



DGS
DHAHRAN
GEOSCIENCE SOCIETY

**The Oil
Drop** A DGS
Magazine



2022 Edition

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Membership Update Become a Member



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For more enquiries about membership, please contact the membership liaison

Email: membership@dgsonline.org

Technical Publications Officer Message

DGS is proud to showcase the achievements of the society and its members. During 2022, DGS organized several initiatives highlighted in the annual Oil Drop magazine. I am happy to put together this magazine for you and I wish you an enjoyable read.



Abrar Alabbad
Technical Publication Officer

President Welcome Message

Dr. Nasher AlBinHassan



I am humbled by the opportunity to serve as 2022 President of the Dhahran Geoscience Society (DGS); one of the largest, most vibrant, and also oldest technical societies at the Middle East. We are blessed with many dedicated volunteers who care deeply about our discipline, its standing, and contributions in a fast-changing environment. They also care about serving our community, from the most junior to the most experienced, and about creating opportunities for the betterment and advancement of their careers in industry and academia. We will do our best to make you proud of your association with the Society.

The 2022 DGS executive committee and volunteers led the society to expand events and activities across three platforms; technical exchange, professional development, and public outreach. This has ensured a sustainable focus on generating content, attract wider audience and lead the DGS to become a globally-recognized professional society that enables regional geoscience professionals to share knowledge.

Looking back in the past 12 months, it has been an exceptionally busy year. We have had to deal with a rapid succession of important events and situations, many of which are still unfolding. Indeed, for me, personally, and after the pandemic break, it has been a most eventful period.

throughout, at times challenging but on the whole a most rewarding experience. Today,

it is not my intention to list out all that we have accomplished. I believe they speak for themselves. But rather, I would like to take this opportunity to briefly offer some of my impressions on how things have fared in the work of DGS.

What comes to mind, first and foremost, is the strong and active engagement of the DGS executive committee members and volunteers in advancing promotion of volunteerism in technical exchange, professional development, and public outreach. In face of crisis situations, DGS has shown that, whenever there is a unity of purpose and the strive for consensus, we have the capacity to act to address these situations in a timely and constructive manner. That was very clear when DGS continue technical lectures and awareness through the use of virtual meetings with attendance from all around the world.

I have no doubt that the building of bridges and the forging of common grounds and engagement of all stakeholders will determine, to a significant extent, how successful we are in carrying out the manifolds entrusted upon DGS. DGS has endured because of the impressive dedication by its successive executive committees ensuring the steady progress towards the society's strategic goals and the current committee carried the flag to assure the continuity.

Let me conclude on a note of thanks. I would like to thank our Platinum sponsor Saudi Aramco, and our Gold sponsors Saudi Geophysical and BGP. Most importantly, I would like to thank my Aramco management, colleagues, DGS executive committee, and volunteers.

Sincerely,
Dr. Nasher AlBinHassan
2022 DGS President

Executive Committee



Dr. Nasher AlBinHassan
DGS President



Musab AlModra
President - Elect



Layal Khan
Field Trip Coordinator



Fahad Dossary
Secretary



Eyad AlJshi
Treasurer



Khalid AlOtaibi
VP Public Outreach



Noha AlLababidi
Young Professional Officer



Danah AlSayyid
Social Media Officer



Nawaf AlGhamdi
Membership Liaison Officer



Sattam AlMutairi
VP Technical Exchange



Elsbeth Crawford
Technical Meeting Officer



Abrar AlAbbad
Technical Publication Officer



Abdulrhman AlShamsi
Academic Liaison Officer



Yaser AlZaver
VP Prof. Development



Ezzedeen A Fataierge
Prof. Meeting Officer



Abdulrhman AlKunaini
Young Prot. Officer



Naser AlNaser
Mentorshin Program Officer

Interview with Mr. Ashgar

Q1. With all of the technological advancement and efforts to reduce carbon footprint in upstream, what is the future of exploration geoscience? and what are the key technical skills that are needed in the future?

The future of exploration geoscience is bright. Geoscience has always been critical to decarbonization and with more worldwide commitment to reducing emission, the role is more significant. The key technical skills will have to cover conventional detailed understanding of the target's properties and characteristics as well as more advanced data analysis, machine learning, artificial intelligence, and predictive analytics. These skills will enable exploration geoscientists to better understand the subsurface environment and make better decisions about resource exploration as well as carbon footprint reduction ambitions.



Mr. Samer Ashgar
SR VP Exploration

Q2. With this accelerated transformation in the industry, innovation seems to be a key-element that drives this change, how do you see this reflected in exploration geoscience?

We certainly see innovations through the whole exploration geoscience cycle. This includes the groundbreaking introduction of robotization in the data collection and advanced big data mining, advanced prediction technologies and HPC. We are still more ambitious as an industry than ever for innovations that improve the accuracy and expedite generation of our geological and geophysical driven models while minimizing the carbon footprint

Q3. What is the role of geoscience in the global zero-net carbon initiative? And what kind of skills are needed to achieve this goal?

Geoscience plays a critical role in the global zero-net carbon initiative. The first part will be on identifying and developing strategies to reduce emissions and improve efficiency through existing workflows. The more tangible impact is on developing and participating in large scale carbon sequestration projects very much needed to reach the global zero-net ambitions.

The skills needed to achieve this goal include expertise in geology, hydrology and good exposure to atmospheric science, oceanography, ecology, and other related fields. Additionally, geoscientists need to be able to analyze data from various sources and communicate their findings effectively through oil and gas communities and beyond.

Q4. Recently, more oil and gas discoveries have been announced, congratulations! What are the factors that led to the success in exploration?

Thank you very much, I strongly believe this boils down to the excellent dedication of our team of geoscientists. As everyone is aware, a discovery is a lengthy process that recently has seen the integration of various innovative solutions at multiple fronts from acquiring the data to recent AI has put the team in a position to embark on these discoveries.

Q5. From your perspective, what are the biggest challenges young geoscientists face in the energy industry nowadays?

The biggest challenge/opportunity young scientists face in the energy industry nowadays is the rapid pace of technological change. With the emergence of new technologies such as artificial intelligence, machine learning, and big data analytics, geoscientists must stay up to date with the latest advancements in order to remain competitive. Additionally, geoscientists must be able to effectively communicate their findings and insights to other stakeholders in order to ensure that their work is properly understood and utilized. Finally, young geoscientists must also be able to navigate a complex academic landscape in order to ensure that their work is up to the standards.

Interview with Mr. Ashgar

Q6. DGS offers a networking platform with local and international experts, how can DGS leave more impact in the upcoming MEOS-GEO conference?

I strongly believe that DGS has held wonderful events this year and over the years to link local and international experts, capitalizing on the upcoming MEOS-GEO conference to communicate the previous year's achievements to ensure more engagement from local geoscientist could be key

Q7. The accelerated transformation in the energy business requires new set of partners leadership skills, what leadership skills are especially impactful nowadays?

1. Strategic Vision: The ability to develop a long-term vision and strategy for the organization, and to effectively communicate it to stakeholders.
2. Adaptability: The ability to quickly adjust plans and strategies in response to changing market conditions and customer needs.
3. Collaboration: The ability to work effectively with other departments, stakeholders, and external partners in order to achieve shared goals.
4. Innovation: The ability to identify opportunities for improvement and develop creative solutions that drive value for the organization.
5. Communication: The ability to clearly articulate ideas, build relationships, and influence others in order to achieve desired outcomes.
6. Emotional Intelligence: The ability to understand emotions and use them as a tool for effective decision-making and problem-solving.
7. Digital Literacy: The ability to understand digital technologies, their applications, and their implications on the energy business landscape.

Q8. What fascinates you most about Saudi Arabia geology?

I find the diversity of Saudi Arabia's geology fascinating. From the vast deserts and lush oases, to the high mountains and beautiful reefs in the west, Saudi Arabia is home to a wide range of geological features. The DGS certainly had multiple trips this year that shows Saudi Arabia as a very diverse and an interesting place to explore and study geology.

Q9. Robotics are taking a part in the automation of several technical geoscience tasks, how does this integration impact exploration?

Robotics are playing an increasingly important role in the automation of geoscience tasks, such as seismic data acquisition, mineral exploration, and geological mapping. This integration of robotics into geoscience tasks will significantly reduce the amount of time and money required to complete a task, it will also improve the accuracy and reliability of the data collection. This is particularly important for areas with limited accessibility. Finally, robotics can also help reduce safety risks associated with exploration activities. By automating certain tasks, workers are exposed to fewer hazards in the field. This is especially important when exploring hazardous environments such as deep sea or remote desert locations. Overall, the integration of robotics into geoscience tasks is having a positive impact on exploration activities by reducing costs, improving accuracy and reliability of data collected, and reducing safety risks associated with exploration activities.

Q10. It is almost the end of the year, and the end of our interview unfortunately, do you have any last wishes for words for us?

My last wish is for everyone to stay safe and healthy, the DGS has been and always will be between local geoscientists and our communities and the world.

Professional Development

SEG-DGS Gala Dinner Meeting

The well-attended ceremony recognized the efforts and continuous support provided by experts and leaders in geoscience. Nasher AlBinHassan, DGS president, opened the evening with a warm welcoming message and shared an overview of DGS activities. During the event, Mohammed Badri, the SEG ME Advisory Committee Chair introduced his committee. Ken Tubman, SEG President, gave an insightful talk on the "SEG transformation through Innovation and Collaboration". The ceremony proceeded with the award recognition as follows:

Top Sponsoring Companies award category:

- Mr. Samer S Ashgar from Saudi Aramco
- Mr. Mohammed Membrouk from SLB
- Mr. Adel El-Emam from Kuwait Oil Company
- Mr. Ali Namaani from Petroleum Development Oman
- Mr. E Dianliang from CNPC-BGP
- Mr. Salem Al Hammami from ADNOC
- Mr. Peter Whiting from CGG
- Ms. Nadiyah Almutairi from Shell
- Mr. Abdulwahab Alahmari from Saudi Geophysical
- Mubadala Petroleum



The SEG committee Volunteers category, the awardees are:

- Mohammed Badri, John Crane
- Adel El-Emam, Kuwait Oil Company
- Ahmad Al Eidan, Kuwait Oil Company
- arrah Al-Jenaie, Kuwait Oil Company
- Khalid Al-Bloushi, United Arab Emirates University
- Beth Rees, GeoSoftware
- Tariq Alkhalifah, King Abdullah University of Science and Technology
- Richard Miller, University of Kansas
- Steve Sloan, XRI
- Haydar Baker, United Arab Emirates University
- haled Al Dulaijan, Saudi Aramco
- Chris Koeninger, Schlumberger
- Aiman Bakhorji, Saudi Aramco
- Abdulaziz Almuheidib, Saudi Aramco
- Said Mahrooqi, Petroleum Development Oman

Sponsored by Saudi Aramco, DGS hosted the SEG (Society of Exploration Geophysicists) Middle East 10 year anniversary gala dinner ceremony that took place on Tuesday, December 8th, in the city of Khobar, Saudi Arabia.

SEG Technical Contributions to SEG award category:

- Andrey Bakulin from Saudi Aramco
- Constantine Tsingas, Saudi Aramco
- Daniele Colombo, Saudi Aramco
- Denes Vigh, SLB -
- Klemens Katterbauer, Saudi Aramco
- Amin Ourabah, Stryde
- Gang Yu, CNPC-BGP

Technical Contributions to SEG by a Company:

- Mr. Samer S Ashgar from Saudi Aramco
- Mr. Mohammed Membrouk from SLB
- Mr. Fred Li from CGG
- Mr. E Dianliang from CNPC-BGP
- Mr. Ali Naamani from Petroleum Development Oman

Technical Contributions to SEG by a Company:

- Mr. Samer S Ashgar from Saudi Aramco
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- Mr. Fred Li from CGG
- Mr. E Dianliang from CNPC-BGP
- Mr. Ali Naamani from Petroleum Development Oman

Technical Contributions to SEG by Academia:

- Hakim Saibi from United Arab Emirates University
- Tariq Alkhalifah, from King Abdullah University of Science and Technology
- Chih-Ping Lin, National Yang Ming Chiao Tung University
- Sherif Hanafy, King Fahd University of Petroleum and Minerals

Technical Contributions to SEG by Academic Institutions in the region:

- King Abdullah University of Science and Technology (KAUST)
- Dr. Ahmed Ali Murad from United Arab Emirates University
- Abdulaziz Obaid Al-Kaabi - King Fahd University of Petroleum and Minerals (KFUPM)



Emerging Middle East Young Professionals:

- Abdulrahman Al Shuhail, Saudi Aramco
- Ezzedeem Alfataierge, Saudi Aramco
- Salem Al Hammami, ADNOC
- Muneera Al Awadhi, Kuwait Oil Company
- Omaima Al-Droushi, Petroleum Development Oman

Special Commendation::

- Ahmed Sabry, Schlumberger
- Moosa Jahdhami, Petroleum Development Oman
- Said Al Abri, Petroleum Development Oman
- Saif Messabi, ADNOC
- David Mccarthy, CGG
- Ali Almomin, Saudi Aramco

Regional Partner

DGS, Nasher AlBinHassan



Professional Development Oil Drop Story - Telling

Rufaydah Alyamani is an unconventional **Geophysicist** who joined **Saudi Aramco** back in 2014 as a participant in Saudi Aramco's College Degree Program for Non-Employees (CDPNE). In 2018 she graduated from the University of Houston with a Bachelor of Science degree in Geophysics, and is currently working with Unconventional Resources Exploration Division. Rufaydah has range of interests from exploring planet Earth to appreciating the galaxy wrapping it.



Rufaydah Hisham Alyamani

Astronomical observation, a sport, a hobby, or an entire heritage?

Have you ever heard of astronomical tourism? Or ever thought about the possibility of harvesting on a full moon? The Fundamentals of Astronomical Observations course at Ithra Academy sparked students' curiosity; it opened doors to exploration, adventure, and much more. Our instructor, Eng. Ahmed Taher Althaher is a Mechanical Engineer who gained experiences in a mixture of fields from robotics to military industries. Most of all, experience in astronomical observation methods and light pollution assessment. This makes him one of the most passionate and experienced in sharing joyful astronomical lectures. The course was structured to have a two-day classroom lecture followed by a camp visit to Judah Desert for a live demonstration. As a geoscientist, who spent the most memorable learning hours outdoors, I got curious to see how an unfamiliar topic could be taught in a familiar environment.

Stargazing with Ithra Academy

Signing up for the course, I imagined memorizing the names of stars & planets and identifying their locations as a skilled astrophysicist would. To my surprise, none of my expectations were met! Astronomical observation touches on almost every aspect of life, as explained by Eng. Ahmed. As we were going through the lecture slides, the instructor had continuously paused to connect astronomy to the crowd's diverse backgrounds, engraving in our minds that astronomy is integrated in our lives.

We are looking at a universal frame that people for thousands of years have looked at and utilized for navigation, poetry, and scheduling daily tasks. During the lecture, Eng. Ahmed talked about the impact of astronomy on civilizations. For example, in ancient Egypt, the Egyptians were heavily dependent on the bounties of the Nile River. Because of that, they found a correlation between tracking the river's conditions and flooding cycles with the moon and the reappearance of Sothis the star— in today's language, the correlation they have established is now referred to as our modern-day calendar.

Professional Development

Trip to Judah Dessert

Like many of those around me, I have spent most of my life living in cities, where the view of the clear night sky was not an everyday scene. While the magnificent city structure has brought life to the nighttime, it dimmed the lights of the night sky. Too much light at night reduces the clarity of observing stars with the naked eye; reaching a point where they become invisible. Such experience is caused by excessive artificial light, commonly referred to as light pollution. In class, we learned about this type of pollution that accompanies urbanization, but it is not bound by the city limits. Unfortunately, it exceeds it by kilometers, wiping out the pleasure of witnessing a rich and sparkly night sky.

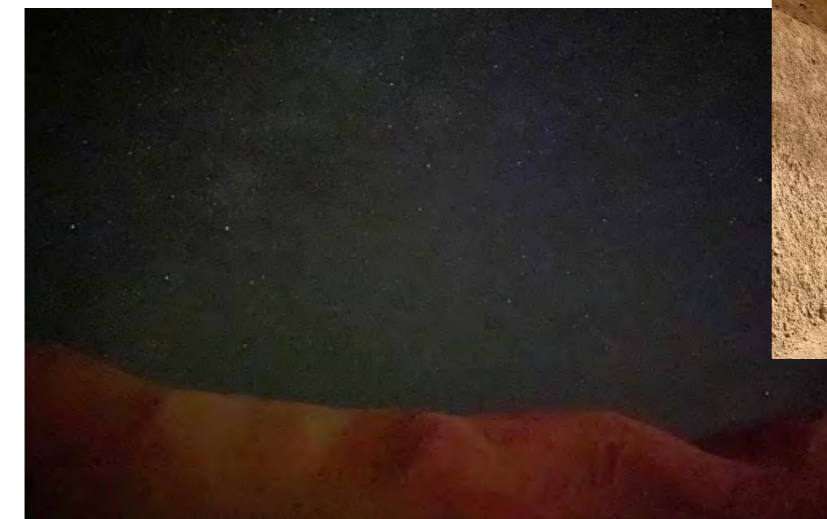
Kingdom's efforts to preserve astronomical observation sights

Suppose one desire to see such a clear night sky. In that case, one must plan to visit rural geographical areas, bearing in mind the distance away from the city, weather conditions, and if any astronomical events are happening during the visit. Thankfully, there are many efforts in the Kingdom to preserve specific locations and protect them from light pollution by marking them as astronomical observation sites only. Eng. Ahmed and many astronomical observation enthusiasts are raising awareness about light pollution and how it jeopardizes astronomical tourism to obsolete.

Know more about stargazing!

I encourage the reader to connect back to childhood curiosity and view the magnitude of countless stars and astronomical events that can be seen with the naked eye. I am filled with gratitude every time I look back to the moment I signed up for the course, and I am thankful to Ithra Academy for hosting it. Nothing tops a learning experience where the classroom is the desert, and the blackboard is the sky embroidered with stars. Eng. Ahmed, our instructor, keeps up to date with stargazing tips and trips on Instagram

follow @Judai_Stargazing to know more.



Judah
Dessert

courtesy of Ahmed
Al-Dulaijan, a course
participant

Author: Rufaydah Hisham Alyamani.

Job: Geophysicist at Saudi Aramco

Professional Development Patenting Awareness Session

DGS conducted a patenting awareness session on October 20th, 2022. During the event, an informative IP overview segment was provided by Steven Gordon followed by an inspirational talk on "Becoming an Inventor" by Dr. Muhammad Arsalan. The talk was followed by an open discussion where attendees interacted with the experts in this subject. The event ended with a tour in the EXPEC Advanced Research Center to gain insight on the latest in-house upstream technologies and inventions.

Steven (Scott) Gordon

Steven (Scott) Gordon is Senior Counsel in the Intellectual Property Group of the Aramco Law Organization. He holds a master's degree in electrical engineering from the University of Utah and a Doctor of Jurisprudence degree from Arizona State University. Scott has nearly 20 years of practical experience in patent acquisitions, patent litigation, licensing, and client counseling. He currently focuses on protection and licensing of IR 4.0 technologies, including: software, artificial intelligence, data analytics, and additive manufacturing.



Steven
Gordon

Dr. Muhammad Arsalan

Dr. Muhammad Arsalan received his B.Eng. degree from Institute of Industrial Electronics Engineering (IIEE), NED University of Engineering and Technology, Karachi, Pakistan in 1999 and his M.A.Sc. and Ph.D. degrees both in electronics engineering from Carleton University, Ottawa, Canada, in 2004 and 2009, respectively. In 2013 he joined Saudi Aramco's EXPEC Advanced Research Center (EXPEC ARC) as senior research scientist and is still working here.

Dr. Arsalan is a seasoned professional with over 20 years of experience in academia and various industries including biomedical, space, chemicals and oil and gas. He has over 100 international patents and publications related to integrated sensors, systems, and tools. He is the recipient of major national and international awards and distinctions for his entrepreneurial skills and his groundbreaking contributions to the innovation, research and technology development. He was the co-founder of two North American technology start-ups. Currently he is leading a team of experts in multiphase metering, sensing, intervention, and robotics focus area within Production Technology Division (PTD) of EXPEC ARC, Saudi Aramco.



Dr. Muhamad
Arsalan



Geo-Trivia Contests

DGS launched three Geo-Trivia contests to keep the community engaged.

First Geo-Trivia Theme
was "Petroleum System".

The winners:
Ali Alsinan
Marco Vecoli
Ahmed Alawami



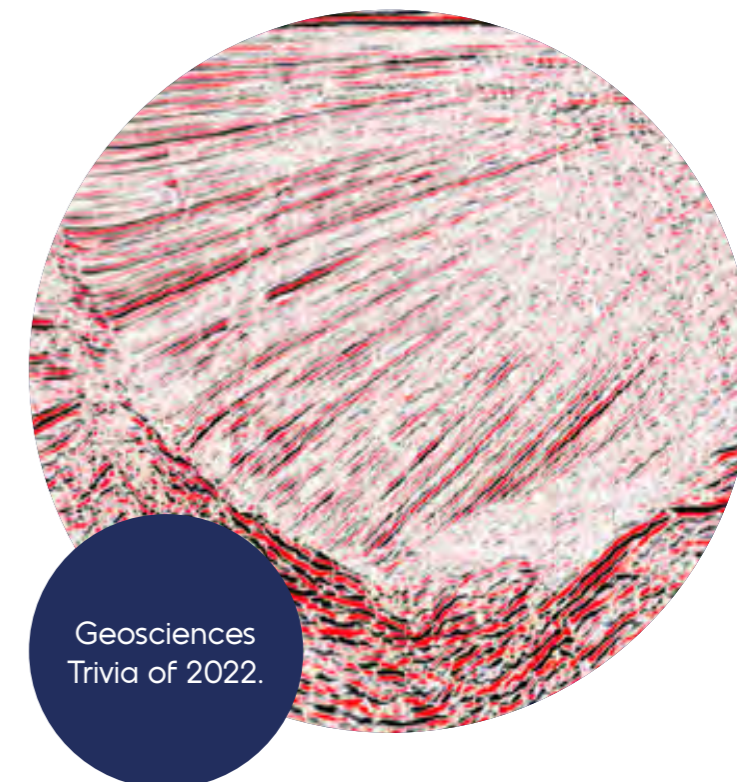
Geosciences
Trivia of 2022.

The second Geo-Trivia Theme
was "Faults".

The winners:
Ali Kawai,
Abdulla Ghazi
Ali Altammar

The third Geo-Trivia Theme
was "Geology of Saudi Arabia".

The winners:
Haidar Aljubran
Saeed Tofaif
Mohammed AlMarri



Geosciences
Trivia of 2022.

Professional Development Meet the Leader YP Series

Dr. Gang Han

President, American Rock Mechanics Association

Showcase the Value of Geomechanics: Hydraulic Fracturing and Well Integrity



Dr. Gang Han has been the president of the American Rock Mechanics Association (ARMA) since 2021, and has led the organization into a more technological, innovative, diverse, and transparent society, contributing to the energy transition toward net zero. By collaborating with multiple societies, such as the Dhahran Geoscience Society (DGS),

he is dedicated to promoting geomechanics in interdisciplinary sectors (petroleum, mining, civil, and geothermal). As the founder of ARMA's technical committee on hydraulic fracturing, he has chaired the hydraulic fracturing community, with over 1,000 members representing 340 international organizations. He has served as the chair for various topics at the Unconventional Resources Technology Conference (URTeC) since 2013, championing geomechanics. With 25+ years of experience in rock and geomechanics, he works in Upstream at Aramco Americas, focusing on the technologies related to hydraulic fracturing, reservoir performance, well productivity, well planning and construction, and stress and rock characterizations.

Prior to joining Aramco, Dr. Han worked on offshore, continental, and unconventional oil and gas fields in the Middle East, Gulf of Mexico, continental USA, North Sea, Southeast and East Asia, Australia, North and West Africa, and South America. With over 55 publications, he is regularly invited to give keynotes at professional meetings and societies such as ARMA, SPE, AAPG, SEG, and URTeC. He is a leading author of a multi-industry book, "Drilling in Extreme Environments - Penetration and Sampling on Earth and Other Planets." He holds a Ph.D. in chemical engineering from the University of Waterloo, Canada.

Professional Development



Anna Shaughnessy

Society of Exploration Geophysicists President
2021-2022

The changing landscape for geophysicists and SEG, challenges and opportunities

Anna received her undergraduate degree from the University of Gothenburg in Sweden and her MSc. from the Massachusetts Institute of Technology (MIT). She began her industry career as a geophysical interpreter and quickly moved into management of technical teams within the energy industry. She has held leadership roles in exploration and advanced technology at Mobil, Saudi Aramco, Texaco, and Kerr-McGee.

After 30 years in the energy industry, she transitioned to the academic sector and became executive director of MIT's Earth Resources Laboratory (ERL). She left ERL in 2018 and is now a consultant. Currently, Anna is president of the Society of Exploration Geophysicists (SEG). Prior to that she was vice chair of the SEG Foundation Board. She has also served on many additional SEG committees, including but not limited to SEG Global Inc. and the Finance and SEAM Audit committees. She was a founding member of the Women's Network Committee and chaired the task force that led to the formation of the Justice, Equity, Diversity, and Inclusion Committee.

Anna is passionate about promoting and expanding all aspects of geophysical study and practice. She is engaged in promoting the role of applied geophysics in the energy transition and is passionate about communicating how geophysics and geophysicists can support the 17 UN Sustainable Development Goals. Anna takes great delight in engaging with students, sharing her experiences with them, and encouraging them to become geoscientists. She is also involved in the development of educational programs for early-career geophysicists to ensure they have access to the tools and materials to navigate successful careers. In summary, Anna's extensive global work experience and professional network have given her a unique appreciation for the role of applied geophysics in industry, academia, and society worldwide.

Technical Exchange

WAVES Launching



EXPEC Advanced Research Center has successfully launched the first Aramco upstream fully commercialized software platform, known as WAVES®, at its new state-of-the-art Upstream research center in Dhahran. The event took place on Wednesday, May 18th 2022, and was well attended by members of PE&D and Exploration management.

WAVES® (Wellbore Acoustics Visualization & Evaluation System), is an innovative and integrated acoustic data processing, analysis, and interpretation system for geological and petrophysical reservoir properties characterization. Geoscientists and engineers utilize WAVES® to provide advanced reservoir solutions such as fracture location and its direction in aid of completion strategy; anisotropy and dispersion analysis for formation stress estimates; azimuthal radial profiling for near-wellbore drilling-induced alteration, permeability and bed boundary estimation, log-run optimization, moduli computation which is an input for completion and fracking designs, as well as 3D visualization capabilities.



Keynote speaker, **Dr. Ashraf Tahini**, Manager of EXPEC ARC, expressed his gratitude to all Upstream collaborators and partners for their continued support and partnership, especially for the milestone achieved with the successful commercialization of the in-house developed software platform, WAVES®. Dr. Ashraf Tahini further stated that "EXPEC ARC recognizes the importance of developing cutting-edge technologies in support of Upstream operations. And when necessary, commercializing some of the developed and patented solutions, like WAVES®, as a seed for marketplace products that benefit our company and the industry." He emphasized the importance of building on existing collaborations between Exploration organizations and EXPEC ARC.

The Chief Technologist, Geology Technology Division, **Maheer Marhoon**, in his general remarks explained the journey of WAVES® from initiation to commercialization. It began with a simple, yet, thought-provoking question: "what do we do with all the waveform data we acquire in exploration wells?" He went on to thank all the partners and collaborators, stating that "WAVES® is a testament to a very successful collaboration efforts by all involved parties, which resulted in the development of the platform



Technical Exchange

Aramco Successfully Launches The First Upstream Fully Commercialized Software Technology

in a record time of one year". Collaborators include professionals from Exploration, Beijing Research Center (BRC), Geophysical Imaging Dept., Technology Strategy Planning Dept., Technology Deployment Division, Southern Area Reservoir Characterization, and Unconventional Resources Exploration and Characterization Departments.

Sonic data is vital for formation evaluation and reservoir characterization. However, waveform data is generally put to limited use due to lack of standardized workflows. WAVES® project team leader, **Chris Ayadiuno**, a Senior Geological Consultant with Geology Technology Division of EXPEC ARC, and a DGS member gave an overview of the motivation and value proposition of WAVES® as well as highlighted both its technical and business impacts. This was followed by user-application examples presented by **Mohammed Tayeb**, a Geophysicist with Geophysical Imaging Department, show-casing several user challenges, workflows applied with results obtained and cost-savings achieved. This integrated multi-functional platform is now available to Aramco users.



Technical Exchange WAVES Launching

The feedback from attendees was extremely positive. **Hatem Hendi**, Manager Area Exploration, stated that "WAVES© software presents wellbore information in a compelling and realistic 3D visualization, providing a step change improvement in identification and visualization of subsurface fractures that impact drilling operations and reservoir performance. We are excited to start utilizing this new technology and its applications to support Exploration activities."

WAVES©
won the top
commercialized
technology in 2021

Mandefro Woldeamanuel, a geological consultant with Southern Area Reservoir Characterization Department, who was one of the early adopters of the technology, stated: "I have been working with WAVES© for many years during its development on selected wells in Ghawar and Central Arabia for fracture and anisotropy detection and I see a lot of improvement with time. The results are very encouraging and it has added value to my work. I encourage Upstream colleagues to fully utilize this tool."



WAVES technology impact is growing in numbers. It has provided over \$700,000 in estimated vendor cost-avoidance, in addition to expected return on investment from external license royalty.

The software has been used to process and analyze over 20,000 ft in 25 wells across several Aramco fields. WAVES© won the corporate innovation board award as the top commercialized technology in 2021. As a result of its unique innovative solutions, it has been granted and filed two and seven patents respectively, in addition to ten publications. Three oil and gas companies are presently evaluating WAVES© prior to adoption as part of the commercialization and marketing efforts by Colchis Petro-Consulting.

Technical Exchange



Colchis PetroConsulting is an international solutions provider to the oil and gas industry providing software and hardware technologies and consultancy. The event was concluded with live demo-sessions to familiarize the attendees with the simple, clean user-interface and easy-to-use platform.

DGS - SEG Distinguished Lecturer

DGS co-hosted the SEG annual distinguished instructor short course (DISC) led by **Dr. Dave Monk**.



The two-day course titled "DISC 2020: Survey Design and Seismic Acquisition for Land, Marine, and In-between in Light of New Technology and Techniques by Dave Monk" was conducted on **June 27th in Khobar**.

The course offers a better understanding of the shortcomings of the data that the geophysicists are given to process, and a better understanding of what techniques will, and will not, work for a particular survey.

Technical Exchange Technical luncheons/talks



Near -surface scattering causes speckle noise and distorts reflections: how to overcome it with single- sensor seismic

Andrey Bakulin
SR Geophysical Consultant

Gained a Ph.D. in Geophysics (1996) from St. Petersburg State University of Russia. While at academia, he contributed to setting foundations for quantitative seismic fracture characterization using seismic anisotropy with key Geophysics paper "Estimation of fracture parameters from reflection seismic data" cited 687 times.

Common wisdom suggests that land seismic challenges are usually attributed to superimposed near-surface noise. However, the overwhelming complexity of high-channel-count and single-sensor data raises a big red flag that something else may be obscuring seismic data in a desert environment. We discover that small-scale near-surface scattering distorts the reflections themselves via a mechanism we dubbed a "seismic speckle," similar to speckle noise in optics and acoustics. We describe a new multiplicative random noise model that captures the main features of such distortions seen in the field data. While extremely damaging, seismic speckle has remarkable properties that allow its mitigation using completely new multi-channel processing. Specifically, we demonstrate that local stacking leads to an estimate of a clean signal phase free from the harmful effects of near-surface scattering. Such unbiased phase estimation is a key toward unraveling the damaging effects of scattering from prestack data using novel seismic time-frequency masking that blends advances from seismic and speech processing. This patented Aramco in-house technology is unique in the industry and the world and is expected to unlock the acquisition and processing of the nodal single-sensor data.



Technical Exchange



Making Decarbonization Work: Using Rock Physics for CO2 Storage

Dr Manika Prasad
Director, Mines CCUS Innovation Center Professor, Geophysics Department

Dr Prasad's research interests are multidisciplinary involving rock, sediment and fluid properties, multiphysics, quantitative nano- and microscale characterizations, refining 4D seismic quantitative interpretation using reservoir simulation, and nondestructive materials characterization. She leads several government and industry-supported projects on CO storage and is leading the Mines' portion of the DOE SMART initiative. She is leading the Mines Carbon Capture Utilization and Storage (CCUS) Innovation Center. Through her teaching and research, she engages the next generation of industry professionals through her own clear understanding of rock physics and perceptive questioning of her students. Dr Prasad earned her bachelor's degree from St. Xavier's College, Bombay, India and her M.S. in geology, and Ph.D. in geophysics from University of Kiel, Germany. Her Ph.D. work focused on attenuation, energy loss mechanisms and velocity dispersion in dry and fluid saturated sands.



Technical Exchange

Meet the Expert Abroad Series

DGS Meet the Expert series are bi-monthly events attracting an audience from DGS members and guests, including organization management from Saudi Aramco and the industry. The goal is to provide a platform where leaders and experts from industry and academia share with guest members a wide range of topics.



Dr. Juan Pedro
Geoscientist

Compartmentalization of aeolian reservoirs. Lessons from recent systems, outcrops, and subsurface analogues

Dr. Juan Pedro Rodríguez-López is an expert on Proterozoic to Recent worldwide aeolian depositional systems in coastal to plateau desert basins and cryospheric processes, working on outcrops and recent systems in the Middle East, South America, Europe, and Asia.

He has developed his professional activity as an Assistant and Associate Professor in universities in Spain, the UK, and UAE, as a geologist in Saudi Aramco, and in developing academic collaborations with Harvard University and the EAGE (European Association of Geoscientist and Engineers).



He has acted as a director of MSc. programs on Engineering and Energy, as co-organizer of the international scientific session for the International Association of Sedimentologists, and as guest editor of special publications for the Sedimentology and Aeolian Research journals.

His research interests focus on pure and applied sedimentology of complex interactions between aeolian depositional systems and other continental and marine environments and the cryosphere, as well as on neglected glaciations during the Proterozoic, Mesozoic, and Cenozoic eras in India, China, and Europe, and the Quaternary glaciokarstic systems in the Middle East. He is acting as co-Principal investigator of the PAGODA (Plateau and Global Desert Basins Research Group) at the Chengdu University of Technology in China.

His applied research interest focuses on the multidisciplinary characterization of outcrop analogues for aeolian subsurface reservoirs with particular attention to the complex faces transitions and compartmentalization processes that affect the quality of these high-porosity and permeability hydrocarbon reservoirs.



Dr. Israa Abu Mahfouz
Assistant Professor of Petroleum/
Structural Geology.

New Model for Hydrocarbon Primary Migration

Dr. Israa S. Abu-Mahfouz is an Assistant Professor of Petroleum/Structural Geology and the first female faculty member at the Department of Geosciences, College of Petroleum Engineering and Geosciences (CPG) - KFUPM. She is a specialist in naturally fractured reservoirs, unconventional hydrocarbon reservoirs, source rocks characterization, hydrocarbon expulsion and fracture development, geomechanics, fracture geochemistry, and reservoir modeling. Dr. Abu-Mahfouz received her PhD in Petroleum/Structural Geology from the University of Oxford (UK) and she holds a BS degree in Geology and Environment and an MSc degree in Applied Geology from the Hashemite University (Jordan).

Dr. Abu-Mahfouz has 14 years of experience in the oil/gas industry and research and academia. The main roles she has held include Senior Geoscientist at Shell/Jordan, two Postdoctoral Fellowships at Oxford University and KAUST, Tutor at Oxford University, and Research Scientist at KAUST. She is also an active member of different professional organizations (AAPG, GSL, OUGG, and JGA). Dr. Abu-Mahfouz served as a committee member and organizer of different international conferences and workshops.

Technical Exchange



Stevanus Dwi Kurniadi
Unconventional Resources Technical
Manager at Schlumberger

Hydraulic Fracturing CO2 Reduction Initiative and Transition Technology: Accelerating the Path to Net Zero

Stevanus is a senior fracturing and stimulation technical engineer with 15 years of strong knowledge and experiences. The experiences include hydraulic fracturing, stimulation and production enhancement, reservoir engineering, geomechanics, intervention, and integrated production optimization. It is shared in more than 20 publications, including SPE papers, internal publications, and a patent. He is currently working as Unconventional Technical Manager in Saudi Arabia-Bahrain, also Subject Matter Expert and coach/mentor for young engineer within Schlumberger.



Zainab Al Ibrahim

EXPEC Advanced Research Center–Saudi Aramco

Zainab Al Ibrahim received her bachelor degree in **petroleum geology** from the University of Oklahoma. She began her industrial career in 2018 as a researcher in **EXPEC ARC**. Zainab demonstrated technical skills being involve in different technical projects including developing a machine learning workflow to automate geological measurements. She Led several programs in local universities that offer STEM majors, and organized YP technical and soft skills workshops including a geologic field trip to empower young female scientists.

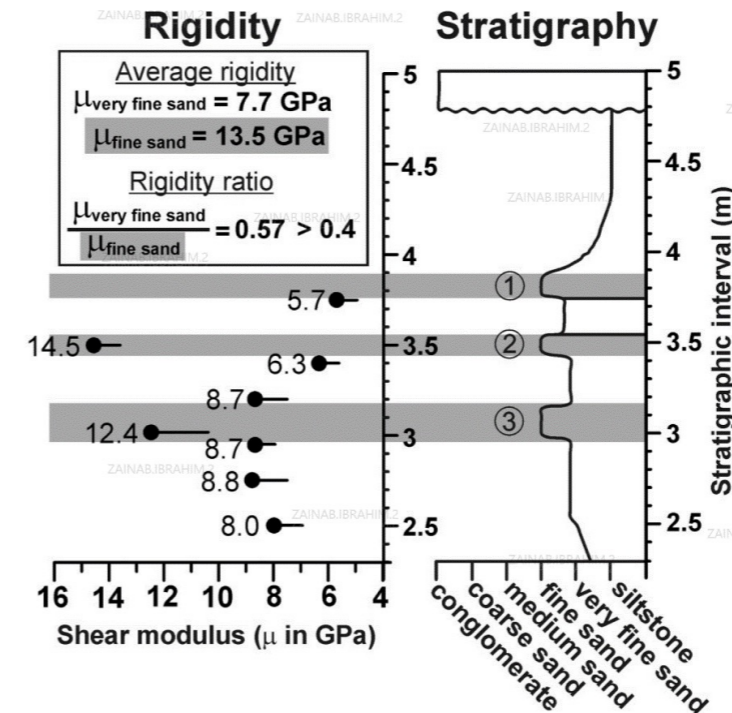


Figure 1: Mechanical stratigraphic profile shows rigidity contrasts correlated with stratigraphy and values of shear modulus. (Shackleton, 2005)

The Influence of Mechanical Stratigraphy on Joint Networks Development

Introduction

Mechanical stratigraphy is defined as variations in mechanical properties of different rock units across the same lithostratigraphic column. Understanding these variations can offer in-depth knowledge of rock behaviors for fractures and joint networks characterization. These mechanical properties include tensile strength, elastic-plastic response, and fracture susceptibility. Each mechanical stratigraphic unit is a product of chemical and mechanical changes on the rock from sedimentation to the present day. Although mechanical stratigraphy is related to lithology, the description of lithology solely does not always reveal the rock's mechanical properties (Fig.1).

The presence of distinct lithologies or structural discontinuities within a stratigraphic unit dictates changes in mechanical stratigraphy. Both layer thickness and rigidity contrast drive mechanical stratigraphy variations, resulting in distinctive rock responses regardless of similarities in depositional environments. This article will highlight the influence of mechanical stratigraphy on deformation styles and lithological variation effects. It will also demonstrate a machine learning application for an efficient identification of mechanical stratigraphy.

Lithological Variations Effect on Deformation Styles

Understanding the influence of mechanical stratigraphy on folds development and geometry requires an in-depth analysis of both the elastic-plastic deformation model and contrast coefficients of adjacent rock layers. Many thrust belts structural deformation occurs when certain layer arrangements exist; which consist of: a weak underlying layer (shale or salt), a strong middle layer (carbonate), and a top cover layer (clastic) (Fig.2). This specific arrangement, along with slip components, enhances folding over faulting in many thrust deformation zones worldwide. In most cases, high strength contrast in mechanical stratigraphy strongly impacts the overall shape.

The presence of a salt layer can be a critical component in the evolution of structures in settings like folds and thrust belts. The deformation geometry is highly influenced by the contrast variation between weak and strong rock layers. Salt is known to be two times weaker than most rock types, and therefore when a décollement develops within a salt layer (i.e., horizontal gliding between two rocks) beneath an existing fold or thrust belt, salt promotes a higher degree of folding. The presence of salt strongly impacts deformation styles, unlike cases in which a salt layer does not exist. The degree to which these layers contrast may favor folding over faulting is exclusively dependent on the mechanical rock properties. For example, at high strain settings, a thick strong rock layer experiences high fold amplification, as strong layers tend to reach the maximum strength point faster than weak layers, and subsequently result in shortening and weakening of that specific layer without breaking into segments.

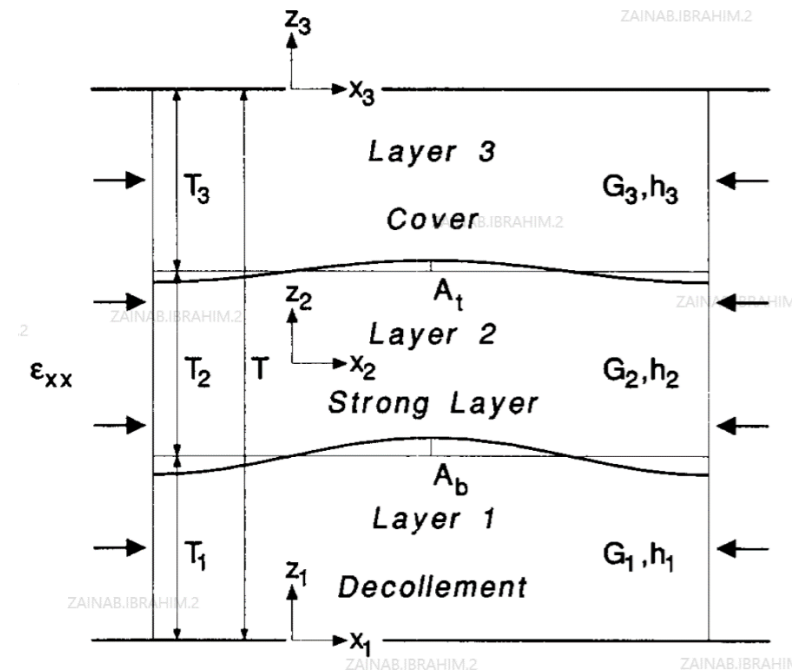


Figure 2: A three-layer arrangements model indicates a weak décollement layer (bottom) experience shortening, underlying by a strong layer (middle) and a cap layer (top). The diagram shows different mechanical properties of materials, where bottom layer has no shear stress or vertical component of displacement. Top layer experiences no stress from other overlaying surfaces (G: elastic shear modulus with X and Z component, H: plastic hardening modulus, T: total thickness, T_{1, 2, 3}: layer thickness). (Erickson, 1995)

Effect of Mechanical Stratigraphy on Joint Network

Mechanical stratigraphic contrasts highly influence joint propagation patterns. These patterns are used to interpret rigidity contrasts and changes in mechanical properties due to diagenetic alterations. Observations of joint patterns, namely bed-contained joints (first event), and through-going joints (a second event that exhibits different orientations), suggest changes in mechanical stratigraphy and the existence of two fracturing events over time (Fig.7). Bed-contained joints formed when rigidity contrast was higher than it is today, while through-going joints indicate low rigidity contrast and preservation of present-day conditions. Different stages of diagenesis affect mechanical properties based on composition, grain size, and compaction. These alterations in mechanical stratigraphy affect joint networks and the overall rock behaviors.

Mechanical conditions do not remain the same, especially if the lithological units experience multiple fracturing events. The mechanical stratigraphy profiles change due to diagenetic processes, which can lead to new 3D joint networks. Sometimes these joint networks act as fluid conduits and enhance the migration process for hydrocarbons, but due to the constant change during diagenesis, these joint networks' effectiveness in the petroleum system can change through geologic time. During deformation, rocks undergo different degrees of diagenesis, and as deformation continues, the beds containing initial joints may get rotated. In this case, these joint networks no longer preserve the original joint network orientation and properties.

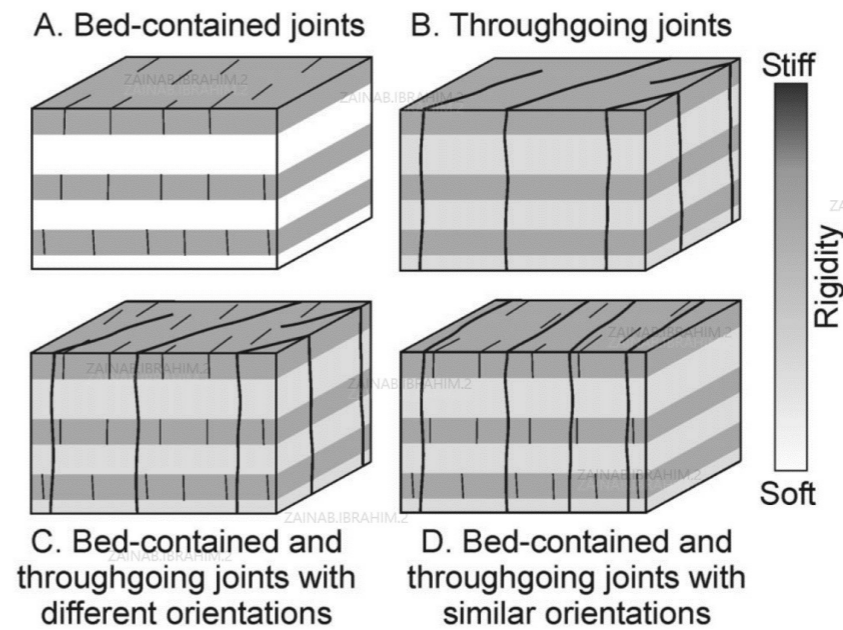


Figure 3: Single joint patterns with constant mechanical stratigraphy (A and B) and double joint patterns with varying mechanical stratigraphy (C and D). Bed contained joints formed at high rigidity contrast (A), while through-going joints formed at low rigidity contrast (B). Illustration of different joint patterns (C and D), as bed contained formed first at high rigidity contrast (primary joints event), then through-going joints at low rigidity contrast (second joints event). C and D are similar, except that C beds got rotated after the first jointing event, resulting in different pattern orientations. (Shackleton, 2005)

Mechanical Stratigraphy Effect on Normal Faults Geometry

The geometry of normal faults is related to the lithological contrast and competency between rock layers which determine propagation (Fig.4). Two main factors affecting fault propagation 1) interface strength and 2) contrast of rheology. A weak rock interface favors fault propagation. This is true for soft and ductile layers. On the other hand, strong rigidity contrast promotes fault termination. Wide fault zones commonly develop when the incompetent/competent ratio equals 1.4 or higher, while narrow fault zones appear if the ratio is 0.07 or less.

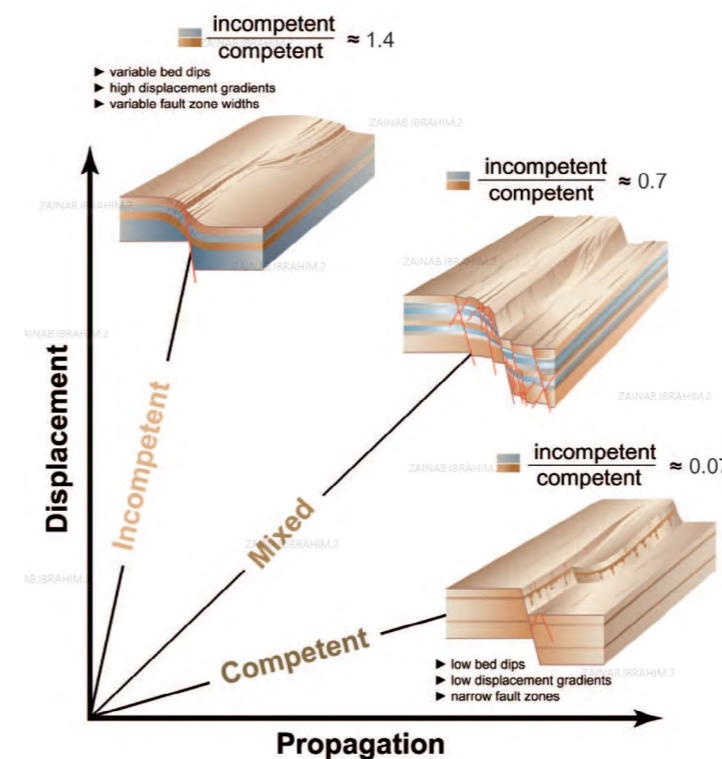


Figure 4: Schematic illustration shows the influence of mechanical stratigraphy and the incompetent to competent ratio for normal faults geometry. Usually, high propagation compared to displacement is common for faults with high competent layers. Both bed dips and the incompetent to competent ratio is low (0.07). On the other hand, high incompetent to competent ratio (1.4) has high displacement compared to the propagation and almost near-vertical displacement gradients. (Ferrill, 2008)

Application of Machine Learning for Mechanical Stratigraphy

One of the limitations of direct mechanical data is that they are usually discrete points and do not necessarily sample the entire section of interest. Machine learning algorithms can be leveraged to detect and visualize differences in mechanical stratigraphy through K-mean clustering. A machine learning workflow analyses lab-measured geomechanical data and clusters them into multiple categories based on visual image characteristics (i.e., RGB components). Later, support vector regression (SVR) is used to link specific mechanical values such as E-static and shear modulus with rock strength and lithology (Fig.5).

Machine learning applications of mechanical stratigraphy identification is implemented to classify lithology contrasts and help predict rock behaviors. This approach is cost and time effective for determining rigidity contrasts and rock strength, with minimal lab testing and rock destruction, after aggregating enough training dataset. The final outcome is a continuous high-resolution mechanical stratigraphy profile which then can be an important input in fracture characterization and subsequently helps in stimulation and development decision making.

Conclusion

Mechanical stratigraphy can be defined by different factors, including rock rigidity, relative thickness of each bed, and the interference contrast between layers. The presence of different lithologies within a stratigraphic unit determines variations in mechanical stratigraphy. These mechanical stratigraphic variations are products of both chemical and mechanical changes on the rock since depositional time.

To understand deformation styles development and geometry, it is critical first to analyze the elastic-plastic deformation model and detect changes in mechanical stratigraphy. These changes are controlled by different layer thickness and rigidity contrast and therefore result in distinguished rock responses and deformation styles such as joint networks and faults.

Although lab and field mechanical stratigraphy data provide a good understanding of rock behaviors, using machine learning applications to identify, quantify, and predict mechanical stratigraphy can be a cost and time effective tool providing inputs and parameters to enhance fracture characterization and field development.

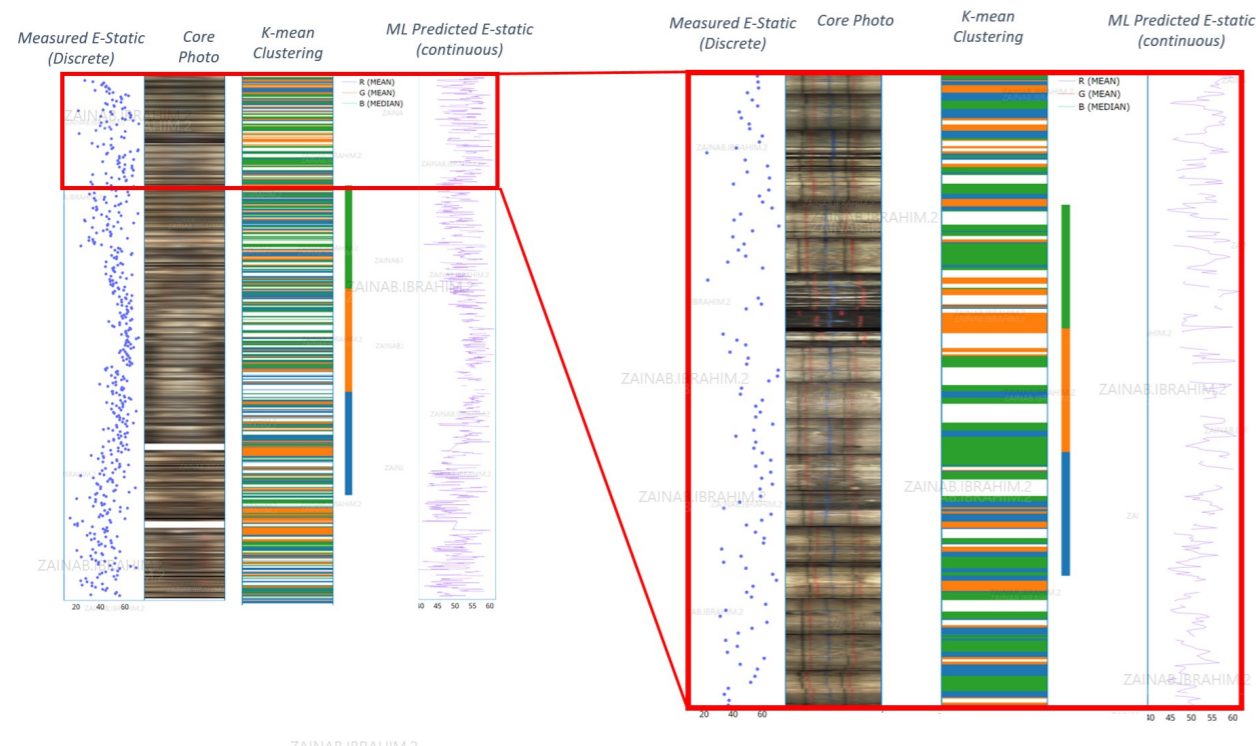


Figure 5: Machine learning application of clustering mechanical data. Core photo along with discrete lab measurements of E-static (GPa) (Right) K-mean clustering of rock types into groups based on image characteristics (RGB) using machine learning workflow (Middle) continuous high-resolution prediction of E-static curve (GPa)(Left).

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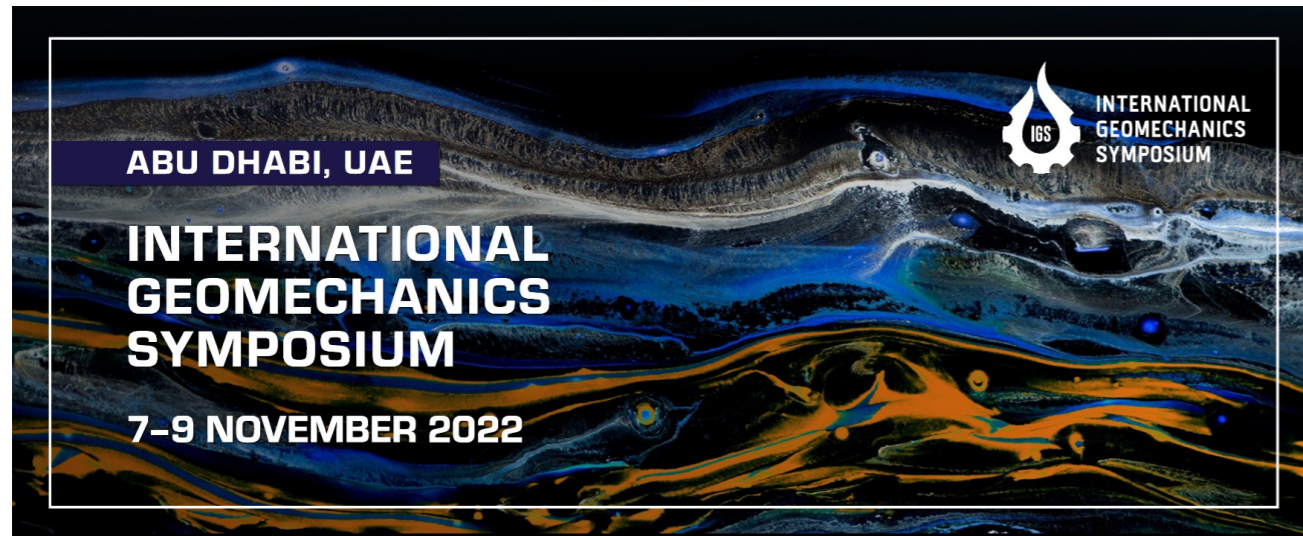
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Call for Articles & Editors

DGS membership has a long history of having specialized experiences in a diverse range of specialties and best practices in the Oil and Gas Industry. Our members are involved in some of the most sophisticated and challenging professions in the exploration for and the extraction of Oil and Gas. The DGS Publication Committee is seeking authors to contribute articles to the upcoming issues of The Oil Drop. To become an editor, submit an article, or ask questions about the suitability of your submission, please contact the Publication Committee at: publication@dgsonline.com



Workshop Topics:

- CO2 sequestration and utilization
- Hydrogen and energy storage
- Rock measurement and characterization
- Digital rock and rock physics
- Shear physics and frictional dynamics
- In-situ stress and pore pressure
- Natural fracture characterization and interaction with hydraulic fracture
- Structural geomechanics, tectonics
- Fault hydromechanical behavior- in situ data and modelling
- Seismic geomechanics
- Drilling geomechanics
- Well integrity
- Completion geomechanics
- Hydraulic fracturing
- 3D reservoir geomechanics for field development
- Production and depletion geomechanics
- Artificial intelligence and data science in geomechanics
- Geomechanics in geothermal and new energies

Partner Societies



Workshop Overview

Theme: The Role of Geomechanics in Energy Efficiency

Energy Efficiency and Energy Sustainability. American Rock Mechanics Association (ARMA), Dhahran Geoscience Society (DGS), Society of Exploration Geophysicists (SEG) are pleased to announce the 2022 International Geomechanics Symposium, to be held on Nov 1-3 in UAE. This symposium is also endorsed by American Association of Petroleum Geologists (AAPG), and Society of Petrophysicists and Well Log Analysts (SPWLA).

The multi-society, multi-discipline, multi-industry event will focus on the role of geomechanics in energy efficiency and sustainability. The symposium will kick off with a legacy training program, "Rock with Fellows", taught by three key speakers Mark Zoback (Stanford University), Herbert Einstein (MIT), John McLennan (University of Utah). The technical program will cover a wide range of geomechanics topics, from rock, in-situ stress, pore pressure, natural fractures, faults, and tectonics to drilling, completion, stimulation, production, and reservoir engineering, and showcase geomechanics applications in CO2 Sequestration, hydrogen storage, geothermal, and new energies. The summit will be an international festival for all rock jockeys from operators, technology developers, service providers, researchers, and students.



Technical Exchange Field trips

Judah FT
"Society of Women Engineers"
26-Mar-22



Loyal Khan
Field Trip Coordinator



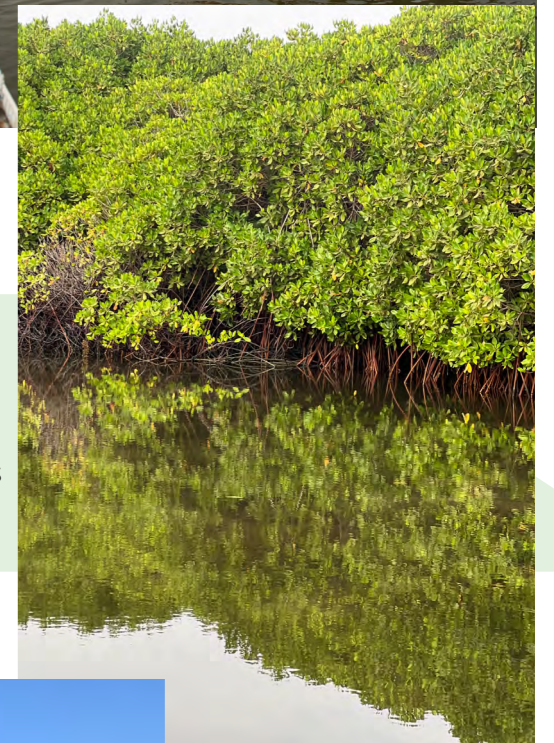
DGS members, Fahad Khunaini, Ammar Banafea and Loyal Khan joined a trip to Judah as geological guides. The trip was ventured by Society of Women Engineers. A newly established society that aims to promote STEM (Science Technology Engineering and Math) to female students. The trip was filled with fun activities and educational experiences, catering to the first cohort of female students at KFUPM.

The guides talked about geology in general, what geologists do in the field and what they look for. Judah's thumb is a known monument and a great example of erosion features. The participants also enjoyed some outdoor yoga and pizza baking.



Jazan FT
"From Land to Sea"
16/18-Jun-22

A unique opportunity for a small group of DGS members to explore the breathtaking natural scenery, rich cultural history and geological wonders of the Southern Region of Saudi Arabia. On this weekend trip, DGS members got to spend the night camping atop the Qahar mountains, and the next day exploring The Farasan islands, a natural archipelago with UNESCO mangrove.



Ali Tammar, prominent sedimentologist at Aramco and avid fieldtrip leader, talked about rocks, and their fascinating structures, particularly how rocks change and differ from the mountains (the source of sediments) to the sea (sediments' destination). The rocks seen spans hundreds of millions of years in the geological record, from ancient basement rocks to baby islands.



The trip also took place in two world heritage sites, national parks and many sites of special scientific and historical interest. Experience the warm hospitality of the south. Indeed, it was weekend full of experiences, discoveries, adventures, and fun!

Technical Exchange Field trips

Land Seismic Acquisition FT "GID" 15-Oct-22



On this day trip, DGS members got to visit a small camp as part of a big seismic project. BGP company welcomed us and enjoyed lunch in the vicinities. They also showed their incredible green initiative, such as burying a seed with every geophone.

The camp had a little greenhouse, self-sustainable camp with processing and quality offices. Special thanks to DGS volunteer Hisham Alsaigh for his valuable contribution.

An incredible and safe trip. It was truly a once in a lifetime experience, outstanding hospitality by GID.

It was well programmed, structured and a safe trip for the participants. The participants learned so much not just on a technical level, but they also gained a distinct appreciation for the magnitude of GID operations.



Technical Exchange

Dammam Dome FT "AAPG workshop" 9-Nov-22



As part of AAPG's "Integrated Emerging Exploration Concepts" Workshop, DGS hosted the Dammam dome fieldtrip with Dr. Rainer Zhulke (EXPEC ARC) and Professor Michael Kaminski (KFUPM) as geological leaders. The fieldtrip consisted of visiting the main outcrops in Dhahran area, namely, around KFUPM and Saudi Aramco campuses.



This field trip explored the Dammam dome in its historical, economic, and ecological significance for Saudi Aramco and the Kingdom. The structure where the first oil exploration wells were drilled back in the 1930s.

It took place in the vicinity of Dhahran, visiting outcrops such as jebel Um Er Rus and Dammam formation outcrops, as well as DMMM-7 wellhead (prosperity well), in Saudi Aramco camp. The participants enjoyed the knowledge-exchange, and to get a brief overview of the rich geological history of Saudi Arabia.



Public Outreach Platform

Dhahran Ahliyya school visit

Elderly care center visit

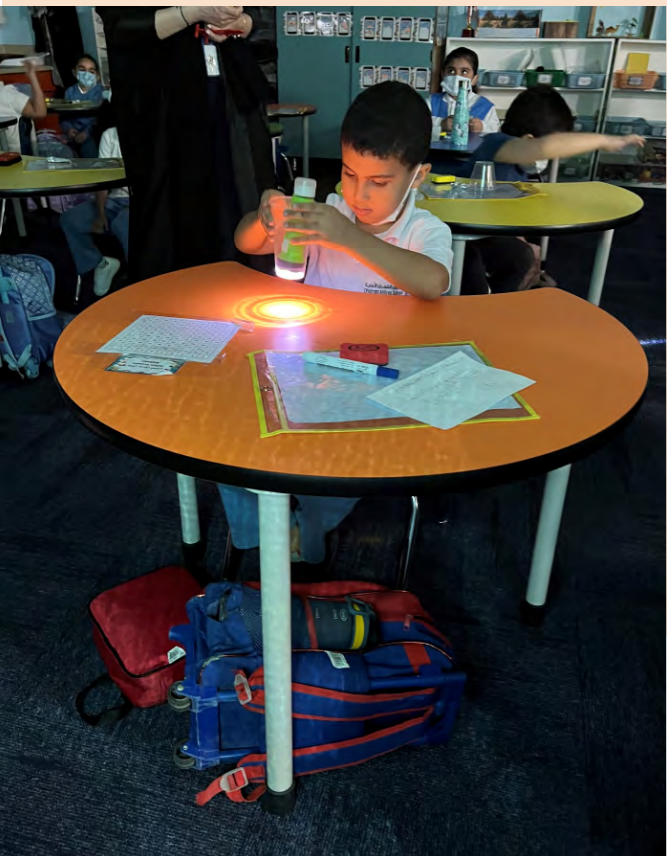


Noha AlLababidi
Young Professional Officer

On Tuesday and Wednesday the 8th and 9th of March, 2022 Dhahran Geoscience Society (DGS) Public Outreach visited Dhahran Aliya School as a part of DGS in Schools series. The event was scheduled for two days from 9:40 till 11:15 which the expert geoscientists and Chemists from Saudi Aramco taught science to 7 classes of first graders. The success of the event is attributed to those who helped from DGS members and volunteers. For that, we want to take this moment to thank them for their remarkable contribution to make this a successful event.



On Tuesday the 20th of September, DGS has celebrated Saudi National day with the elderly with special needs in Dhahran General Hospital. It was a chance to honoring our elderly, and acknowledging their importance as members of the community. The event was from 5pm-8pm and included fun activities, informal talks, traditional foods.



Public Outreach Orphan Movie Day

On Saturday the 10th of September 2022, DGS Public Outreach organized an event for the orphans of Al Bir Charity Society. The event was held in Empire Cinemas – Al Rashid mall from 13:30 pm – 15:30 pm at which our beloved orphans would enjoy their time by a selected movie with snacks and drinks. This was great opportunity to support our local charitable societies and give back to the community.



On the 13 th , 14 th , 17 th of March and 2nd of April DGS arranged for Ramadhan Baskets, volunteers helped with the preparation and distribution of hundreds of baskets for families in need.



Public Outreach Ramadhan Charity basket

Public Outreach IPTC 2022

DGS participated in the International Petroleum Technology Conference (IPTC 2022) that took place in Riyadh, KSA during the period of 21-23 February, 2022. During the three-day conference, the DGS booth experience was very exciting with many activities that attracted many visitors from local companies, university students, international societies, volunteers, and new members!



Saudi Aramco management showing enormous support for the society.

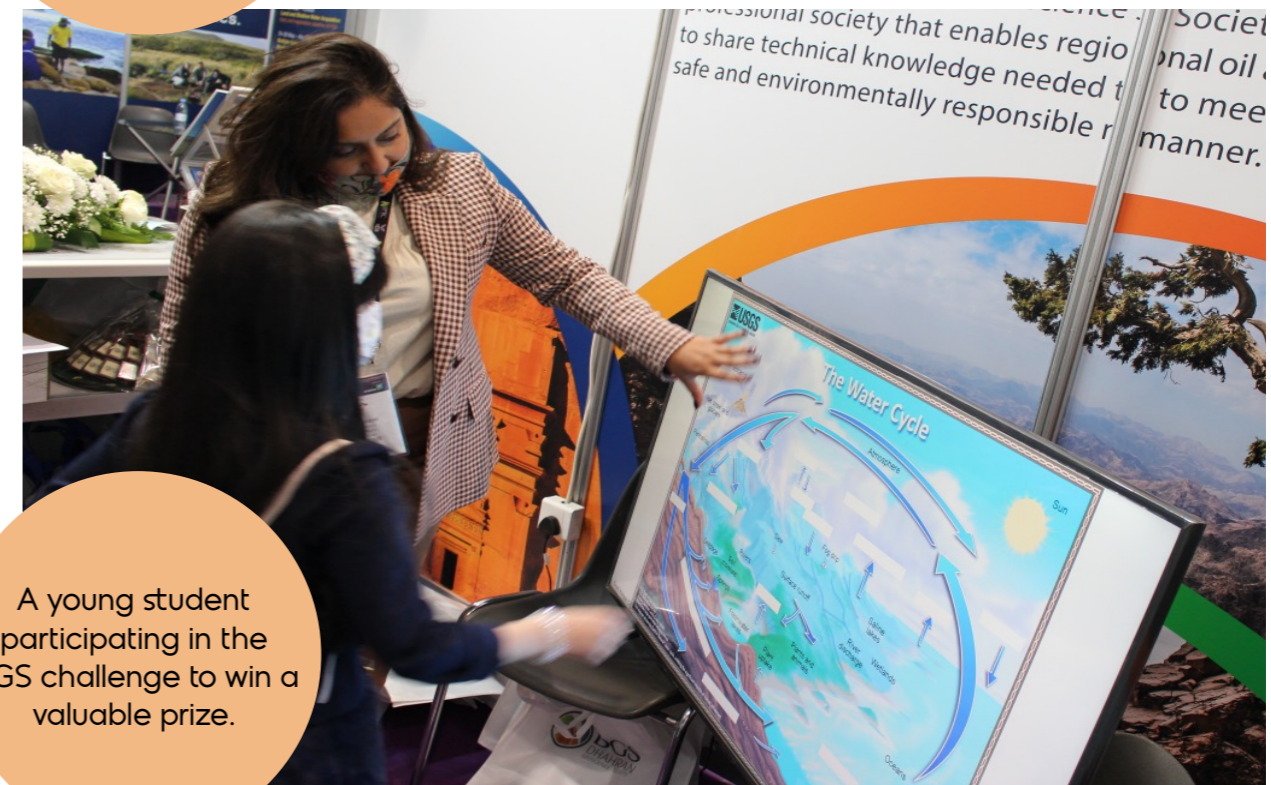


Booth visitors seeking awareness about DGS

Public Outreach



University students were eager to learn about the society and its future activities.



A young student participating in the DGS challenge to win a valuable prize.

Gretchen Gillis

President of the American Association of Petroleum Geologists (AAPG)

Senior Geological Consultant



Interview with Gretchen Gillis – President of AAPG

DGS would like to thank Miss Gretchen Gillis for sharing her thoughts with us. The purpose of this interview is to highlight the journey and achievements that lead you to become the president of the American Association of Petroleum Geologists (AAPG).

• **Q1. Why did you choose to be a geologist in the first place?**

Gillis: My father was a chemical engineer working in oil and gas refineries and LNG. His career led my family to travel to several countries including Algeria, Indonesia, and Kuwait. Because of this, I was always interested in a career that allows me to see the world. I didn't realize geology would be the right path until I started my undergraduate studies when my sister advised me to take a geology course and I found it very interesting. On the other hand, my mother was an English teacher and that helped me tremendously as well later in my career as a geologist.

• **Q2. Was it challenging to find a job as a female geologist?**

Gillis: I decided to earn a master's degree before looking for a job. I studied at University of Texas which led me to start my career in the oil and gas industry. Finding a job was not as challenging as being a woman in the industry because there weren't a lot of women in the industry when I started. One of my tips is to join a supportive network of women. Finding a mentor at an early stage is important. The older I get, the more I value the company of women because I just think their support is really healthy. There are a lot of supportive men but we still have to support each other as women.

• **Q3. How did you progress to become the president of AAPG?**

Gillis: AAPG has always been the society I most belong to, but I also belong to SEG and SPE and other organizations. As a student, I was reading the AAPG Bulletin. Then, I got involved in the activities of AAPG when I started working as a professional geologist in a communications role. I realized then that volunteering at AAPG would help me tremendously in my career. I progressed to joining the publication committee where I held several positions, including the vice chair and then the chair of the committee. Then I became the elected editor which was a wonderful job with a lot of responsibility. Because I was actively volunteering in these societies, I learned early on how to run meeting efficiently, how to motivate the team to increase the productivity especially for volunteers. My dear friend Mr. Sa'id Alhajri said motivated me to run for president, so I have him to thank (or blame!) for me being the AAPG President.

• **Q4. How did AAPG expand your network?**

Gillis: I am interested to know what other people are doing in this industry, because I learn from them. During my 13 years working for Schlumberger, one of my tasks was to report about new technologies. My perception was that a lot of the new technology was first used in Saudi Aramco because Saudi Aramco is a leader in implementing new technology. So, I started knowing more people from Saudi Aramco, and eventually I joined Aramco Americas.

Moreover, as a geologist, having a global network is very important because the scale of our science is the whole Earth. We have to look beyond our borders to understand the full picture of geology.

• **Q5. Have you had the chance to attend any activities organized by our local chapter Dhahran Geoscience Society (DGS)?**

Gillis: Yes of course! The level of engagement is terrific. DGS has a lot of people that are actively volunteering to ensure the success of society. The level of skills is impressive and with each generation we achieve more and expect more from our young professionals. I am so proud to see more women joining Saudi Aramco who are strategic thinkers, unafraid to express their ideas, and very competent at their job. This makes me optimistic about the future of women, Saudi Aramco, and geoscience in general.

• **Q6. The whole oil and gas industry is moving into sustainable energy, what does AAPG offer to support this cause?**

Gillis: AAPG has a lot of initiatives including an active sustainable development committee, a sustainable development competition for both undergraduate and graduate students, a whole division of environmental geoscience, and even the Imperial Barrel Award (IBA) is adding sustainability as a new category in the competition.

• **Q7. How do you see the future of the oil and gas relative to the sustainability goals?**

Gillis: Throughout my career, I've seen the oil and gas industry constantly moving towards cleaner energy. There's a continuous effort into becoming more environmentally friendly and reduce our carbon footprint. In fact, the pandemic showed us how important the oil and gas industry is for medical tools, which depend in most cases on plastic.

• **Q8. Any last message to the DGS members?**

Gillis: I really enjoy visiting DGS events. Collaboration is a great way to exchange our knowledge. Networking is important especially since we've been isolated for the past two years, which is a long time for young professionals not to be interacting with the society. Lastly, volunteering is a lot of work, but the benefits and learnings outweigh all the effort and time. Thank you and hope to visit you soon.

DGS in Numbers



Technical Luncheons

2



Public Outreach Events

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Dinner Ceremony

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GeoTrivia Contests

4



Meet the Expert Abroad Series

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FieldTrips

4



Meet the Leader Series

3



Workshop

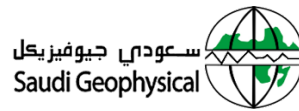
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