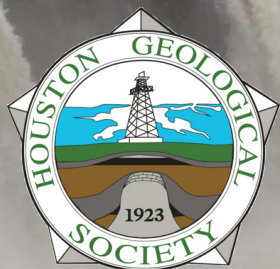


BULLETIN

HOUSTON GEOLOGICAL SOCIETY



In this issue:

HGS E&E MEETING

Construction Dewatering 101

HGS GOLF TOURNAMENT

October 17, 2022

HGS GENERAL DINNER

Workflow for Determining Relative
Permeability Behavior in Low
Permeability Media

HGS GRAND CANYON FIELD TRIP

Deadline to register is
October 28, 2022

Board of Directors 2022-2023

President (P)	Walter Light, Jr.	Thunder Exploration	713-823-8288	wthunderx@aol.com
President-Elect (PE)	Paul Britt	Texplore Inc.	832-372-5725	pbritt@texplore.com
Vice President (VP)	Scott Sechrist	Acoustic Geoscience Consulting	281-638-1213	penntexas53@yahoo.com
Secretary (S)	Amanda Johnston	Hess	832-331-5876	johnstonama@gmail.com
Treasurer (T)	Bruce Blake	Tri-Star Petroleum	713-459-7508	bruce.blake@tri-stargroup.com
Treasurer-Elect (TE)	Fang Lin	Chevron	281-253-0430	fanglinvt@yahoo.com
Editor (E)	Ken Thies	Toxodon Exploration	713-598-0526	kenthies.kt@gmail.com
Editor-Elect (EE)	Caroline Wachtman	Oxy	281-825-9627	carolinewachtman@gmail.com
Director 21-23 (D1)	Lanette Marcha	Chevron	832-808-0263	lmarcha@hotmail.com
Director 22-24 (D2)	Bill DeMis	Rochelle Court, LLC	713-402-8627	billdemis@aol.com
Director 22-24 (D3)	Troy Meinen	ERM - Southwest Inc.	713-962-5495	troy.meinen@erm.com
Director 21-23 (D4)	Dianna Phu	INTECSEA	281-236-3131	dianna@exabyte.com

Committee	Chairperson	Phone	Email	Board Rep.
AAPG House of Delegates	Kenneth Mohn	713-485-9696	kwmohn123@gmail.com	P
Academic Liaison	Paul Mann	713-743-3646	pmann@uh.edu	D2
Advertising	Bryan Guzman	832-503-4645	bryanguzman85@gmail.com	E
Africa Conference	Caroline Wachtman	281-825-9627	carolinewachtman@gmail.com	PE
Applied Geoscience Conference	Jason Simmons	832-573-2687	jason.simmons@bhge.com	P
Geomechanics	Umesh Prasad	713-879-2529	umesh.prasad@bhge.com	P
Arrangements	Scott Sechrist	281-638-1213	penntexas53@yahoo.com	VP
Awards	Mike Nieto	281-783-6130	michael.nieto@pofg.com	P
Ballot / Elections	John Jordan	713-594-5648	john.jordan.062255@gmail.com	S
Calvert Fund	Jeff Lund	713-253-7481	jeff.lund@corridoroilandgas.com	PE
Continuing Education	Thom Tucker	281-413-0833	century@flash.net	D4
	Cheryl Desforges	713-816-9202	cheryldesforges@hotmail.com	D4
Communications Committee	Dianna Phu	281-236-3131	hgs.socialmedia@gmail.com	PE
	Rosemary Laidacker	713-805-9672	rmlgeo@gmail.com	PE
Earth Science Week	Lynn Travis		lynnstravis@gmail.com	D2
Educational Outreach	Steven Johansen	346-234-7032	geosjohansen@gmail.com	D2
Employment / Expo Committee	Amanda Johnston	832-331-5876	johnstonama@gmail.com	D3
Environmental & Eng, Geology	Matthew Cowan	713-777-0534	mrcowan1@hal-pc.org	VP
	Troy Meinen	713-962-5495	troy.meinen@erm.com	VP
Exhibits	Marcus Zinecker	469-693-1285	marcuspzinecker@gmail.com	D3
Field Trips	Constantin Platon	832-686-3231	constantin@oakgeosciences.com	D4
Finance	Bruce Blake	713-459-7508	bruce.blake@tri-stargroup.com	T
	Walter Light, Jr.	713-823-8288	wthunderx@aol.com	T
	Patty Walker	832-444-0900	pattywalker1@icloud.com	T
	Paul Britt	832-372-5725	pbritt@texplore.com	T
	Mike Erpenbeck	832-418-0221	mike.erpenbeck@hotmail.com	T
	Fang Lin	281-253-0430	fanglin@chevron.com	T
Foundation Fund	Joe Lynch	346-333-9872	joelynchtx@gmail.com	PE
General Meetings	Scott Sechrist	281-638-1213	penntexas53@yahoo.com	VP
Golf Tournament	Jimmy Bagley	832-564-6028	jbagley@continentalabs.com	D1
	Kenny Baucum	713-882-6010	kenneth.baucum@stratagraph.com	D1
Government Affairs	Henry Wise	281-242-7190	hmwise@yahoo.com	D4
	Arlin Howles	281-753-9876	arlinhowles@yahoo.com	D4
Guest Night	Dave Orchard		dmorchard_geology@outlook.com	D1
HGS New Publications	William Rizer	503-852-3062	rizerwd@gmail.com	EE
International Explorationists	Steve Getz	713-304-8503	sgetz@outlook.com	VP
Latin American Conference	Ceri Davies	281-777-0683	ceri.davies@cgg.com	P
Membership Growth	Gustavo Carpio	832-706-7619	gecarpio@gmail.com	S
Membership, New	Sharma Dronamraju	713-503-5011	parsonal.sharma@gmail.com	S
Museum of Natural Science	Inda Immega	713-661-3494	immega@swbell.net	D2
	Janet Combes	281-463-1564	jmcombes@msn.com	D2
NeoGeos	Bryan Bottoms	405-623-4533	geobottoms@gmail.com	D3
Nominations	Mike Erpenbeck	832-418-0221	mike.erpenbeck@hotmail.com	P
North American Explorationists	Mark Hamzat	832-540-3216	mark@bdsrvs.com	VP
	John Bishop	713-819-0891	johnwbishop@outlook.com	VP
Office Management	Walter Light, Jr.	713-823-8288	wthunderx@aol.com	P
Scholarship Night	Fang Lin	281-253-0430	fanglin@chevron.com	P
Outcrop Family Campout	VACANT			D1
Science & Engineering Fair	Dorene West	281-413-7172	dbwesthou@earthlink.net	D2
Shrimp Peel & Crawfish Boil	Michael Salazar	713-410-4391	msalazar@coregeologic.com	D1
Clay Shoot	Howard Wood	832-277-0141	hw@coregeologic.com	D1
Social Media	Dianna Phu	281-236-3131	hgs.socialmedia@gmail.com	D4
	Lauren Robinson	317-402-6482	lseidman5.robinson@gmail.com	D4
Tennis Tournament	Constantin Platon	832-686-3231	constantin@oakgeosciences.com	D1
Vendor's Corner	HGS Office	713-463-9476	office@hgs.org	TE
Video Committee	Linda Sternbach	832-567-7337	linda.sternbach@gmail.com	D3
Web Management	VACANT			D4
HGS Executive Office Director	Andrea Peoples	713-463-9476	andrea@hgs.org	
HGS Web Content Manager	Alyssa Cushing	713-463-9476	acushing@hgs.org	

Table of Contents

ON THE COVER: Godafoss Waterfall. Located in northern Iceland near the Arctic Circle, this waterfall in the Skjálfandafljót River flows north traversing a 7,000 yr. old lava flow on the North American side of the island. The lava flow originated from the Trölladyngja volcano. While Iceland generates much of its power from hydroelectric (75%) and geothermal (24%) sources, about 15% is imported hydrocarbons mainly for transportation. Photo provided by Ken Thies.

5 LETTER FROM THE PRESIDENT

by Walter Light, Jr.

15 HGS E&E MEETING

"Construction Dewatering 101" by David Bardsley, PG

8 LETTER FROM THE EDITOR

by Ken Thies

16 HGS GENERAL DINNER

"Workflow for Determining Relative Permeability Behavior in Low Permeability Media" by James Greene

9 LETTERS TO THE EDITOR

Submit your letters to kenthies.kt@gmail.com

17 HGS NOVEMBER CONTINUING ED SHORT COURSE

"Discovery Thinking: By-Passed Pays & Plays in Conventional Reservoirs" by Bill DeMis

10 HGS GOLF TOURNAMENT

October 17, 2022

20 HGS EDUCATIONAL OUTREACH COMMITTEE UPDATE

by Steve Johansen

12 BRITAIN LIFTS BAN OF FRACKING

Article by Bill DeMis, HGS Director

21 HGS GUADALUPE FIELD TRIP

March 2023

13 HGS SEPTEMBER DINNER MEETING

Article by Linda Sternbach

25 HGPESGB AFRICA CONFERENCE EXTENDED ABSTRACTS

by Bernard Laugier & Felicia Winter



**HGS Invites You To
Join Us On This
Memorable Trip!**

The 2023 trip will be leaving from Las Vegas, Nevada on June 1st and returning to Las Vegas on June 8th. There are limited spots available, so be sure to reserve your spot before the trip fills up!

HGS GRAND CANYON FIELD TRIP

This is a full canyon raft trip with 7 nights on the river, plus the first night in Marble Canyon. Cost is \$4650 per person and includes bus transportation from Las Vegas to Marble Canyon through Zion National Park, double occupancy room at Cliff Dwellers Lodge, 8-days/7-nights on the river including a sleep kit and all meals on the river, drinks on the river, and transportation back to either Las Vegas or Marble Canyon.



**COME ROCK WITH US
AT HGS**

TRIP LEADERS

Ross Harrison
ross.harrison@tcu.edu
Mattie Reid
mmreid4@gmail.com

REGISTRATION DEADLINE

October 28, 2022
Deposit of \$1,000 per person
due at registration

FINAL BALANCE DUE

MUST be made by
February 1, 2023
*\$200/person fee for guest
substitutions after Oct. 28*

1 – 8 JUNE 2023
DEPART FROM LAS VEGAS, NEVADA

Contact:

office@hgs.org | 713-463-9476

Register & More Information:

www.hgs.org



Greetings fellow HGS members. We have nearly closed our first active month of this new business year.

I am pleased to report it has been a successful September on all fronts and we are moving forward on the **Three Point Plan of increasing membership, rebuilding community with in-person events, and working toward financial stability.**

Membership

Bill DeMis is to be commended for his near single-handed pilot program on our initial telephone campaign to restore our membership to pre-Covid numbers. Over a five-day period Bill, along with the help of John Bishop, Paul Britt and Linda Sternbach made in excess of 350 phone calls to grace-period members that had failed to renew their membership. In conjunction with this effort, the HGS office staff (Andi and Alyssa) along with Linda Sternbach conducted an email blast. As a result of the combined effort over the last month, renewed membership has increased approximately by 200. We still have more than one-half of the 842 grace-period members to contact by phone. Using Bill's approach we could use some additional volunteers to make phone calls and follow up emails to encourage folks to renew. An added benefit to working methodically down the list, these calls could lead to new friends and business contacts.

- Please contact Bill DeMis who will coordinate this effort for the next few weeks.

Rebuilding Community / In-Person Events

Our first evening technical dinner of the season on September 12th was a venue-sellout at the Norris Center. Art Berman delivered an exciting and interesting presentation on energy with approximately 65 people in attendance. One take-away from Art's presentation was that all forms of energy are additive. There are still parts of the global population that use the most basic biomass fuels such as dung and firewood to cook and heat their homes. At the same time these biomass fuels are being used, in other parts of the globe we are adding high-technology renewables of solar and wind. However, coal and hydrocarbons continue to deliver the bulk of the energy. Realistically, the use of hydrocarbons or any form of energy for that matter, will never disappear. Every form of energy is part of the total energy supply. An interesting point on this subject is that while State of Texas is one of the largest oil and gas producing regions in the world, we also have the highest percentage of wind-generated electricity of any state in the US, accounting for approximately 25% of the total electricity. Approximate percentage contributions by other energy sources to electricity supply in Texas: Nat Gas 51%, Coal 13%, Nuclear 5%, Solar 4%, Hydro/biomass 2%.

- Thank you to those that attended and helped make this event a success.
- Bring a friend or work-colleague to the next event and encourage them to re-engage in our professional community.

International Dinner on September 26th, the kick-off event for the Africa Conference, was a near-capacity event with about 65 folks attending the dinner and presentation. The evening technical presentation dovetailed extremely well with several of the talks given in the Africa conference.

- Thank you to those that attended the event and made it a huge success.

The Africa Conference September 27-28, a virtual event that required a full year of planning, was well-attended. The conference committee was organized and led by Caroline Wachtman who did an incredible job. The talks on the first day were exceptional and illustrated how feeder channel/basin floor fan/ contourite plays are opening areas and creating renewed exploration on both sides of the Atlantic. The presentations illustrate how these plays will continue to contribute new discoveries and significant reserves to the global supply for the foreseeable future. We also had an excellent session on Red Sea plays.

- Consider attending this conference in person next year in London.

Community Involvement/ University Student Support

HGS Geoscience Student Expo 2022 The Student Expo Committee led by Amanda Johnston organized an exceptional two-day event including an extremely well attended social gathering with over 200 people in attendance. Approximately thirteen companies sponsored the EXPO. Their participation included corporate informational booths and interview booths. The student and corporate registration sold out and provided interview opportunities for approximately 170 job-searching university students.

Financial Stability

Paul Britt, President-Elect, and the Finance Committee are making good progress on analyzing, understanding and revising various components of the budget.

Future Events for Networking and Rebuilding our Professional Community

Golf Tournament October 17

Pull together your foursome, sign up and have fun! See the Bulletin or Website for further details.

Continuing Education Training Course November 11

This By-Passed Pay course will be taught by Bill DeMis. It has been organized by Cheryl Desforges and the Continuing Education Committee. The Course will be held at CORELAB's auditorium, who have donated the use of the facility. See the HGS Bulletin or website for additional details and to register.

Environmental & Engineering Dinner November 12

See the HGS Bulletin and Website for additional information and registration.

GeoGulf 2023 (formerly GCAGS) April 23 to 25. This promises to be an outstanding event. It is being led and coordinated by Charles and Linda Sternbach. Watch for announcements in the HGS Bulletin and on the Website.

Grand Canyon Field Trip scheduled for June 1 -8, 2023 has just a few spots left! Deposits are due before October 28. Having been on this field trip several years ago, I can say this is a once in a lifetime trip for anyone, especially geologists. Go to the Website and sign up for one of the last spots before it is sold out!



- When you see anyone of the folks mentioned in this article, please thank them for their volunteer service to the HGS.
- Talk to your geological friends and work colleagues.
- Encourage them to join HGS and get involved in a committee.
- Participate in the upcoming events and opportunities to rebuild our professional community.
- **KEEP UP THE GOOD WORK!**

Walter S. Light, Jr.
HGS President, 2022-2023

Will your company support public education at the local level?

Local school districts want volunteers to meet and speak to students about careers in STEM (Science, Technology, Engineering, and Mathematics). Educators ask companies in the Houston area to send one or more representatives, with suitable poster sessions or table displays. This is a great opportunity for your company to show their support for STEM at the local level and to engage with the public.

HGS also wishes to find sufficient volunteers to staff a table at these events. If you would like to help HGS at any of these events, contact Steve Johansen geosjjohansen@gmail.com

Spring ISD: October 13th, 3 pm to 7 pm. An open house aimed at 8th graders, encouraging them to plan their high school coursework with STEM in mind. Location is 16717 Ella Blvd. This is west of the intersection of FM 1960 and I-45. The organizer is Mark Rouse, High School Science Specialist for Curriculum and Workforce Development. Reach out to Mark for details. mrouse@springisd.org.

LaPorte ISD: November 3rd, 5:30 to 7 p.m. A district-wide, all grade STEM night is being planned. This will consist of tables and booths where volunteers can engage with students and parents. They additionally would welcome anyone wishing to do audio-visual presentations in a classroom setting. The theme of the STEM night is 'STEM Park' (dinosaur/Jurassic park theme). Location is in La Porte. The organizer would appreciate ANY presentations on STEM themes. If interested, you can contact Shannon Fanning, fannings@lpsid.org

Alief ISD: November 5th, 8 a.m. to 1 p.m. The target audience is grade 4 - 12 students in the Alief school district; it will be an open house so whole families may attend. The school will have an area for booths and tables. They are also looking for speakers willing to talk for 30 minutes about how STEM disciplines and the 4 C's of 21st century learning (Critical thinking, Collaboration, Communication, and Creativity) enabled them to solve a problem they faced. Location is Kerr High School, 8150 Howell Sugar Land Rd. This is east of Highway 6 on Beechnut. You can reach out to Bob Fulbright, District STEM Facilitator, for details. Robert.fulbright@aliefisd.net

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.



Virtual HGS Event Sponsorship

Promote your business at a virtual meeting. Along with the opportunity to reach a global audience, HGS will promote your business on the event page, on our social media, and at the technical talk.



GeoJobs

The HGS GeoJobs section provides a variety of employment information to interested HGS members and the geological and geophysical community at large. If your business has an employment opportunity, let us help you fill the position!

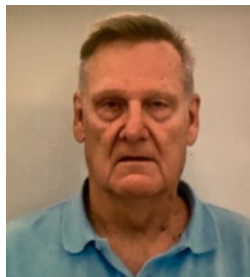


HGS Weekly Newsletter

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.





Some of you may be surprised to see a photo of a waterfall in Iceland on the cover of the HGS Bulletin. Last month I put an iceberg on the cover. My purpose was and is twofold. One I like these pictures and the HGS is a geological society that should cover many aspects of the science. My second purpose, since this societies membership is

overwhelmingly made up of people who work directly or indirectly in the hydrocarbon business is to talk about energy.

At our September dinner meeting, (the first in-person meeting in two years) Art Berman gave an interesting and, in my opinion, somewhat controversial talk about the future of energy and its effect on the world economy. (There is a brief report on his talk later in the Bulletin by Linda Sternbach.) Our world runs on energy and the availability of energy at a reasonable cost has directed the world's economies and to a great sense civilization. I think Iceland provides an interesting side note to the conversation.

According to the official Iceland Ministry of Environment: "About 85% of the total primary energy supply in Iceland is derived from domestically produced renewable energy sources. This is the highest share of renewable energy in any national total energy budget. In 2016 geothermal energy provided about 65% of primary energy, the share of hydropower was 20%, and the share of fossil fuels (mainly oil products for the transport sector) was 15%". The transportation sector is cars and trucks but more importantly the fishing fleet.

Operating an aluminum smelter in **Iceland** is over one-third cheaper than the global average, which is roughly US\$10/MWh above the average price paid by smelters on the island. The industry has taken full advantage of this fact, as the three aluminum smelters on the island consume over seventy percent of the electricity produced each year.

This is great for Iceland but not helpful for the rest of us. Few of us have rivers like the one pictured on the cover to provide cheap hydroelectric power. Even less of us have mantle plumes below us to provide the heat source for geothermal energy. So, most of us have transitioned from sources like wood, peat and whale oil to coal, oil and natural gas. While not 'clean' they are cleaner than the first three for the amount of energy provided and also provide the feed stock for many of the luxuries and necessities we have today.

A couple of sidelights. When the first people started to permanently inhabit Iceland approximately 1,000 years ago most of the non-glaciated terrain was covered by forest. Over the centuries much of this forest disappeared used mainly for heating homes and cooking. Now there is very little forest left despite a strong campaign to replace the trees. These trees are so slow growing and stunted that the common joke in Iceland is: if you find yourself lost in a forest in Iceland what do you do? The answer is stand up.

If you travel to Iceland, you will see very few electric cars or trucks. The electricity is very cheap but few can afford the cars. As for boats, the batteries would cost more than the boat and probably sink the smaller ones.

We live in a world where very few understand energy. True story. On a cruise ship recently, a passenger asked a member of the crew where they get the electricity to power all the lights? The straight-faced answer was "we have a very long extension cord". He was not about to get into the volume of bunker fuel they consume. Similarly, a driver of a Tesla was asked where the electricity comes from to power his car and he answered "from the wall". He lived in a state where virtually all the electricity is generated with coal. But he thinks by driving an electric car he is saving the environment and combatting climate change.

But who can blame them for their ignorance. Our own government wants to kill our industry and blames Big Oil for all of the climate problems from sea level rising to hurricanes to droughts. Even the API sponsors ads that talk about doing their part to "combat climate change". If we lost the API we are in trouble. I hope they actually know better but should someone remind them that while we humans may have a small, hopefully temporary, effect on climate, the real causes are out of our control.

2.8 MMYBP Central America rose out of the sea. As a result of this event, the intra-ocean warm water circulation between the Atlantic and Pacific oceans was cut off. This just happens to correspond to the onset of the last ice age in the northern hemisphere. The earth has gone through many warming and cooling cycles since then. In this latest warming cycle or interglacial that began about 24,000 years ago there have been many smaller cooling and warming phases. Is our use of "fossil fuels" having an effect? Yes. Is it outside the "normal" range of the past? No. Do we know enough to confidently predict the long term results of our influence? I don't think so. It's good to have a few alarmists out there to cause us to better protect our planet. But we also need to balance the good fossil fuels do for us with the possible harm.

Ken Thies, HGS Editor 2022-2023
kenthies.kt@gmail.com



Are you a photographer who would be willing to donate your services for the Houston Geological Society?

HGS is in need of a photographer to capture the candid moments at some of our monthly and annual events such as General meetings, social events, and our annual conferences! If you or someone you know would be interested, please contact the HGS Office at office@hgs.org.

LETTERS

to the Editor

To be considered for publication, please submit your "Letter to the Editor" to Ken Thies at kenthies.kt@gmail.com. Please keep letters brief. The Editor reserves the right to decline submissions.

"CONGRESSIONAL TESTIMONY BY MICHAEL SHELLENBERGER: AN IMPROBABLY ADVOCATE FOR THE OIL INDUSTRY AND ATOMIC POWER"

"Climate change is real and we should seek to reduce carbon emissions. A far more immediate and dangerous threat is insufficient energy supplies due to U.S. government policies and actions aimed at reducing oil and gas production."

- Michael Shellenberger, Founder and President of Environmental Progress, 9/15/2022



Mr. Shellenberger gave expert Testimony to the House Committee on Oversight and Reform on September 15, 2022.

Michael Shellenberger is known as the "father of the Green New Deal." In the early 2000s, he advocated for an environmental "Project Apollo." His vision was for environmentalist and labor unions to work together to completely rebuild America's utility infrastructure using green technology. In 2008, Time Magazine ennobled Mr. Shellenberger with the title "Hero of the Environment." President Obama embraced Mr. Shellenberger's vision on the campaign trail, and later committed \$150 billion to Shellenberger's green energy ideas.

But Mr. Shellenberger has since published *Apocalypse Never*. The book is a well-reasoned indictment of the impracticality of trying to replace the US power grid with wind and solar. The book lucidly reasons wind and solar are "destroying the planet to save the climate." He thoughtfully reasons that nuclear power is the ultimate solution to carbon emissions. But he also argues that we need abundant natural gas and oil today to reduce human suffering and to stop energy poverty.



Mr. Shellenberger has also produced a TED Talk on YouTube on "Why renewables can't save the plant."

Below is part of Mr. Shellenberger's Testimony to the House Committee on Oversight and Reform:

Good morning
Chairwoman Maloney,
Environment
Subcommittee Chairman
Khanna, and Ranking

Member Comer, and members of the Committee. I am grateful to you for inviting my testimony.

I am deeply troubled by the way concern over climate change is being used to repress domestic energy production. The U.S. is failing to produce sufficient quantities of natural gas and oil for ourselves and our allies. The result is the worst energy crisis in 50 years, continuing inflation, and harm to workers and consumers in the U.S. and the Western world. Energy shortages are already resulting in rising social disorder and the toppling of governments, and they are about to get much worse.

We should do more to address climate change but in a framework that prioritizes energy abundance, reliability, and security. Climate change is real and we should seek to reduce carbon emissions. But it's also the case that U.S. carbon emissions declined 22% between 2005 and 2020, global emissions were flat over the last decade, and weather-related disasters have declined since the beginning of this century. There is no scientific scenario for mass death from climate change. A far more immediate and dangerous threat is insufficient energy supplies due to U.S. government policies and actions aimed at reducing oil and gas production.

For Mr. Shellenberger's entire congressional testimony, use this link:

<https://static1.squarespace.com/static/56a45d683b0be33df885def6/t/63232baabbb3e951df7e15ba/1663249322435/Michael+Shellenberger+Testimony+to+the+House+Committee+on+Oversight+%26+Reform-2.pdf>

by William DeMis
HGS Director 2022-2024



GOLF TOURNAMENT

Register Now

Entry deadline Oct. 14
www.hgs.org

***Monday,
October 17, 2022***

**Early Bird Special
through Oct 8**

One Golfer \$150
Four Some \$600

HGS ANNUAL GOLF TOURNAMENT

17 OCTOBER 2022 | STERLING COUNTRY CLUB



TEAM APPLICATION

Entry deadline: October 14, 2022

Come join us for golf, food, friends, and fun at the annual HGS Golf Tournament at Sterling Country Club and Houston National Golf Club (www.sccathn.com). There will be prizes awarded for closest to the pin and long drive, putting games before we start, as well as many great door prizes for participants.

Entry Fee: \$175.00/Golfer or \$700.00/Team.

Early Bird Special (Through October 8th): \$150.00/golfer or \$600.00/team

Entry Deadline: October 14th.

Individual entries will be grouped with other individual golfers to make a foursome. Entries are limited to and will be accepted on a first-in basis.

Schedule of Events

8:00am - 9:45am Registration, free use of driving range and mini games

(Breakfast will be provided by Core Lab and Petro Log International, Inc.)

10:00am Shotgun start

3:00pm Cash bar, open buffet

3:30pm Door prizes and awards presentation

Companies or individuals interested in sponsoring the event should contact the HGS Office at office@hgs.org or 713-463-9476. If paying by check, please make check payable to HGS or Houston Geological Society. Sponsorship deadline is October 8th.

Team Captain: _____ Phone: _____ Amount Enclosed: _____

Company: _____ Email: _____

Card Number: _____ Exp. Date: _____ CVC: _____

Billing Address: _____

Phone: _____ Email: _____

Card Number: _____ Expiration Date: _____ CVC: _____

Foursome Members

Company

Phone

Email

1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Please print Please provide email addresses for ALL team members, as all communications will be done via email.

Britain Lifts Ban on Fracking

BY WILLIAM DEMIS, HGS DIRECTOR 2022-2024

Britain announced on September 22 that it was lifting its ban on fracking. Prime Minister Liz Truss said that her administration would support fracking where it is supported by the community. Business and Energy Secretary, Jacob Rees-Mogg said the country needs to increase domestic production of natural gas, and all forms of energy. The UK has been suffering crushing natural gas prices well before the war in Ukraine (Figure 1).

Fracking had been banned in 2019 after industry regulators said it was not possible to predict the magnitude of earthquakes the process might trigger. A report by the British Geological Survey said it "remains challenging" to estimate the seismic impact that fracking might have because little fracking has been done in Britain.

A tremor attributed to fracking took place in Blackpool, northern England, in 2011. The quake registered a magnitude of 2.3 on the Richter Scale. After this, the government implemented a "traffic-light system" that suspended well operations when tremors exceeded 0.5. The BGS said that the threshold was the most conservative for any region where fracking is conducted, and noted some US states where fracking is conducted have a magnitude 4 threshold. Secretary Rees-Mogg pointed out that the limits on ground movement for the construction industry are double those for the fracking industry in England.

This article is summarized from Reuters and data from Statista.com



Figure 1. Price of natural gas in British pence per therm. Data from statista.com. Prices in the UK were up 4- to 5-fold before the Ukraine war.

HGS September Dinner Meeting

BY LINDA STERNBACH



The HGS started our in-person Dinner Meetings in September with a talk by Art Berman titled: “The Real Energy Paradigm.” The meeting was held at the Norris Conference Center in West Houston to a crowd of more than 65 people. The HGS did not host in person meetings in 2021 or 2022, opting instead for zoom meetings with sporadic attendance. President Walter Light, Jr. welcomed the attendees and noted that many present and past HGS presidents and board members were in attendance. He also told the crowd that he believes that in-person meetings are critical to networking and re-invigorating the HGS as a society and that the response to this meeting was encouraging.

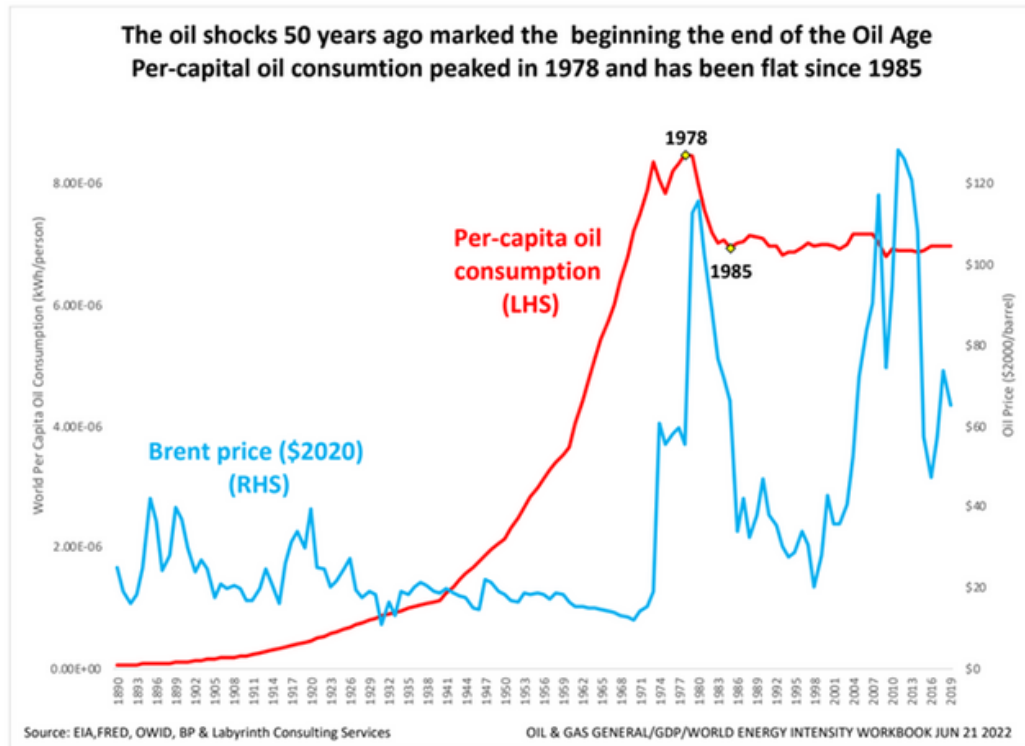
Mr. Berman made several key points on oil prices, oil supply and overall energy consumption. Hisdata pointed out that oil use began to decline as a portion of total world energy consumption after 1977. Berman indicated that “This was the beginning of the end of the oil age. Per-capita oil consumption has been flat since 1985 on a per capita basis. (See chart below). He surmised that the oil age has been ending for 50 years but there is no substitute for oil on the horizon. Wind, solar and nuclear only address electric power generation which likely accounts for only 18% of world energy consumption and does not address the feed stock issues that we count upon. (See chart below). Art focuses on peak oil or “cheap oil” but suggests that other energy sources cannot supply the energy demands for the world.

But then Art sees a bright future for geoscientists to continue to find and develop- new sources of oil and gas but with rapid changes in technology. ‘We won’t be sitting and making maps in the future.’ But rather finding what oil remains with better technology and higher prices. He projected that with higher relative prices living standards will fall and mass immigration and civil unrest will probably increase.

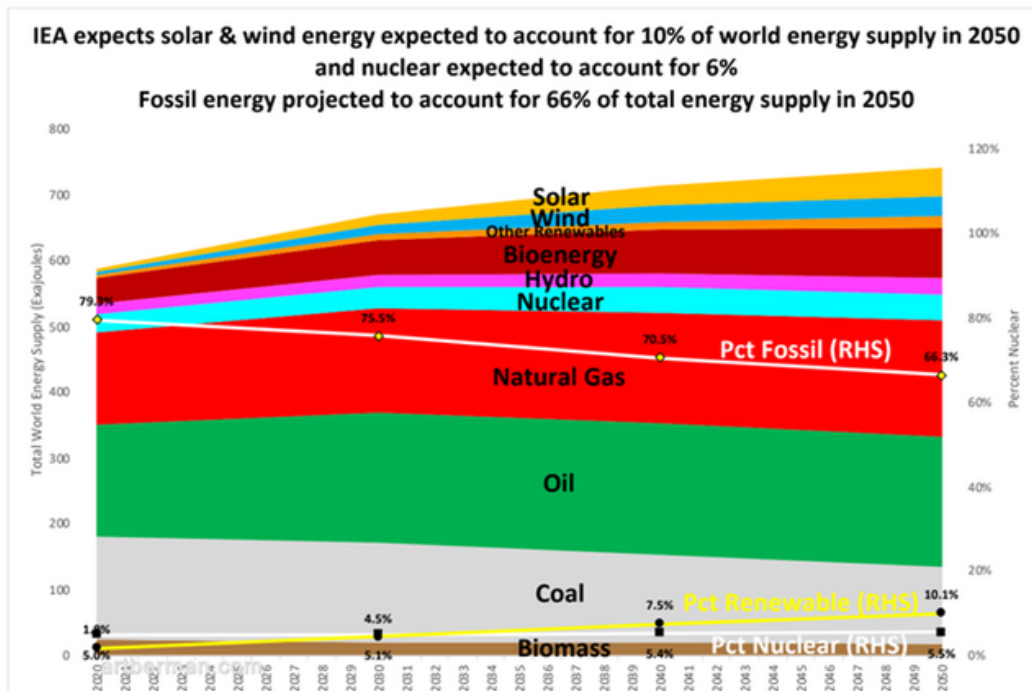


HGS September Dinner Meeting...continued

Per-capita oil consumption peaked after the oil shocks



Renewables Cannot Substitute for Fossil Energy



HGS ENVIRONMENTAL & ENGINEERING MEETING

WEDNESDAY, OCTOBER 12, 2022 | 5:30 - 9:00PM

CRAFT REPUBLIC HOUSTON

11470 WESTHEIMER RD, HOUSTON TX 77077

HGS MEMBERS \$35 NON-MEMBERS \$40 EMERITUS/HON. LIFE \$18 STUDENTS \$12 WALKUPS \$40

[HTTPS://WWW.HGS.ORG/CIVICRM/EVENT/INFO?ID=2412](https://www.hgs.org/civicism/event/info?id=2412)

EVENT CONTACT: MATTHEW COWAN | MRCOWAN1@HAL-PC.ORG



Construction Dewatering 101

Dewatering means “the removal of water from soil” or “taking the water out of the particular construction problem completely.” In other words, we are discussing the pre-drainage of soils and/or groundwater control at construction sites. Construction sites can range in size and complexity from a simple man-hole replacement on a sewer line to a multi-block urban development project. Additionally, dewatering may be required at environmental remediation sites including coal ash (CCR) and manufactured gas plant (MGP) remediation. This presentation will cover the following topics:

- What is dewatering and why is it needed for construction activities
- Site/project specific data required to develop a dewatering plan
- Drawdown, cone of influence and hydraulic conductivity basics
- Types of dewatering systems
- Drilling equipment
- Water treatment
- Case studies options include
 - Coal ash dewatering
 - Basic construction dewatering
 - Levees and dams
 - Water treatment

The data presented will be useful for both seasoned and relatively new construction professionals. This program is an informal format and attendees will be encouraged to engage in the discussion.

Biographical Sketch



David Bardsley, PG has over thirty-eight years of geotechnical, water supply and environmental drilling experience working in a variety of settings across the United States. He started his career as a drill rig helper advancing through various technical and managerial positions in

both small and large drilling companies. He was an early leader in the use of horizontal directional drilling and well installation methods to solve environmental and water supply challenges. Mr. Bardsley has recently transitioned back into the traditional vertical drilling and well installation market with Griffin Dewatering. Mr. Bardsley has a B.S. in Geology & Geophysics along with a Communications Minor (1984) from the University of Missouri-Rolla. He is a licensed well driller in Texas, Arizona and Louisiana and holds RG/PG certifications in TX, MO, LA, and TN.



HGS GENERAL DINNER MEETING



TUESDAY, OCTOBER 25, 2022 | 5:30 - 9:00PM
NORRIS CONFERENCE CENTER, CITYCENTRE
816 TOWN AND COUNTRY BLVD #210 HOUSTON, TX 77024
HGS MEMBERS \$65 NON-MEMBERS \$75 STUDENTS \$25 WALKUPS \$75
[HTTPS://WWW.HGS.ORG/CIVICISM/EVENT/INFO?ID=2432](https://www.hgs.org/civicism/event/info?id=2432)
EVENT CONTACT: SCOTT SECHRIST | PENNTEXAS53@YAHOO.COM

Workflow for Determining Relative Permeability Behavior in Low Permeability Media Using MICP Drainage-Imbibition Measurements (Determining Rel Perm within the Permian Delaware 3rd Bone Spring Sand and Wolfcamp formations)

We introduce an analytical workflow for determining relative permeability behavior of two-phase matrix flow within low permeability samples using mercury injection capillary pressure (MICP) drainage-imbibition measurements. Low permeability samples often experience wettability alterations during core cleaning and require extensive time to reach equilibrium conditions, which challenges traditional core flood measurements using reservoir fluids.

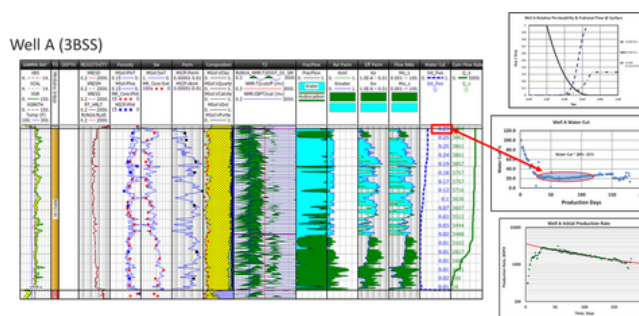
Mercury is advantageous as it effectively describes the non-wetting phase connectivity and trapping behavior defined by the pore geometry, regardless of wettability alterations. Sample compressibility occurring during measurement is used to quantify stress sensitivities and the subsequent reduction in porosity and permeability so that extracted values can be representative of reservoir stressed conditions. The MICP drainage-imbibition measurements utilize the compressibility, capillary pressure, and pore geometry concepts to provide Corey power-law wetting and non-wetting phase exponents (nw, nnw) and residual saturation (S_w , S_{nw}) values. The relatively short measurement time allows for high frequency sampling within intervals of interest to determine relative permeability behavior at appropriate vertical resolution. Data was acquired on samples from produced intervals within the 3rd Bone Spring Sand and Wolfcamp formations across four Delaware Basin wells. These producing wells observed water cuts ranging from 25% to 82%. Core measurement data are applied via petrophysical framework and engineering equations of state (EOS) to model fractional flow at surface for comparison to observed production. The core-calibrated fractional flow models closely match produced water volumes, demonstrating that this methodology can be applied with predictive capabilities. The free fluid saturation ($1-S_{or}-S_{wir}$) described by the relative permeability curves indicate only a small fraction of the total porosity is capable of two-phase flow, which suggests that relatively small saturation changes can result in drastic changes in fluid phase mobility. This is reflected in the very steep slope of the fractional flow at surface curve as a function of water saturation.

Biographical Sketch



James Greene is manager for the PoroLab business unit at NuTech Energy Alliance. He received dual B.S. in geology and petroleum engineering from Louisiana State University in 2014 and 2015. James was formerly a technical advisor for core analysis services at ALS Oil & Gas

Laboratories. His experience also includes facility management, production, and development responsibilities for domestic onshore and international offshore assignments at Noble Energy and Wapiti Energy.



Needing more luck with your sales efforts? Promote your business as a Vendor Corner at an HGS meeting!

Make direct contact with interested geoscience buyers without being lost in an ocean of exhibitors. The money that is raised through Vendor Corner helps the HGS support continuing education, networking, outreach to students, student scholarships, and young professional activities. [Click here to read more!](#)

HGS CONTINUING EDUCATION SHORT COURSE

FRIDAY, NOVEMBER 11, 2022

CORELAB, BUILDING 2 | 6316 WINDFERN RD, HOUSTON, TX

8:00AM - 5:00PM

HGS MEMBERS \$200 NON-MEMBERS \$350 STUDENTS/EMERITUS/IN-TRANSITION \$150

[HTTPS://WWW.HGS.ORG/CIVICRM/EVENT/INFO?ID=2428](https://www.hgs.org/civicism/event/info?id=2428)

8 PROFESSIONAL DEVELOPMENT CREDIT HOURS OFFERED



Discovery Thinking: By-Passed Pays and Plays in Conventional Reservoirs

Registration includes: course notes, continental breakfast, lunch and beverages, 8 hours PDH certificate (handed out at the end of the event). Attendees should bring a calculator, ruler, and a few colored pencils for exercises done by hand.

Course Description

This class promotes discovery thinking using case histories and hands-on exercises to find by-passed pay in real-life “dry holes.” The class presents ten case histories of missed pay and a dozen in-class exercises. The exercises require the synthesis of various data to find the pay, including well logs, DSTs, thin sections, cores, mud logs, thin beds, shaly sand, and offset analogues.

The class will review well log analysis and the Archie equation. It will briefly touch on shaly sand and carbonate well log analysis, with exercises on shaly sands and carbonates. But the primary focus of the class is learning how to find by-passed pays by the synthesis of data besides the well logs.

Participants looking for “the secret formula” for a perfect well log analysis without collecting other data will be disappointed by the class. They should not attend. Participants who want to expand their toolkit of eclectic discovery thinking, and geoscientists with little experience in conventional reservoirs, will benefit the most from the class.

Testimonial from a former student

“Mr. DeMis’ By-Passed Pays and Plays class is a must-attend event for engineers or geoscientists working on mature assets. This class will provide you with tools, knowledge and insight to discover missed potential in brown fields.”

- Carlos Bahamon, Geological Advisor, Oxy, Houston, Texas

Biographical Sketch



William DeMis currently is president of Rochelle Court, LLC, a consulting company. He is currently working with two startup companies: one in the US and one in Europe. He has held positions of Exploration Manager at Marathon Oil Company, Exploration Vice President at

Roxanna Oil Company, and Senior Vice President at Goldman Sachs.

Mr. DeMis have been a member of teams that have found over 600 BCFG and 45 MMBO of bypassed pay. For his role in finding bypassed pay, Bill was appointed Project Champion for a company-wide Strategic Initiative on bypassed pay at Marathon Oil Company.

Mr. DeMis has been awarded the dedicated Service Award from the West Texas Geological Society and the AAPG. Mr. DeMis has been awarded the Best Paper Award from the RMAG and GCAGS. In 1996 and 2000, Bill was awarded Best Paper Awards at AAPG National Conventions for his talks on the effects of US dollar exchange rate changes and inflation on OPEC price policy.

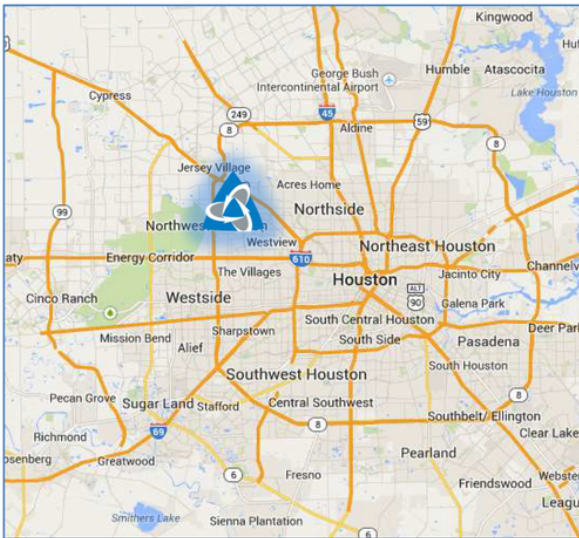
8 PROFESSIONAL DEVELOPMENT CREDIT HOURS OFFERED



Directions to Core Lab

6323 Windfern Rd. Houston, TX 77040

Core Viewing Hours: 8am – 5pm (Weekdays)



Traveling west on Hwy 290: Exit N. Gessner. U-turn at the intersection and proceed east on the eastbound Hwy 290 feeder. Turn right onto Windfern, just past Gessner.

Or

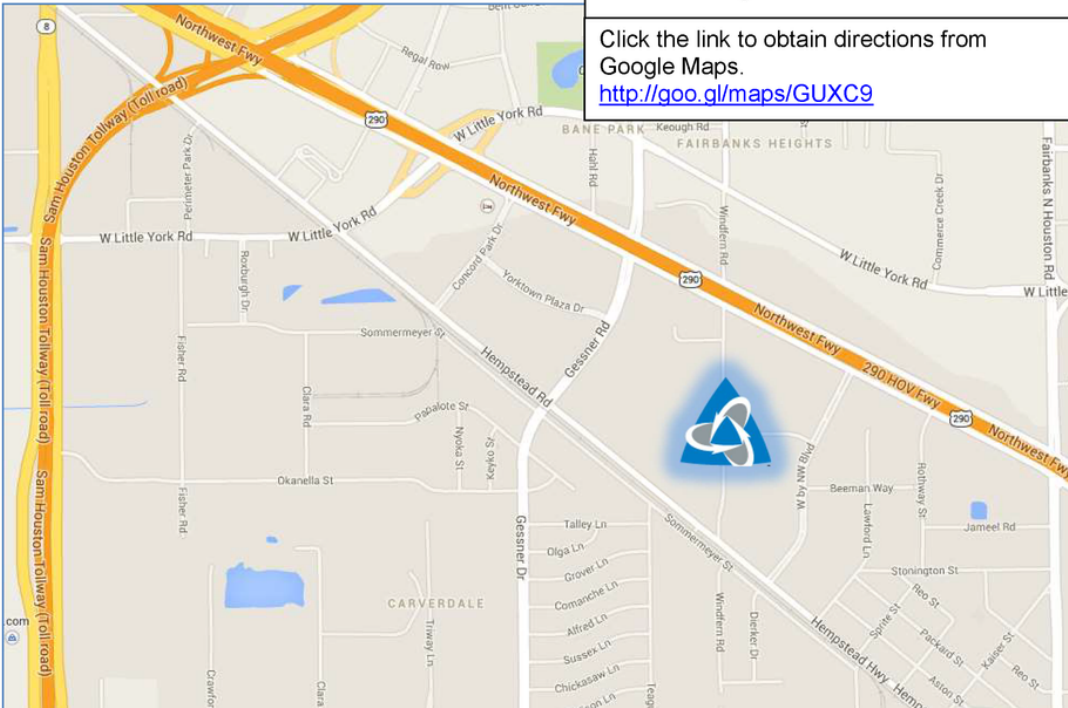
**Traveling north on W. Sam Houston Toll
way from I-10: Exit West Little York.**

Proceed north on the feeder road to Hwy 290. Turn right on the Hwy 290 feeder. Proceed east on the feeder through the Gessner Intersection. Turn right onto Windfern.

Or

Traveling west on the N. Sam Houston Parkway from I-45 or IAH

Airport: Exit West Road / Philippine Road. Turn left on Philippine Road and proceed to Gessner. Turn right on Gessner to Hwy 290 intersection. Turn left onto the Hwy 290 feeder then right onto Windfern.



Click the link to obtain directions from Google Maps.

<http://goo.gl/maps/GUXC9>

HGS CONTINUING EDUCATION SHORT COURSE

FRIDAY, NOVEMBER 11, 2022

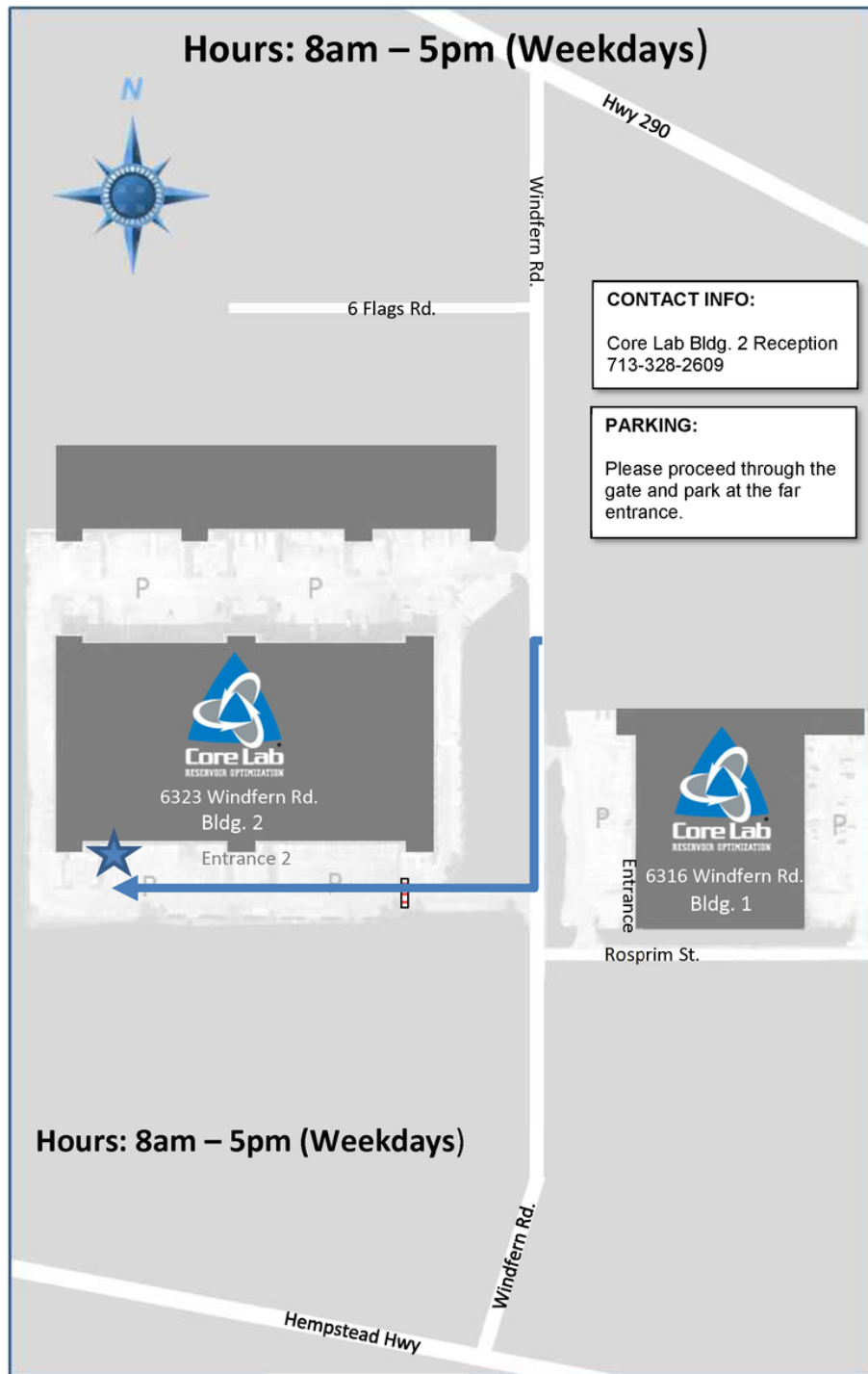
CORELAB, BUILDING 2 | 6316 WINDFERN RD, HOUSTON, TX

8:00AM - 5:00PM

HGS MEMBERS \$200 NON-MEMBERS \$350 STUDENTS/EMERITUS/IN-TRANSITION \$150

[HTTPS://WWW.HGS.ORG/CIVICRM/EVENT/INFO?ID=2428](https://www.hgs.org/civicism/event/info?id=2428)

8 PROFESSIONAL DEVELOPMENT CREDIT HOURS OFFERED



HGS Educational Outreach Committee

BY STEVE JOHANSEN, EDUCATIONAL OUTREACH COMMITTEE CHAIR



Members of the Educational Outreach Committee & volunteers sort mineral & fossil samples at the HGS Office.

Members of the HGS Educational Outreach Committee and friends met on a recent Saturday to sort a large collection of minerals and fossils donated by the family of Julie D'Ablain.

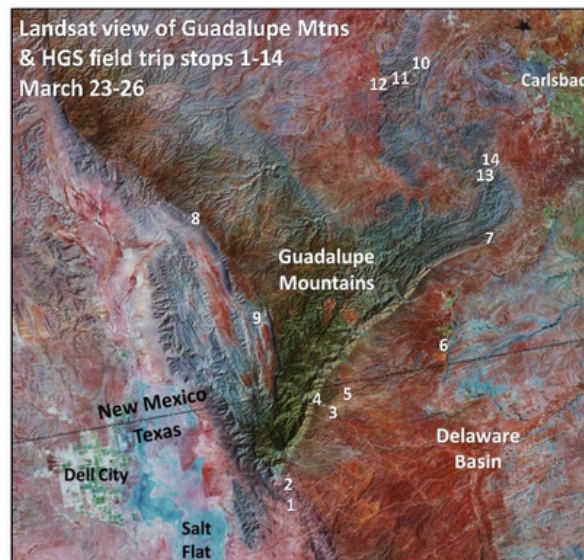
The collection was assembled by Ms. D'Ablain's father. Most materials are from the UK, but the collection has samples from every continent except Antarctica. The D'Ablain family donated it to HGS for educational outreach events in grades K - 12 classrooms, scout troops, and STEM festivals. Over 60 samples were set aside for immediate inclusion in our public education events, and another four samples will be used by HGS for speaker honoraria.

We still have several hundred fossils and minerals, many of which would best serve HGS if they were sold. We need help in assessing their value. If you have a good sense of the market value of mineral specimens, please join in the fun!

We wish to hold a joint work session with members of the Houston Gem and Mineral Society to fairly price the hundreds of remaining specimens, and to find public venues to sell them. Please contact chairman Steve Johansen (geosjjohansen@gmail.com) if you wish to assist!



HGS GUADALUPE MOUNTAIN AND DELAWARE BASIN FIELD TRIP



When: March 23- 26, 2023

Where: Starts/ends in Midland, TX & base camp is Carlsbad, New Mexico

Itinerary: Carbonates Galore - Debris flows, turbidites, shelf margins, basin floor deposition, and sponge-algal reef as presented by Dr. Robert Lindsay who has led dozens of field trips in this area in the past. Finish with your own cross section of the area.

Cost: \$1,200 (approximately) includes local transportation to and from Midland airport, van transportation to the various geologic stops, van snacks & water, guidebook, welcome dinner, daily lunches, 3 nights lodging. Cost does not include airfare from home to midland and back.

Please contact the HGS Office (713-463-9476) to reserve a spot early (limited to 30 people). More details to follow at a later date.

Drawing Middle Permian lithofacies onto 38 mile cross section – Guadalupe Mtns into Delaware Basin



Guadalupe Mountains: View of El Capitan with Guadalupe Peak, highest peak in Texas, in the background





October 2022

<i>Sunday</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>
2	3	4	5
9 <i>Earth Science Week</i>	10	11 <i>HGS Board Meeting</i> 6 p.m.	12 <i>HGS E&E Meeting</i> "Construction Dewatering 101" Page 15
16	17 <i>HGS Golf Tournament</i> Page 10	18	19
23	24	25 <i>HGS General Dinner</i> "Workflow for Determining Relative Permeability" Page 16	26
30	31		



October 2022

<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>	
		1 	<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.</p> <p>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 HGS Office at office@hgs.org. Once the meals are ordered and name tags and lists are prepared, no more reservations can be added even if they are sent. No-shows will still be billed.</p> <p>Pricing</p> <p>In-Person Meetings HGS Members \$65 Non-Members/Walk-Ups \$75 Students \$25</p> <p>Virtual Meetings HGS Members \$15 Non-Members \$30 Students \$10</p>
6	7	8 	
13	14	15	
20	21	22	
27	28	29	



VENDOR CORNER

Advertise your services at an HGS meeting

READ MORE
www.hgs.org

CALL FOR PAPERS



Be There!

APRIL 23-25, 2023
NORRIS CONFERENCE CENTER

**SUBMIT A TALK OR POSTER ABSTRACT
DEADLINE: DECEMBER 15, 2022**



www.geogulf2023.org

**72nd Annual Meeting
of the Gulf Coast Association
of Geological Societies
(GCAGS)**

Unsupervised AI workflow to evaluate the transition of a 50-year giant gas field quickly and thoroughly to potential multiple CO₂ storage and geothermal viable projects

AS PRESENTED BY BERNARD P. LAUGIER (SEISNETICS) AT THE 2022 HGS-PESGB AFRICA CONFERENCE

Introduction

Seismic data remain a pillar of subsurface modeling and the understanding of the potential for transitioning from oil and gas production to applications such as CO₂ storage and geothermal projects. However, interpretation is a biased and time-consuming process forcing geoscientists to spend more energy picking horizons and building models than interpreting the significance of the results and their implications for ultimate field development, CO₂ storage and geothermal project evaluation.

In this paper, we detail the use of a new unsupervised Artificial Intelligence based on genetic algorithm to automatically process the seismic data in an unbiased way and record time.

After 12 minutes of AI processing, we could display all horizons on the seismic and visualize multiple attributes for all subsurface layers and start building all necessary geological model to localize CO₂ storage areas within the Rotliegend reservoir and evaluate geothermal projects from multiple systems.

The Groningen field is in Netherlands and is one of the world largest gas fields. Since discovery in 1959, it was recovered more than 100 TCF of gas.

Since the 1920's, geoscientists have acquired several million square kilometers of 3D seismic data onshore and offshore looking for hydrocarbon or mineral deposits. The information extracted from the seismic data often constitutes the base of subsurface models which are used to make decisions for further exploration, appraisal, and development activities.

The challenge? The time available for features extraction, analysis and interpretation remain limited, and very often the geoscientists spend more time picking horizons and building models than analyzing the significance of results. In this paper, we will describe a new approach using an Artificial Intelligence (AI) based on genetic algorithm (GA) to automatically extract information from the 3D seismic data in an unbiased manner and in record time.

After more than half a century of production and with some 350 wells, the challenges for managing the risks associated with recovery of the remaining gas, CO₂ storage areas and geothermal systems will continue to require an increasingly detailed knowledge and understanding of its geology.

The Groningen geology provide a unique opportunity to have a giant mature gas field that could transitioned to a CO₂ storage area within the Rotliegend sandstones reservoirs and Zechstein salt. Additionally, the structural history contributes to create an unusually high thermal maturity in the Carboniferous rocks directly below the Base Permian Unconformity (Dinantian) that could be exploited within geothermal projects. (Figure 1 and 2). The main reservoir is the Upper Permian Rotliegend sediments deposited in a very broad basin stretching from the UK in the west to Poland in the east (Figure 3).

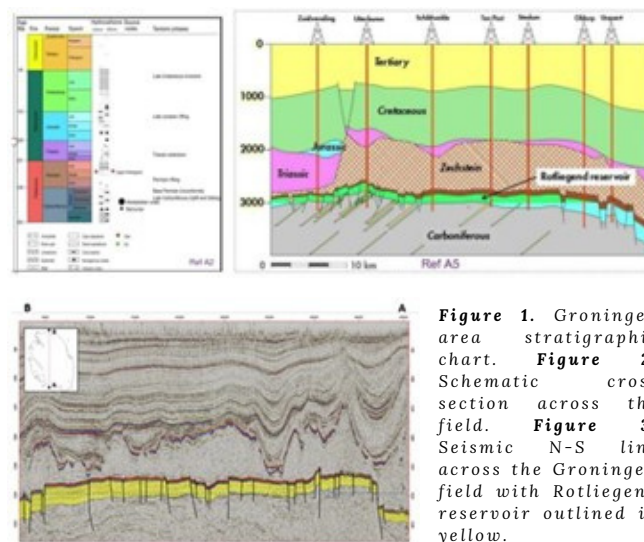


Figure 1. Groningen area stratigraphic chart. **Figure 2.** Schematic cross section across the field. **Figure 3.** Seismic N-S line across the Groningen field with Rotliegend reservoir outlined in yellow.

Method and/or Theory

The key initial factor within those energy transition projects will be the understanding and integration of a huge amount of data available after so many years of Gas exploration and production and target a different focus workflow and reasoning with the objectives of CO₂ storage and geothermal evaluation in mind. The traditional seismic data "interpretation" approach which basically refers to human intervention to pick horizons or analyze the seismic images obtained over the years could be an issue with the introduction of bias, the time required to process and analyze the data and finally the lack of accuracy. On the contrary, the AI system described below, is global, fully automatic, and unbiased. The extraction of geological features (e.g., horizons) from seismic data can be seen as a data segmentation problem where the objective is to split the whole into the most coherent parts. Among the many AI algorithms, the genetic algorithm proved to be robust and very well adapted to the seismic data analysis (see Dirstein & Fallon in 2011 for a more detailed description). The application of the GA for the seismic data segmentation can be described as follows:

- An individual is a location in the volume characterized by the neighboring seismic waveform (the chromosome). Each waveform is characterized by its own unique suite of attributes (i.e., location, amplitude value, neighbor trace shape, etc.).
- The population is the set all the individuals as all the locations in the entire seismic volume,
- A sub-population is a group of individuals (a seismic horizon) that have the maximal genetic similarity (maximal waveform similarity).

The purpose of the GA is to mimic the genetic process of biological evolution based on the “survival of the fittest” principle applied to the seismic samples to produce the optimal “sub-populations” i.e., the horizons. The seismic volume is represented as a population of individuals that must be grouped into horizons throughout the process of the biological evolution. Therefore, at every generation:

The selection - only the fittest: individuals and sub-populations that have the highest fitness (seismic similarity) are allowed to evolve. The selection is in favor of cohesion: it tends to bring together those seismic waveforms that constitute the most “balanced” horizons.

The crossover: the selected individuals and sub-populations combine their genetic information to build a new generation. The combination tends to straighten the contribution of some seismic character and therefore to maximize the intra-sub-population similarity and maximize inter-sub-population dissimilarity. The evolution continues throughout the entire volume until all the sub-populations have been identified, characterized, and categorized into a database of horizons ready for analysis and interpretation. (Figure 4).

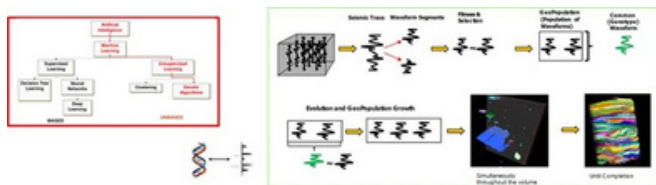


Figure 4. Unsupervised AI workflow based on Genetic algorithm.

Workflow and results

We developed a 7 steps workflow to go through the input database to the technical and economical project viability analysis. The utilization of the AI approach in the front end reduces the time spent clicking and manually interpreting during the first 2 steps, allowing us to have more time focusing on understanding the results and the key geological elements of both specific plays (CO₂ storage and geothermal).

Step 1.

Seismic volumes were downloaded in SEGY format from the online Groningen library and were directly processed without any additional treatment, by the GA in less than 12 minutes for each dataset.

Seis-H pre-interpretation analysis is fully automated and is applied consistently through the all-seismic datasets, thus producing a database of unbiased and high-quality attributes. Seis-H extracts almost every peak and trough surfaces allowing 100% of the seismic data to be examined, meaning previously underexplored and potentially missed features can be analyzed. A total of 3277 horizons have been automatically computed by the AI with different continuities over the seismic volumes. The surfaces, their specific waveform and their associated attribute maps are integrated into an easily accessible visual database through an interactive visualization software. (Figure 5).

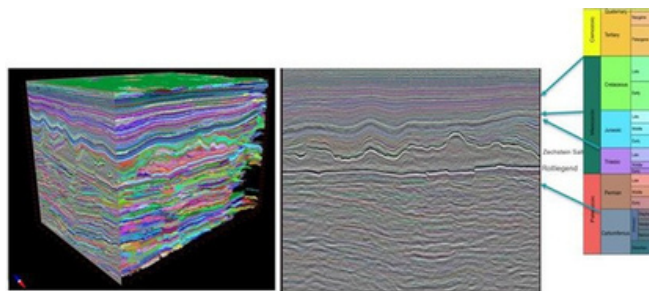


Figure 5. AI processing results -12 minutes run and 3277 geo-populations extracted.

Step 2.

Seis-F the fault extraction application is completely unsupervised and only data driven based on the seismic data and the surface database from Seis-H. Seis-H does not require any questionable learning or the step backwards manual labelling. It extracts almost every fault plane objects from the seismic volume by going beyond detection of simple discontinuities on the seismic image and searching for planar breaks in the geological layers database built with Seis-H. Seis-F extracts first all fault polygons which are defined by its geometry and a throw map. Secondly Seis-F group them into fault planes considering the fault polygons properties, geometries, throw maps and the underlying seismic data. (Figure 6)

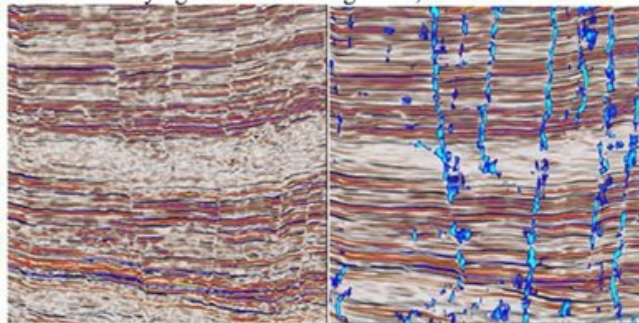


Figure 6. Faults locations resulting from the AI processing Seis-F.

Step 3.

The interactive and query able database of surfaces and faults with their own suite of attributes allows for the rapid screening of the data and bring to light any viable and prospective areas.

Each surface is characterized by their waveform genomes, and we can build seismic facies maps through sub-waveform analysis and identify stratigraphic domain within all datasets including unconformities, stratigraphic trap, seal, and reservoir units. In addition, the fault polygons properties are used to identify structural domain within the datasets. Subtle features both stratigraphic and structural are automatically identify and characterized within the resulting database.

Step 4.

After more than half a century of production and with some 350 wells, the Groningen gas field must be one of the best-studied gas fields in the world. We built this unbiased database of surfaces, fault planes, seismic facies, and stratigraphic/structural domains in less than one day for the complete seismic volumes (Surface to about 12000m). This database allows us to spend our time analyzing the data and integrating the geologic data base including 350 wells, outcrops, production history and previous studies.

The well ties and rock physics model help us to link waveform and attributes for all key surface/faults to essential geological properties and quickly establish their spatial distributions.

Step 5.

The interpretation and integration of all geological / geophysical data provide us the tools to build an extensive portfolio of opportunities with relative ranking based on potential values and uncertainties.

After technical and economical screening of this portfolio, we can identify a large variety of viable prospective area for both CO₂ storage and geothermal projects. (Figure 7).

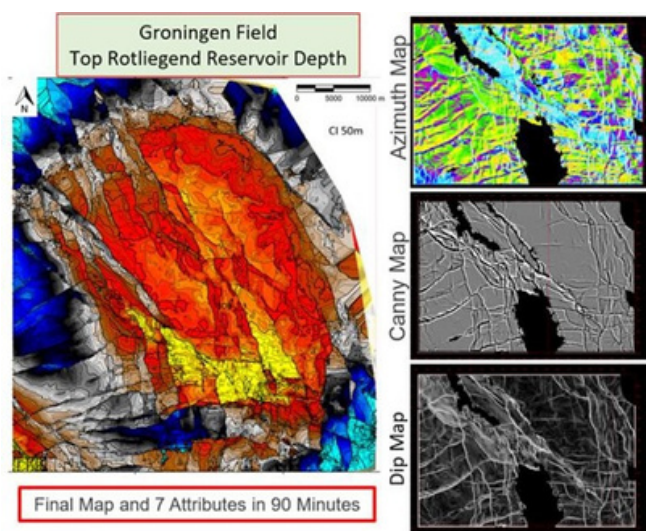


Figure 7. Final Rotliegend reservoir map after 12 minutes AI processing and 90 minutes integration.

Step 6.

For each identified potential areas, we can quickly build the geological model necessary for full evaluation. The key zones surfaces and main faults that will influence the flow are easily selected from our database, cleaned, and integrated in a tight framework. The model is then populated with any sub-zones layers and subtle structural features pertinent to our projects, quickly picked from the Seis-H and Seis-F databases. Lastly, we add the corresponding properties extracted from our extensive attributes database calibrated to wells and outcrops. This all process is done in less than a day as each element were built by our AI approach into a query able database for the entire data volumes.

Step 7.

In this final step we proceed the full technical, reservoir engineering, drilling and economical project and portfolio analysis based on the developed geological and reservoir models. With a fast turnaround to build and eventually recycle those models, we have more time to integrate, interact with the larger team of experts and perform a sounds economical evaluation.

Conclusions

An artificial Intelligence based on genetic algorithm (GA) has been used successfully to automatically compute an extensive horizons/faults/attributes database. After a processing step which lasted less than 12 minutes for each seismic volume, maps with various attributes were displayed for all the layers computed by the AI including amplitude for instance. Main faults planes and subtle features were also extracted and integrated into a database with their own properties and fault throw maps. The genetic algorithm automatically generated a suites of e waveform, attributes and other characterization of surfaces and faults that help build stratigraphic /structural domain and seismic facies maps within the entire Groningen area top to bottom in less than a day. Such an automatic, extremely fast, and unbiased approach can help the geoscientists directly focus their time and attention visualizing and interpreting the significance of the results delivered by the artificial intelligence for various applications, as base for the entire Groningen area undergoing evaluation for CO₂ storage and geothermal projects. (Fig. 8)

References

Jan de Jager & Clemens Visser, 2017, Geology of the Groningen field – an overview: Netherlands Journal of Geosciences – Geologie en Mijnbouw |96 – 5 | s3–s15 | 2017
Dirstein J.K., Fallon G.N., 2011. Automated interpretation of 3D seismic data using genetic algorithms. Preview, 2011:151, 30–37. doi: 10.1071/PVv2011n151p30



Bernard Laugier has over 42 years of Oil & Gas Geoscience experience; he is an expert in integration of multi discipline geoscience approaches with emerging high-end geophysics. He has worked with ExxonMobil for 41 years in exploration, development, and production projects around the world. Recently worked high profile

development in Guyana and pre-salt Brazil. Since retirement, he is involved in the SEG Evolve program as mentor and is participating with several companies in their development programs as senior geoscience consultant. Bernard continues to be at the front end of developing interpretation and management decision workflows integrating the latest machine learning application to high end geophysics. Currently expending his oil and gas experience to geologic CO₂ storage and geothermic projects. Bernard holds an PhD degree from Ecole National de Geologie and geophysics (France), a master in geology from the Ecole des Mines (France) and a master in quantic physics from the University of Paris (France).

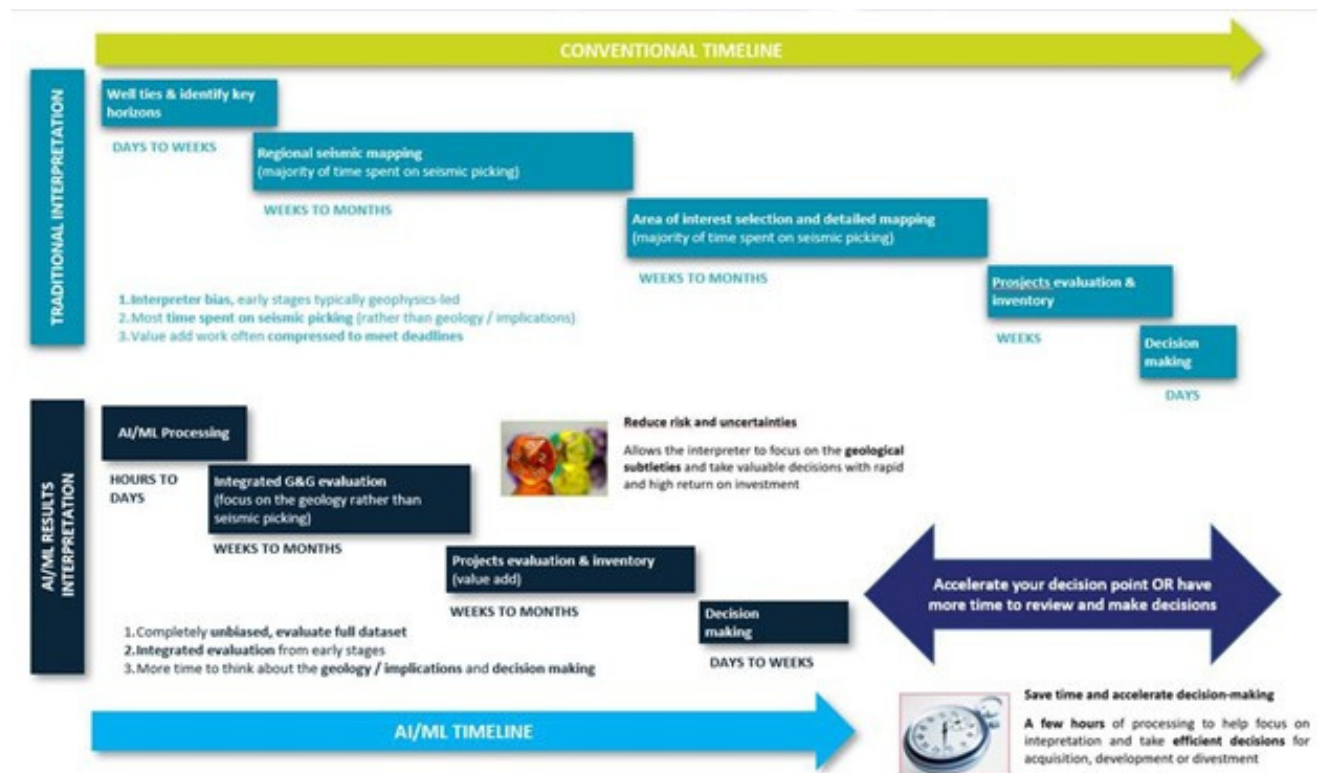


Figure 8. AI workflow effectively and accurately compress seismic interpretation timeline projects.

The oil window in a renowned gas province - new insights regarding source rock maturation in deepwater northern Senegal

AS PRESENTED BY FELICIA WINTER (TGS) AT THE 2022 HGS-PESGB AFRICA CONFERENCE

The margin offshore Senegal is known for a broad shelf in the south, narrowing significantly to the north of Dakar. Recent discoveries have suggested a S-N trend of oil to gas charge in the play fairway. These include oil fields following the shelf edge trend in the south in Sangomar (SNE) and FAN, and several commercial gas discoveries in the basin domain in the north at Tortue, Yakaar and more recently Orca (Figure 1). However, the results of a recent hydrocarbon seep hunting survey that used multibeam and seafloor sampling (MB&SS) suggest that this trend is only part of the story. Interpretation of the MB&SS survey indicates that both hydrocarbon phases are likely to be present for the Cretaceous source rocks throughout the basin (Esestime and Winter, 2022). Further confirmation of an oil play seems to be needed to confidently enter the next phase of exploration.

Modern broadband 3D seismic data in northern Senegal provided more detail for the burial history modelling of the outboard source rock facies, which were recorded by the DSDP borehole 367 in southern Senegal (Figure 2.A). With large parts of the northern Senegal offshore area being held acreage, the new 3D covers open acreage blocks only, but underlying regional 2D depth migrated seismic surveys enable a tie to the discoveries and offer context regarding the depositional environment away from the wells for the prospects mapped on the 3D. Detailed reservoir mapping outboard of Northern Senegal has also identified an untested play over oceanic crust (Figure 2.B). This new play relies on subtle fractures connecting the source rock sequences on top of oceanic flood basalts with the main reservoir sequences in Mid and Late Cretaceous. The new 3D survey imaged fans and structural closures related to the subtle faulting which were mapped and assessed for hydrocarbon migration and charge based on geophysical attributes.

This paper will show how the regional overburden trend affects source rock maturation across the margin. It will further outline the argument for oil maturity further outboard of known discoveries due to thinning overburden and changing thermal conditions for the black shale source rocks deposited on oceanic crust. The source rock facies from two levels (DSDP 367) have been mapped offshore Senegal, and the accompanying regional basin temperature model has now been refined over the modern 3D seismic. Geophysical analysis of the seismic character and relative impedance of broadband 3D seismic supports identification of source rock signatures and possible hydrocarbon charge in several levels throughout the Cretaceous sediments. Hydrocarbon charge and leakage anomalies from seismic attributes can be tied back to the reservoir sequences in the discoveries and provide viable analogues.

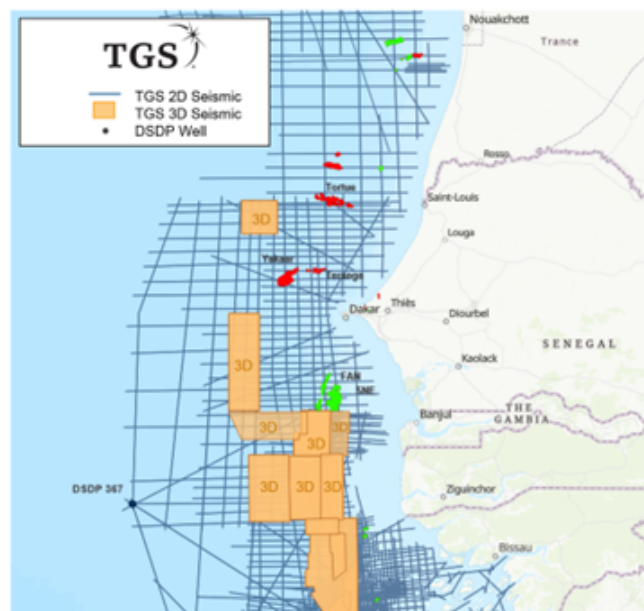


Figure 1. Location map of seismic surveys used for this study: regional 2D seismic offshore Senegal and Mauritania, and deepwater 3D seismic surveys offshore Senegal.



Heading up the exploration advice group for frontier basins in Africa, Mediterranean and Middle East, Felicia's team's core tasks are: demonstrating data quality, showcasing subsurface sweet spots and facilitating strategic positioning of their business unit's data in their Multi-Client Business Unit. Project strategy and survey

planning being her day to day business, the collaboration with their E&P business partners is her top priority. Ad-hoc decision making with significant logistical and financial consequences is second nature since an early career in Arctic Marine Research, managing observer shifts and hand-over protocols for heatflow campaigns, and as part of a seismic acquisition team.

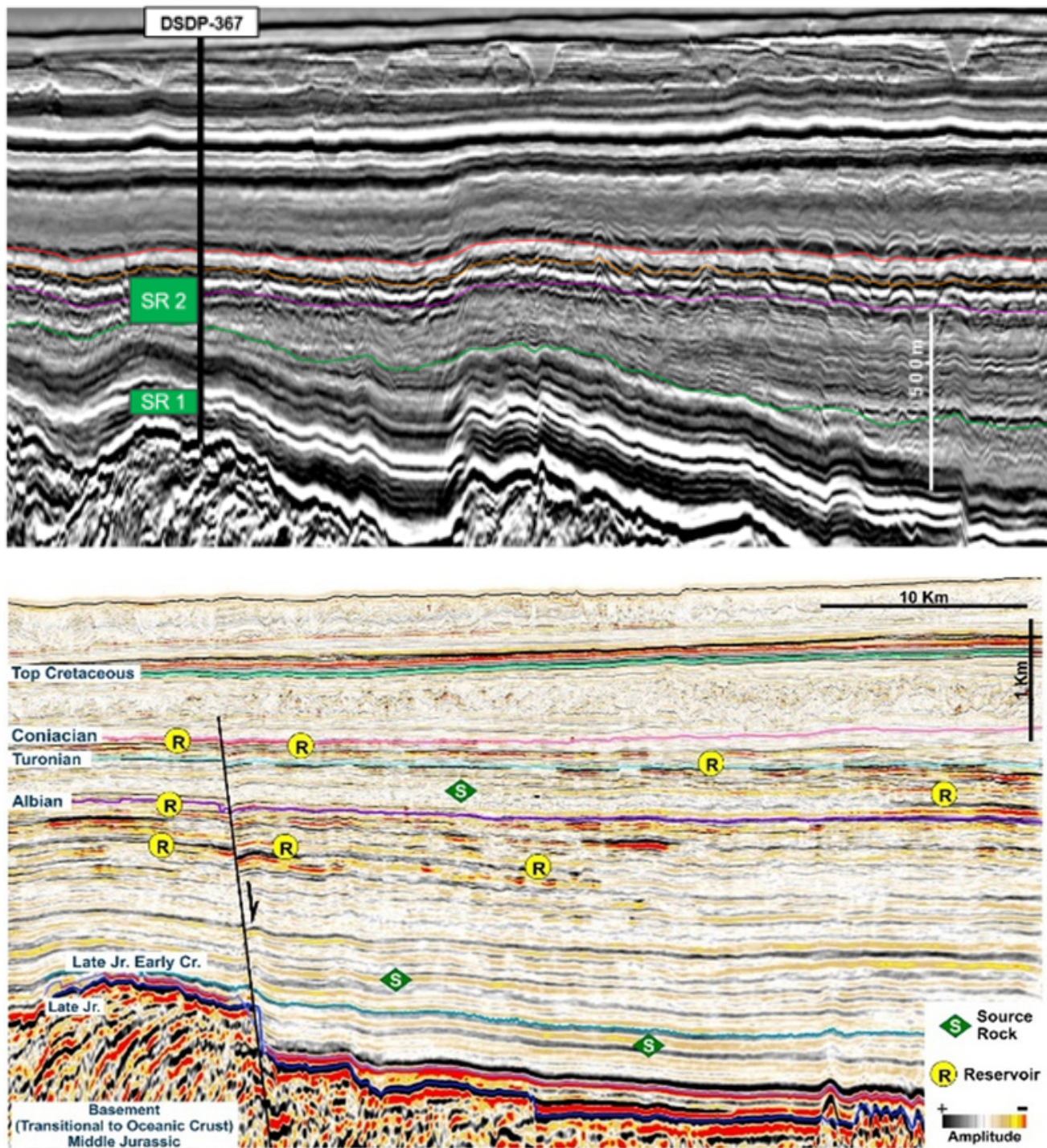
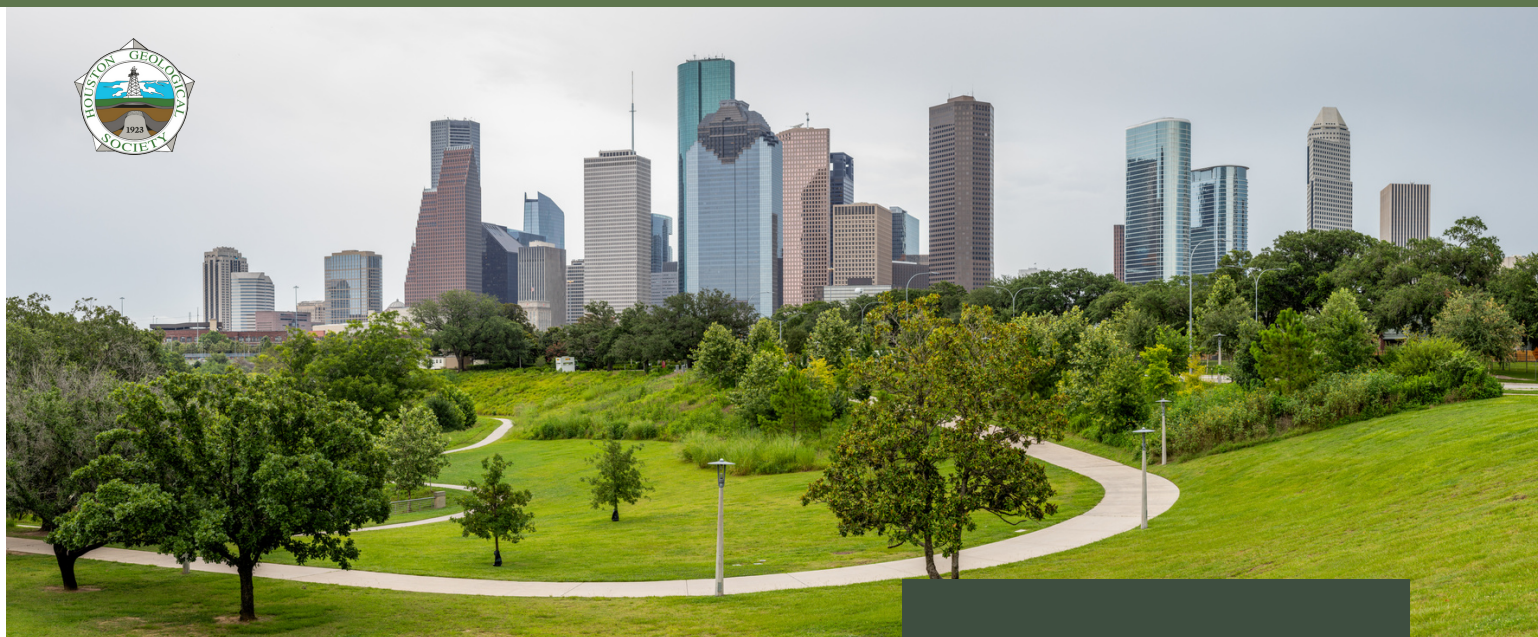


Figure 2. A. DSDP well 367 with source rock (SR) facies interpreted from the cores and tied via regional 2D seismic: SR 1 Neocomian black shales and SR 2 the Apto-Turonian black shales of more than 100m. B. Senegal North deepwater Albian channels and deepwater basin-floor fan identified by amplitude anomalies. With the source rock mapped and basin modelling indicating oil generation in the outboard, subtle faults rising from the basement step such as the SDR in the section play a crucial role for hydrocarbon migration into Albian to Coniacian reservoirs.

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
- Tennis Tournament
- Field Trips



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!



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!

Remembrance

LEONARD CHARLES "CHARLIE" DAVIS
1933-2022



Leonard Charles "Charlie" Davis was born in Alamo, Texas on the 1st of April 1933 to Leonard Cecil Davis and Helen Mary (Martin). God opened his arms to Charlie peacefully, surrounded by family at his home in Missouri City, Texas on the 23rd of September 2022. Our hearts are broken with the loss of a wonderful husband, loving father, strong brother and uncle, doting Papaw, witty (often hilarious) friend and an honest, hardworking man.

Charles, as he was known by family, graduated in 1950 from Tivy H.S. in Kerrville, Texas. He went on to serve 4 years in the U.S. Navy 1951-1955. A wartime veteran of the Korean War, Charlie returned from the Philippines aboard the USS Midway, which he was able to step foot on again just 9 years ago. After service to our great country, his college education began at Schreiner College in Kerrville. After 2 years, he transferred

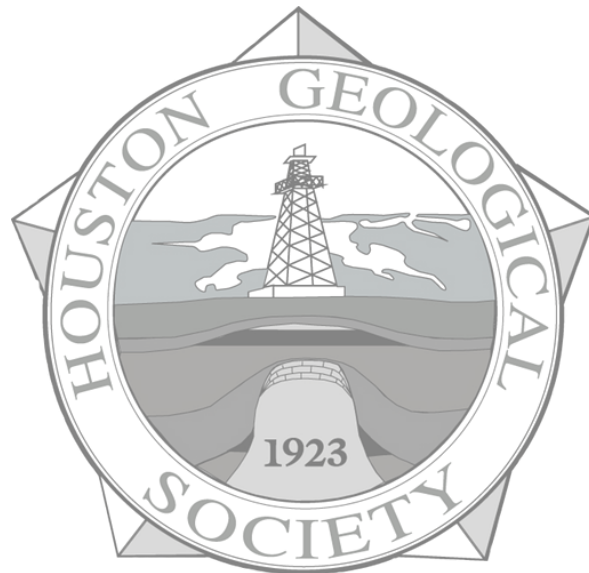
to Texas A&M University in College Station, graduating in 1960 with a B.S. in Geology. He's worn that Aggie ring proud ever since!

Charlie led a long career in the oil and gas industry and was recently recognized for 50 years as a Certified Professional Geologist by the American Institute of Professional Geologists. He joined Houston Geological Society on 1/1/77. Companies he worked for include Sinclair, Arco and Houston Oil & Mineral. Charlie's work was his passion. He taught us that hard work pays off and doing what you love is most important. He wrapped up his career with a great group of Aggies at W. D. Von Gonten & Co., retiring one day before his 83rd birthday.

A round of golf, a hunting trip, a beer with a buddy, or watching sunsets in South Padre, Charlie made the most of his free time. Cheers to a one of a kind, irreplaceable man!

He is now reunited with his father and mother, his sisters, Mary Alice, Joan Hill, Betty Rhodes and his son, Michael. Charlie leaves behind his bride of 43 years Dolores "Dee;" their daughters, Danielle and Anita (Johnny) and his sister, Marian Drummond (Jerry). He is also survived by his son, Kelly; his brother-in-law, Malcolm Rhodes; his nieces, Mary Alice "Allie" Wallace (Dan), Barbara Gaiser (Chuck), Donna, and Marie; his nephews, Kirk Drummond and Charles Drummond (Kay); his grandchildren, Kaelynd, Alex and Siena and many more great-nieces, great-nephews and dear friends.

Summarized from Earthman Southwest Funeral Home obituary notice on 9/30/22



DOMESTIC &
INTERNATIONAL



BIOSTRATIGRAPHY

**ANYTIME.
ANYWHERE.
ANY FOSSIL.**

Complete paleo services

*Largest single-source GoM
database*

Custom projects & mapping

Multiple fossil disciplines



**P A L E O
D A T A**

**504-488-3711
PALEODATA.COM**

NEW ORLEANS, LA



THUNDER EXPLORATION, INC.

Celebrating 30+ years of prospect generation and exploration in the following South Texas plays and trends.

Frio	San Miguel	Edwards
Jackson	Austin Chalk	Pearsall
Yegua	Eagle Ford	Sligo
Wilcox	Buda	Cotton Valley
Olmos	Georgetown	Smackover

Thunder is currently seeking non-operated working interest participation in projects and prospects.

**Contact Walter S. Light Jr.
President/Geologist**

713.823.8288

EMAIL: wthunderx@aol.com

**THIS SPACE COULD BE
YOURS!**

Promote your business
with a 1/4 page ad.
Contact office@hgs.org
for more information.

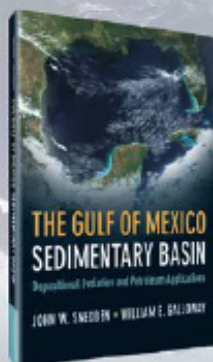
THE GULF OF MEXICO SEDIMENTARY BASIN

Depositional Evolution and Petroleum Applications

JOHN W. SNEDDEN

WILLIAM E. GALLOWAY

HARDBACK \$94.99 \$75.99*
ISBN: 9781108619024



A comprehensive and richly illustrated overview of the Gulf of Mexico Basin, including its reservoirs, source rocks, tectonics and evolution.

***20% DISCOUNT FOR HGS MEMBERS**

USE CODE SNEDDENHGS AT CHECKOUT ON WWW.CAMBRIDGE.ORG



**CAMBRIDGE
UNIVERSITY PRESS**

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 Black & White Prices Shown – Color add 30% to prices below					Specific Page Color Ad Placement					
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	
HGS Website Home Page Column Ad	\$700 – Monthly	200 x 400 pixels; home page right column ad
	\$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	
Vendor Corner	\$1200 – 12 Months	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.
	\$250	
	*4 Pack option with 1 FREE bonus event for \$1000.00 available. Send request to vendorcorner@hgs.org .	
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. 	



The Houston
Geological
Society

Renew your membership

OR BECOME AN HGS
MEMBER TODAY!



Renew or join by scanning the QR code above!

ACTIVE/ASSOCIATE MEMBERS: \$36 EMERITUS MEMBERS: \$18
STUDENT MEMBERSHIPS FREE

VISIT OUR WEBSITE AT WWW.HGS.ORG



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 \$36; Emeritus members pay \$18; 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) \$36.00 _____

Student membership \$0.00 _____

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

Total Remittance _____

Payment

Check # _____

Credit Card: V MC AE Discover Credit Card #: _____

CVC Code (**required**) _____ Expiration (mm/yy) _____

Signature: _____ Date: _____

Company _____ Company Street Address _____

City _____ State _____ Postal Code _____

School (**required**) _____ Major (**required**) _____

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.

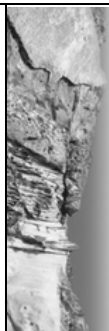
AAPG Member Number _____ HGS Sponsor's Name _____

Signature: _____ Date: _____

Consulting, Evaluate Prospects:
USA and International
Seeking Prospects: Texas

Victor H. Abadie III
Consulting Geologist

650.201.0528 • vic@montara.com
Post Office Box 81, Montara CA 94037-0081
AAPG/DPA, SIPES, Calif. Reg. Geologist, Tex. Reg. Geologist



Paul W. Britt
Geologist, P.G., C.P.G.

Houston, Texas

Geological & Geophysical Consulting
Petra Consulting and Training
Kingdom Seismic Interpretation

713-651-0004
www.petrauser.com

pbritt@texplora.com
www.texplora.com

COWBOY
EXPLORATION

*Utilizing 3-D seismic technology to identify, assemble,
and drill conventional exploration prospects
throughout the Texas Gulf Coast*

Cameron Goodwin - Head of Development

office: 512-717-4491 | cameron@cowboyexploration.com
cell: 361-834-8519 | www.cowboyexploration.com

3800 N. Lamar Blvd, Suite 200, Austin, Texas 78756



THUNDER EXPLORATION, INC.

WALTER S. LIGHT, JR.
PRESIDENT
PETROLEUM GEOLOGIST

P.O. BOX 541674
HOUSTON, TEXAS
77254-1674

US MOBILE: +713 823 8288
UK MOBILE: +44 (0)794 755 1693
EMAIL: wthunderx@aol.com



METAROCK
LABORATORIES

2703 Highway 6 S, Suite 280A
Houston, TX 77082
Tel 713-664-7916
Cell 832-287-8320
Fax 832-415-0358
zach@metarocklab.com
www.metarocklab.com

Zach Arasteh
Business Manager

Website • Brochure
Ad • Logo • Catalog
Newsletter Design



Krueger Design

Design and Art Direction for Print and Web

LisaKruegerDesign.com
713.664.7267

Mustafa Touati

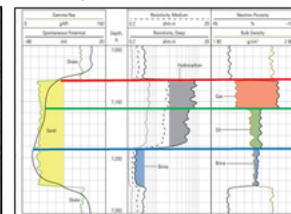
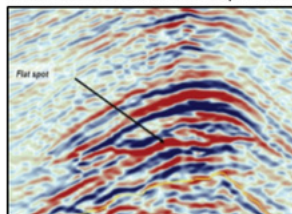
**Digital Rock Physics - Numerical Geology
Geomodeling - Geostatistics and the Road
To Geoexploration Robots.**

Mailing address: P.O. Box 3401
Sterling, VA, 20167
E-mail: mustafa_touati@yahoo.com

Getz Exploration Consultants Inc.

Geoscience Consultation Since 1982

Seismic and Well Log Interpretation/Computer and Applications Work
Onshore and Offshore USA Gulf Coast Basins, Oil & Gas/**Geothermal**
International Oil & Gas Exploration in Africa, Far East and Americas

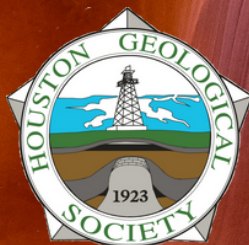


Contact Steven L. Getz at

Address: 12102 Piping Rock Drive, Houston, Texas, USA, 77077
Email: Steven L. Getz @ [sigetz@outlook.com](mailto:siget@outlook.com)
Telephone: (713) 304-8503

Professional Directory

Advertise your Business Card!
\$175 per 10 Issues
Contact: 713-463-9476 or office@hgs.org



Houston Geological Society

14811 ST. MARY'S LANE, SUITE 250
HOUSTON, TX 77079

Contact Us
713.463.9476
office@hgs.org



Connect with us on social media

www.hgs.org