



Bulletin 12 ²⁰²⁵

Spotlight on the 27th Sheriff Lecture
Page 9

**Award-Winning Student Research
Highlights**
Page 13

Celebrating HGS Events & Volunteers
Page 19



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In Every Issue

- 5 **From the President**
by Patty Walker
- 4 **Sponsorship**
- 6 **From the Editor**
by Lucia Torrado
- 35 **HGS Calendar**
- 42 **HGS Membership Application**
- 44 **Professional Directory**

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About the Cover: The iconic Blue Lagoon in Iceland formed accidentally in 1976 when runoff from a nearby geothermal power plant filled lava fields with mineral-rich water. The area is located ~ 7 km from Grindavík, the site of recent eruptions discussed during the 27th Sheriff Lecture.

Technical Meetings

- 32 **HGS General Dinner Meeting**
2025 Global Energy Outlook
Clark Osterlund
- 33 **HGS General Luncheon Meeting**
Petroleum Geology as a Science and Industry – Past, Present, Future(?)
Rene Jonk

Features

- 9 **Feature Article**
The 27th Annual Robert E. Sheriff Lecture Recognizes Outstanding Student Research in Geosciences
Lucia Torrado
- 13 **Technical Article**
Sheriff Lecture Abstracts
- 19 **Committee Update**
Houston Geological Society Volunteers Inspire Future STEM Leaders at GEMS 2025
Janet Combes and Lucia Torrado
- 20 **Committee Update**
Annual HGS Salt Party
- 23 **Committee Update**
GSH/ HGS Case Study Seminar II
Lessons from Missed Opportunities and Surprise Successes
- 24 **Committee Update**
HGS at the Houston Gem and Mineral Show
Janet Combes and Lucia Torrado
- 24 **Committee Update**
A VIP Night at the Mercury Chamber Orchestra
- 25 **Committee Update**
A Hole-in-One for HGS: 2025 Golf Tournament a Huge Success!
Seth Johnson
- 27 **Committee Update**
General Dinner Meeting on Lithium Exploration in the Smackover Formation
- 37 **We Are The HGS**
- 39 **Rock Solid Guess!**
- 40 **GeoPicks**
A Book Review of Roadside Guide to Geology of Texas
Rasoul Sorkhabi



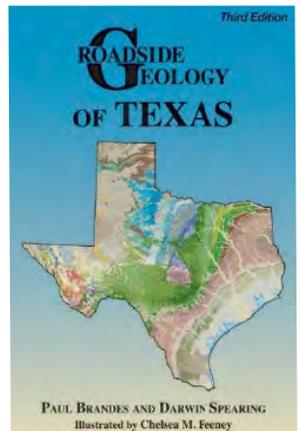
page 18



page 19



page 34



page 40



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Patty Walker, HGS President 2025-26
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President's Letter – December 2025

December is upon us and a time of holiday gatherings with family, friends, and work colleagues. A season that is equally happy and hectic as we fill the calendar with activities and experience the joy of giving to others. For me personally, this is also a time of reflection and gratitude.

THE GIFT OF GIVING TIME

As we begin another month of scientific exchange, professional growth, and community engagement, I want to pause and reflect on something fundamental to the success of our Society: the extraordinary spirit of volunteerism that drives HGS forward.

Our organization has always been built on the dedication of individuals who give their time, their talent, and their energy—not because they have extra hours in their day, but because they believe in our mission. They believe in fostering technical excellence. They believe in the value of professional community. They believe in supporting the next generation of geoscientists. And they believe in something that is increasingly rare: contributing for the sake of collective progress.

To every volunteer who organizes a technical meeting, leads a committee, mentors a student, coordinates outreach efforts, reviews abstracts, manages logistics, or simply raises a hand when help is needed—thank you. Your work often happens behind the scenes, but its impact is visible everywhere. You are the reason our events run smoothly, our publications remain strong, and our Society continues to thrive.

I also want to extend my sincere gratitude to those who contribute through donations and sponsorships. Your generosity allows us to fund scholarships, support student chapters, strengthen our educational programs, and uphold the high technical standards that make HGS such a respected organization. Your financial support is not just a gift—it is an investment in the future of our profession.

Whether you give your time, share your expertise, or provide financial support, you are part of what makes HGS exceptional. This Society is more than an association—it is a community built on shared values, curiosity, and service. And for that, I am deeply grateful.

As we move forward towards a new year, I encourage each of you to stay involved, stay engaged, and stay connected. Your contributions—large and small—shape who we are and what we can accomplish together.

*Your contributions—
large and small—shape
who we are and what we
can accomplish together.*

UPCOMING EVENTS

Please join us on **Monday, December 8th** for the HGS General Dinner. Our speaker will be Clark Osterlund, Industry Outlook Advisor for ExxonMobil. He will be discussing ExxonMobil's view on the Global Energy Outlook.

On **December 16th**, HGS will be hosting our Fourth Annual Holiday Party at Cadillac Bar from 5:30 to 8:30. Come join us for some holiday merriment! Details and registration are at the HGS website.

On **Wednesday, December 17th**, HGS will offer a Zoom based lunch talk. Dr. Rene Jonk will be discussing "Petroleum Geology as a Science and Industry - Past, Present, Future". Details and registration are at the HGS Website

Registration is now open for the Case Studies Seminar II to be held **January 15, 2026**. Case Studies Seminar is a one-day conference featuring real-life field studies, geology, and geophysical overviews presented by geoscientists with detailed working knowledge of drilling success and failure. This event is co-hosted by the Houston Geological Society and Geophysical Society of Houston.

It is an honor to serve as your President, and I look forward to seeing you at our next event.



Lucia Torrado, HGS editor 2025-26
editor@hgs.org

Shaping the HGS Community through Volunteering

HOW I GOT INVOLVED WITH HGS

Volunteering has been one of the most rewarding experiences of my professional journey, and I want to share a bit of my story in the hope of encouraging more of you to get involved. My first experience with HGS was at the 2011 AAPG ACE Conference, where I helped out at the HGS booth for just a few hours. Over time, those few hours grew into many, and I found myself volunteering at multiple events, even managing the booth myself at the GSA Conference in Phoenix, supporting membership drives and connecting with attendees.

Through these experiences, I began to see the incredible value volunteers bring to our societies. I eventually joined the HGS Board as Secretary in 2021-2022, which gave me deeper insight into how the society operates, and from my transition from Editor-Elect to Editor, I've learned even more and continue to do so.

WHY VOLUNTEERS MATTER

What has become abundantly clear is that volunteers are the backbone of our society. Without their time, energy, and commitment, events like the Sheriff Lecture and many other programs simply wouldn't happen. In fact, the November 19th General Lunch was dedicated entirely to volunteering, a reminder of how important it is that we've created a session just to celebrate and encourage volunteerism.

Over the past few years, every editor letter has touched on the subject of volunteering in their Editor's Letter. This is not a cliché or an attempt to sound like a broken record, it is simply a reality: the HGS depends on volunteers.

This issue of the *Bulletin* is dedicated entirely to that spirit. You won't find a single technical article here; instead, we feature articles from the students who won awards at the Sheriff Lecture and write-ups of the many events that have taken place over the past

month. All of these activities are organized and run by volunteers reaching out to the Houston geoscience community.

MANY WAYS TO CONTRIBUTE

Volunteering comes in many forms. Attending events, submitting material to the Bulletin, or even sharing, commenting on, or liking our social media posts are all ways to contribute. These actions require only a little of your time and energy, yet they make a meaningful impact by promoting the society and helping us reach more members.

Even though I often see familiar faces at these events (and I love saying Hi to all my friends!), it would be wonderful to see more

new participants, especially students, -many of whom, like me, started their careers through these connections- and professionals from industry, who bring fresh perspectives and help carry the vision of our evolving field.

A CALL TO ACTION

Volunteering has taught me invaluable skills: effective communication, attentive listening, better editing, thinking beyond myself, managing time, and understanding what resonates with people. It has been feedback not just for my professional life, but for my personal growth as well. Giving your time isn't just about helping others: it's also about learning and creating a strong foundation for future contributors.

I encourage everyone reading this to consider volunteering in some capacity. Whether it's a few hours with the HGS booth, helping organize an event, or serving on a committee, your contribution matters.

IN THIS ISSUE OF THE BULLETIN

- *All About the 27th Sheriff Lecture*

I am delighted to highlight the 27th Sheriff Lecture, featuring the award-winning student abstracts.

Giving your time isn't just about helping others: it's about learning, growing, and shaping the future of our geoscience community

From the Editor

- *HGS at GEMS, Golf & Minerals: Made Possible by Volunteers*

Our volunteers helped make GEMS 2025 a memorable experience for Girl Scouts exploring STEM, had a fun and successful Annual Golf Tournament, and contributed with the Gems & Minerals Show. Read on for highlights from each event and see how our members continue to engage with the community!

- *Geo-Picks: Texas Roadside Geology Book Review (Part 2)*

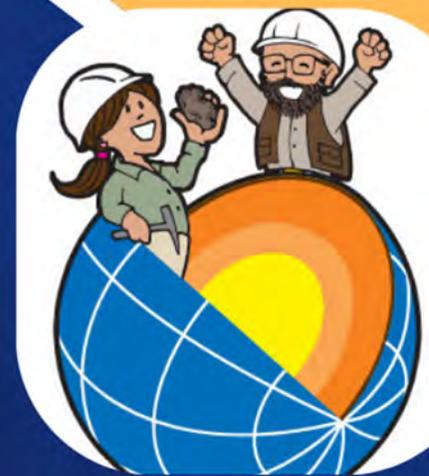
December is probably the busiest time of the year — with the holidays, pricey planes, and crowds everywhere... why not hit the road instead? Don't worry, we've got you covered. Our second book review from Rasoul Sorkhabi continues the journey of "Texas Rocks!" with its second part, "Texas Roadside Geology." ■

GSH/HGS ONE-DAY SPEAKER PROGRAM

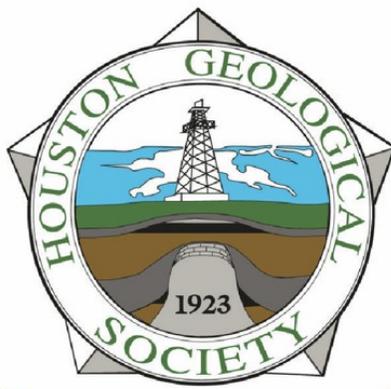
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The 27th Annual Robert E. Sheriff Lecture Recognizes Outstanding Student Research in Geosciences

By Lucia Torrado

The Robert E. Sheriff Lecture is an annual joint event hosted by the Houston Geological Society (HGS) and the University of Houston (UH) Department of Earth & Atmospheric Sciences. It was created by UH geoscience alumni in 1999 and brings a distinguished speaker to Houston to present a public lecture on a geoscience topic. It features a student poster/session before the talk, student recognition, and opportunities for networking between students, faculty, and industry professionals.

The 27th annual Sheriff Lecture was held on Monday, November 10 at the Norris Center. The event attracted approximately 100 attendees, including 42 students who presented their posters.

The lecture both showcases a high-profile academic or industry speaker and spotlights student research. The evening typically includes a social hour with poster sessions, making it an important outreach and professional-development night for UH students and the local geoscience community.

William Struble, assistant professor of Geomorphology and Surface Processes, was the master of ceremonies. He introduced Dr. Thomas Lapen, UH EAS Chair and Professor of Geology, Isotope Geochemistry, Geochronology, and Petrology, who reported on the growing number of students that are part of the EAS department, a trend that has been consistent for the past few years (Go Coogs!). Caroline Wachtman, HGS Vice-President, addressed the audience and encouraged members to sign up for the upcoming Lunch Talk and Dinner Meeting. She highlighted that the next lunch talk will focus on the importance of volunteering and how members can get involved. Julian Chenin, Co-President of the EAS UH Alumni Association, also encouraged attendees to participate in its social gatherings and networking events. He invited everyone to spread the word to fellow UH alumni and help strengthen the growing alumni community.

Dr. Jiaxuan Li, who joined the University of Houston as an Assistant Professor of Geophysics in January 2025,

southwest Iceland. His team conducted two phases of Distributed Acoustic Sensing (DAS) deployments between November 2023 and November 2024.

Dr. Li and his research colleagues successfully issued alerts for two eruptions while avoiding false alarms during non-eruptive periods. Impressively, he shared real-time examples where the system detected precursors up to two hours before an eruption — how cool is that? These results demonstrate the potential of fiber-optic geodesy as a powerful tool for monitoring ground deformation. Remaining challenges include expanding these applications to offshore environments using existing telecommunication infrastructure or dedicated fiber deployments. Dr. Li also the recipient of the AGU Seismology Keiiti Aki Early Career Award Recipient, which is among the highest honor made to an early-career researcher in seismology and geophysics.

Student awards are an integral part of the program, too. Professional and academic judges volunteered to assess and rank the student posters into first, second, and third place winners across three experience levels: Undergraduate or 1st year MS, Advanced MS or 1st year PhD, and Advanced PhD.

The student presentations showcased a remarkable breadth of research topics, highlighting the diversity and depth of the department's work. Posters ranged from advanced geophysical methods, such as seismic analysis with radon transforms and machine learning-based predictions of sediment dynamics, to tectonic and structural investigations across regions including the Himalayas, the Arabian Shield, the Pamir Mountains, and South Atlantic margins. Environmental and coastal studies explored sediment transport, water quality, and estuarine dynamics in Texas and beyond, while planetary and geochemical research spanned topics from lunar isotope systems to serpentinization of oceanic crust. Students also presented innovative applications of hyperspectral imaging, UAV monitoring, and basin modeling, as well as hydrocarbon prospectivity and petroleum system assessments.

THE POSTER WINNERS ARE:

Undergrad or 1st year MS

1st Rebekah Wells-Mourre
2nd Kathryn Hardy
3rd Christina Raymond

Advanced MS or 1st year PhD

1st Amberlee Enger
2nd Estefani Ruiz Toro
3rd Jack McLaughlin

Advanced PhD

1st Poorna Srinivasan
2nd Malinda Millangoda
3rd Muhammad Asif

The 27th Annual Robert E. Sheriff Lecture

Together, these presentations underscored the department's interdisciplinary approach, connecting field observations, laboratory analyses, and modeling techniques to tackle a wide range of geological and environmental challenges. The abstracts of the winning student posters are featured here in the *Bulletin* for readers to explore.

Thank you to Caroline Watchman, HGS Vice-President, and Andrea Peoples, HGS Office Manager, for coordinating the advertising and on-site logistics of the event at the Norris Center. Special thanks to the volunteers and judges for generously dedicating their time and expertise to evaluate the student

presentations. Their support and commitment were essential to making this event possible.

A heartfelt thank you also goes to the students, for whom this event is truly designed. Their dedication and passion for geoscience remind us why it's so important to continue supporting opportunities like the Sheriff Lecture. Events like these strengthen the connection between the University of Houston and the Houston Geological Society, and encourage the next generation of geoscientists to stay engaged and involved with the HGS community. See you all next November at the 28th Annual Sheriff Lecture! ■

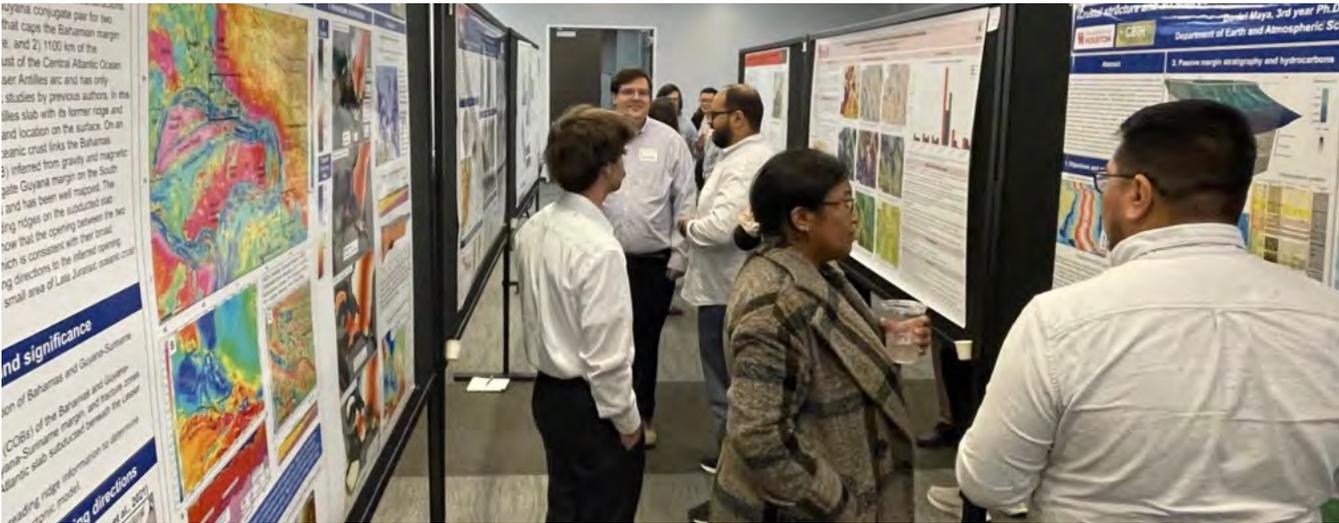


Poster winners (left to right): Poorna Srinivasan, Malinda Millangoda, Muhammad Asif, Amberlee Enger, Estefani Ruiz Toro, Christina Raymond, Jack McLaughlin, Rebekah Wells-Mourre, and Kathryn Hardy. Congratulations!



Thomas Lapen (left), UH-EAS department chair and Jiaxuan Li (right), speaker.





The 27th Annual Robert E. Sheriff Lecture



Sheriff Lecture Abstracts

UNDERGRAD OR 1ST YEAR MS_1ST PLACE_REBEKAH WELLS MOURRE

Presenting Author:

Rebekah Wells-Mourre

Authors:

Wells-Mourre, Rebekah Theresa¹, Karaca, Onur², Carlson, Brandee³, Khan, Shuhab⁴, Wright, Kyle⁵

Organizations:

University of Houston¹, Texas Water Development Board²

ABSTRACT

Suspended sediments affect water quality, ecosystems, and shoreline stability in coastal systems. Understanding their spatial and temporal variability is essential for effective coastal management. Traditionally, suspended sediments are measured by filtering and weighing solids from water samples, however this provides limited spatiotemporal coverage and is time- and labor-intensive. This project aims to build tools to predict total suspended solids (TSS) using multispectral UAV data from two contrasting Texas bays, Trinity Bay (TB) and Matagorda Bay (MB). Both bays receive direct river input, however MB is more influenced by marine exchange. Between August 2024 and July 2025, twelve monthly multispectral UAV flights were conducted over each bay, paired with

in-situ water sampling conducted on the same day to obtain TSS measurements. Red, Green, NIR, and Red-Edge bands were processed into orthomosaics. Open water was isolated using

the Normalized Difference Water Index (NDWI), and shoreline vegetation was removed using the Red Edge Simple Ratio (SR_{re}). Three spectral indices, Normalized Difference Turbidity Index (NDTI), Suspended Sediment Index (SSI), and Bounded Turbidity Ratio (BTR), were calculated as reflectance-based proxies for suspended sediment in the upper water column.

In TB, SSI values were highest near the Trinity River mouth in February and March following rainfall events which generated broad sediment plumes. SSI values declined through June, as freshwater input decreased. MB exhibited lower, more uniform SSI values, reflecting limited river input and minimal seasonal variation.

These results show that multispectral indices can aid in detecting surface sediment patterns. UAV-based monitoring provides a high-resolution, cost-effective tool for tracking suspended sediment in coastal systems. ■

UNDERGRAD OR 1ST YEAR MS_2ND PLACE_KATHRYN HARDY

Spatiotemporal Analysis of Dune Morphodynamics on Follet's Island, Texas (2023–2025)

Kathryn Hardy ; Advisor: Shuhab D. Khan

This study presents a high-resolution spatiotemporal analysis of foredune and coppice dune evolution on Follet's Island, Texas, from 2023 to 2025. Using multispectral and LiDAR drone surveys collected every six months, this project focuses on quantifying short-term geomorphic change along the barrier island's active dune field. Digital elevation models derived from each survey were compared through elevation differencing, volumetric analysis, and area measurements to evaluate patterns of erosion and accretion. Results show distinct morphodynamic

trends, with the most pronounced changes occurring after Hurricane Beryl (July 2024), where spatial analyses in ArcGIS Pro quantified significant foredune scarping and dune volume loss, with subsequent partial recovery observed in the following survey cycles. Overall, this study demonstrates how integrating repeat drone-based LiDAR and multispectral datasets with GIS-based spatial analysis provides an effective framework for monitoring coastal dune dynamics and quantifying short term geomorphic processes along the Texas Gulf Coast. ■

UNDERGRAD OR 1ST YEAR MS_3RD PLACE_CHRISTINA RAYMOND

Natural and Anthropogenic Controls on Suspended Sediment and Water Quality in Texas Estuaries: A Multi-Scale Analysis of Matagorda and Trinity Bays.

Christina Raymond, Brandee Carlson, Claudia Aramburu University of Houston, Department of Earth and Atmospheric Science

Matagorda and Trinity Bays are dynamic coastal environments with contributions from both terrestrial and marine influences. There are three main natural controls on sediment dynamics in estuary systems: sediment transport into the bays by rivers, tidal forcings, and wind-generated waves, especially in microtidal environments like Trinity and Matagorda Bays. To measure total suspended solids, boat-based water sample collection was performed monthly in Matagorda and Trinity Bays at up to 10 locations each to test for total suspended solids (TSS). To determine the dominant forcing, linear analysis was performed with river discharge from USGS gauges, NOAA meteorological measurements of wind speeds, and NOAA tides gauges. The results showed very weak correlations across all variables and even with the introduction of lag-times. This result is likely due to the samples

only being collected during fair weather conditions, emphasizing the temporal limitation of boat-based in-situ water sampling and the need for more continuous data collection during all different conditions in the bay. To combat this, we have deployed 6 moored optical backscatter sensors (OBS-328) in Matagorda Bay that will collect turbidity measurements as a proxy for TSS and 2 tilt-current meters that will record current velocity. Each instrument will collect data in 15-minute intervals and will be revisited monthly for analysis. We hope that with the introduction of the OBS-328 in combination with in-situ water samples and current velocity measurements, we will be able to account for the complex spatial and temporal variations in bay systems. ■

ADVANCED MS OR 1ST YEAR PHD_1ST PLACE_AMBERLEE ENGER

Stretch, Serpentinize, Sequester: Using Isotope Geochemistry to Constrain Serpentinization and Carbonation of a Modern Ocean Floor

Amberlee Enger¹, Michael A. Antonelli¹, Qi Fu¹, Donald J. DePaolo²

¹Department of Earth and Environmental Science, University of Houston

²Department of Earth and Planetary Science, University of California – Berkeley

Hydrothermal alteration of mafic minerals occurs when seawater percolates through seafloor basalts and peridotites at elevated temperatures (100-400°C), producing various hydrous minerals (Allen & Seyfried, 2004). The high abundance of olivine in peridotites leads to dramatically different hydrothermal reactions than for typical basaltic crust, generating high pH fluids, serpentine minerals, brucite, magnetite, and carbonates.

Carbonate formation in natural serpentinite systems remains underexplored, hindering our understanding of modern geochemical cycles linking the atmosphere, oceans, and solid Earth. Given that serpentinization is conducive to the precipitation of carbonates, significant efforts are underway to optimize carbon sequestration efforts in ultramafic tailings (Stokreef et al., 2022). Major cation sources, reaction temperatures, and rates of both serpentinization and carbonation of peridotite-hosted carbonates remain uncertain.

To address these questions, we have obtained 18 peridotite samples (~3 Ma) from Vavilov basin, Mediterranean Sea (IODP Expedition 402). Here, normal faulting has allowed for the infiltration of seawater and subsequent hydrothermal alteration (Sanfilippo et al., 2025). We will analyze major and trace element abundances and follow with $\delta^{44}\text{Ca}$, $\delta^{18}\text{O}$, and 87Sr/86Sr analyses on both silicate and carbonate phases from these samples. This combination of isotopic proxies allows us to evaluate the sources of Sr and Ca in the silicates and carbonates, the temperatures at which they likely equilibrated, and the reaction rates associated with carbonate precipitation. Additionally, Ca isotopes in peridotite-hosted carbonates are underexplored, so our data will likely have compounding implications for the use of $\delta^{44}\text{Ca}$ in tracing recycled carbonates in mantle-derived igneous rocks (Antonelli & Simon, 2020). ■

ADVANCED MS OR 1ST YEAR PHD_2ND PLACE_ESTEFANI RUIZ TORO

Late Cretaceous Oceanic Plateau Origin of the Bering Sea Lithosphere from 3D Gravity Inversion for Crustal Thickness and Integration of Heatflow and Depth to Basement Data

Estefani Ruiz Toro

Department of Earth and Atmospheric Sciences, University of Houston, Texas 77204 (edruizto@cougarnet.uh.edu)

ABSTRACT

Previous workers have proposed differing hypotheses for the crustal origin of the Bering Sea lithosphere that include: 1) Paleogene back-arc spreading; and 2) Eocene collision and accretion of an intra-oceanic island arc and its trailing oceanic plateau. To test these models, I combined existing seismic refraction data merged with an Airy isostatic gravity model to constrain a 13-33 km thickness of crust underlying the deeper areas of the Bering Sea. This crustal thickness model and basin-wide variations were validated with a 2D forward gravity model that incorporated well information and seismic refraction data. To constrain the age of the proposed oceanic plateau, I used seismic reflection data to measure depth to basement points across

the Bering Sea which were plotted on a geodynamic basement subsidence curve to yield a crustal age of 60-45 Ma I also plotted 17 heat flow values from DSDP and ODP sites and exploration wells to compare to global heat flow curves that yielded an age of ~52 Ma. Based on these constraints, I propose the following sequence of events in the Bering Sea: 1) Formation of the ~385,210 km² oceanic plateau during the Late Cretaceous as the hotspot “head” of the present-day Hawaii-Emperor seamount chain dated from Maastrichtian to recent; 2) the Bering Plateau and its fringing intra-oceanic arc which collided with the Koryak margin during the late Paleocene (58–50 Ma); 3) the accretion of the arc-plateau caused the plate boundary to shift ~640 km to the south to form the present-day Aleutian arc system. ■

ADVANCED MS OR 1ST YEAR PHD_3RD PLACE JACK MCLAUGHLIN

Evolution of Clay Composition During Burial of Marine Sediments

Jack R. McLaughlin and Regina M. Capuano

A new methodology exists in which the cation composition of clays is determined from the chemical composition of water based on the instantaneous cation exchange equilibrium between pore water and clay minerals. This has been used to evaluate the environments of deposition of the sediments in shallow stratigraphic units of the Texas Gulf Coast (Capuano and Jones 2020, 2023), but has not been used on deeper systems at elevated temperatures. This study uses this methodology to calculate the cation composition of deeper, higher temperature clays to determine how their composition is affected by long term burial and water flushing.

Exchange constants needed for this study were not available at elevated temperatures, so as part of this study an internally

consistent thermodynamic database of heats of reaction for the relevant exchange reactions was compiled. From these data exchange constants up to 100° were calculated and used to determine the clay compositions from water samples collected from 45 wells at depths of 650 to 2886 meters in the Texas Gulf Coast.

Preliminary results show that the clay compositions of deeper sediments no longer reflect their depositional environment due to long term water flushing. Compared to the expected composition of marine clays, a relative decrease in Mg content and increase in Na content was observed. Determining the cation composition of clay minerals is important for understanding mineral alterations and the hydrodynamics of the system. ■

ADVANCED PHD_1ST PLACE_POORNA SRINIVASAN

Evaluation of Gas Compositions and Compound-specific Isotopes from Hydrous Pyrolysis of Coal

Poorna Srinivasan^{1*}, Qi Fu¹, Tao Sun^{1,2}, Thomas Malloy¹, Jagoš R. Radović¹

¹Department of Earth and Atmospheric Sciences, University of Houston; ²Department of Earth, Environmental, and Planetary Sciences, Rice University)

ABSTRACT

Monitoring gas emissions from coal formations not only provides vital information for exploration of hydrocarbon gases but is also important for determining CO₂ sequestration sites and evaluating the potential for alternative energy sources (e.g., hydrogen). Numerous experimental studies have been conducted investigating the gas generation potential of coal, but results vary greatly. Hydrous pyrolysis (HyPy) is an experimental technique used to simulate natural processes occurring in the subsurface.

Twenty-four HyPy experiments were conducted on a Ft. Union Formation lignite at 24-, 72-, and 144-hours and held isothermally between 260 °C to 365 °C to assess the influence of time and temperature on natural gas generation. The resultant gases were analyzed using gas chromatography and isotope ratio mass spectrometry. The concentration of gases shallowly increased

from 260°C until 340 °C, and then exponentially increased thereafter due to secondary cracking. The experimental run time had a notable effect on gas yield, with the 144-hour experiments generating higher concentrations. Generally, δ¹³C isotopic values became more enriched as the temperature increased. Carbon isotopes showed rollovers of ethane and propane at 310 °C for the 72- and 144-hour experiments. However, the rollover was either delayed or not observed in the 24-hour experiments, suggesting its time-dependency.

Gas generation is highly dependent on the original maceral content, the type and amount of accessory minerals present, and any simultaneous reactions occurring during thermochemical maturation. Experiments will next be conducted on shales containing Type I and Type II kerogen to evaluate the gas yield, composition, and isotopic variability. ■

ADVANCED PHD_2ND PLACE_MALINDA MILLANGODA

Climatology of Inland Propagation of Convection over Texas Gulf Coast

Malinda Millangoda¹, Youtong Zheng¹, Yixin Wen²

¹Department of Earth & Atmospheric Sciences, University of Houston, ²Department of Geography, University of Florida

ABSTRACT

The inland propagation of convection from coastal regions plays a key role in modulating precipitation patterns, the hydrological cycle, and severe weather along the Texas Gulf Coast. This study presents a multifaceted climatological analysis of warm-season convective systems that initiate near the coastline and move inland, using high-resolution satellite and radar-derived rainfall data from 1998 to 2024. We apply the Tracking and Object- Based Analysis of Clouds (TOBAC) framework to identify convective features and assess their density, diameter, and mean precipitation using Multi Radar Multi Sensor (MRMS) Quantitative Precipitation Estimates

(QPEs) data for the 2021–2024 period. The results reveal a robust diurnal inland shift of convection, with convective systems intensifying and expanding in size throughout the afternoon as they move away from the coast. Using Climate Prediction Center Morphing Technique (CMORPH) QPE data from 1998–2024, we further examine how different background wind regimes modulate the spatial extent of inland- reaching convection. This multi-dataset climatology provides valuable insight into coastal convective behavior over Texas Gulf Coast and supports improved forecasting of heavy rainfall and flash flooding across vulnerable inland areas, including the Houston metropolitan region. ■

ADVANCED PHD_3RD PLACE_MUHAMMAD ASIF

Extensional Fault Dynamics and Strain Migration: Across the Thakkhola Graben, Central Himalayas

Muhammad Asif*, Michael A. Murphy, Alexander Robinson, and Michael S. Daniel

The Dangardzong Fault (DF) in the Nepal Himalayas is the primary normal fault bounding the Thakkhola graben. It has accommodated orogen-parallel extension since the Miocene. Although active slip rates exist for many faults that accommodate Himalayan orogen-parallel extension, none exist for the Dangardzong Fault despite several decades of research on this prominent rift- bounding structure. In this study, we employed small-baseline subset interferometric synthetic aperture radar time-series analysis to investigate the surface displacement patterns across the Dangardzong Fault. The InSAR data were first processed to extract the east–west velocity component, and three InSAR swath profiles across the fault were then modeled using the simple 2D elastic screw dislocation model (Savage & Burford, 1973), which describes velocity as a function of slip rate, locking depth, and static offset. All three profiles consistently suggest a fault slip rate of $0.0 \pm <0.1$ mm/yr. The best-fit model estimates a poorly constrained locking depth of 12 km +5.3/-6.9 km. The results show no measurable east-west extensional surface displacement across the Dangardzong Fault indicating a lack of active orogen-parallel deformation in the area.

Dangardzong Fault is consistent with thermochronologic evidence indicating a progressive decline in footwall cooling rates from ~22 Ma to present, reflecting reduced exhumation and extensional activity (Brubacher et al., 2021). This temporal shift suggests that orogen-parallel strain has progressively migrated away from the Thakkhola Graben, likely accommodated by younger extensional systems across the plateau. Structural analysis further indicates that arc-parallel extension along the graben-bounding faults is minimal (~0.22 mm/yr since 10 Ma), significantly less than estimates for extensional features to the west, supporting the hypothesis that central Nepal represents a transitional zone of reduced orogen-parallel strain due to low convergence obliquity (Baltz et al., 2021). GPS velocities reveal increasing east–west extension toward the west and the MFT (Styron et al., 2011), likely driven by oroclinal bending and enhanced strain accommodation along the outer arc of the Himalaya. These findings point toward a broader geodynamic evolution involving a southward shift in thrusting, underthrusting of Indian lithosphere, and lateral lower crustal flow, which collectively contributed to the spatial redistribution of extensional deformation in the southern Tibetan-Himalayan orogenic system. ■

The absence of measurable present-day fault slip across the

WELCOME TO NEW MEMBERS, EFFECTIVE NOVEMBER 2025

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Paul Schatz

John Mastroianni

STUDENT MEMBERS

Haiyang Liao

Nitin Paliwal

CASE STUDY SEMINAR II

Lessons from Missed Opportunities and Surprise Successes

Thursday, January 15, 2026

Norris Conference Center, West Houston

One Day Conference with Real Life Exploration Stories!

Learn from Senior Geoscientists!



Morning Session 1 “Practical Paths to Informed Decisions”

- **Systematic Exploration, Geologic Insight, Professional Networks, and Business Actions Leading to the Discovery of Unconventional Resources in The Permian Basin Wolfcamp Formation** Bill Fairhurst, Riverford Exploration
- **Risking Exploration Prospects – Lessons from the Dark Side in Leadership and Practice** Mark Shann, Westlawn Americas Offshore
- **Pendleton Field: A Case Study of the Horizontal Development of the Fractured Saratoga Chalk, Sabine Parish LA** Julie Garvin, Garvin Resources

Session 2 “Look Back Studies and New Ideas In Mature Areas”

- **The Sedimentology, Depositional History, and Reservoir Modelling of Zama Field, Offshore Mexico** Steve Cossey, Cossey and Associates; James Pasley; Howard White
- **Lessons from Understanding Structural Styles of the Central Graben in the UK and Norway** Rich Sears, Leading Energy Now

“The Deep-Dive Entrepreneur: Fusing Technical Mastery with Strategic Value Creation”
Special Luncheon Presentation by Scot Fraser, Aurivos

Afternoon Session 3 “Development and Testing of the Working Models”

- **The Opening Up of Mauritania Offshore: the Promise, a Discovery, the Disappointment, a Second Wave, and What Was Never Tested** Brian Frost, Retired, Anadarko
- **The Importance of "Co-Opetition" Among Players: The Case of the Vaca Muerta Unconventional Play** Daniel Minisini, ExxonMobil; Fernando Sanchez Ferrer, GeoPark
- **New Value from Old Wells – A Case for Revisiting Dry Holes** Matt Flannery, Stratum Reservoir

Session 4 “Integration of Geophysics & Geology in Play-Based Portfolios”

- **Reflecting on the Experience of an Exploration Project in Suriname – Lessons Learned from Seeing Both Sides of the Table** Scotty Salamoff, Bluware
- **Understanding Strawn Deposition and Production in Southern Oklahoma Using Machine Learning** Deborah Sacrey, Auburn Energy
- **Forensic Science in Geophysics: Unlocking the Value of Vintage Subsurface Data** Rene Mott, Empress Exploration

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Co-Chairs Katya Casey (GSH) and Linda Sternbach (HGS)

Houston Geological Society Volunteers Inspire Future STEM Leaders at GEMS 2025

By Janet Combes and Lucia Torrado

The Houston Museum of Natural Science and the Girl Scouts of San Jacinto Council recently hosted the annual Girls Exploring Math and Science (GEMS) event, giving young students a hands-on look at science, technology, engineering, and math (STEM). The Grand Hall and Glassell Halls at the Museum were buzzing with interactive exhibits, demonstrations, and activities from local STEM organizations, including the Houston Geological Society (HGS).

Organizer Steven Johansen, with Nancy Engelhardt-Moore and Stephanie Suarez, spent the day talking with students and families about planetary geology, petroleum geology, hydrogeology, and mineral exploration. As Stephanie shared, “We talked about everything from how oil and gas form beneath the Earth to how scientists study rocks from other planets, and even handed out halite (rock salt) samples as fun take-home geology souvenirs.”

Students also had the chance to present their own STEM projects to

the public and compete for prizes recognizing the top submissions. Steve and Nancy judged 9 posters and STEM professionals were available to answer questions and offer guidance, showing firsthand what careers in science and engineering can look like.

The HGS table has a fairly steady stream of people visiting, as Nancy happily shared “I brought a meteorite, a large dinosaur bone, a large piece of pumice, and amber with insects. The kids were interested in the salt and we handed out some samples. Overall, the event was a success!”

The GEMS event, supported by CITGO Petroleum Corporation, the Girl Scouts, and HGS volunteers, continues to provide an important opportunity for girls to explore STEM fields and for volunteers to share their knowledge and enthusiasm. A big thank you to all the organizers and volunteers whose time and effort make this event possible! ■



HGS volunteer Stephanie Suarez



HGS volunteer Nancy Englehardt-Moore



HGS display at GEMS 2025

Annual HGS Salt Party

Every year the Hockley Salt Mine gives the HGS Educational Outreach committee multiple bags of rock salt pieces and volunteers meet up on Janet Combes's driveway and patio to break up the large pieces into smaller samples to give away at various STEM events. This year we got 8 large bags of about 50 pounds each from Hockley and on September 20 everyone worked hard and got 1064 samples into baggies with labels and ready-to-go! That includes 66 bagged labeled salt crystal samples.

Volunteers included Jinny Sisson, Huw James, Debbie Caperton, Janet Combes, Steve Johansen, Sue Pritchett, Elsa White, Barbara Hill, Gregg Zelewski, Jim Tucker, Michelle Pittenger, Beverly de Jarnett, and Letha Slagle. If anyone wants to participate in various STEM events this coming year, please contact Chuck Caughey. If you'd like salt samples for a STEM event of your own – contact Janet Combes. ■



From left to right: Jinny Sisson, Huw James and Debbie Caperton



From left to right: Steve Johansen, Sue Pritchett and Elsa White



From left to right: Barbara Hill, Gregg Zelewski and Jim Tucker



From left to right: Michelle Pittenger, Beverly de Jarnett and Letha Slagle

HGS GENERAL DINNER

2025 Global Energy Outlook

The Global Outlook is ExxonMobil's view of demand and supply of energy and related products through 2050. This analysis is based on a long-term assessment of; economic trends, technological advances, consumer behavior and climate related public policy. Through 2050 we expect all energy types are needed for a more prosperous low emission future. Rising living standards are projected to increase energy use 25% in developing countries. To meet this increase in demand a broad array of energy types will be needed with oil and gas projected to make up more than half of the world's energy supply in 2050.

Monday December 8 | 5:30 – 7:30

Federal American Grill, 510 Shepherd Dr., Houston, TX 77007

Cost: \$45 Members, \$55 Non-members, \$40 Students

Includes hearty appetizers and two drink tickets

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Clark Osterlund



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GSH/ HGS Case Study Seminar II

Lessons from Missed Opportunities and Surprise Successes

January 15, 2026 | 8:00 AM to 5:30 PM

Norris Conference Center (816 Town & Country Blvd., Houston, TX 77024)

Networking and Happy Hour 5:30 PM to 7:00 PM

Registration includes a Buffet lunch, a luncheon talk, a post-event Happy Hour, and a booklet of speaker titles and abstracts.

Cost:

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Non-Member Price \$325

Geoscience Student \$150

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Join or renew your Society membership by contacting the

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HGS and GSH are teaming up for a premier one-day program called Case Study Seminar, the second edition of the popular program, which last hosted in November 2024.

The Case Study Seminar is a unique all-day program. Twelve experienced geoscientists will recount how they found oil and gas during their careers, and what they learned from their exploration and production experience. The day-long event includes experts who are true Explorationists as well as geologists and geophysicists. Event speakers have extensive experience in the oil and gas industry; they expect attendees to ask questions! Speakers will share behind-the-scenes stories centered on the theme “*Lessons from Missed Opportunities and Surprise Successes!*”

Join the Case Study Seminar co-chairs, Katya Casey (GSH) and Linda Sternbach (HGS), and absorb insights from Society leaders Rene Mott (GSH President), Patty Walker (HGS President), AAPG Past President Deborah Sacrey, AAPG President Elect, John Casiano; HGS Past President Jeff Lund; SEG President Joe Reilly; and SEG and AAPG Legend Mike Forrest. We recommend staying late for the included “Networking Happy Hour,” starting at 5:30 PM at the Norris Center, where all attendees and speakers can network in person.

The Case Study Seminar II event at the Norris Center on January 15 includes a group luncheon, followed by a motivational noon-time talk by Scot Frasier of Aurivos on “The Unfair Advantage: Engineering a Memorable Career in the Energy Sector.” The Case Study seminar features a morning and an afternoon panel session in which the seminar speakers answer audience questions, and a microphone is passed around the audience, guided by moderators. Bring some questions and leave with informed answers!

THE 2026 CASE STUDY SEMINAR TOPICS

Discovery of unconventional resources in the **Permian Basin**/ first oil (Bill Fairhurst)

Risking exploration prospects: GOM and international (Mark Shann)

Fractured reservoir plays in Louisiana (Julie Garvin)

Offshore Mexico: learn about the huge **Zama oil field** (Steve Cossey)

UK **North Sea** Central Graben exploration discovery stories (Rich Sears)

Northwest Africa, **Mauritania** Discoveries (Brian Frost)

Argentina’s Onshore Vaca Muerte Unconventional Play (Daniel Minisini and Fernando Sanchez Ferrer)

Revisiting dry holes and old wells: more to find (Matt Flannery)

South America, **Suriname** exploration: working with international partners (Scotty Salamoff)

Southern Oklahoma — **seismic-based machine learning** (Deborah Sacrey)

Using **vintage geology and geophysical data** creatively (Rene Mott)

To become a sponsor, contact office@hgs.org or office@gshtx.org Gold, Silver, Bronze, and Individual levels are available.

Please submit the company logo with the form to the GSH at Office@gshtx.org or HGS. Sponsorship packages available with tickets

HGS at the Houston Gem and Mineral Show

By Janet Combes and Lucia Torrado

The Houston Gem and Mineral Show, held on November 7-9 at the Humble Civic Center, brought a weekend of hands-on geology and mineral fun for all ages. Chaired by Sarah Heinlein with support from Phil Caggiano, the HGS booth was set up Thursday by Chuck Caughey, with prep help from Janet Combes. Throughout the weekend, dedicated HGS volunteers — including Ken Williams, Huw James, Barbara Hill, Michelle Pittenger, Elsa Capitan-White, Jim Tucker, Janet Combes, and several UHD students — welcomed visitors and shared their passion for earth sciences.

Friday featured school and home-school groups, Saturday was full of scouts working on geology badges, and Sunday opened the doors to the general public. The HGS tables included pamphlets and information about the HMNS, which drew interest from adults curious about membership and upcoming exhibits. Kids loved the dinosaur postcards, while over 200 rock salt samples and halite info sheets were handed out, giving visitors a tangible connection to the fascinating world of minerals. ■

A VIP Night at the Mercury Chamber Orchestra

Houston Geological Society members were given VIP treatment on Saturday, November 8th at the Mercury Chamber Orchestra presentation of its “mostly Mozart” concert. The performance was in the Cullen Theatre at the Wortham Center. The evening began with Haydn’s Symphony No. 88, followed by Mozart’s Clarinet Concerto and his Jupiter Symphony, No. 41. The clarinet concerto featured guest soloist Thomas Carroll, a virtuoso artist who also builds period clarinets.

The music is performed in the Cullen Theatre at Wortham Center, unamplified yet the music fills the space with a unique sound and a personal feel.

Special accolades to HGS member Marsha Bourque for arranging this wonderful event which included discounted ticket prices and access to the “green room.”

The Mercury Chamber Orchestra focuses on music of the baroque, classic, and romantic periods, performed on replica instruments.

Look for the announcement of a future opportunity for HGS members to enjoy a very special experience during this 25th anniversary season for Mercury Chamber Orchestra. ■



Marsha Bourgue, Chris Prince, William Dickson, Micheal Bourque, Sue Pritchett.



A Hole-in-One for HGS: 2025 Golf Tournament a Huge Success!

By Seth Johnson



The 2025 HGS Golf tournament was held on Thursday, October 23 at the Golf Trails course in the Woodlands Resort. By all accounts, this year's tournament was a smashing success. The HGS would like to thank Daniel Baker and Seth Johnson of EDGE Systems, who volunteered to organize this year's tournament with the support and guidance of HGS's own Andrea Peoples.

For the first time in several years, the event was completely sold out. The 148 golfers who participated in the event enjoyed perfect weather, delicious food, and a complementary Bloody Mary bar!

Congratulations to this year's champions: the team of Jimmy Bagley, Zach Hendershot, Parker Smith, and Elliot Wall, who carded a score of 52 to claim the 2025 title.

TOURNAMENT RESULTS: TOP TEAMS

1st Place winners *Continental Labs* (Jimmy Bagley, Zach Hendershot Parker Smith Elliot Wall)

2nd Place *EDGE* (James Small, Joe Edmonds, Chad Grimes, Rob Hargett)

3rd Place *SLB* (Roy McCall, Harry Fowlow, Mike Schneider, David Pasquini)

Thanks to the generous donations of the sponsors, and all the golfers who participated and purchased raffle tickets, the 2025 HGS golf tournament raised twice as much money as in previous years. Stay tuned for details on next year's event! ■



From left to right: 1st Place Team Winners: Jimmy Bagley of Continental Labs, Zach Hendershot, Parker Smith, Elliot Wall



From left to right: 2nd Place Team Winners: James Small of EDGE, Joe Edmonds, Chad Grimes, Rob Hargett

A Hole-in-One for HGS: 2025 Golf Tournament



From left to right: 3rd Place Team Winners: Slb, Joel Ruzicka, Kirk Robichaux, Naish Zhang, Derek Buster



From left to right: Kelly Bentley, Magly Cabrera, Jacob Smith



Adam Haecker



Seth Johnson, EDGE



Brent Propst, Wampum Hardware Co.



From left to right: Andrea Peoples and Ceri Davies of Viridien



Raffle winner Bryan Mogrovejo (right)

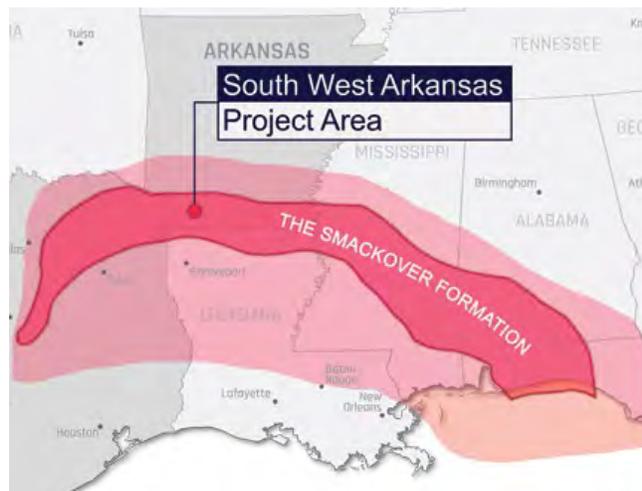


From left to right: Magly Cabrera and Andrea Peoples

General Dinner Meeting on Lithium Exploration in the Smackover Formation

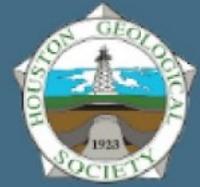
Stephen O'Leary, who leads Equinor's US Lithium subsurface team, presented a talk on lithium exploration in the Smackover formation at the October 13th general dinner meeting at the Federal Grill. O'Leary shared that lithium exploration is ramping up in southwest Arkansas and eastern Texas. The Smackover formation is ideal for lithium extraction because of its high lithium concentration and strategic location. Strong support from local communities is helping to drive projects to final investment decisions.

Thanks to Robin Fernandez (Ikon Science) for volunteering to assist with logistics. ■



Location of joint venture between Equinor and Smackover Lithium Co. Graphic from Smackoverlithium.com.

HGS IS GETTING A NEW WEBSITE



HGS's NEW Website:

- Fresh new webpage format
- More intuitive, user-friendly design
- Easy access to HGS member sites
- Improved navigation to HGS and external links
- New access for event registration

Regards,
Penny Patterson
HGS President 2024-2025

Patty Walker
HGS President 2025-2026

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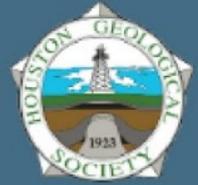
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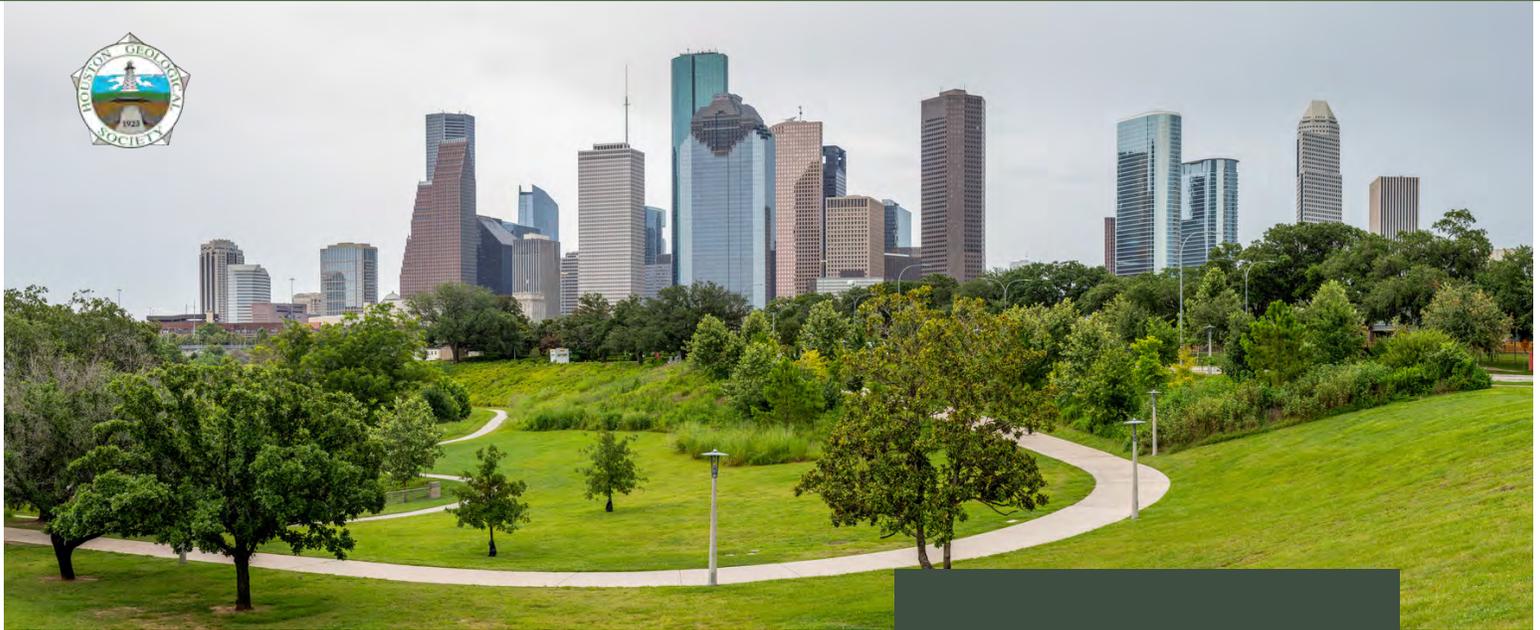
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Volunteer with HGS



Annual Events

Every year the HGS has annual social events, and we need volunteers to help us organize and set up on the day of!

These include events such as:

- Golf Tournament
- Shrimp Peel & Crawfish Boil
- Skeet Shoot
- Pickleball Event
- Field Trips



Interested in Volunteering?

The HGS is always looking for energetic members to become volunteers for the society! As the largest local geological society in the country, we depend on the support of our members to help us organize and execute our many activities. Committees such as Educational Outreach, Continuing Education, and our annual social event committees are always looking for extra helping hands! Contact the HGS Office at office@hgs.org to learn more!

Committees

HGS committees such as Educational Outreach and Continuing Education provide geoscience learning resources to students and the local geoscience community. These groups are always looking for volunteers! If you or someone you know is interested in lending a hand, please contact the HGS Office!





HGS General Lunch



Petroleum Geology as a Science and Industry – Past, Present, Future(?)

In this talk, we will look at the ups and downs of the Petroleum Industry. We will start our journey in the late seventies (when we thought the world was running out of oil and inflation-corrected WTI price-per-barrel was about \$150). We will arrive at the present-day (when we think we have more than enough oil and gas reserves to see us through the energy transition, with price-per-barrel around the \$60 mark), and consider some thought-provoking scenarios for the future.

The focus will be on integrating the world's geopolitical setting with technological developments and the addition of significant resources through exploration. First through the application of 3D seismic in established provinces, the advent of deep-water drilling in the 90ies, the opening of subtle (stratigraphic) play trends and finally through the rise of unconventional resources.

December 17, 2025

11:30am - 12:30pm

Zoom

Members: \$20

Students: \$15

Non-Members: \$25



Dr. Rene Jonk



REGISTER NOW



Monday, December 8, 2025

HGS General and North American Dinner Meeting

5:30 – 9:00 p.m.

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Students \$40 • Non-Members & Walkups \$55

Federal American Grill

510 Shepherd Dr., Houston, TX 77007

Directions: Valet parking available

Includes hearty appetizers and two drink tickets

<https://www.hgs.org/civicrm/event/info?id=2673>

Clark Osterlund

HGS General and North American Dinner Meeting

2025 Global Energy Outlook

The Global Outlook is ExxonMobil's view of demand and supply of energy and related products through 2050. This analysis is based on a long-term assessment of; economic trends, technological advances, consumer behavior and climate related public policy. Through 2050 we expect all energy types are needed for a more prosperous low emission future. Rising living standards are projected to increase energy use 25% in developing countries. To meet this increase in demand a broad array of energy types will be needed with oil and gas projected to make up more than half of the world's energy supply in 2050.

BIOGRAPHICAL SKETCH

CLARK OSTERLUND is an Industry Outlook Advisor in ExxonMobil's Upstream Strategy Department. In his role, he works



with a team of individuals to analyze global market fundamentals, economic trends, technology advancements, consumer behavior and climate-related public policy to project the most likely view of the world energy supply and demand. His regions of focus include Latin America, Africa and the Middle East.

Clark received his BS degree geology from Baylor University, and his MS from Texas Christian University. He started his career working for the Bass Family in Ft Worth and joined ExxonMobil in 2017 upon the sale of Bass' Permian position.

11:30 a.m. – 12:30 p.m.

HGS Members/Emeritus/Honorary Life \$20

Students \$15 • Non-Members & Walkups \$25

Location – Zoom (virtual only)

<https://www.hgs.org/civicrm/event/info?id=2674>

Event Contact: Andrea Peoples

Rene Jonk

Petroleum Geology as a Science and Industry – Past, Present, Future(?)

In this talk, we will look at the ups and downs of the Petroleum Industry.

We will start our journey in the late seventies (when we thought the world was running out of oil and inflation-corrected WTI price-per-barrel was about \$150).

We will arrive at the present-day (when we think we have more than enough oil and gas reserves to see us through the energy transition, with price-per-barrel around the \$60 mark), and consider some thought-provoking scenarios for the future.

The focus will be on integrating the world's geopolitical setting with technological developments and the addition of significant resources through exploration. First through the application of 3D seismic in established provinces, the advent of deep-water drilling in the 90ies, the opening of subtle (stratigraphic) play trends and finally through the rise of unconventional resources.

We will also look at how hiring & firing cycles influence research, university enrollment and staff demographics to arrive at the present-day state of our demographics globally.

This talk provides the perspective of a single individual, and

therefore is just that! It should make for an entertaining, thought-provoking and perhaps educational experience. ■

BIOGRAPHICAL SKETCH



DR. RENE JONK is the director of ACT-Geo, a company that specializes in subsurface consulting and training. He also holds an honorary professorship in Geology & Geophysics at the School of Geosciences at the University of Aberdeen.

Rene has more than 20 years' experience in global surface and subsurface basin characterisation with a focus on oil & gas exploration and production, having worked in both technical and leadership roles at ExxonMobil and Apache.

He has worked across the full upstream cycle, from exploration, through appraisal into field development on conventional and unconventional assets from onshore to deep-water settings.

He currently applies his subsurface problem-solving skills across the energy spectrum.

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DECEMBER 2025

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MONDAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

SATURDAY

				4	5	6
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7	8	9	10	11	12	13
	<p>HGS General Dinner Meeting 2025 Global Energy Outlook Page 32</p>		<p>HGS E&E Dinner Meeting TBD</p>			
14	15	16	17	18	19	20
		<p>HGS 2025 Fourth Annual Holiday Party Page 34</p>	<p>HGS General Luncheon Meeting Petroleum Geology as a Science and Industry – Past, Present, Future(?) Page 33</p>			
21	22	23	24	25	26	27
			<p>HGS office closed</p> 			
28	29	30	31			

INSTRUCTIONS TO AUTHORS

Materials are due by the first of the month for consideration to appear in the next month's publication. Submissions should be emailed to editor@hgs.org. The Editor reserves the right to reject submissions or defer submissions for future editions.

Text should be submitted as a Word file. Figures or photos may be embedded in the document or submitted separately. The following image formats are accepted: tif, .jpg, .png, .psd, .pdf.

Feature submissions, e.g., GeoPicks, should be approximately 600 words. Technical papers should be approximately 2000 words or less (excluding references).



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We Are The HGS



FRED ARASTEH, HGS member since March 2010
 Fred Arasteh, an HGS member for 15 years, brings both technical expertise and a global perspective to his work as a Reservoir Engineer. Most recently at Vaalco Energy in Houston, he oversaw corporate-wide reserves processes, subsurface engineering, and asset management functions across multiple international locations, including Gabon. In this role, he led a team of reservoir engineers, managed reserves evaluations in line with SEC regulations, and supported business development through technical due diligence and asset evaluations.

HGS provides a forum to learn from and exchange ideas with some of the best geoscientists in the industry

Fred's career began with ExxonMobil, where he worked across the Middle East, Europe, and Africa on a mix of onshore and offshore projects. These early experiences taught him to navigate diverse cultures and regulatory environments, building adaptability that would serve him well throughout his career. In the late '90s, he moved to the United States, working on unconventional plays like the Eagle Ford and Utica, collaborating with companies such as Hess, BHP, and Weatherford. "I sought opportunities to build new skills and take on leadership roles that allowed me to influence organizational processes," he recalls. While his work relies heavily on reservoir simulation, decline curve analysis, and pressure transient analysis, Fred emphasizes that technology alone isn't enough. "The real value comes from integrating geoscience inputs, production data, and economics into a coherent picture to guide decision-making," he explains.

Fred is also deeply committed to mentoring the next generation of engineers. He advises young professionals to stay technically sharp, be adaptable, and invest in relationships to remain effective in the industry. "Understanding the geological context is critical for effective reservoir management," he says. "HGS provides a forum to learn from and exchange ideas with some of the best geoscientists in the industry." In addition to HGS, he maintains active memberships with the Society of Petroleum Engineers (SPE) and the Project Management Institute (PMI).

Fred earned his MS in Petroleum Engineering from Montan Mining University in Leoben, Austria, and is a licensed Professional Engineer in Texas as well as a certified Project Management Professional (PMP). Beyond technical excellence, he emphasizes mentorship, relationship-building, and lifelong learning as the keys to a rewarding career in energy. ■



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We Are The HGS is a series that highlights the careers and contributions of HGS members with the intention of building community. Would you like to be featured in We Are The HGS? Send a note to editor@hgs.org.

WORD BRECCIA - A GEOLOGY WORD JUMBLE

Unscramble the words below and rearrange the circled letters to find the answer to the clue.

ALGNIS ○

CAIDNLE ○

ROSSEN ○ ○

NRGANIW ○

EIRFB PCOIT ○ ○

HINT: In the Sheriff Lecture, Dr. Li Talked About a _____ Network for Early Eruption Warnings.

Unscrambled Word Breccia (November issue): Variance, Curvature, Amplitude, Frequency, Azimuth and Quantitative.

Advertise with HGS

The Houston Geological Society has many advertising opportunities to help you promote your business. The money raised through advertising helps the HGS to be able to support continuing education, networking, outreach to students, student scholarships, and young professional activities. Check out some of our advertising opportunities below!



Vendor Corner

Promote your business with a booth at an in-person luncheon or dinner meeting. HGS will also post your logo, website/social link(s) and a brief company summary on the HGS website below the technical meeting's announcement and abstract.



HGS Bulletin

Published 10 months out of the year and available digitally on the HGS website, the HGS Bulletin is an outstanding technical journal sent electronically to all current members and to subscribing libraries around the world.



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HGS Weekly Newsletter

The HGS Weekly Newsletter is published digitally every week, and reaches a global community of 8,000+ people. HGS will promote your business with an ad of your design or your logo and a link to your website or social media.

To learn more about advertising rates and how you can promote your business with us, visit our website or contact the HGS Office at 713-463-9476 or office@hgs.org.



ROCK SOLID GUESS!



HINT: The holidays are coming! Can you guess where this festive underground “Christmas Tree” is found? Photo courtesy of Alan Cressler.



HINT: A fiery spectacle unfolds near the very place where our Sheriff Lecture speaker conducted their research. What and where is this?

Rock-Solid Answers (November issue):

1. The Realmonte Salt Mine

Located in Sicily, the Realmonte salt mine contains one of the largest salt deposits formed during the Messinian Salinity Crisis, a short period of isolation of the Mediterranean Sea that caused the precipitation of a million cubic kilometers of salt.

2. Llanite:

Considered one of the world’s rarest rocks, llanite is a porphyritic rhyolite with distinctive blue quartz and reddish microcline feldspar phenocrysts found exclusively in the Llano Uplift north of Llano, Texas..

A Book Review of Roadside Guide to Geology of Texas

By Rasoul Sorkhabi, PhD, University of Utah, Salt Lake City

In the October issue of the HGS *Bulletin*, I introduced *Texas ROCKS!* published by the Geological Society of America (GSA). In this issue, I turn my attention to another recent release on Texas geology: the third edition of *Roadside Geology of Texas*, published in September 2025 by the same publisher. Building upon the experiences of its previous editions, the new edition is an up-to-date field guide for geology teachers, students, and visitors in Texas.

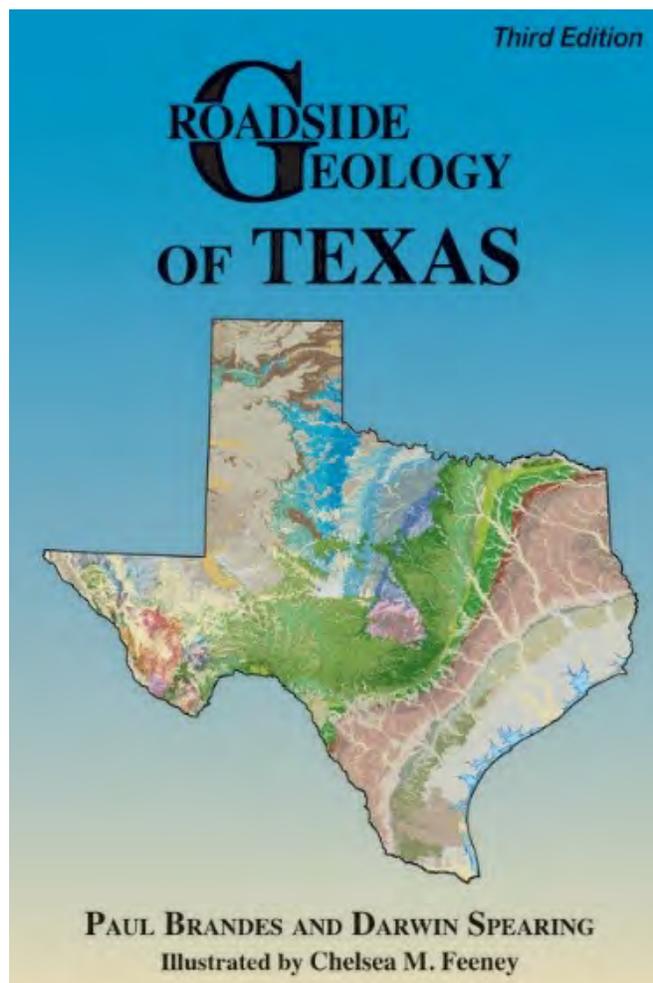
Written by Paul Brandes and Darwin Spearing, *Roadside Geology of Texas* is a helpful companion for geologic time travelers driving on the highways and backroad of Texas. The book is profusely illustrated with maps and photographs.

The book was first published in 1979 and then again in 1991 by Mountain Press, which was acquired by the Geological Society of America in October 2024. Rober Sheldon and Darwin Spearing, the authors of the first and second editions of the book, have both passed away, but their efforts constituted the foundation for this new edition.

The book begins with an introductory chapter on the formation of Texas through geological time, giving readers a sense of the state's diverse outcrop geology and complex geological history. It provides roadside descriptions of outcrops, parks, and other significant geological sites across Texas. The book is complemented by geological maps, cross-sections, and photographs, with roads and distances between locations clearly noted. Coordinates for the photographs are also provided in the figure captions.

The oldest rocks in Texas are 1.35-billion-year-old granite gneiss outcropped in the Llano Uplift. The origin of the Llano Uplift dates to more than one billion years ago, when it formed as part of the Grenville orogeny during the assembly of Rodinia. It is amazing to observe the rock record of this event in the heart of Texas- for example, east of Loyal Valley on Texas State Highway 87.

The second major mountain-building event in Texas took place during the Permian period, roughly 320 to 290 million years ago, during the assembly of the Pangea supercontinent. During this tectonic episode, North America collided with Northwest Africa to raise the Appalachian and Ouachita mountains. Interstate 30 in northeast Texas and Interstate 35 from Dallas to Austin run roughly along the Ouachita Mountain trend currently buried



Roadside Geology of Texas, by Paul Brandes and Darwin Spearing with illustrations by Chelsea Feeney (Geological Society of America, 2025), 372 pp., \$34

under Cretaceous sediments. The Marathon Uplift in southwest Texas is a remnant of the Ouachita orogeny.

The third stop in our geological journey through Texas takes us to the Western Interior Seaway during the Cretaceous period, which spanned from Texas northward all the way to British Columbia in Canada. The subsequent uplift of the Rocky Mountains put an end to the Western Interior Seaway.

After the Rockies soared to the sky, another major geological event shaped the region. The Basin-and-Range event was responsible

GeoPicks features recommendations from fellow geoscientists like resources, experiences, or tools. Do you have a favorite you'd like to share? Send it to us at editor@hgs.org.

A Book Review

for the formation of rift valleys such as the Rio Grande and the outpouring of volcanic rocks 35 years ago. These volcanic rocks are exposed in western Texas and extend into New Mexico.

The Cenozoic build-up of the Gulf Coastal plains adjacent to the Gulf of Mexico is an ongoing process shaping and changing the Texas landscape.

How can one slice Texas geologically? The book follows the traditional classification of Texas into five geological provinces, each with its own characteristics. These are, from east to west: 1) the Coastal Plains, 2) the Llano Uplift, 3) the Central Plains, 4) the High Plains, and 5) West Texas (or the Basin-and-Range province). Of these, only the Llano Uplift lies entirely within Texas. The other provinces extend into the neighboring states - Louisiana on the east, Oklahoma in the north, and New Mexico on the west-, demonstrating the transcendence of geology beyond human-made borders. If you want to see all of Texas's geological provinces, travel westward along Interstates 10 and 20.

Let's explore the five geological provinces of Texas as outlined in the book:

1) The Gulf Coastal Plains in eastern Texas, consist of the Northern and the Southern Plains, and are covered with the following sedimentary formations from southeast to northwest:

- Quaternary coastal sediments (Galveston to Houston)
- Pliocene-Oligocene sediments, delimited roughly by the Oakville Escarpment
- Eocene-Paleocene sediments (toward San Antonio)
- Cretaceous sediments on which Dallas and Austin are situated. This zone falls along the Balcones-White Rock Escarpments – a trend of Miocene-age normal faults formed along the buried hinge zone of the ancient Ouachita Mountains

(2) The Central Plains are covered with Cretaceous, Permian and Pennsylvanian sediments.

(3) The Llano Uplift encompasses Paleozoic sediments surrounding the Mesoproterozoic metamorphic and igneous rocks of the Grenville Orogeny.

(4) The High Plains are covered mostly with Pliocene-Miocene sediments and patches of Permian-Jurassic sediments on the east.

(5) West Texas, or the Basin-and-Range province, is composed of Paleozoic to Cenozoic sediments and Eocene-Oligocene volcanic rocks. This geological zone extends into New Mexico.

The book ends with a seven-page glossary for readers who are not familiar with geologic jargon and a five-page bibliography of articles and books for those who want to learn more about the geology of Texas.

Overall, considerable effort has gone into producing this book – fieldtrips, research, writing, photographing, cartography and illustrations. The result is a book indispensable to geological field trips in Texas and enriches the experience of travelers in the Lone Star State. There is plenty of geology to see in Texas.

The state's hot and humid climate of Texas is not always kind to outcrops, as the rocks easily wither, crumble or covered with vegetation. Yet, for now, we have the privilege of visiting some of these rocks, sites and parks with friends, geology students, and colleagues – equipped with copies of *Roadside Geology of Texas*. ■

ABOUT THE REVIEWER

Rasoul Sorkhabi, PhD is a professor at the University of Utah in Salt Lake City. His articles and reviews have appeared in various journals. He edits the *AAPG Core Elements* - a weekly geoscience news bulletin.



HGS Membership Application

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14811 St Mary's Lane Suite 250 Houston
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Phone: (713) 463-9476
Email: office@hgs.org

Active Membership

In order to qualify for Active Membership you must 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 of earth science for at least 5 years. Active Members shall be entitled to vote, stand for election, and serve as an officer in the Society. Active Members pay \$40.00 in dues.

Associate Membership

Associate Members do not have a degree in geology or allied geoscience, but are engaged in the application of the earth sciences. Associate Members are not entitled to vote, stand for elections or serve as an officer in the Society. Associate Members pay \$40.00 in dues.

Student Membership

Student membership is for full-time students enrolled in geology or an allied geoscience. Student Members are not entitled to vote, stand for elections or serve as an officer in the Society. Student Member dues are currently waived (free) but applications must be filled out to its entirety. Student applicants must provide University Dean or Advisor Name to be approved for membership.

Membership Benefits

Digital HGS Bulletin

The HGS Bulletin is a high-quality journal digitally published monthly by the HGS (with the exception of July and August). The journal provides feature articles, meeting abstracts, and information about upcoming and past events. As a member of the HGS, you'll receive a digital copy of the journal on the HGS website. Membership also comes with access to the online archives, with records dating back to 1958.

Discount prices for meetings and short courses

Throughout the year, the various committees of the HGS organize lunch/dinner meetings centered around technical topics of interest to the diverse membership of the organization. An average of 6 meetings a month is common for the HGS (with the exception of July and August). Short courses on a variety of topics are also planned throughout the year by the Continuing Education Committee. These meetings and courses are fantastic opportunities to keep up with technology, network, and expand your education beyond your own specialty. Prices for these events fluctuate depending on the venue and type of event; however, with membership in the HGS you ensure you will always have the opportunity to get the lowest registration fee available.

Networking

The HGS is a dynamic organization, with a membership diverse in experience, education, and career specialties. As the largest local geological society, the HGS offers unprecedented opportunities to network and grow within the Gulf Coast geological community.

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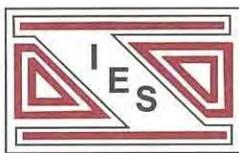


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The Pamir Plateau lies along the historic Silk Road, spanning western China, Tajikistan, and Afghanistan. It was formed by the ongoing collision between the Indian and Eurasian tectonic plates. The Pamir Mountains are also the focus of research by one of the students presenting at the Sheriff Lecture. Photo credit: Feng Wei Photography

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