-cost sustained observations.

While most of the report focuses on NASA missions, the report also provides specific recommendations to NOAA and USGS. The report recommends that NOAA should make it easier for satellite data to be used beyond weather applications, further U.S. and international government partner observations, be a leader in utilizing commercial observations, and improve technology transfer from NASA. In regard to Landsat, the USGS is urged to continue to ensure that user needs are understood and addressed, reduce development costs, and leverage Landsat-related partnerships including international complements. ■

Remembrance

DONNA DAVIS



The HGS membership were deeply saddened to learn that Donna Davis had passed away on April 30, 2018. In the words of a close friend, the HGS was her life. No one was more fiercely dedicated to the well-being of our Society than Donna. Whether she was registering walk-ups at International or North American Explorationist dinner meetings or working behind the scenes on the Continuing Education and Africa Conference Committees, she was always helping.

Beyond being a tireless volunteer for HGS Donna was a good friend with a big heart and a big appetite for knowledge. One Muslim HGS member will always remember how diligent she was at calling and wishing him a Happy Ramadan. She knew more about Islam than most Muslims.

Those close to Donna know how challenged she was in life and hope that she is rewarded for how she rose to those challenges and found the energy to have contributed so much to the HGS. She is already missed and her efforts will be difficult to replace. Details about her funeral and/or memorial service will be announced as soon as they are known. ■

Dear Sirs:
I wish to nominate Ms. Donna Davis for a distinguished Service award. Committee/ area of volunteering: They have included The International Explorationists, The North American Explorationists, The Continuing Education Committee, and the African Conference.

I am nominating Donna for a Distinguished Service Award for her many years she has been active in HGS committees which arrange talks. At many meetings, first in the international explorationists and now in the North American Explorationists she has helped with arrangements and sat at the table checking in attendees. She has performed the same duties in continuing education. She worked with me in the African Conference arranging the poster section of the meeting.

All in all she has been an effective worker handling duties that make meetings run well.

I believe it is now time this year to recognize her overall contribution to the HGS. I request that she be given a Distinguished Service Award at our annual award banquet.

It is important that she receive this award to illustrate to the members of the HGS that faithful simple service to the HGS is valued. We cannot all be leaders or organize great events, but workers in projects are also valued.

Best regards, Martin
Dr. Martin M. Cassidy Ph.D.

NOTE: Donna received the Presidents Award 2009 and 2014

I feel very sad at the passing of Donna. I will miss her a lot. Donna was very helpful and supportive when I was starting my volunteer career at the HGS. I will always remember her enthusiasm and support of the success and mission of the HGS. Donna was also a very good friend and I always looked forward to seeing her at HGS events.

—Larry Quandt

Aside from being a tireless worker for HGS, Donna was a good friend with a very big heart. I will always remember how diligent she was at calling and wishing me a Happy Ramadan or Happy Eid. She wasn’t a Muslim, but she knew more about it than any other non-Muslim I know. I miss her already.

—Tarek

Donna Davis will be missed by all. I knew that I could always count on her help. When I think of the HGS, she is always one person that I think of. Please notify me of her funeral schedule so that I can attend.

—Steven L. Getz

Remembrance

GEORGE DEVRIES KLEIN
1933-2018



George Devries Klein was born on January 21, 1933 in s’Gravenhage, Netherlands. He immigrated to the United States and attended Wesleyan University in Middletown, Connecticut, where he earned a BA in Geology in 1954. He attended the University of Kansas in Lawrence and worked for the Kansas State Geological Survey while completing his MSc in Geology in 1957. He completed a PhD from Yale University in 1960. Sinclair Research Inc. employed him as a research sedimentologist from 1960-61 prior to George joining the faculty at University of Pittsburgh, Pennsylvania. In 1963 George moved to take a faculty position at The University of Pennsylvania in Philadelphia. In 1970 George accepted a position at the University of Illinois at Urbana-Champaign where he remained for the rest of his academic career. He retired to professor emeritus in 1993.

From 1993 he has been the president of the New Jersey Marine Sciences Consortium and director of the New Jersey Sea Grant College. He has also run a geologic consulting business (George D. Klein and Associates, and SED-STRAT Geoscience Consultants, Inc.) part-time from 1970 to 1996, and has been a full-time consultant as a petroleum geologist since 1996. He has been a visiting professor several times to Oxford University, England; University of Tokyo, Japan; University of Utrecht, Netherlands; Seoul National University, Korea; University of Chicago, Illinois; Scripps Institution of Oceanography, California; and several others.

Although he has actively participated in exploring, and developing oil and gas fields, his main contribution is the development of depositional models to help geologists predict where petroleum can be found. He taught petroleum geologists how to use sedimentology in their exploration by teaching numerous short courses. In his research, he developed the concept of “Tidalites”, which are sediments deposited by tidal currents. He also developed an evolutionary model for the development of cratonic (on continental crust) basins. He applied the tidalite concept to predict tidal circulation on ancient craton platforms (shelves) based on observations of modern processes. Klein showed that increasing shelf width also increased tidal range and thus tidal circulation dominated cratonic seaways. Other work on tidal flats includes documenting vertical sequences of rocks and sedimentary structures developed in carbonate banks. He developed new criteria for recognizing features and sediment distribution within tidal flats and the tidal reach in coastal areas.

In addition to his tidal work, Klein documented the control of the bedrock source on the composition of sandstone in rift margins. Such deposits form in basins over granites that are formed during continental breakup and a whole model was proposed for this scenario. This model is especially applicable in the breakup of super-continents. Klein also developed new field methods to identify ancient lake deposits.

George Klein led an extremely productive career. He is an author of 137 articles in international journals, governmental reports, field guidebooks, and professional volumes. Several document new processes in sedimentology. He was the author or editor eight books and volumes. His book, Sandstone Depositional Models for Exploration for Fossil Fuels, has been reprinted in three editions. Other books and volumes include Tidal Sedimentation and Clastic Tidal Facies. He has also written some 41 technical reports for companies, societies, and trade magazines. Klein received numerous awards for his contributions to the profession. He received the Outstanding Paper Award from the Society of Economic Paleontologists and Mineralogists (SEPM) in 1970 and honorable mention in 1971. He received the Laurence L. Sloss Award from the Geological Society of America in 2000. He was awarded a Citation of Recognition from the Illinois House of Representatives and the Erasmus Haworth Distinguished Alumnus Award from the University of Kansas, both in 1980. He was a Senior Fulbright Research Fellow in 1989 and Senior Research Fellow for the Japan Society for the Promotion of Science in 1983. At the University of Illinois, he was twice an associate at the Center for Advanced Study, and he received an Outstanding Faculty Award.

Klein has performed outstanding service to the profession. He has served as member and chair of numerous committees and panels for the American Association of Petroleum Geologists, Geological Society of America, Society of Sedimentary Geology of SEPM, International Association of Sedimentologists, Global Sedimentary Geology Program, JOIDES (Joint Oceanographic Program), DOSECC (Deep Drilling of Continents), and the Society for Exploration Geophysicists, among others. He served in numerous editorial roles including associate editor for the Geological Society of America Bulletin and on the editorial board for Geology, Sedimentary Geology, and Journal of Geodynamics, and numerous advisory boards for publishing companies.

George passed away April 30, 2018 at his home in Guam. He is survived by his wife Suyon Cheong Klein originally from Seoul, South Korea. ■



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 hard copy 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.

HGS Bulletin 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 ads@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.**

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9	\$800	\$1,300	\$2,500	\$4,700						
8	\$750	\$1,250	\$2,250	\$4,300						
7	\$600	\$1,100	\$2,200	\$3,850						
6	\$550	\$950	\$1,800	\$3,500						\$2,000
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4	\$450	\$650	\$1,300	\$2,500						
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2	\$250	\$400	\$700	\$1,500						
1	\$150	\$250	\$450	\$1,000	\$1,500	\$1,400	\$1,250	\$1,000	\$1,250	\$850
Professional Directory Section Business Card Ad: 10 Issues – \$160 (\$30 for each additional name on same card)										

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There are currently 5 opportunities to help spread the word about your business or event and generate traffic to your website or campaign. Please submit all ad materials five (5) days prior to the go-live date for testing.

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	\$1200 – 3 Months	
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Geo-Jobs	\$50 – 14 days	Posting of job opportunities on HGS website. Click the Geo-Jobs tab to get started. Must be filled out completed and the dates set appropriately.
	\$100 – 30 days	
	\$300 – 3 Months	
	\$600 – 6 Months	
	\$1200 – 12 Months	
Vendor Corner	\$250 *4 Pack option with 1 FREE bonus event for \$1000.00 available. Send request to vendorcorner@hgs.org.	Company logo, company website, and company description will be highlighted on HGS Calendar website event. This is an opportunity to display company wares, gain personnel exposure and hand out product information at HGS dinner meetings.
Event/Short Course Calendar Ad	\$100 – Monthly	An event ad posted within the HGS website calendar under the Events tab.
Bundle & Save!	• 30% off website ads when combined with print ads in all 10 HGS <i>Bulletin</i> issues. • 20% off website ads when combined with print ads in 5 HGS <i>Bulletin</i> issues. • 10% off website ads when combined with print ads in 3 <i>Bulletin</i> issues.	



Application to Become a Member of the Houston Geological Society

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

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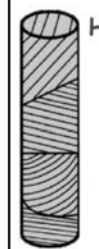
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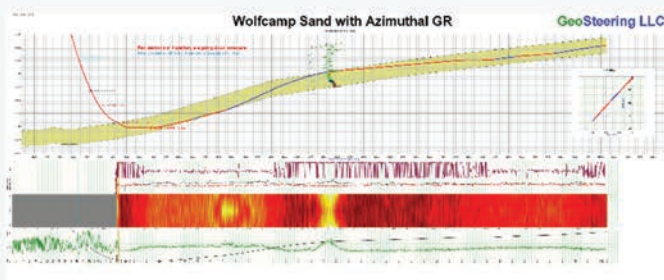
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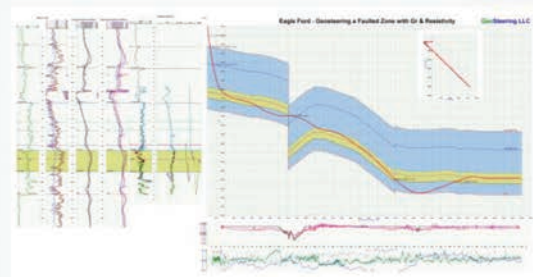
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