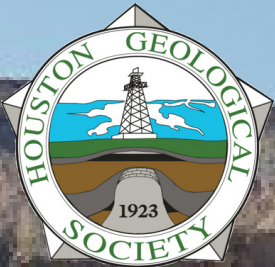


BULLETIN

HOUSTON GEOLOGICAL SOCIETY



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Annual University of Houston
Sheriff Lecture | Life and Death by
Impact: Drilling for Clues

THIRD EAGE-HGS CONFERENCE ON LATIN AMERICA

Leading the Global Future Supply
Growth

INTERNATIONAL DINNER

The Role of Structural
Inheritance in the Tectonic
Evolution of Chiapas, Mexico:
From Paleozoic Pangea Assembly
to Mesozoic Rifting and Cenozoic
Shortening and Basin Inversion

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Dionel Fuselier, William Howell, Donald
Lehto, Charles Revilla

ON THE COVER: The Triassic Chugwater in the Bighorn basin. This is at the lake in the Recreation area. This formation works as a major topseal separating the Paleozoic HCS (dominantly the Phosphoria) from the Mesozoic HCS (the Mowry and Thermopalis shales). Photo provided by Patty Walker.



2021 GSH Special Evening Event

The Search for Extraterrestrial Life



For Registration & Sponsorship call the GSH @ 281-741-1624 or visit gshtx.org

Wednesday November 3rd , 5:30-8:30



Buffalo Brewing Co.
Sunset Gallery
2101 Summer Street
Houston, TX 77007

Dr. Donna Jurdy,
Professor Emeritus,
Northwestern University



FROM THE PRESIDENT

MIKE ERPENBECK



HGS and its Volunteers

"Step up and volunteer" we've been told from the moment we entered the work environment after college, and have an industry and educational background we can "give back" to. Actually, for most of us the message came as early as high school and was amplified

during college. We were encouraged to join clubs and other fraternal organizations to test our wings within: leadership and social and organizational skills. Not much mention of "giving back"

And although our industry-related organizations often present volunteering as a kind of exercise in virtue (and often it is a giving back concept), it is just as important to recognize it as a continuing process in personal and professional development. Volunteering is the space where one gets a chance to showcase his/her "other" skills than those professional skills needed to advance in our industry.

In the volunteering realm, we get to acquire a reputation within our Society for getting things done and following through on promises to deliver. It doesn't hurt that we also get to list these accomplishments on our resume.

The HGS has an extraordinary list of committees (45-50 it's always changing), as can be seen in the beginning page of every month's Bulletin. There is a lot of volunteer work that needs to be done in the largest geological society of its kind in the world. If you have technical skills you don't get to use at work- financial/economic, data analysis, website-related etc., you are valuable to the Society's work. If you have social skills that help us reach out to our members and outside community you are good as gold. And it should be noted that project management is the essence of committee leadership. Future employers value that experience. Hence, all these aspects indicate it's beyond "giving back". Do it for your own benefit, too.



Check out the photos in the Bulletin and on the website of all the Society activities to get a sense of who is contributing their time to pull off all these events. One can't help concluding that it is a mix of senior volunteers and the younger or "nextgen" contributors. See the accompanying photos. Frankly, though we need more of the younger volunteers to step up. Not only are you the future of the Society and need to rise up in the volunteer corps, but often young professionals are more appropriate in certain committee work. Examples are seen in the community outreach committees. As we reach out to primary and secondary schools in their classrooms, science fair, etc. we note that the students seem to relate better to the younger geologists who are closer in age and stage in life. (We old geezers are boring and sometimes intimidating to younger students.)

If you head up a committee already, consider distributing the workload more to incorporate other new volunteers.

Your duties should include the training of those next in line, who will be the future leaders of our Society. When the time is appropriate, step down and let others lead the committee.

On another note, I attended GeoGulf last week in Austin and had a great time. Nonstop Gulf-Coast geology for 2+ days in the form of oral presentations, posters, short courses, and field trips. The Gulf Coast Association of Geological Societies (consisting of 13 local societies in the gulf coast province) presents GeoGulf every year as its premier convention. The Austin Geological Society was the host society this year and its crew put on a wonderful show. As the GeoGulf convention switches from a fall to spring time slot, there will be no event in 2022. However HGS will be the host society in April 2023 and Charles Sternbach will be the General Chair. Linda Sternbach will be Technical Program Chair, and I will be president of GCAGS that year. Charles is already at work generating excitement for GeoGulf 2023, as it is being promoted as linked to the 100 year anniversary of the Houston Geological Society. The theme will be "United we Explore and Revitalize the Gulf of Mexico Super Basin" We look forward to engaging HGS members as volunteers to GeoGulf 2023 Houston as we continue to Serve the Science.

Mike Erpenbeck, President





COVID-19 Policy Statement

Updated November 1, 2021

The Houston Geological Society continues to maintain a cautious approach to indoor social and educational gatherings. Please check the HGS website on a regular basis for all HGS online event opportunities.

The HGS Board will continue to monitor the situation and governmental directives to determine the pace of opening up the holding of HGS in-person events or whether the situation calls for reversing the trend in some measure.

Please monitor [hgs.org](https://www.hgs.org) and your email for further communication concerning HGS events.

For more information about how you can help to prevent the spread of the virus, visit the CDC website: <https://www.cdc.gov/>.

2021-2022 HGS Board

FROM THE EDITOR

SCOTT SECHRIST



Giving Thanks, Giving Back and Paying Forward

As we leave October behind, culminating in (we hope) a safe, spooky and fun Halloween, we begin November, remembering fondly held traditions at Thanksgiving and looking forward to the 2021 Holidays with new hope.

As Geoscientists, HGS Members have much to be thankful for. Recent increase in commodity prices for not only oil but also natural gas, will all provide support for innovative energy solutions moving forward.

There are jobs for Asteroid Sample Management / Curation, Onshore Seismic Data Processing, Staff Geology positions at least four Majors and Large Independents currently interviewing in Houston. It's not yet the "Good Old Days", but both Conventional Hydrocarbon and Renewable business activity and hiring are on the upswing. Freshen up that resume and take another look, if you haven't checked on the job market recently.

Our HGS Past President Jim Tucker manned the HGS Booth at the October SPEGCS hosted Job Fair in conjunction with the Texas WorkForce Commission. Jim tells us a robust number of virtual and In-Person Companies interviewed, and a record number of job seekers attended.

The GeoGulf (ex-GCAGS) Convention in Austin wrapped up the last week of October with better than expected attendance for this Hybrid In-Person and Virtual event. We seem to be gradually emerging from Covid... stay well and considerate of everyone around you.

HGS NOVEMBER EVENTS

REGISTER EARLY for the Monday, November 1 HGS / UH Sheriff Lecture! HGS joins the University of Houston Annual Sheriff Lecture as a jointly hosted Virtual event on Zoom from 6 – 9 PM. There will be Virtual Student posters (Virtual Judges Needed!); U of H State of the Department presentations, Outstanding Alumni Award, UH Student Poster Awards, and the Keynote presentation.

Dr Sean Gulick, Research Professor at the Jackson School of Geosciences at the University of Texas at Austin will present Life and Death by Impact: Drilling for Clues based on his research of the geological processes, environmental effects, and habitability of the Cretaceous-Paleogene Chicxulub meteor impact. Dr. Gulick took many World Class field trips to back up his research, highlighted in his service as the co-chief scientist for IODP Expedition 364 to the Chicxulub Impact Crater during 2016-18.

The STGS Austin Chalk Seminar has AGAIN been RESCHEDULED; now set for Friday & Saturday, April 8 & 9, 2022. Previously rescheduled for November 5th & 6th, 2021 in San Antonio, Texas....not going to happen. Don't go, thinking you can pay at the door.... You will be a San Antonio tourist at that point. More details in the spring.

Monday November 8 begins the Third EAGE-HGS Latin America Conference! This year the 3 day conference will be held in Houston, TX with an in-person networking reception and dinner on November 8th, and online with virtual presentations November 9th and 10th. An extensive Session Overview is available on the HGS Calendar; just click on the event link. Regional Overviews, with detailed sessions on New Plays, the Greater Caribbean; Non-Guyana and Suriname; the South Atlantic; Brazil, Non-Brazil and the Equatorial Margin will all be reviewed in the authors' latest work.

The Networking Reception & Dinner on Monday, November 8, 2021 will be held at Saldivia's South American Grill from 5:00pm - 9:00pm; see the HGS Calendar for more details. On Wednesday, November 10, 2021 the HGS Engineering and Environmental Group will have another Surprise Speaker at their In-Person Dinner Meeting at The Craft Republic Houston, 11470 Westheimer Rd. with Social 5:30 p.m., Dinner 6:30 p.m., Presentation 7:30- 9:00 p.m. Always a good time, fun networking and relevant speakers / topics.

Attention, Christmas and Holiday shoppers: for the rockhounds and gemologists in your life, two great events are scheduled for the middle of November; your perfect shopping schedule.

The annual HGMS Rock, Mineral, and Fossil Show will be held Friday, November 12 thru Sunday November 14, at the Humble Civic Center in Humble, Texas. HGS Volunteers are being requested to staff the HGS K12 booth. Contact HGS Event Liaison Janet Combes for more details: jmcombes@msn.com. Tickets are only \$8, good for all three days; kids under 8 get in free, so bring them along to see the beauty of nature's creative forces! It's a great STEM teaching opportunity in a fun environment.

On Saturday / Sunday November 14 & 15, plus Saturday / Sunday November 20 & 21, GeoInteriors will conduct their Annual Mineral & Fossil Sale; this Annual Charity event is benefitting HGS & GSH this year. Contact and event location info are on the HGS Website November Calendar page. 25 Metric Tons, wholesale prices on 2 weekends. Bring your forklift for that Petrified Tree Coffee Table! Checks, cash, no credit cards or e-payments; go prepared! Their warehouse is in NW Houston; see the HGS Website Calendar for more details.

Monday, November 15 HGS International Virtual Dinner meeting will present: "The Role of Structural Inheritance in the Tectonic Evolution of East and South Mexico: From Paleozoic Pangea Assembly to Mesozoic Rifting and Cenozoic Shortening and Basin Inversion" By Dr. Elisa Fitz Díaz from the National University Autonomous of Mexico (UNAM) in outside Mexico City, in Coyoacán, México, D. F. In the final week of November, we give thanks while honoring Thanksgiving traditions and creating new ones. We honor all of our HGS Volunteers and HGS educational outreach teams in schools, home and virtual classrooms and Universities all across the Houston metropolitan region. Wishing All great success and the best of health!

HGS Editor 2021-2022 | Scott C. Sechrist | Editor@HGS.org

HGS VIRTUAL GENERAL DINNER MEETING

MONDAY, NOVEMBER 1, 2021 | 6:00 - 9:00PM

ZOOM WEBINAR

HGS MEMBERS \$15 NON-MEMBERS \$30 STUDENTS \$10

[HTTPS://WWW.HGS.ORG/CIVICISM/EVENT/INFO?ID=2303](https://www.hgs.org/civicism/event/info?id=2303)

EVENT CONTACT: PATTY WALKER | PATTYWALKER1@ICLOUD.COM

HGS Annual University of Houston Sheriff Lecture Life and Death by Impact: Drilling for Clues

The most recent of Earth's five largest mass extinction events occurred 66 Ma, coeval with the impact of a ~12 km asteroid, striking at ~60 degrees into what is today the Yucatán Peninsula, México, producing the ~200 km-wide Chicxulub crater. This impact, by some estimations, drove the extinction of 75% of life on Earth at the genus level including all non-avian dinosaurs. Proposed kill mechanisms include thermal effects caused by the reentry of fast ejecta into Earth's atmosphere, dust, soot, and sulfate aerosols reducing Earth's solar insolation and ocean acidification. In 2016, 835 m of core was recovered from the Chicxulub impact structure through IODP-ICDP Expedition 364. Analyses done on these cores, downhole logs, and geophysical site survey data have led to a series of advancements to our understanding of impact cratering processes and to how the Chicxulub impact affected the Earth's environment leading to the Cretaceous-Paleogene mass extinction. Key areas of discovery include: 1) clear evidence for origin of peak rings and crater dynamics in large impacts, 2) highest resolution record to date of impact processes within the crater include deposition of impactites and role of ocean surge, 3) rapid recovery of life at ground zero with a key niche being filled by cyanobacteria, and 4) development of a long lived hydrothermal system with astrobiological implications.

Agenda

UH Earth and Atmospheric Sciences Poster Competition

Sheriff Lecture Registration with HGS is not required for the poster competition.

9am Oct 31 - 5pm Nov 1 – Viewing period for Poster Judges to review the following for each student:

3:00 -5:00 pm EAS Posters and Videos available for viewing

5:00 -6:00 pm EAS individual video/chat sites open for Q&A with the poster presenter

6:00 pm Sheriff Lecture

Sheriff Lecture Sequence of Events

Times subject to change.

6:00 pm Introductory remarks

6:10 pm Dr. Tom Lapen (UH-Earth and Atm. Sci. Department Chair) - Department Update

6:30 pm Dr. Paul Mann - Introduce the Sheriff Lecture speaker

6:35 pm Dr. Sean Gulick - Sheriff Lecture Presentation with Q&A

7:45 pm Dr. Henry Chafetz - Introduce the outstanding alumni award winner

7:55 pm Dr. William Dupre - EAS Outstanding Alumni Award - award acceptance - short presentation

8:05 pm Dr. Tom Lapen - UH Student Poster Competition - Award announcements

8:40 pm Dr. Tom Lapen - Final remarks

Biographical Sketch



Dr. Sean Gulick is a Research Professor at the Jackson School of Geosciences at the University of Texas at Austin where he conducts research and supervises student research projects in the areas of tectonic-climate interactions, the role of catastrophism in the geologic record and

marine and planetary geophysical imaging at nested resolutions. His Sheriff lecture at the University of Houston will focus on his current research on the geological processes, environmental effects, and habitability of the Cretaceous-Paleogene Chicxulub meteor impact. In order to test many hypotheses related to the effects of the impact, Sean was the co-chief scientist for IODP Expedition 364 to the Chicxulub Impact Crater during 2016-18.

The shipboard experiences and research outcomes of the IODP expedition to the Chicxulub impact site have been featured on NOVA on PBS: [Video 1](#) [Video 2](#)

In 2013-15 he was co-chief for IODP Expedition 341 that investigated tectonic and glacial interactions recorded by sedimentation in the Gulf of Alaska. His other current research projects include margin evolution of subduction and transform faulting in Alaska, Sumatra, New Zealand and Japan. In 2014, Sean led the seismic imaging component of a multidisciplinary cruise to the unexplored Sabrina Coast shelf in East Antarctica.

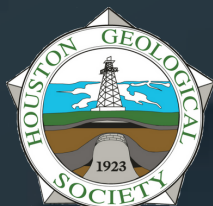
Prior to his joining the research staff of the Jackson School in 1999, Sean completed his PhD dissertation on seismic imaging of the southern Cascadia subduction zone. Sean holds a bachelors degree in geology with a minor in marine sciences from the University of North Carolina at Chapel Hill.

Sean is a Fellow of the Geological Society of America and was previously selected as a distinguished lecturer for the Consortium of Ocean Leadership and Joint Oceanographic Institutions. He has received numerous research and teaching awards at the UT Jackson School where he has supervised 3 postdoctoral researchers, 21 MS and PhD students and 5 undergraduate students.

Sean lives on a small ranch in Sunset Valley Texas with his wife, Dr. Jennifer Jobst, and their horses, dogs, cats, and chickens. He competes in medieval jousting tournaments and conducts medieval research as a hobby.

EAGE

EUROPEAN
ASSOCIATION OF
GEOCENTRISTS &
ENGINEERS



THIRD EAGE/HGS CONFERENCE ON LATIN AMERICA

leading the global future supply growth

SESSION OVERVIEW

8-10 NOVEMBER 2021 • HOUSTON, UNITED STATES & ONLINE

www.eage.org



Welcome to the Third EAGE/HGS Conference on Latin America

Latin America – An Exploration Overview

Chairs: Bob Fryklund (IHS) and Daniel Minisini (Shell)

The Atlantic conjugate margin agglutinate the activity of most offshore operators. Analyzing the geological and non-technical risks at continental scale allows ranking the opportunities within the entire conjugate margin, classifying reliable sites against marginal sites, based on criteria derived from the same group of explorers, and on knowledge transferred from databases geographically far apart. Method, data and mindset behind these analyses will be presented to debate among explorers.

Brazil and Guyana are leading the region and the world in new volumes of discovered hydrocarbons. Mexico is in pursuit, but the next several years of deep-water drilling will be critical. Colombia offshore too is in the proof of concept stage and upcoming wells will be critical in determining if there are enough resources for commerciality. In Argentina, the Vaca Muerta is ramping up.

- Still lots of basins remain under-explored.
- Where will the next discovery be?
- What role will future demand and the call for a reduced carbon footprint have?
- Will Venezuela rejoin the marketplace?

Frontier Areas; New Plays and Missed Opportunities

Chairs: Catie Donohue (GeoMark Research) and Mark Olson (Apache)

The Latin America and Caribbean regions contain about 20% of the global proven oil reserves but the excitement of the area lies in the significantly under explored offshore and unconventional opportunities. Recent exploration work is challenging preconceived models of reservoir presence,

source presence, and tectonic development to identify some compelling new petroleum concepts. From new reservoir provenance models in Mexico, updated crustal type models in the Caribbean and new details on the A-C-T source rock along the equatorial margin, these new ideas are driving frontier exploration and regenerating interest in the area.

Greater Caribbean; Non-Guyana and Suriname

Chairs: Bryan Ott (Hess) and Sean Romito (University of Houston)

The Caribbean Region remains a challenging frontier area located between the prolific oil-rich basins of the Gulf of Mexico and northern South America. Despite a number of gas discoveries in recent years, bold explorers continue their search for the elusive oil field, and the region has seen numerous high-impact wildcats drilled in the recent years. This year BPC spud the Perseverance -1 wildcat targeting Jurassic to Cretaceous carbonates in a large fold on the Bahamas Bank. BHP and partners continue exploring in the deep water areas of Trinidad, where a number of gas discoveries have been made. Elsewhere in the Caribbean, Shell has farmed into offshore Colombia, and ongoing farm-outs continue in Jamaica.

Greater Caribbean; Guyana and Suriname

Chairs: Shawn Wright (Hess) and Ben Kirkland (CNOOC)

The Guyana-Suriname basin is often considered one of the last remaining under-explored but highly prospective basins in the world. With exception of the discovery of the onshore Tambaredjo and neighboring heavy oil fields in Suriname in the 1960s, a spotted exploration history dating back to the

1920's had been largely unsuccessful. Exploration interest was renewed when a 2002 report by the USGS estimated ~13.6 Bbbls of oil reserves were left undiscovered. Exploration efforts were soon rewarded with the economic discovery of high-quality oil-bearing Late Cretaceous turbidite sands at Liza-1 in the Stabroek block by an ExxonMobil-led partnership in 2015. Following the Liza discovery, additional operators have found success in the basin with discoveries at Jethro and Joe (Tullow-led), Maka, Sapakara, Kwaskwasi, and Keskesi (Apache-led) and Sloanea (Petroneas-led). Since 2015, ~25 commercial discoveries have been made making the Guyana-Suriname basin the most exciting basin on the Atlantic margin. As exploration moves outside of the proven Upper Cretaceous stratigraphic trap play fairway in the SE Stabroek area, the level of technical understanding of the petroleum system is the key to predicting hydrocarbon fluid properties and discovering additional resources. In particular, source rock presence/maturity and reservoir presence/quality are areas of substantial interest. With several high-impact wells in the very near future targeting Paleocene to Jurassic plays, the players in this basin are continually acquiring new information and the future of the Guyana-Suriname basin is bright.

South Atlantic; Non-Brazil

Chairs: Katy Sementelli (BHP) and Corey Moss (Murphy)

Industry activity has recently shifted south to the countries of Argentina and Uruguay with successful bid rounds held in each country in 2018 and 2019. Both countries saw an increase in interest in Frontier Offshore blocks with awards going to supermajor partnerships in Argentina (Shell, XOM, Total) and independent operators in both countries (BPC in Uruguay, for example). Recent seismic acquisition and reprocessing of data have expanded interest in new play ideas, such as stratigraphic traps in deep-water reservoirs, and revisiting known plays in new areas (Malvinas Basin). Uruguay has revamped the bid-round process to include an open-round formula for flexible options in generating interest in both offshore and onshore acreage. Argentina has put the 2020 round on hold in light of economic investment concerns related to the COVID19 pandemic. However, activity in the region has not stalled with seismic acquisition associated with work commitments continued in 2020. Optimism in the Southern Atlantic was enhanced with a discovery in 2019 in the Outeniqua basin off South Africa by Total with the Brulpadda well. Further excitement continues with a well of interest; Total's Venus-1 wildcat targeting a major ultra-deep water prospect in the Orange Basin offshore Namibia which may confirm the Cretaceous source potential in the South Atlantic. Frontier exploration continues in the Southern Atlantic areas.

South Atlantic; Brazil

Chairs: Bill Dickson (DIGs) and Marcus Zinecker (BP)
Equatorial Margin - huge region, unclear potential
Vast region with potential for Upper Cretaceous & younger fan plays analogous to Jubilee (offshore Ghana) and Zedyus (offshore French Guiana). Restrained by lack of infrastructure except Potiguar/Ceara (easternmost basins) where existing onshore and shallow water fields mature. Undeveloped deepwater discoveries at Pecem, Pitu, Tango.

Southeast Margin - giant and super-giant discoveries & production; unexplored potential

2021 excitement includes:

Sergipe: ExxonMobil well on an outboard ultra-deep-water block, perhaps testing two new play types (contourite sands, carbonate buildups on rift-age volcanic features) which could require sourcing from Aptian seaward dipping reflectors interbeds where younger A-C-T marine source is too shallow or absent.

Campos: probe ultra-deep-water targets with both post-salt A-C-T marine source pods; and usual syn-rift-sag lacustrine source. Post-salt targets include contourites in lows; pre-salt CO3 targets difficult to image and a really reduced by lack of regional top seal resulting from extensive salt movement.

Santos: 3D mapping of present-day pre-salt structuration is excellent; reservoir facies inversions are good; but insufficient. Need better understanding of basin evolution at crustal level to improve models of thermal history, CO2 and volcanic pathways, source facies distributions.

Pacific Margin; Onshore and Offshore

Chairs: Lucia Torrado and Leo Liu (Chevron)

The Pacific Margin of Latin America has one of the largest concentrations of oil seeps in the world. With several mature Cretaceous to Cenozoic source rocks, reservoirs like turbidite sandstone, extensive seal rocks and multiple, combined trapping mechanisms, the Latin America's convergent margin is proving to be an attractive area ready to be explored. The increased availability of high-quality data and farm-ins from major O&G companies like Equinor in Nicaragua's Sandino basin, and Tullow Oil, BP and Oxy's in the Peruvian offshore are an encouraging indicator of the value and potential of this margin.

Mexico

Chairs: Stan Ingram (CNOOC) and Mike Durcanin (Murphy)

Mexico is a major petroleum producing country with numerous proven basins, including the both the Salina del Istmo and Sureste "Super Basin" with ~60 BBOE of recoverable reserves. These offshore basins are characterized by world-class mature source rocks with numerous reservoir - seal pairs proven in several different stratigraphic intervals similar to its northern counterpart. Unlike the US GoM however, initial exploration and development generally focused mainly on both shallow-water Cretaceous and Jurassic carbonates. As such, the deeper water clastic Neogene/Paleogene plays attracted little interest until now. Following the historic energy reform in 2013, five offshore license rounds were held between 2014 - 2018 with participation from 25 companies that bid over 50 exploration wells and numerous seismic acquisition programs across 55 licenses. With the exception of the giant Zama discovery (roughly 700+ mmbbl recoverable) within the Upper Miocene play in the Sureste basin and minor successful step outs within this play (i.e. Cholula, Saskeen), exploration results thus far have been disappointing. Recently, the newest discovery, Polok-1, confirmed a commercially viable petroleum system in the Lower Miocene. To date, as over half of the initial commitment wells remain to be drilled, Mexico remains an exciting location for exploration activity in 2021 and beyond.

TECHNICAL PROGRAMME

Oral Presentations | Tuesday 9th November 2021

08:30	Welcome by Mike Erpenbeck & Ceri Davies
Latin America: Scene Setter Session Chairs: Bob Fryklund & Daniel Minisini	
08:45	Future of Latin America - Exec Panel Hosted by Bob Fryklund and Daniel Minisini
09:30	Latin America Petroleum Systems Overview Fernando Sanchez-Ferrer ¹ ¹ Independent
10:00	Role of Conjugate Margins - Jim Pickens ¹ ¹ Shell
10:30	Break
Non Guyana-Suriname Session Chairs: Bryan Ott & Sean Romito	
10:40	Exploring an Active Transformation Margin South of the Cayman Trough - Chris Machelette Downes ¹ ¹ CaribX
11:05	Controls on Deposition and Reservoir Character of Atypical Shallow-water Tropical Carbonate Systems: Miocene, Cibuco Field, NW Colombia - Angela Torres-Zamora ¹ ¹ University of Kansas
11:20	Unravelling the Mid Miocene Exploration Upside of the Ortoire Block, Onshore SE Trinidad - Xavier Moonan ¹ ¹ Touchstone
11:45	Break
12:00	Guest talk & Lunch: Guyana - Tim Chisholm ¹ ¹ Hess
12:45	Break
Guyana-Suriname (Part 1) Session Chairs: Shawn Wright & Benjamin Kirkland	
12:50	Deepwater Hydrocarbon Migration and Focus Challenges Explored in the Suriname-Guyana Basin - Melissa Braun ¹ ¹ Chevron
1:15	3D Gravity Inversion Supports the Guyana-Suriname Rifted-passage Margin of Jurassic Age: But where is its Conjugate?- Kenneth Shipper ¹ ¹ University of Houston
1:30	Analysis of the Poly-phase Plate-Margin Processes of Primary Influence on Jurassic and Cretaceous Basin Development in Guyana-Demerara and Conjugate Guinea Plateau Basins - Katya Casey ¹ ¹ Actus
1:55	Break
New Plays/Missed Opp. Session Chairs: Catie Donohue & Mark Olson	
2:05	New Evidence From Regional Source Rock Correlations and Tectonic Reconstructions Point the Way to an Upper Cretaceous Source Rock Depositional Fairway in the Caribbean - Paul Ryan ¹ ¹ United
2:30	Mesozoic Carbonate and Evaporites Bahamas - SA Epstein ¹
2:55	Geologic Framework for Critical Risk Factors Analysis of a Tertiary Carbonate Play in Colombian-Venezuelan Sedimentary Basin Along the Caribbean Margin of SA - Juan Aminio ¹ ¹ Independent
3:20	Break
South Atlantic: Non-Brazil Session Chairs: Katy Semantelli & Corey Moss	
3:25	The Role of Geophysics in Addressing The Multiple Challenges Facing Development of Vaca Muerta, Argentina - Luis Venengo ¹ ¹ Pan American
3:50	Prospectivity of the Colorado Basin, Offshore Argentina - Steve Devito ¹ ¹ Independent
4:15	Atlantic Margin Unexplored Play Fairway Sweet Spot with Significant Hydrocarbon Potential - Neil Hodgson ¹ ¹ Searcher
4:40	Close

Oral Presentations | Wednesday 10th November 2021

08:30	Welcome by Mike Erpenbeck & Ceri Davies
México Session Chairs: Stan Ingram & Mike Durcanin	
08:40	Column Height Guidelines for Undrilled Prospects in Mexico - Mark Shann ¹ ¹ Geomarcas/Sierra
09:05	Integrated model for the tectonic development of Southern Mexico/Central America and the Chiapas-Campeche Basin: plate motions, geochronology, thermochronology, paleomagnetism, structural geology and depositional source to sink models James Pindell ¹ ¹ Rice University
9:30	Regional Source Rock Maturity Modeling Along the Campeche Salt Basin, Southern Gulf of Mexico - Md Nahidul Hasan ¹ ¹ University of Houston
9:45	Break
Pacific: Onshore & Offshore Session Chairs: Lucia Torrado & Leo Liu	
9:55	Cretaceous-Cenozoic Tectonostratigraphic Evolution and Hydrocarbon Prospectivity of the Sandino Forearc Basin, Offshore Nicaragua - Paul Mann ¹ ¹ University of Houston
10:10	Regional effects of Miocene-Recent Panama Arc collision; Influence on maturation and distribution of HCs in NW South America and S. Central America - Juan Pablo Ramos ¹ ¹ University of Houston
10:25	Peruvian Petroleum System Assessment with a Focus on Offshore Basins - Craig Schiefelbein ¹ ¹ Independent
10:50	Break
Greater Caribbean: Guyana-Suriname (Part 2) Session Chairs: Shawn Wright & Benjamin Kirkland	
10:55	Oil and Source Rock Geochemistry of the Guyana Basin - Andres Cedeno ¹ ¹ University of Stavanger
11:20	Distinguishing Petroleum Source Rock Acmes Across Northern South America: Application to Evaluate the Potential of the Albian to Maastrichtian Guyana Basin - Daniella Easley ¹ ¹ University of Houston
11:35	An Integrated Approach of Forward Source Rock Modeling in the Suriname-Guyana Basin - Yushi Zhao ¹ ¹ Chevron
12:00	Break
12:10	Guest talk & Lunch: The Outlook for High Impact Exploration in Latin America - Graeme Bagley ¹ ¹ Westwood Energy
12:55	Break
South Atlantic: Brazil (Part 1) Session Chairs: Bill Dickson & Marcus Zinecker	
1:00	Thermal and petroleum systems evolution in the outboard Campos and Santos basins, offshore Brazil: Insights from 3D basin modelling - Tono Martin Monge ¹ ¹ Repsol
1:25	Tectonostratigraphic evolution and thermal maturity modeling of the Sergipe-Alagoas rifted-passive margin, northeastern Brazil - Hualing Zhang ¹ ¹ Ripid/University of Houston
1:40	Rift-Associated Magmatism in the Sergipe-Alagoas Basin and its Influence on Local Petroleum System - Mariana Mairalles ¹ ¹ Petrobras
2:05	Break
South Atlantic: Brazil (Part 2) Session Chairs: Bill Dickson & Marcus Zinecker	
2:10	Early post-rift dynamo-thermal subsidence and stratigraphic architecture as magma-rich rifted margins move off plumes James Pindell ¹ ¹ Rice University
2:35	Geological Sources of CO2 in Santos, Campos and Espírito Santo Basins - Sharon Cornelius ¹ ¹ University of Houston
3:00	Huge Structures Associated to Novel Deformation as Seen in New 3D Data in the Pre-Salt of Santos Basin - Pedra Zalan ¹ ¹ 7AG Consulting in Petroleum Exploration
3:25	Wrap up/Awards

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MONDAY, NOVEMBER 15, 2021

6:00PM - 7:00PM

HGS MEMBERS \$15 NON-MEMBERS \$30 STUDENTS \$10

[HTTPS://WWW.HGS.ORG/CIVICISM/EVENT/INFO?ID=2310](https://www.hgs.org/civicism/event/info?id=2310)

EVENT CONTACT: STEVEN GETZ | SLGETZ@OUTLOOK.COM

The Role of Structural Inheritance in the Tectonic Evolution of Chiapas, Mexico: From Paleozoic Pangea Assembly to Mesozoic Rifting and Cenozoic Shortening and Basin Inversion

Chiapas is the southernmost state of Mexico, and it preserves in its rocks a protracted history from the Proterozoic to recent tectonics. The stratigraphy of Chiapas can be synthesized in four groups: the crystalline basement rocks, the Chicomuselo fold-thrust belt units, the Mesozoic-Cenozoic sedimentary cover, and the Miocene to recent volcanic and plutonic rocks. On a geological map, the first group is distributed along a NW-SW oriented fringe across southwestern Chiapas, known as the igneous and metamorphic Chiapas massif complex, which includes early Neoproterozoic gneisses and anorthosites, plutons and metamorphic rocks of Ediacaran age, as well as deformed Ordovician-Silurian and Permian plutons. Because of its nature this rock assemblage behaves as a rigid block bounded by two major SE-NW oriented shear zones on its northern and southern edges, the Miocene Tonalá fault to the south and the Motozintla shear zone (MSZ) to the north, respectively. The MSZ is about 3 km thick and is located at the boundary of the crystalline basement with the Chicomuselo fold-thrust belt (CFTB), which is a Permian-Triassic tectonic element that involves a succession of fine-grained carboniferous turbidites and early middle Permian carbonates in the deformation. The MSZ and the CFTB are unconformably covered by the Mesozoic and Cenozoic sedimentary cover that starts with Jurassic red beds that transitionally change to evaporites and carbonates in the Late Jurassic throughout the Cretaceous. Late Cretaceous platform carbonates are mostly covered by Maastrichtian-Paleogene turbidites in most Chiapas, and then shallower water carbonates and locally continental deposits were deposited in the Eocene-Oligocene, a patchy regional unconformity between the Eocene and Oligocene accuses a major tectonic disruption. In the Miocene, there is also a major change in the stratigraphy as most units were deposited in a continental environment due to significant uplifts related to the Chiapanecan orogeny. The fourth and last group includes Miocene plutonic and igneous rocks emplaced along regional NW-SE oriented faults in central, southern, and northern Chiapas. These faults include the Tonalá and Motozintla shear zones, and the lateral faults province in the northern Chiapas fold-thrust belt. These rocks are partly covered by fluvial and alluvial deposits.

The main tectonic events of Chiapas (excluding those in the crystalline basement) include: 1) the formations of CFTB and the MSZ in the Permian-Triassic, which are NW-SE oriented; 2) an Early-Middle Jurassic extensional phase that assisted the formation of also NW-SE oriented basins in central Chiapas; 3) a phase of contraction that formed early regional folds in the Chiapas fold-thrust belt, which are also have the same orientation; and 4), the Miocene Chiapanecan orogeny during which NW-SE oriented sinistral faults were activated. The parallelism among most regional structures present in Chiapas suggests a high influence of the basement architecture in the orientation and kinematics of subsequent structures.

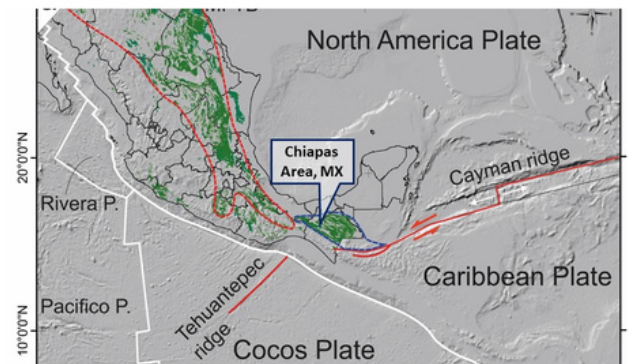


Figure 1. Tectonic plates encompassing Chiapas area, Mexico

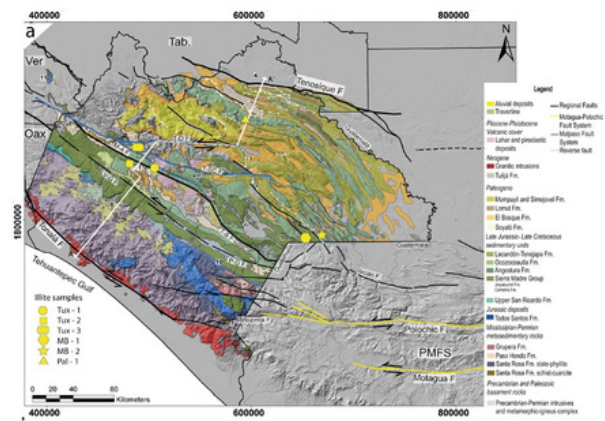


Figure 2. Tectonic plates encompassing Chiapas area, Mexico

Biographical Sketch



Dr. Elisa Fitz Díaz graduated as a geological engineer from the National Polytechnic Institute in Mexico in 2001, obtained a master's degree in Earth Sciences from the National University Autonomous of Mexico (UNAM) in 2004, in addition to obtaining a PhD degree

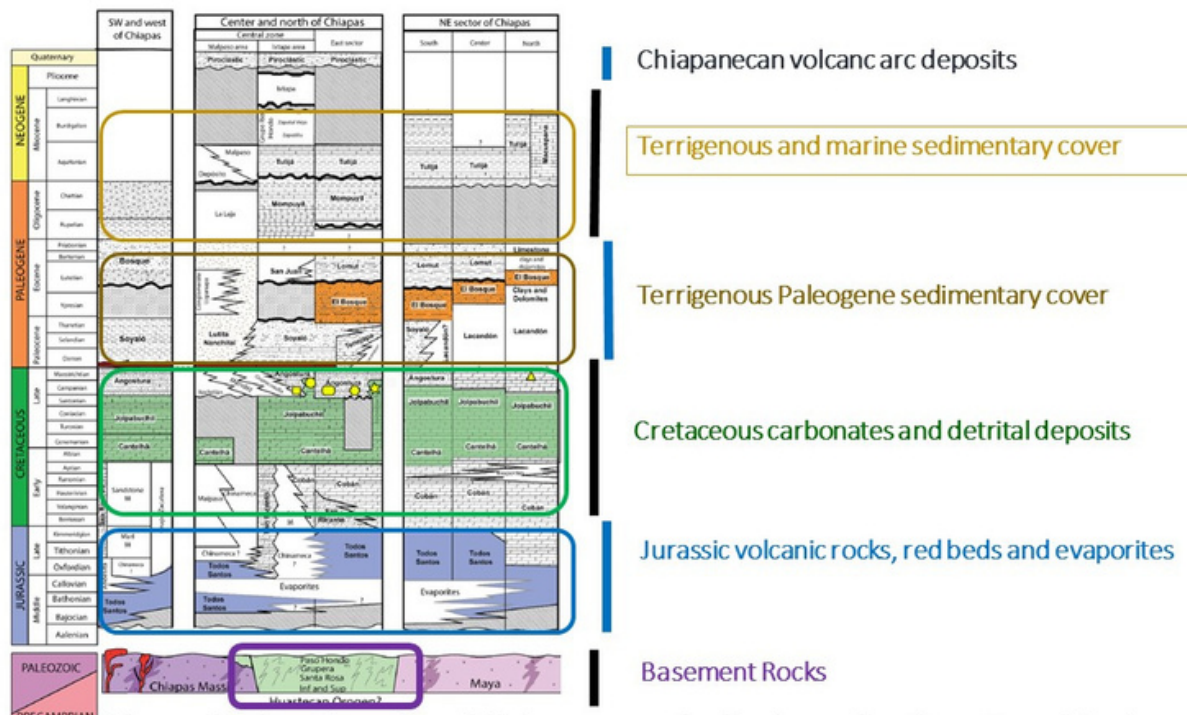
from the University of Minnesota in 2010. In 2011 she did an 8-month postdoctoral stay at UNAM, and then another 2-year postdoctoral residency at the University of Michigan. In 2013 she was hired by the Institute of Geology at the UNAM, where she currently works as a full-time researcher.

Since last year, she has served as head of the Lithospheric Processes Department at said institution. She has advised 8 bachelor's theses, 3 master's thesis and 1 PhD thesis. And she is currently work with 3 PhD students and 3 master's students.

Dr. Fitz has specialized in Structural Geology focused on the study of shallow orogenic belts, that is, those that develop in the shallow upper crust. Another of her specialty topics is the radiometric dating of the deformation that occurs at low temperature and pressure conditions, in addition to studying fluid-rock interaction processes and fluid flow in the afore mentioned tectonic features, as can be seen in her publications and the thesis she wrote and has directed.

Elisa Fitz Diaz has authored and/or coauthored too many papers concerning structural geology (at least 25) to enumerate in this short biography.

Benavides (1950), Quezada-Muñetón (1991), Vázquez-Meneses (1996), Ferrusquía-Villafranca et al. (2000), Meneses-Rocha (2001), Mandujano-Velázquez et al. (2005), Hernández-Vergara et al. (2020)



68th Annual Gem, Mineral, Jewelry & Fossil Show



Fluorite, Hardin County, Illinois

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Houston Gem & Mineral Society

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Humble Civic Center

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HGS Volunteers are being requested to staff the HGS K12 booth at the annual HGMS Rock, Mineral, and Fossil Show in November on Friday to Sunday, 11/12 - 11/14. **Contact Janet Combes for more details: jmcombes@msn.com**

KEY DETAILS

Dates/Times: Friday, November 12 & Saturday, November 13: 9am – 6pm

Sunday, November 14: 10am – 5pm

Tickets: \$8, FREE Entry for age 10 & under

FREE Parking at Humble Civic Center

EDUCATIONAL ACTIVITIES AND DEMONSTRATIONS

HGMS Show Classes offered all 3 days including: Beaded Spider, Wire-wrapped Stone Pendant, Bead People, Beaded Tassel, Kitty Mala Bracelet, & Leather Wrap Bracelet. Register ahead of the show as spaces are limited!

Live Wirewrapping, Silversmithing and Cabochon-making Demonstrations by our club member experts happen in our Demo Area as well as in the classrooms in the west hall during Saturday and Sunday of the show.

The **HMNS** will have crafts and shark's teeth to give away at their table. The **HGS** will give demos of the oil and gas extraction process. The Youth Section will have mineral and fossil examples at their table and a host of fun games!

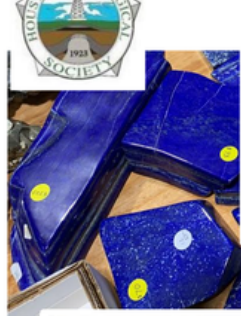
Friday of our annual show is Kids Day for K-12 students. Teachers may bring their classes and parents their homeschool students to the annual show to participate in a FREE extensive, hands-on learning experience. Public/private school teachers and homeschool parents who have 20 or more students may request one of four Annual Show Rock Sets.

Mad Science of Houston educational presentations take place on Friday (Kids Field Trip Day) of the show. They're a staple of our Kids Day Earth Science Program and one of the highlights of our show.

In addition to the Kids Day Scavenger Hunt Questionnaire, we have an **At-Home Economic Minerals Scavenger Hunt** version for investigating materials that can be found around the house (it's listed in the educational activities shown below). Just like our Kids Day Scavenger Hunts, the questions are grade-appropriate and TEKS-based so educators can choose the level of complexity appropriate for their students.

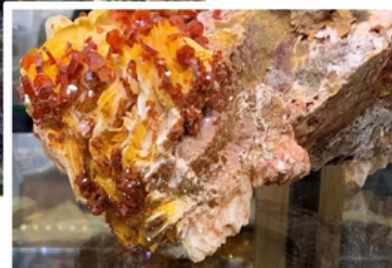
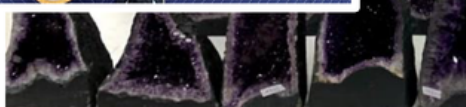
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Nov 13th (if you put in an order)
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See details page 2



November-December 2021 Overview – Read twice!

For over 20 years GeoInteriors has been buying Minerals, Fossils and Petrified Wood in bulk and selling the pieces to our Buyers Group. When you purchase a rock – you'll write two checks....one for the rock and one for 10% of your gross purchase to one of the non-profits (charities) we're supporting. For the 2021 sale we're supporting the Houston Geological Society and the Geophysical Society of Houston.

If you're interested – you have two options for buying:

- 1) Get on our mailing list, get an order form and follow the instructions. This gets you into the warehouse the first day of the sale on **November 13th**. Email to galent888@gmail.com subject **Mailing List** and we'll send you more details including **assigned pick-up times** once you've ordered.
- 2) Show up with your checkbook on **November 14th (9:00-3:00) 20th (9:00-4:00) or 21st (9:00-2:00)** and shop. Bring plenty of packing material to pack up any purchase. **We may be open December 4th too (9:00-2:00).**

Warehouse Location 22936 Kuykendhal Rd. Spring Tx 77389 – Building B (Sunday parking will be tough in the AM – local church uses the same spaces until noon)

Minerals are priced at wholesale rates. We mark-up the pieces to cover our overhead, breakage and pizza for the volunteers. We are generally 50-80% off the Rock Shop price. GeoInteriors is a "For Profit" company but our primary goal is to not lose money and help the charities we support. We've raised over \$350,000 for various entities. Your contribution goes directly to the charity – we just collect the checks.

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What we have this year:

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For pictures and prices – get on our mailing list (galent888@gmail.com, email subject: **Mailing List**)





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November 2021

<i>Sunday</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>
	1 HGS Annual University of Houston Sheriff Lecture "Life and Death by Impact: Drilling for Clues" Page 6	2	3
7	8 HGS-EAGE Conference on Latin America Page 7	9 HGS-EAGE Conference on Latin America Page 7 HGS Board Meeting 5 p.m.	10 HGS-EAGE Conference on Latin America Page 7 HGS E&E Meeting
14 HGMS Gem, Mineral, & Fossil Show GeoInteriors Mineral & Fossil Sale benefitting HGS & GSH	15 HGS Virtual International Dinner "The Role of Structural Inheritance in the Tectonic Evolution of Chiapas, Mexico" Page 12	16	17
21	22	23	24
28	29	30	

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- \$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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November 2021

Thursday		Friday		Saturday	
4	5	6	<p>Reservations</p> <p>The HGS prefers that you make your reservations online through the HGS website at www.hgs.org. If you have no internet access, you can email office@hgs.org or call the office at 713-463-9476.</p> <p>Reservations for HGS meetings must be made or cancelled by the date shown on the HGS website calendar, which is normally 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, please contact the Webmaster at webmaster@hg.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 still be billed.</p> <p>Pricing</p> <p>In-Person Meetings HGS Members \$35 Non-Members/Walk-Ups \$40 Emeritus/Honorary Life \$15 Students \$5</p> <p>Virtual Meetings HGS Members \$15 Non-Members \$30 Students \$10</p>		
11	12	13			
18	19	20			
25	26	27			

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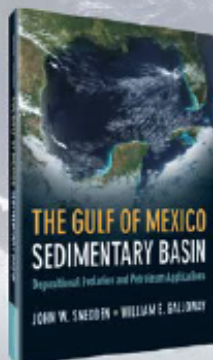
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Remembrance

DIONEL R. FUSELIER
1935-2021



Dionel Ray Fuselier, 86, died peacefully Thursday, Sept. 30, 2021, at Inova Fairfax Hospital in Fairfax VA.

Dionel was a 1953 graduate of Mamou High School and Southwestern Louisiana Institute, now University of Louisiana at Lafayette, in 1957 with a degree in geology. He was a HGS Member for several years.

Survivors include his wife of 42 years, Tineke Anna Pondaaga of Indonesia, his children, Jeannine Colligan and husband, Gerald of Church Point, LA, Stephanie Richardson of Lafayette, LA, Eric Fuselier of Kinder, LA, Rebecca Eldridge and husband, Ryan of Richardson, TX, Warren Fuselier of Houston, TX, Vanessa Vernon and husband, Zach of Golden, CO, as well as his grandchildren: Jordan Colligan, Mary Kate Colligan, Anne Marie Richardson, Ariel Fuselier, Madeleine Eldridge, Killian Eldridge, Dutch Vernon. He is also survived by a sister-in-law, Masako Fuselier and niece, Tina Fuselier Ray of Lafayette.

He was preceded in death by his parents, Sidney and Lessie Fuselier, his brother Joseph Sherril Fuselier, and nephew, Mark Fuselier.

Dionel was dedicated to his career and spent 40 plus years in the oil exploration industry. His work brought him all over the United States, as well as South America, Europe, Asia, and Africa. He loved to travel and was able to visit many unique places. He also enjoyed photography and took many pictures documenting his travels and his family. Dionel resided in the Houston area for over 28 years: in recent years, he lived in Vienna, VA, near Washington DC. He spent many hours exploring the local history, museums, and scenery. He also became an avid fan of the Washington Nationals baseball team. Dionel enjoyed the culinary experiences of many different cultures, but he was very fond of the traditional Cajun dishes from his early life. His other hobbies include reading and woodworking. Many of his children and grandchildren have furniture made by him in their homes. He was deeply loved and will be greatly missed.

Remembrance

WILLIAM FRANKLIN "BILL" HOWELL
1932-2021



William F. Howell (Bill) of Houston, TX, passed away on October 13, 2021. He was preceded in death by his wife of 62 years, Suzanne, who passed in 2015. He is survived by 3 sons: Drs Mark (Maria), Dr Todd (Robin) and John (Katinka), 7 grandchildren and 5 great-grandchildren.

Bill was a geologist, active in oil exploration with a career in Houston many years. He founded Paragon Petroleum and served as a valued consultant to the industry. He was a member of the Houston Geological Society, AAPG, Petroleum Club, and Houston Racquet Club. He was an avid tennis player and founding member of World Oilman's Tennis Tournament receiving the Humanitarian Award in 2018.

A memorial service is scheduled for November 13th, 11:00 am, at Chapelwood Methodist Church.

Please visit <https://www.luxfhcares.com> for full obituary and information.

Remembrance

DONALD K. LEHTO
1956-2021



Donald (Don) K. Lehto, passed away peacefully at his home in Houston on September 29, 2021.

Don was born to Arthur and Vera Lehto in November 1946 in Painesville, Ohio. He grew up in Madison, Ohio, on the shores of Lake Erie and graduated from Bowling Green University with a degree in Geology. Soon after he was hired by Texaco and moved to New Orleans, where his sons Matthew and Jason were born. It was in New Orleans that Don learned that there was a reason to eat besides being hungry. His career then took him to Houston where he worked for Signal and C&K before forming his own company, Allegro Oil and Gas, the first of numerous oil and gas ventures in his fifty year career. Don joined Houston Geological Society in 2009.

In 1993 Don married Jane Pierce Stuart and they began years of adventure, travel, and happy times spent with family and many friends. Don was loved by all who knew him and admired for his kindness, honesty, loyalty and love of life.

Don is predeceased by his parents and his sister, Lorraine. He is survived by his loving wife, Jane; sons, Matthew (Mary) and Jason (Nicolle); daughter, Dr. Lynn Melancon; grandchildren, Jordan Lehto, Audrey Lehto, Renee Lehto, Emmett Lehto and Katya Shmorhun; nephew, Marcus Menough (Angie) and children, Jackson and Georgia.

Remembrance

CHARLES E. REVILLA
1926-2021



Charles Edward Revilla, a long time HGS Member and volunteer, passed away from complications of break-through COVID-19 on September 27, 2021, in Houston, Texas. He was on the HGS Bulletin Committee and did editing from 1990-2015. Charles received the HGS President's Award (2007); Chairman's Award (2015); and Distinguished Service Award (2017).

Born late on a stormy summer day (July 6, 1926) in the tiny coal mining town of Imboden, Virginia, to Grace Payne and Ramon Revilla, Charlie carried his Appalachian roots with him throughout his life. Although his early aspiration to follow in the footsteps of Fred Astaire did not work out, he was able to perform his second-grade tap routine well into his 80s, making it his signature farewell gesture. Charlie joined the U.S. Navy in 1944 and loved being a seaman, even volunteering to observe the Atomic Bomb tests in Bikini Atoll. After the war, he proudly attended the University of Virginia, graduating Phi Beta Kappa in 1952 with a master's degree in Geology. His career in petroleum geology brought foreign travel, exploration, and residency. Some of his most cherished friendships were made in Peru and Argentina. In 1966, he married Erna Müller, from Santa Fe, Argentina, who happily joined his peripatetic life. Their son Paul and daughter Bettina were both born in London and the family lived on five continents and eight countries. In 1978, they moved to Houston, Texas, where they remained.

After retirement, Charlie continued to be active, especially with the Houston Geological Society and Greenhouse Community Church. He kept up with family and a host of friends from his travels and spent an entire month every year writing Christmas letters to stay connected with people flung across the world.

He was preceded in death by his beloved wife of 50 years, Erna, and his nine siblings. He is survived by his son, Paul (Laura), daughter Bettina, grandsons Patrick Revilla and Graham Revilla, sister-in-law Ruth Revilla, a host of beloved nieces and nephews, a wide extended family in Argentina and the U.S., and 80 treasured photo albums documenting a life well-lived.

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 can 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.**

Random Inside Ad Placement					Specific Page Color Ad Placement					
Black & White Prices Shown – Color add 30% to prices below										
No. of Issues	Random Eighth Page	Random Quarter Page	Random Half Page	Random Full Page	Inside Front Cover Full Page	Inside Back Cover Full Page	Page 2 Full Page	Outside Back Cover Half Page	Back of Calendar Full Page	Calendar Quarter Page
10	\$950	\$1,350	\$2,550	\$4,750	\$8,000	\$7,500	\$7,050	\$6,850	\$6,650	\$3,000
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
5	\$500	\$800	\$1,600	\$3,000	\$4,700	\$4,500	\$4,350	\$4,000		
4	\$450	\$650	\$1,300	\$2,500						
3	\$300	\$550	\$950	\$2,000						\$1,000
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)										

Website Advertising Opportunities

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.

Placement	Rate	Specifications/Description
HGS Website Home Page Banner Ad	\$800 – Monthly	275 x 875 pixels; home page top banner ad. All Home Page Banner Ads rotate every 10 seconds.
	\$1800 – 3 Months	
	\$2800 – 6 Months	
	\$3600 – 12 Months	
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	\$1500 – 3 Months	
	\$2400 – 6 Months	
	\$3600 – 12 Months	
HGS Website Event Page Ad	\$600 – Monthly	200 x 400 pixels; calendar page left column ad. All Event Page Ads rotate every 10 seconds.
	\$1200 – 3 Months	
	\$1600 – 6 Months	
	\$2600 – 12 Months	
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!	<ul style="list-style-type: none"> • 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

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

Qualifications for Associate Membership (including students)

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

Apply online at www.hgs.org and click "Join HGS". Annual dues expire each June 30.

Annual dues are \$30; Emeritus members pay \$15; Students are free.

To the Executive Board: I hereby apply for membership in the Houston Geological Society and pledge to abide by its Constitution and Bylaws.

Full Name _____ Membership Type (choose one): Active Associate Student

Current Email (for digital Bulletin & email newsletter) _____

Phone _____

Preferred Address for HGS mail _____

Employer (required) _____ Job Title (**required**) _____

Will you volunteer? (Y/N) _____ Committee choice: _____

Active & Associate membership for one year (July 1st - June 30th) \$30.00 _____

Student membership \$0.00 _____

OPTIONAL Scholarship Contributions: Calvert/HGS Foundation-Undergraduate \$5.00 _____

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Degree (**required**) _____ Year Graduated _____

School (*optional*) _____ Major (*optional*) _____

Degree (*optional*) _____ Year Graduated _____

Years Work Experience (**required**) _____

Please submit a brief statement regarding your work experience in the practice or application of earth science or an allied science.

AAPG Member Number _____ HGS Sponsor's Name _____

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Kristen Briggs

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Nathan Shamtoub

Ryan Riggs





Houston Geological Society

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