SandRose

August 2023

Magazine

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ENERGY

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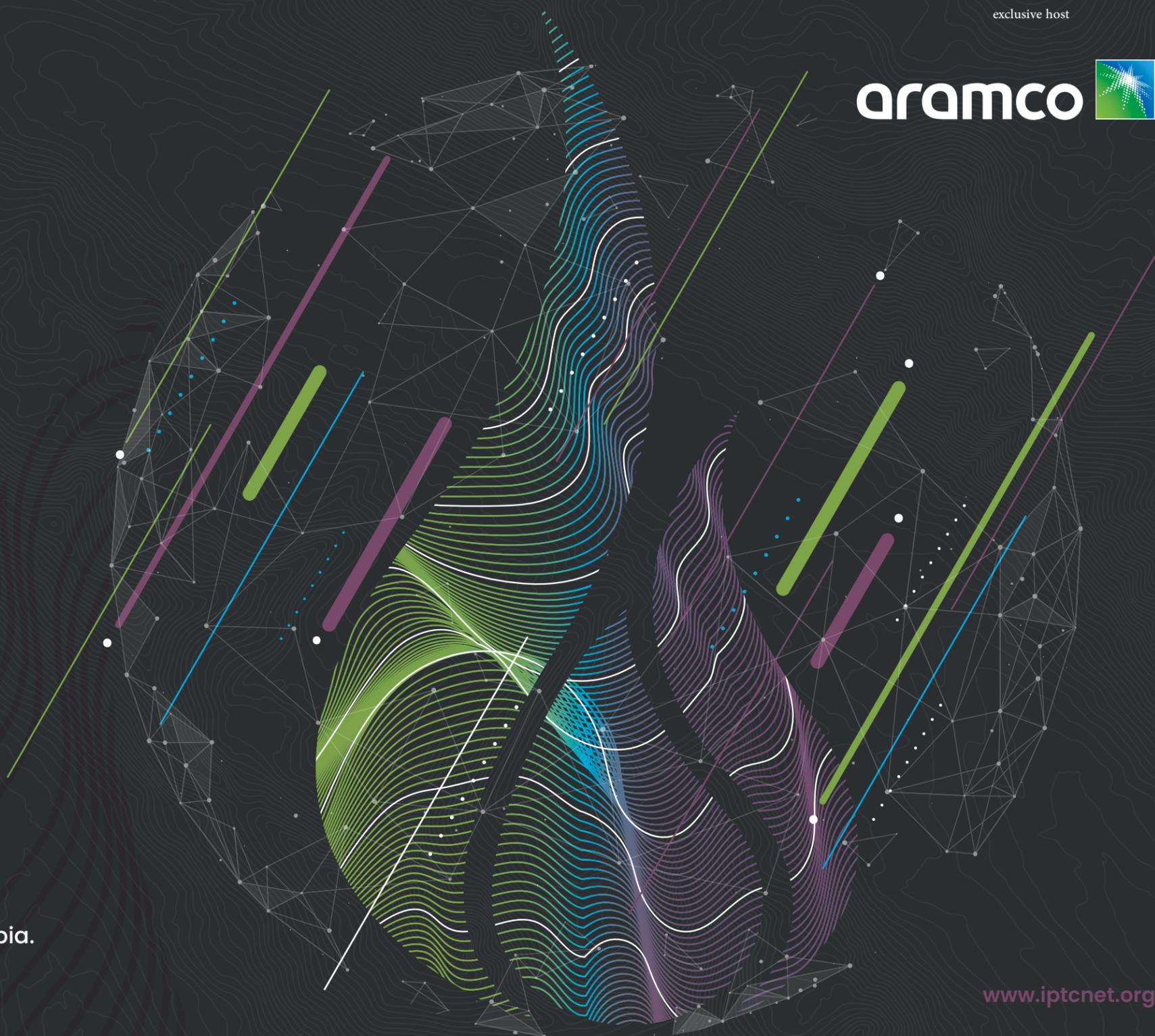
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Unconventional Resources

Sustainability & Environmental, Social, and Governance (ESG)

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IOR/EOR

Reservoir Engineering

Integrated Reservoir Engineering & Geosciences

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Letters from
THE EDITOR-IN-CHIEF

Dear Reader,

It gives me great pleasure to present to you the final edition of SPE-KSA's SandRose Magazine for the 2021-2023 term. This final issue is launched under the theme of "Human Energy", celebrating the industry's greatest resources, its people, and the energy they put into providing the world with reliable and sustainable energy. For this special installment, we address this theme with an exclusive interview on "Developing the Next Generation of Talent within the Energy Industry" with SLB's Chief People Officer (CPO), Carmen Rando Bejar. In this fifth and final issue, we feature some general interest and technical articles from the SPE-KSA community as well as highlighting some of our section's events and activities.

In the spirit of celebrating "Human Energy", we dedicated a page to celebrate some SPE-KSA volunteers for their outstanding contributions and efforts in making the 2021- 2023 term a memorable one. Additionally, we recap some key events and accomplishments from this term from sustaining the accomplishment of being the largest SPE section in the

world and to continuing our record of excellence with award of the section excellence award for the 15th consecutive time, among launching the Diversity & Inclusion committee, reintroducing the Technical and Professional Programs dinner meetings, the expansion of Student Outreach and Young Processional development programs.

To our valued sponsors, editors, readers, and contributors, I thank you. Your interest in SandRose Magazine has allowed it to grow since its inception in the early 2000s from a humble newsletter to a full-fledged magazine with a devoted following. I am excited to see what's in store for SandRose.

Finally, I'm also excited to pass the mantle to the incoming editor-in-chief and longtime editor, Yazeed Aldughaither.

Thank you from the bottom of my heart

We are always looking for talented writers and artists to feature in future issues. Feel free to contact us for feedback or future contributions at sandrose@spe-ksa.org SR

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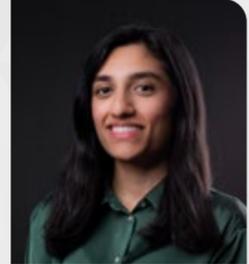
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Letters from
SPE-KSA CHAIRMAN

Dear valued SPE-KSA members,

Over the past two years, the SPE-KSA executive team has built on a decades-long legacy of excellence by providing many initiatives and programs to honor SPE international's mission to connect a global community of engineers and energy professionals to exchange knowledge, innovate, and advance their technical and professional competence in the field of energy.

In the 2021-2023 term, the executive board launched a new identity reflecting the focus on sustainability and digital transformation within the energy industry. Additionally, the team worked diligently to bring back flagship programs such as the Technical and Professional Program's dinner meeting, the Young Professionals and Student Outreach teams' development and outreach programs, and the Trips and Social Activities community events and activities. The term however, also introduced a number of unique programs with the introduction of the Diversity and Inclusion committee with a focus on human capital development with events such as international disabled person's day and women's day and roll-out of mentorship programs. The IT committee has also worked tirelessly to develop a new platform to streamline the event and membership registration processes.

The efforts of the SPE-KSA 2021-2023 executive team have culminated in not only winning the section excellence award for the 15th consecutive time, 12,000 members strong, it has also led the section to sustain the accomplishment of being the largest section in the world.

The success of this term wouldn't have been possible without the support of SPE-KSA team members, sponsors, SPE-KSA board of directors, our section members, and lastly but certainly not the least, our volunteers. Thank you all for a successful term. Finally, I wish the 2023-2025 SPE-KSA executive team all the best in their upcoming term. I am confident that they will continue to build and add on to SPE-KSA's legacy of excellence. SR

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ABDULAZIZ AL-NUAIM
SPE-KSA Chairman 2021-2023

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Event Management Vice- Chairperson

Announcing

THE NEW SPE-KSA EXECUTIVE BOARD

With a successful track record of over 60 years, SPE- KSA has consistently pursued excellence and upheld its legacy. A key aspect of its mission is giving back to the community through knowledge transfer and community outreach activities across various platforms.

Our vision in the 2023-2025 term is to uphold the legacy of SPE-KSA and pave the path toward a sustainable future. We are committed to excellence through the delivery of various exceptional initiatives to fortify our three key pillars: energy, digital transformation, and sustainability SR

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MAHER RAHAYYEM
SPE-KSA Chairman 2023-2025

SPE-KSA 2023-2025 EXECUTIVE BOARD

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MUTLAQ AL-OTAIBI
Logistics Officer

SPE-KSA 2021-2023
End of Term Achievements

After a long and rewarding term, the SPE-KSA Executive Board will now pass the torch to its new members after an achievement-filled two years. This term marked the introduction of a new identity for SPE-KSA which revolves around three key pillars: energy, digital transformation, and sustainability. Despite starting the term with the unprecedented circumstances of COVID-19, the team showed resilience, quickly adapting and recovering from the pandemic, and enabling the return of in-person events. The impact of this term has launched SPE-KSA to new heights with its many legacy outreach events, programs, and initiatives, in addition to a variety of novel programs.

12 committees worked in concert to pour back into a thriving energy industry, with a variety of valuable offerings to disseminate petroleum engineering knowledge, developing professional skills, and nourishing a broad yet tightly-knit community. These programs brought together students and professionals from all levels of experience and sub-sectors of the energy industry in an effort to further bolster these dynamic networks and arrays of experience.

The team founded a new committee for Diversity & Inclusion (D&I), which took confident first steps in fostering an environment that is welcoming to the varied spectrum of students and professionals. This committee garnered a team of 50 volunteers who worked together to organize 10 events with an attendance of 1000+ people. The Information Technology (IT) Committee also took large strides in automating SPE-KSA's operations to transform and align the chapter's broad-reaching efforts.

SPE-KSA also played a significant role in organizing world-class conferences, workshops, and lectures as part of the Conference Management, Young Professional, and Event Management Committees' diligent efforts. Here at SandRose Magazine, we take pride in showcasing our section's achievements and engaging with our readers through interviews, editorials, technical articles, event coverage, and more. The Public Relations (PR) Committee also shone a spotlight on these activities and broadened the range of its beneficiaries. The Membership Committee also boasts the accolade of SPE-KSA being the world's largest SPE section at 12,000 members and counting.

Reflecting on this remarkable term, we demonstrate our commitment to maintaining a legacy of excellence and delivering higher standards of productivity, responsibility, and resilience. As we transition to the incoming SPE-KSA Executive Board, we are confident that our accomplishments will be built upon and transcended.

SPE-KSA **Volunteers** of the Year

Over the past two years, SPE-KSA has launched many successful programs and initiatives giving back to its 12,000 members, the local community and the SPE community as a whole. The success of the term has been made possible due to the efforts and contributions of its many volunteers. In this section, we would like to acknowledge the efforts of some outstanding volunteers who have made the 2021-2023 term a successful one.

ABDULRAHIM AL MULHIM
Petroleum Engineer
Saudi Aramco
Southern Area Reservoir Management Department

Volunteering Team
Student Outreach

"SPE-KSE serves as a gateway for its members to give back to the community. In the student outreach team, it was splendid to collaborate with students and inspire them to grow within SPE's framework to be global leaders in the energy industry. Establishing student chapters across the kingdom exposed me to a diverse network and facilitated my personal and professional development."

ABDULRAHMAN ALRUMAIH
Petroleum Engineer
Saudi Aramco
Southern Area Reservoir Management Department

Volunteering Team
Student Outreach

"During the first few years in my career, SPE-KSA has complemented my technical domain knowledge in the petroleum and energy industry with vital professional skills. Working with student outreach team has equipped me with must-have practical skills that are essential in the future of work such as team work, time management and effective communication which are relevant and transferrable across various roles."

ABDULAZIZ AL-FATHI
Senior Human Resources Assistant
Saudi Aramco
Shaybah Producing Department

Volunteering Team
Trips & Social Activities

"SPE-KSA connects you with an amazing network, exposes you to great volunteering opportunities, and provides you with the spaces to grow personally and professionally. Being a member of SPE-KSA (Public Relations Team) made it easier for me to realize what my passion is. Discovering who you are and where your interests lie will steer you onto the right path in your career and life. My volunteering journey with SPE-KSA has been a highly rewarding and enriching experience with truly a great society."

ABDULAZIZ AL-QARNI
Project Engineer
Saudi Aramco
Refining & NGL Projects Department

Volunteering Team
Technical & Professional Programs

"SPE-KSA has been a great venue to communicate with various stakeholders, explore fabulous experiences and enrich my knowledge about the petroleum sector. My Volunteering on SPE-KSA Technical Dinners was remarkable in terms of connecting with guests and approaching audience. Finally, I was deeply honored and delighted to be part of SPE-KSA team."

ALGHALIA AL KHALIFA
Petroleum Engineer
Saudi Aramco
Reservoir Description and Simulation Department

Volunteering Team
Young Professionals

"I am indebted to SPE-KSA for its unwavering trust and invaluable embrace as I took the first steps in my professional career. This organization took my hand and walked me into a world of endless social and technical opportunities, introduced me to exceptional and inspiring individuals, challenged me to grow and fostered in me a sense of pride and purpose like no other. Being part of such a unique culture is truly an honor."

DANNA KHATTAB
Petroleum Engineer
Saudi Aramco
EXPEC ARC

Volunteering Team
Diversity & Inclusion

"Reflecting on my past two years of involvement with SPE-KSA, I am filled with an overwhelming sense of gratitude and accomplishment. As someone who values giving back to the community, SPE-KSA has provided the perfect medium for fueling this passion. In addition to affording me the opportunity to connect with tremendously talented individuals who have left their mark on me. I eagerly anticipate many more years of contribution to this wonderful organization."

FATIMAH ALNASHWAN
P&PM Analyst
Saudi Aramco
PE&D Financne & Performance Managment Division /
Planning & Performance Mgmt

Volunteering Team
Conference Management

"Over the past five years, I had the privilege of working in various SPE activities which allowed me to grow personally and professionally. The most rewarding part of my experience that I was fortunate to have the opportunity to work alongside people from diverse backgrounds and cultures which helped me as an individual to improve my communication, leadership skills, taught me a sense of responsibility towards others and developed meaningful relationships."

KHALED ALSUBAIE
Petroleum Engineer
Saudi Aramco
Safaniya Reservoir Management Department

Volunteering Team
Technical & Professional Programs

"Last year's experience volunteering with SPE-KSA was nothing short of transformative. I am immensely grateful for the warm welcome I received from all teams and the invaluable opportunity to work closely with the technical and professional programs team. This experience has not only honed my soft skills but also expanded my professional network, fostering meaningful connections with a diverse group of talented individuals. Being exposed to such an array of different backgrounds and perspectives has truly enriched my personal and professional growth. I am honored to have been a part of this dynamic community, and I look forward to continuing to contribute in the future."

NORA ALSUDAIRI
Petroleum Scientist
Saudi Aramco
EXPEC ARC

Volunteering Team
Student Outreach

"To be blessed with the trust of diverse inspirational committees such as D&I, Young Professionals, Information Technology, and especially, Student Outreach to demonstrate SPE-KSA's core values in numerous events and activities was such a rewarding experience on the personal and professional level. During such early beginnings of my career, I was privileged to experience high level management to humble yet essential roles. This exposure has unleashed my energy to reach new heights of empowerment, influence, leadership, and cooperation."

NOUF ALSAAD
Geophysicist
Saudi Aramco
EXPEC ARC

Volunteering Team
SandRose Magazine

"As the Marketing Liaison and Associate Creative Director at SandRose Magazine Publication, I take pride in being part of five successful launches featuring local talents. Reflecting on my experience, I am grateful for the opportunity to have gained valuable insights from tackling different marketing strategies, undergoing real business communication, and adapting to a variety of tasks within and outside my role. My involvement with SPE-KSA has provided me a platform to access valuable resources, explore my passion, and most importantly, express myself with like-minded individuals who share the same values and commitment."

KHLOOD MATAR
Reservoir Management Engineer
Saudi Aramco
Safaniya Reservoir Management Department

Volunteering Team
Public Relations

"Volunteering with SPE-KSA was an incredibly enriching experience that allowed me to exchange knowledge with my peers, acquire new skills, and make meaningful contributions to various insightful initiatives that resonated with me. Through this opportunity I had the privilege of expanding my network and building valuable connections with dedicated individuals who share my commitment in continuously creating a positive social impact."

MOHAMMED HOWSAWI
Drilling Engineer
Saudi Aramco
Drilling and Workover Services Department

Volunteering Team
Trips & Social Activities

"It is a great pleasure to be nominated among the "Volunteer of the Year" by the SPE-KSA executive board. Working with the SPE-KSA Trips and Social Activities (T&SA) Team provides countless opportunities to meet and connect with a lot of great and inspiring individuals who are keen to support interpersonal growth and to enrich personal experience. Followingly, the collaboration in drafting the SPE-KSA T&SA events highlights to be posted on the SandRose magazine has allowed me to practice my passion for writing. Thanks to SPE-KSA Section for the great opportunity and wish a prosper future on the forthcoming terms."

OTHMAN AL-DRAWEESH
IT Tech / SVP Staff
Saudi Aramco
PE&D Business Support Division / PE&D Admin Services Unit

Volunteering Team
Information Technology

"My SPE-KSA journey has been a very eventful and enriching experience since I joined as a new hire. I have been practicing what I learned and applying a lot of my academic knowledge and putting it to good use. And, I cannot stress how this experience made me grow, opened many new horizons and gave me great opportunities that I wouldn't have if not for SPE-KSA organization as a whole. Thank you for highlighting my effort throughout the year and I feel truly proud for being nominated for SPE-KSA's Volunteer of the Year."

REEM ALBUKAIRI
Reservoir Engineer
Saudi Aramco
Safaniya Reservoir Management Department

Volunteering Team
Public Relations

"As you strive for excellence in your career, SPE-KSA fuels your aspirations by the boundless opportunities it offers. Being a member of the Public Relations team, I was responsible for managing the organization's image across various digital platforms, increasing the visibility of its accomplishments to a wider audience of professionals. What made my experience truly rewarding was the chance to continually improve my abilities and unlock new opportunities for advancement, laying a solid foundation for long-term success. With SPE-KSA, individuals are empowered to illuminate their path towards a brighter future in the ever-evolving energy sector."

Developing the Next Generation of Talent within the Energy Industry:
An Interview with SLB Chief People Officer, Carmen Rando Bejar

The oil and gas industry is facing a number of challenges, including the need to balance increasing demand for energy with the need to reduce emissions and move toward clean energy systems.. The industry needs to attract and retain a talented workforce to meet these challenges.

SLB is a leading global technology company that is committed to developing the next generation of talent within the energy industry. For our cover story and the main article for this issue, we interviewed SLB CPO, Carmen where we discussed the current state of affairs within the energy industry, SLB's approach to talent development, the skills that are needed for the future of the energy industry, and how the industry can attract and retain the next generation of talent.

INDUSTRY BACKGROUND

The energy industry currently lies at a crossroads where technology adoption is no longer a luxury but rather a necessity to meet energy transition ambitions. However, a McKinsey research study revealed the industry sector where digital natives (Generation Y or millennials) would least like to work is oil and gas– with 14% of respondents admitting they would not seek a career due to its perceived negative image. Some of the criticism is attributed to the rigid hierarchical management infrastructure where innovation and ideas are overlooked and a slowness in embracing newer ways of operating. Millennials are no longer a small group of new university graduates; in many oil and gas companies, they occupy managerial roles and are starting to climb into the executive ranks. Therefore, the need to evolve to retain and attract talent is more pressing than ever to meet energy demands and thrive in the era of new energy.

> **Q1) The energy industry has a perceived negative image (impact on climate change and low-tech adoption), how can energy companies combat this perception?**

The industry needs to clearly articulate its value proposition.

I am convinced that, for those who have the desire to make a positive, meaningful, and lasting impact in society, for those with a taste for technology and science, our industry is the place to be. But we need to be able to clearly convey the message.

The world needs more energy. For most of the world's population, access to energy doesn't mean more comfort, as is the case in developed countries. It means a greater life expectancy. There is a direct correlation, as shown by the IEA. So, access to energy for many means access to LIFE.

And at the same time, we must also protect our planet, and there is great urgency on that, as in this aspect too lives are on the line.

So, we, as humanity, have a great challenge ahead of us. Providing sufficient, reliable and affordable access to clean energy to meet the world's needs. At SLB, we refer to this as the "world's greatest balancing act".

And this trilemma will only be addressed through science, technology and digital innovation, in combination with evolving regulations, relevant financial mechanisms, and government incentives.

Our industry encompasses many essential capabilities. We have a wealth of talented, expert scientists and engineers; we have long been in the business of developing innovative technologies and solutions to address some of the most complex challenges that exist; and we have an in-depth knowledge of the energy systems. Nobody is better positioned than us to help solve the energy trilemma.

I also see a huge desire from many people—both inside SLB and across the wider industry—to make a positive impact for the planet.

If you want to drive change, our industry, the energy industry, is the place to be.

We also need to educate public opinion. I hear statements about low levels of tech adoption, for instance. How is that possible? We create cutting-edge technology to be used in the most extreme conditions and environments there are! We need to do a better job of explaining this to society.

Last, and very importantly, we need to join forces. As members of this industry, we need to collaborate to address this negative image that does not reflect who we are and where we are going. Within the industry, we need to constantly raise the bar for each other when it comes to delivering on the decarbonization of our own industry and on the transition to a new energy landscape, and externally we need to be consistent in our message. We need to both listen and speak up, and educate society while remaining open and humble.

> **Q2) The new generation of potential employees has a different view when valuing future careers, younger generations consider company values and social impact as important factors for future employers. What can the energy industry do to enhance that image? What is SLB doing in this regard?**

First of all, our industry needs to continue to embrace sustainability. We need to be committed to decarbonizing the energy systems, and we need to be able to demonstrate that commitment through tangible and quantifiable initiatives.

Beyond climate impact, we need to show our leadership when it comes to social impact. Many of us have been leading the way on employee health and safety; we need to continue extending that leadership into labor standards, community engagement or diversity and inclusion, among others.

And we need to lead with determination and commitment—but also with transparency. Because leading with transparency promotes accountability, builds trust, drives improvement, and addresses global challenges more effectively.

At SLB, we have an unwavering commitment to sustainability in all its dimensions. It is an integral element of our strategy, and what better way to publicly display our commitment than to make it part

of our new visual identity. Last October, we launched a new identity focusing on energy innovation and decarbonization to address the world's energy needs today and to forge the road ahead for the energy transition. Our new logo represents the carbon budget curve, showing the emissions reduction required to achieve the Paris Agreement. But it is not only a logo. Behind the logo stand all the actions that we are taking to deliver innovation at speed and scale across the energy landscape to pave a path to net zero and beyond. Our recently published Sustainability report shows our actions to address our three priorities: Climate Action, People, and Nature. We believe that these actions are the responsibility of each of us, so we have allocated sustainability KPOs to all our incentivized employees with the aim to empower everyone to prioritize emissions reduction actions, focused on our Scope 1-3 emissions.

We are also leading with transparency when it comes to diversity and inclusion. Women comprised 30% of our executive team at year-end 2022 and represented 23.8% of all salaried positions. In 2022, SLB released its first global Women and Pay report relative to 2021 performance. It was a pioneering act in the energy sector, aimed at increasing the transparency of our pay practices to employees and external stakeholders and supporting joint efforts industry-wide to further attract female talent.

This report also serves as an accountability mechanism for SLB's gender balance targets, including our goal of having 30% women in our salaried workforce by 2030. Our purpose is to create amazing technology that unlocks access to energy for the benefit of all. It is what drives us. We are passionate about ensuring progress for people and the planet, on the journey to net zero and beyond. The drive, the ideas and the contributions of our exceptional and diverse people can help to move the world forward.

Q3) What steps can the industry take to become more attractive to the youngest generation of workers, Gen Z?

The new generations are looking for a relationship with their employers beyond receiving a paycheck. They are looking for a purpose. As an industry, we need to be ready to articulate that purpose—and of course we need to be committed to deliver on it. This is what I described earlier.

The generations that we are recruiting nowadays are digital natives. And of course, they want the same experience in their professional lives that they have in their personal lives. From that perspective, digital at work is a must-have. The industry needs to accelerate digital adoption, for all the good business reasons, but also to be able to offer it as part of the employee experience for the digital-savvy generations.

New generations are looking for flexibility in their working arrangements. We should leverage our experience during the pandemic to provide opportunities for flexible working.

Historically, our industry has been associated with a leadership style of control and command. The new generations are looking for authentic leaders that acknowledge and support them as human beings to reach their full potential . This means we need leaders that are ready to show vulnerability, humility, and compassion, adopting a style of leadership that shows care, and promotes development and well-being, both at work andin their personal lives.

Q4) How can organizations prioritize the development and retention of younger generations while balancing other strategic challenges, such as sustainability and digital transformation?

These priorities go hand in hand, as a healthy talent pipeline is the foundation for any successful business strategy.

To deliver on your company's strategic directions, you need a competent workforce capable of addressing the challenges of an ever-changing world and innovating at scale. To get your workforce ready to deliver on these aspects, development is key and needs to be prioritized. For that reason, training and development of the workforce need to be understood as an investment, not a cost.

What we want is to maximize the return on that investment. This can be achieved through a combination of three things:

- Investing in your talent to build workforce competencies aligned with your strategy.
- Developing learning systems to enable employees to be productive in these new competencies and skills as quickly as possible.
- Leveraging technology through a blended learning system that delivers a combination of instructor-led training and virtual training, as this will be more effective and decrease your cost.

I believe that having those capabilities and providing these opportunities to our employees is highly motivating. This is about ensuring that the skills of our employees remain compatible with our needs, as much as it is about providing the opportunity to our employees to remain relevant in a fast-evolving world in such a way that they do not feel the need to leave the organization to remain up to date.

It is a very compelling value proposition for our current and future talent to excel in this evolving industry that offers so many exciting opportunities.

The energy industry is facing a number of challenges from meeting the growing energy demand to aiding the energy transition and meeting climate ambitions. While this won't be easy, it is an exciting opportunity for the next generation of talent to make a global impact, and there is plenty of space, especially for those who are driven to solve the world's most pressing problems, and who are motivated by the possibilities of technology and science. If the industry can adapt to the needs of the next-generation workforce, it will be well-positioned for success in the years to come.

To read SLB's sustainability report visit
https://www.slb.com/-/media/files/sustainability/2022/sustainability-report-2022.ashx

TAQA
ENERGY
FROM WITHIN
OUR PEOPLE

The growth journey at TAQA began a few years ago with a well-defined strategy and key milestones to position the company among the leading international Oilfield Services and Equipment companies, delivering value to our shareholders, customers, and above all, our people.

To drive this exciting journey to success and maximize value, it was imperative that we cultivate the energy of our key stakeholders. We believe that energy takes its most authentic form in people. Whether it is the positive impact that an individual's energy has the potential to create, or the union of many to collaboratively achieve, the power of human energy is at the center of all progress. This collective power proudly defines us as a people-centric organization.

Our stakeholders are key enablers of our strategy, central to our core values, and the driver of all key initiatives within the organization. Our strategic direction as an organization, is provided by our shareholders and customers, and we keep moving in that direction, on our growth trajectory, by harnessing the energy of our people.

Accordingly, we foster a workplace culture that is conducive to building, maintaining, and promoting optimal levels of energy that empowers our people and inspires innovation. We invest in our people through fulfilling career opportunities, recognizing and rewarding performance, and nurturing career development. All this has proven to be pivotal to our growth and success. We celebrate our wins, big and small, which reinvigorates the energy among our people and the organization, which by virtue extends to our customers and stakeholders.

This energy from within is demonstrated by the high employee engagement levels achieved at TAQA over the past three years, consistently exceeding the industry benchmarks. This is a testament to the One TAQA culture fostered within our organization and the many other contributing factors, such as our Leadership Brand, our Employee Value Proposition, and the carefully crafted Employee Journey.

We are committed to maintaining high levels of energy and employee engagement and leave no stone unturned to tailoring each employee's experience and journey at TAQA. We strive to ensure that this experience is consistent at the organizational level, at the same time, customized to each employee's performance and interests. A plethora of digital platforms are made available to our employees, which in turn provides our HR team with crucial data to construct bespoke employee experiences.

A consistent area of strength in the annual employee engagement survey "Empowerment" of our employees resulting in optimum energy levels central to our ongoing success. Not only do these possibilities energize our employees, but the organization benefits considerably from business continuity and talent retention. Another area of our strength is the resulting positive "Workplace Culture "at TAQA. Powered by a robust policy framework, steered through strong leadership, governed by stringent codes of conduct, and executed by capable employees on the ground, we at TAQA are proud to foster a culture conducive to building, maintaining and promoting optimal levels of energy within the company which is foundational to building a world-class oil field services organization.

As we progress towards our next milestones, TAQA is committed to continuously investing in nurturing its "Energy from Within" which will propel us to achieve an Employer of Choice status soon.

We pledge to always be "The Enabler of Energy", committed to value-creation, economic growth, and long-term sustainability.

Member Spotlight

In this section, we select a distinguished member of the SPE-KSA community to highlight in each issue.

FAST FACTS

Name:

Ibrahim Moussa

Job title:

Managing Director-SLB, Saudi Arabia & Bahrain

SPE involvement:

SPE involvement: Executive Sponsor of SPE-KSA

1) Why did you decide to join the energy industry?

The excitement of the adventure, the global and local aspects of the industry, and the sheer scale of the projects drew me in. It is an industry made by those who think big and manage to successfully combine science, engineering, and business acumen to realize humanity's vital need for energy. Over the years, as I gained more insights into the industry, I developed a great sense of pride in being part of this community of dedicated professionals who, in simple terms, feed the world with energy, enable socio-economic development, and drive progress. Today, energy is more than ever central to humanity's prosperity, but at the same time, we need to rethink the whole ecosystem to preserve our planet. We all must wear our pioneer's hat again and embark on this mission, hence being a leader in this industry today is even more fascinating.

2) What event, person, or life experience has had the most influence on the direction of your life?

Different experiences have an impact on how we live our lives and choose our careers. Some people may be inspired by a mentor who has achieved success in their field, they can be motivated by overcoming a personal challenge or by reaching a significant milestone. When I started on the job, I interacted with numerous colleagues from a variety of backgrounds, cultures, and disciplines, all working together towards a common goal. This diversity, which is unique, enriches the working environment and brings about multiple approaches and talents. Working, learning, and socializing together in a camaraderie spirit with mutual respect in a borderless environment has made me a true citizen of the world. By this, I mean that our rich and multicultural working environment has taught us tolerance, openness, and curiosity to an all-new level.

3) What does SPE mean to you?

(SPE) is a dynamic organization that provides technical knowledge, training, networking opportunities, innovation, and best practices for the community. Members may also benefit from technical training and career development opportunities that can help them achieve their professional career goals. Developing young talent, progressing the industry, and cross-pollination of ideas between community members have a high impact on the development of careers, as observed every day in our domain and community. It is a privilege to work in that industry, and it is our role to open to others in the wider energy industry who are not aware of the complexity, precision, and technological innovation aspects of our operations. This spirit of pioneering and innovation has advanced the oil and gas industry to where we are now. I firmly believe that this same spirit and knowledge will serve the world again as we diversify our energy sources through the energy transition. SPE plays a crucial role on this journey as a backbone for young talents and the future of our industry.

4) When you're not working, how do you enjoy spending your time?

While it may seem that being at the helm of a very large operation with thousands of team members does not allow time for off work routines, those mental breaks are crucial, even if brief, to re-energize, inspire, and ultimately a testament to one's ability to plan and be ahead of the curve. I cherish the time I spend with my family, hiking trips, engaging in cultural activities and events, and reading stories and insights about the different corners of the world. I have learned over the years to protect the time for hobbies. They keep the mind sharp and provide a wider view of the world.

5) What are you looking forward to in the future?

I must admit I often wake up with the belief that we are about to achieve something memorable here and now. With SLB's nearly 100 years of passion for science and technology combined with the Kingdom of Saudi Arabia's drive to strive in a new energy and economic future, I see all the elements aligned to achieve a historical leap forward. And I see that Saudi has it all: oil and gas, solar and wind, hydrogen and energy storage, geo-energy and CCUS, etc.

We are fortunate to be living and operating in Saudi today, teaming up with passionate and talented people acting together for a brighter future.

6) Advice you would give to other SPE members?

Never lose your curiosity. Our industry has a great journey ahead. Leverage your network and the fantastic opportunity that SPE offers us all to connect and further personal and collective goals. Be sure to enjoy the ride! Let's embrace the opportunities ahead and work together to create a brighter and more sustainable future for the energy industry and the generations to come.

Proxy Modeling of Hydraulic Fractured Wells using Machine Learning and the Subsequant Transfer learning for Estimating of Half Fracture Length

By Uchenna Odi, Aramco Americas, Kola Ayeni, Nouf Alsulaiman, Karri Reddy, Saudi Aramco, Kathy Ball, Chevron, Mustafa Basri, Cenk Temizel, Saudi Aramco

INTRODUCTION

Transfer learning is a powerful machine and deep learning method that allows knowledge gained by training for one task to be transferred to a similar task. It is widely used in computer vision, natural language, and other unstructured data modeling problems where training a model without prior knowledge can take considerable time and iterations. When utilized, transfer learning can save on training time while providing accuracy that translates to business value.

To understand the uniqueness of transfer learning machine consider Figure 1 which illustrates the working setup of traditional machine learning and transfer learning. In traditional machine learning, two models are constructed to estimate domains A and B separately. However, in transfer learning, knowledge gained from training on domain A is used to model and predict domain B.
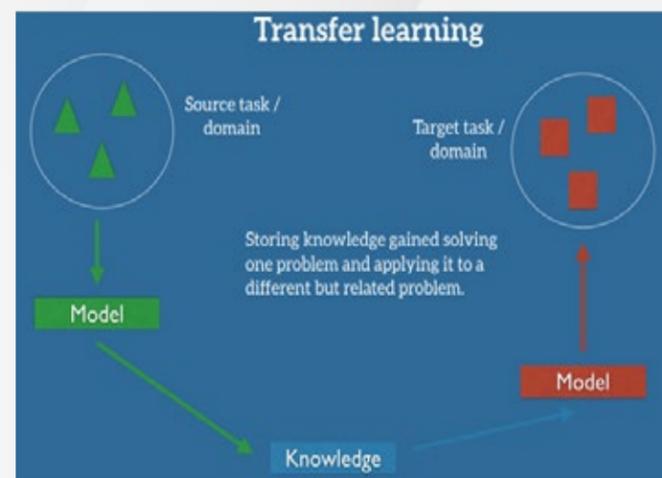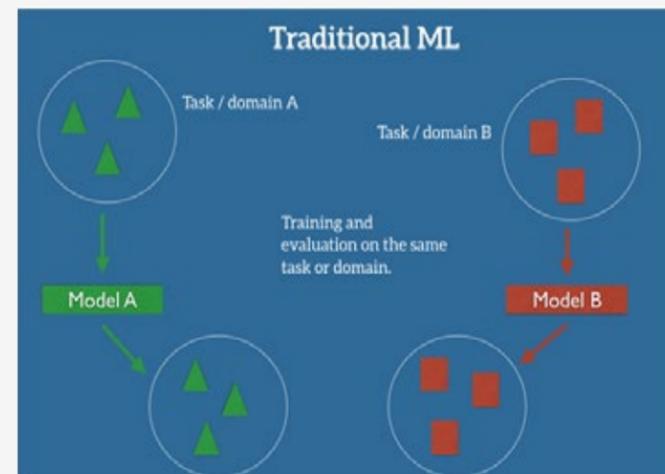

Figure 1: *Traditional supervised learning vs. transfer learning setup (Ruder, 2017)*

As consequence of transferring knowledge from domain A to domain B, more business value is realized when compared to directly spending time and resources to separately train domain A and B separately. This business value of transfer learning is apparent for oil and gas operations where solutions to technical challenges hinge on the amount of capital used to attain the respective solution.

Because of the potential business value in oil and gas, others have applied transfer learning to various types of upstream energy problems. Liu et al. (2020) proposed a joint distribution adaptation based Extreme Gradient boosting transfer learning approach to estimate water adsorption of sublayers in water injection well. For their work, machine learning models were trained on historical injection profile of wells to predict the injection

wells of new wells. The authors' application provided accurate results using transfer learning methodology. The scheme of the proposed workflow is shown in Figure 2 and illustrates a joint distribution adaptation to transfer knowledge obtained from a trained source well block to the target well-block with no injection. The machine learning model was Extreme Gradient Boosting and it was used build a predictive model for water absorption.
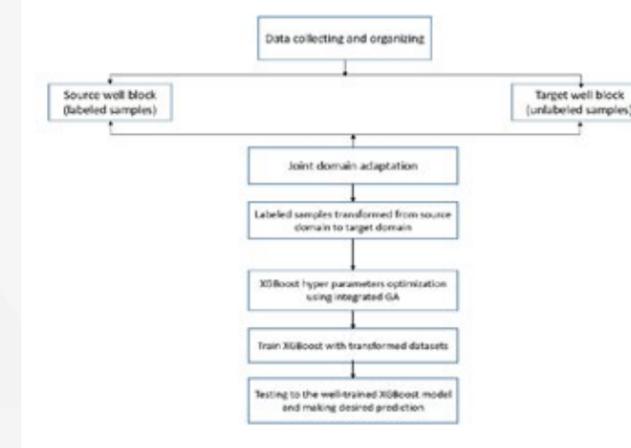

Figure 2: *Workflow of the proposed method (Liu et al. 2020)*

Ma et al. (2020) studied gas adsorption in metal-organic frameworks using transfer learning. Metal-organic frameworks (MOF) are considered one of the most promising materials for gas adsorption due to their nano-porous structures. Ma et al. introduced an inductive transfer learning approach for maximizing the accuracy of machine learning models using a limited number of adsorption gas data. The authors

did this by first training a deep neural network (DNN) with a database of 13,506 MOF structures for predicting the adsorption capacity of gases. The trained model knowledge was then transferred to another DNN model (with a small number of data, 100 data). It was found that knowledge learned from the source task significantly increased the prediction accuracy of the other model. Zini et al. (2020) published a seismic data analysis study for bright spots detection using a deep transfer learning framework. Bright spots are considered strong indicators for hydrocarbon accumulation. Adopted machine learning methods using classification workflow and feature extraction are effectively utilized on 2-D seismic with an 85.4 % F1 score. For this deep learning image classification approach, Zini et al. (2020) implemented data augmentation and inductive transfer-learning methods to overcome the limited data challenge, which is a common issue while performing the training process. As result of their approach, Zini et al. (2020) was successful in detecting bright spots from seismic data using convolutional neural networks (CNN).

Zheng and Wang (2020) investigated applying a deep convolutional neural network for oil spill detection. They used a big data set (including 20,000) from Synthetic Aperture Radars (SARs). The massive data set was trained with a deep convolutional learning network (DCNN) for oil spill detection. The workflow of the proposed DCNN is shown in Figure 3. The data set was carried out using Adaboost Multi-Layer Perceptron (AAMLP) for transfer learning in three possible networks, and the

best network was used as the leading network. Since the hyper-parameters and the architectures were adjusted, the network no longer needed transfer learning. The data augmentation process was performed only on the training data.
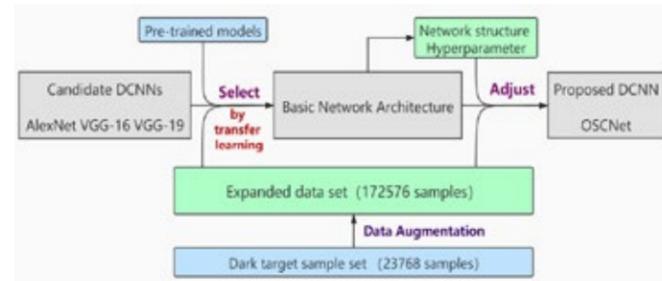

Figure 3: *Flow diagram of the proposed DCNN (Zheng and Wang, 2020)*

Transfer learning has been widely used in geophysical studies. Specifically, it is used to interpret the seismic data better and increasing the quality of seismic data. Jreij et al. (2018) used transfer learning in a convolutional neural network to quantitatively analyze the added value of surface distributed acoustic sensors in sparse geo-phone arrays. Hu et al. (2019) performed a progressive deep transfer learning study to cycle-skipping full-waveform inversion. They reconstructed the absent low-frequency data by deep learning networks involving dual data feed and progressive transfer learning. A nonlinear relationship between different bands was created. One of the most important outcomes of their study is that the model did not require any prior information of the subsurface geological data.

Xing et al. (2018) studied transfer learning applications on synthetic data to improve faults continuity. Faults are defined as planar fracture shape discontinuities created as the result of tectonic movement in a volume of rock. Manual fault interpretation required too much time and effort. It is more efficient to use automatic fault interpretation, which involved calculating edge attributes and fault likelihoods and extraction of fault surfaces. Xing et al. (2018) proposed a transfer learning method that uses synthetic circle data. The circle data had different connectivity balancing on curvatures and dips. The proposed method was also applied to fault likelihood data with discontinuity. Synthetic data was

trained with convolutional and fully connected layers, and the trained models were then used to track faults for testing. Promising results were obtained from the tests performed on synthetic circular datasets and on real fault datasets. As shown in Figure 4, the input discontinuity is improved using the transfer learning method with different techniques. The black ellipsoids show the connected discontinuities. The study concluded that using transfer learning from synthetic circle datasets can significantly improve fault detection.
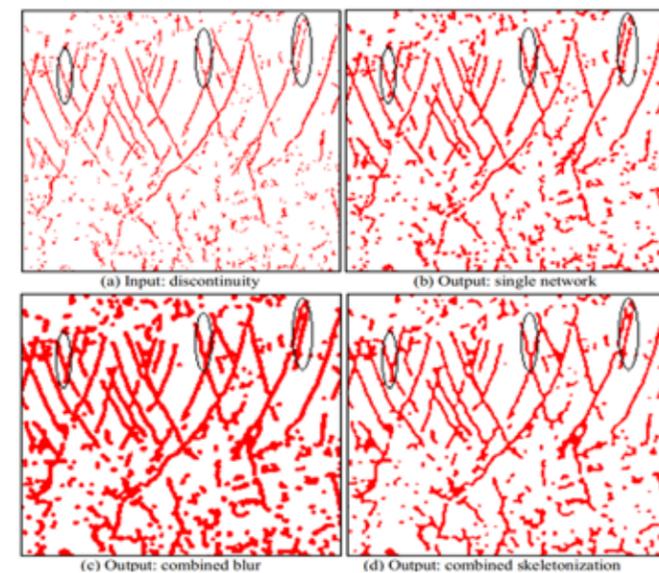

Figure 4: *Test results on fault tracking using Hca dataset (Xing et al. 2018)*

In this work, transfer learning is applied to shale gas production for two tasks. The first task was history matching half fracture length across an area of interest. The second task was predicting gas production. To understand the two applications of transfer learning introduced in this work, the generalized methodology and procedure of both proposed applications is discussed.

METHODOLOGY

In the context of shale gas reservoirs, transfer learning is utilized by training a machine or deep learning model on existing shale data for a specific task with specific characteristics and applying it to an area of similar characteristics for a similar task. Pan and Yang (2009) explained mathematically the general concept of transfer learning. These authors mathematically conceptualized

transfer learning by considering a domain consisting of a feature space and corresponding marginal probability distribution expressed as the following expression.

$$D = \{\chi, P(X)\}$$
....(1)

Where D, corresponds to the domain consisting of a feature space, χ, and marginal distribution, P(X). X is series of data points paired to target points Y in the target output space, γ, expressed as the following.

$$X = \{x_i, ..., x_n\}, \ x \in \chi$$
....(2)

$$Y = \{y_i, ..., y_n\}, \ y \in \gamma$$
....(3)

Pan and Yang then defined a machine or deep learning tasks in the same language as the domain space in the following expression.

$$T = \{\gamma, P(Y|X)\} = \{\gamma, \eta\}$$
....(4)

Where T represents the task domain consisting of a target output space, γ, and the function, η, which predicts y_i as a function x_i. Transfer learning can then be defined as learning the target conditional probability distribution, $P(Y_T|X_T)$, in the target domain, D_T, by using the information trained from source tasks, T_s, in the domain, D_S.

Applying the generalized transfer learning methodology to half fracture length and gas production rate requires creating a predictive model that trains from a known domain consisting of shale gas data, and then transferring the conditional probability generated by the machine learning tasks onto the target domain. The application and procedure for transfer learning for half fracture length is discussed which uses several novel components.

Transfer Learning for Half Fracture Length Prediction Inferring half fracture after a hydraulic fracturing task can be difficult and generally requires several history matching iterations in a finite difference simulator. In this work, transfer learning is used in conjunction

with hydraulic fracturing simulation and probabilistic sampling. Specifically, the procedure for applying the transfer learning methodology to half fracture length prediction involved utilizing a hydraulic fracturing simulator, Monte Carlo Sampling, and machine learning. The steps of this process are outlined as the following:

1. *Generate sensitivities using Monte Carlo sampling related to hydraulic fracturing in shale reservoirs.*
2. *Run each hydraulic fracturing sensitivity in a hydraulic fracturing simulator and store as a central data set used for machine learning training. This data set serves as the source domain for transfer learning.*
3. *Create machine learning model of half fracture length using the generated hydraulic fracturing sensitivities as inputs and the corresponding half fracture length as a target parameter. This generalized step serves as the source task.*
4. *Appy machine learning half fracture length prediction across target domain.*

For the first step, generating sensitivities of hydraulic fracturing, parameters ranges were defined for subsequent probabilistic sampling. Table 1 corresponds to the parameter ranges sampled that described a hydraulic fracturing process in a wet gas to dry gas reservoir.

Parameter	Minimum	Maximum	Probability Distribution
Fracture Half Length, ft	100	600	Uniform
Lateral Well Length, ft	1,000	12,000	Triangular
Number of Fractures	5	600	Uniform
Permeability, mD	.0001	.1	Lognormal
Porosity	.01	.13	Uniform
Formation Thickness, ft	10	1,000	Uniform
Gas Gravity	0.55	1.6	Uniform
Surface Pressure, psia	300	1,000	Uniform
Reservoir Pressure, psia	5,000	10,000	Uniform
Reservoir Temperature, oF	200	300	Uniform
Producing oil (condensate) gas ratio, STB/MMSCF	10	313	Uniform
Tubing Diameter, in	2.5	5	Uniform
Formation Depth, ft	1,000	15,000	Uniform

Table 1: *Hydraulic Fracturing Sensitivity Parameter Ranges*

Using the parameter ranges, 2,000 realizations of hydraulic fracturing were randomly generated using Monte Carlo sampling. For the second step of the proposed process, these realizations were simulated in a hydraulic fracturing simulator which models a hydraulically fractured well where the interference between each fracture is accounted for using spatial superposition theory. Using superpositioning theory,
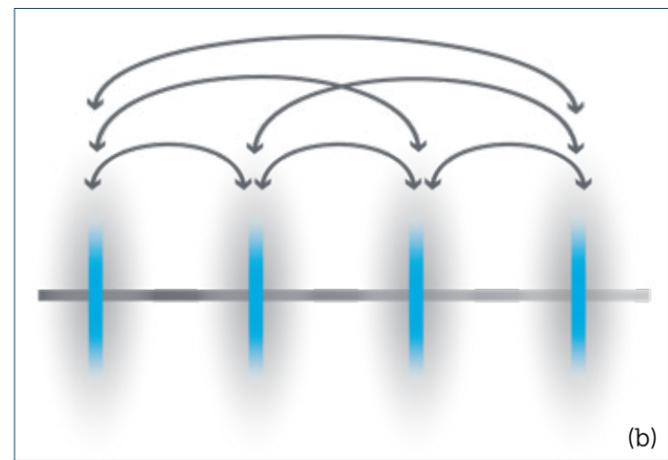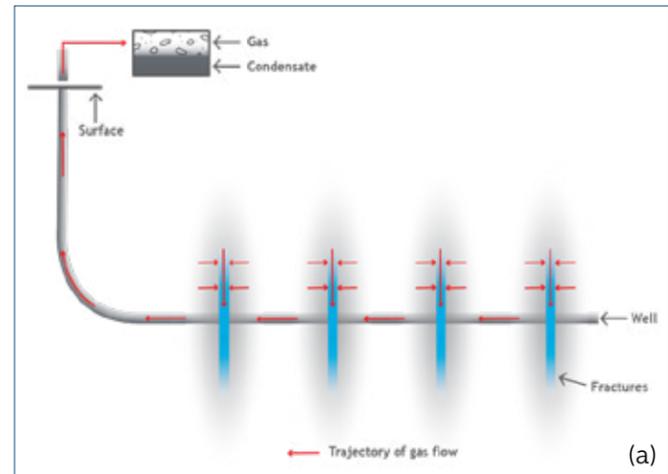

(a)

(b)

Figure 5: *Generalized Hydraulic Fracture Simulator Schematic and Assumptions (a) Hydraulic Fracture Single Well System (b) Interference Between Each Fracture.*

the interference between each fracture was modeled and accounted for in a matrix expression which incorporates respective pressure drops and rates from the fracture well system. For example, a four fracture system results in a four by four matrix represented in the following expression.

$$[p_{D11} \, p_{D12} \, p_{D13} \, -^1 \, p_{D21} \, p_{D22} \, p_{D23} \, -^1 \, p_{D31} \, p_{D32} \, p_{D33} \, -1 \, 1 \, 1 \, 1 \, 0][q_{D1} \, q_{D2} \, q_{D3} \, p_D] = [0 \, 0 \, 0 \, 1]$$

....(4)

Where p_D corresponds to the dimensionless pressure drop from a fracture and q_D corresponds to the dimensionless rate from a fracture. For instance, the interference between the first and second fracture corresponds to p_{D12} and the rate from the first fracture corresponds to q_{D1}. The analytical solution for dimensionless pressure can then expressed as the following equation.

$$p_D = \pi q_{Dj} \int_0^{t_D} S_{xD} S_{yD} d\tau$$

....(6)

Where S_{xD} is the source function aligned to the x axis, S_{yD} is the source function aligned to the y axis. Further details about the hydraulic fracture analytical solution formulation can be found in Horne and Temeng's publication (Horne and Temeng, 1995).

As a result of running each realization of hydraulic fracturing, the corresponding statistical attributes of all generated sensitivities and corresponding gas production rate are displayed in Table 2.

	mean	standard deviation	Minimum	Maximum
Gas Production Rate, MSCF/Day	20.7	21.4	0.025	109
Fracture Half Length, ft	345	143	100	600
Lateral Length, ft	5664	2188	1128	11829
Number of Fractures	107	57	5	203
Permeability, mD	0.00476	0.00423	0.000256	0.0363
Porosity	0.0654	0.0345	0.0100	0.130
Formation Thickness, ft	473	291	11	1000
Gas Gravity	1.08	0.297	0.551	1.60
Bottomhole Pressure, psia	877	301	337	1916
Reservoir Pressure, psia	7496	1435	5004	9997
Reservoir Temperature, oF	250	28.4	200	300
Producing Oil Gas Ratio, STB/MMSCF	159	86.8	10.1	313
Tubing Diameter, in	3.79	0.72	2.50	5.00
Depth, ft	7960	4084	1008	14995

Table 2: *Statistical Ranges for Hydraulic Fracturing Monte Carlo Sampling and Simulation*

Having now defined the source domain (represented by the generated hydraulic fracturing sensitivities) and the source target (half fracture length generated from sensitivities), a machine learning task was designed to estimate half fracture length as a function of the hydraulic fracturing parameters. In this third step of the overall workflow, the machine learning task was created by using the hydraulic fracturing sensitivities to train a gradient boost machine learning model. The resulting prediction accuracy of the machine learning prediction for half fracture is outlined in Figure 6.
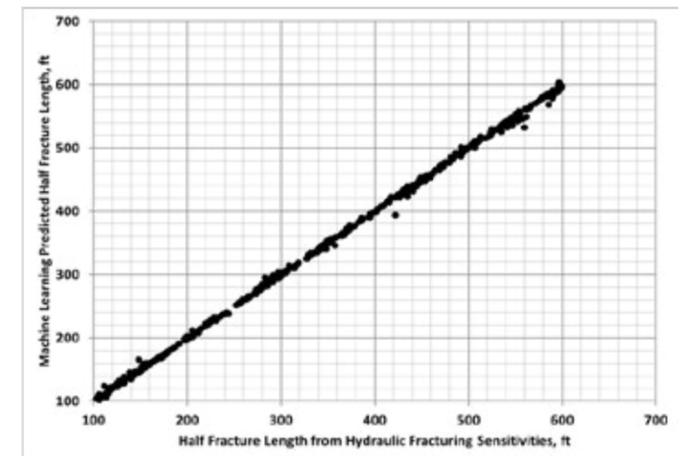

Figure 6: *Cross Validation Results for Half Fracture Length Machine Learning Prediction from Monte Carlo Sampling.*

Figure 6 illustrates that the gradient boost model approximately models the half fracture length generated from Monte Carlo sensitivity simulation. The resulting machine learning model had a root mean square error of the validation, cross validation, and holdout set of 3.69 feet, 3.72 feet, and 3.87 feet respectively. The relative importance (Figure 7) of the parameters was calculated and revealed a ranking of essentiality for each feature used to predict half fracture length from simulation data.
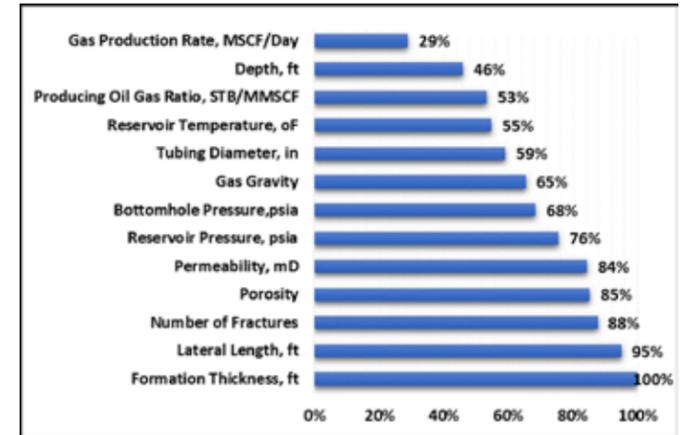

Figure 7: *Relative Feature of Importance for Half Fracture Length Machine Learning Prediction from Monte Carlo Sampling*

The relative feature of importance reveals an approximate understanding of the parameters that contribute significantly to the half fracture length prediction.

To test the effectiveness of the trained machine learning model, transfer learning methodology was utilized to deploy the machine learning model across the Eagle Ford shale data set. The Eagle Ford data set served as a target domain and it comprised of more than 20,000 wells with statistical characteristics summarized in Table 3.

	mean	standard deviation	Minimum	Maximum
Gas Production Rate, MSCF/Day	343	728	0	46094
Depth, ft	9997	2006	4038	14000
Formation Thickness, ft	145.4	37.8	48.6	291
Porosity	0.134	0.0195	0.042	0.240
Lateral Length, ft	5485	1475	115	20564
Reservoir Pressure, psia	6013	1203	2437	8415
Reservoir Temperature, oF	260	40.1	141	340
Producing Oil Gas Ratio, STB/MMSCF	97902	11658994	0	1398100820
Gas Gravity	0.822	0.052	0.490	1.40
Permeability, mD	0.00000550	0.00000006	0.00000522	0.00000583
Bottomhole Pressure, psia	1000	0	1000	1000
Tubing Diameter, in	4	0	4	4
Number of Fractures	96.0	2.30	28	168

Table 3: *Statistical Summary of the Eagle Ford*

Using transfer learning, the machine learning prediction for half fracture length was applied to the Eagle Ford data in the fourth step of the overall process. Mapped out results (Figure 8) reveal the generalized half fracture length prediction across the Eagle Ford basin.
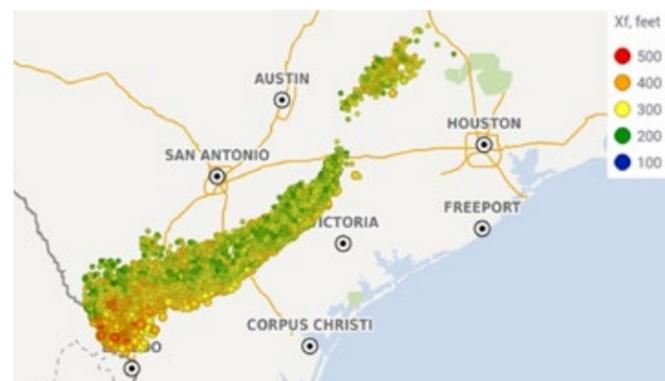

Figure 8: *Eagle Ford Average Half Fracture Length*

With estimates of half fracture length across the Eagle Ford shale data set, an approximate understanding of the half fracture length was created. The Eagle Ford shale data, including the half fracture length estimate, was then combined with the hydraulic fracturing data set generated by Monte Carlo sampling. A history matched model for gas production using the transfer learning half fracture length prediction was then generated by creating a machine learning gas production prediction using the combined data set as the domain source. A decision tree machine learning algorithm was utilized for the task of predicting gas production as function of the combined Eagle Ford and Monte Carlo sensitivity generated data set properties. The corresponding root mean square error of the gas production decision tree machine learning prediction was 340 MSCF/Day, 338 MSCF/Day, and 354 MSCF/Day for the validation, cross validation and holdout set. A summary of model results (Figure 9) show the effectiveness of history matching half fracture length using the transfer learning methodology.
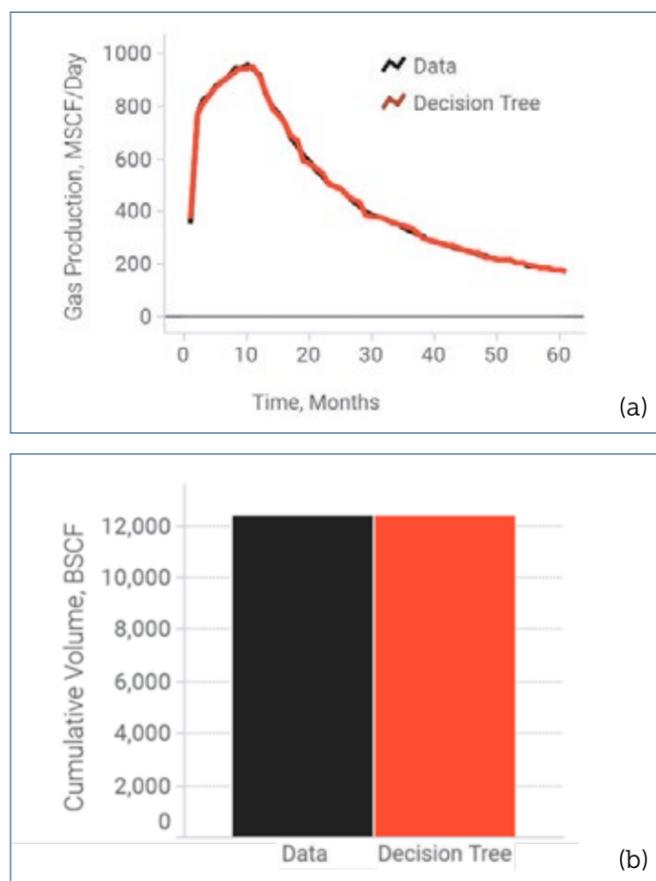

Figure 9: *Eagle Ford History Matched Results (a) Average Gas Production (b) Cumulative Gas Production*

The average gas production across the Eagle Ford data set approximately matches the average predicted gas production through normalized time. In addition, the predicted cumulative volume similarly matches the Eagle Ford cumulative volume data. Results illustrate the overall success of history matching half fracture length using transfer learning methodology. Further results from LaSalle and Frio County (Figure 10 and Figure 11) illustrate how powerful the transfer learning methodology is in approximating half fracture length and correspondingly predicting gas production and cumulative production for respective counties in the Eagle Ford.
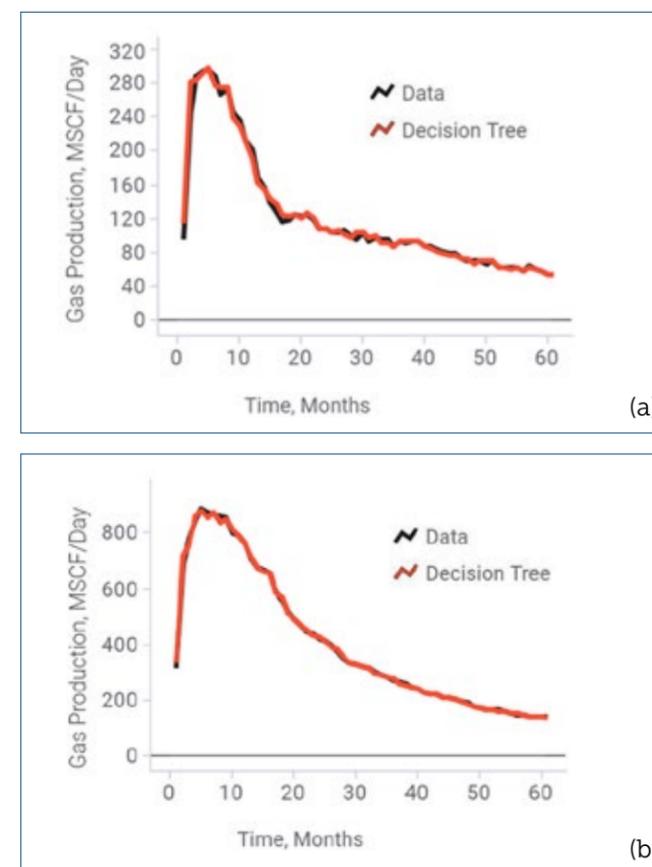

Figure 10: *History Matched Average Gas Production for Eagle Ford Areas (a) Frio County (b) La Salle County.*
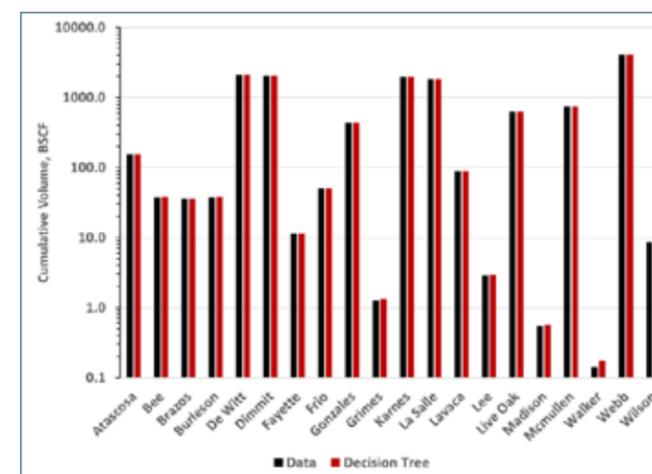

Figure 11: *History Matched Cumulative Gas Production for Eagle Ford Counties*

TRANSFER LEARNING FOR GAS PRODUCTION RATE PREDICTION

In the previous section transfer learning was successfully implemented to predict half fracture length and to subsequently history match Eagle Ford gas production. In many cases, predicting gas production in un-drilled locations is a challenge in addition to estimating half fracture length. To solve this problem a transfer learning methodology was utilized. To illustrate the transfer learning approach, the transfer learning methodology was applied to the Eagle Ford shale data set where La Salle County was used as a training set to predict gas production from Frio, McMullen, Webb, and Dimmit county. In this application, La Salle county data served as the source domain data set while Frio, McMullen, Webb, and Dimmit County served as the target domains. La Salle was chosen because of its representative fluid windows (Figure 12) observed in Frio, McMullen, Webb, and Dimmit counties.
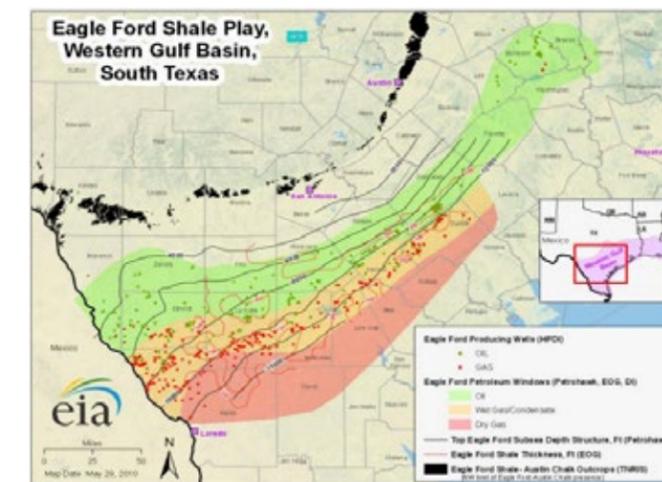

Figure 12: *Eagle Ford Fluid Window (EIA, 2014)*

The generalized methodology of applying transfer learning for the purpose of shale gas forecasting involved the following steps:

1. *Collect reservoir, completion, geological, and engineering parameters across wells with gas production history. Apply transfer learning half fracture length model on wells with production history.*

2. *Using area of interest data, train machine learning model using half fracture length as target parameter.*
3. *Train machine learning and deep learning model for gas production prediction using area with gas production history.*
4. *Collect reservoir, completion, geological, and engineering parameters across potential well locations with unknown gas production history.*
5. *Use machine learning model of half fracture length trained on area with known production history to make prediction of half fracture length of area with unknown production history.*
6. *Apply transfer learning gas production model onto area with unknown history for gas production prediction and forecasting.*

For the first step, well level data was collected across La Salle County and the transfer learning half fracture length model was deployed using the well level production history. A summary of La Salle's data including the half fracture length is displayed in Table 4.

	mean	standard deviation	Minimum	Maximum
Gas Production Rate, MSCF/Day	278	633	0	16420
Depth, ft	9106	1055	6931	13035
Formation Thickness, ft	135	38	66	291
Porosity	0.124	0.0230	0.0420	0.169
Lateral Length, ft	5800	1530	2184	15534
Reservoir Pressure, psia	5478	633	4173	7836
Reservoir Temperature, oF	242	21	199	321
Producing Oil Gas Ratio, STB/MMSCF	588	1139	0	34326
Gas Gravity	0.820	0.0581	0.508	0.970
Permeability, mD	0.00000546	0.0000000701	0.00000522	0.00000560
Bottomhole Pressure, psia	1000	0	1000	1000
Tubing Diameter, in	4	0	4	4
Number of Fractures	96	0	96	96
Fracture Half Length, ft	299	41	207	430

Table 4: *Statistical Summary of the La Salle County*

To determine the half fracture length of an area with no prior production history, required building a new machine learning model that did not include gas production rate as one of the inputs. A random forest machine learning model was chosen, and the resulting machine learning model had a root mean square error validation, cross validation, and holdout of 2.84 feet, 2.85 feet, and 2.79 feet respectively. The relative importance of the parameters was calculated and revealed a ranking of essentiality of each feature used to predict half fracture length from La Salle county field data (Figure 13). The relative importance for permeability, tubing diameter, number of fractures, and bottomhole pressure were found to be not important due to the small standard deviation of each parameter revealed in Table 4. Furthermore, number of fractures and bottom hole pressure were approximate assumptions for the area and thus spatial variability was purposely omitted for these parameters in this work. Finally, mapped out results (Figure 14) illustrate the generalized geospatial distribution of the half fracture length prediction across La Salle county.
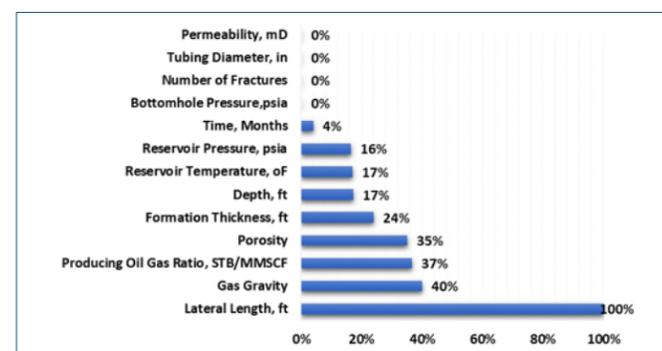

Figure 13: *Relative Feature of Importance for Half Fracture Length Random Forest Machine Learning Prediction from La Salle County Data.*

The next step in the workflow required using transfer learning methodology to train a machine and deep learning model for gas prediction. To do this, a gradient boost machine learning model and a deep learning neural network (ANN) was constructed for comparison. The gradient boost machine learning model had a root mean square error of 234 MSCF/Day, 250 MSCF/Day, and 229 MSCF/Day for the validation, cross validation, and holdout set respectively. The deep learning model contained eight hidden layers. The number of nodes in
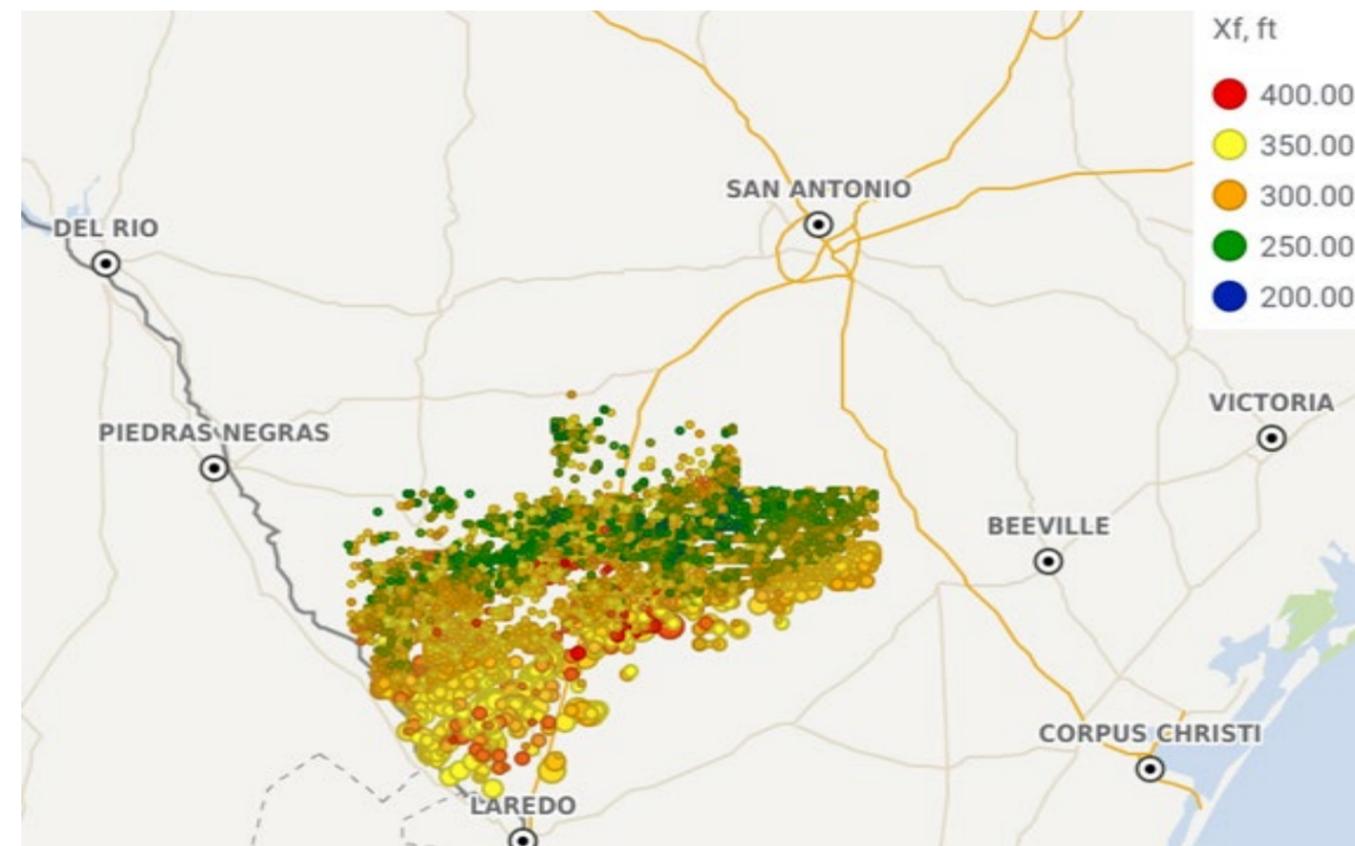

Figure 14: *Geospatial Distribution of La Salle County Half Fracture Length Prediction.*

each layer listed in order were 1024, 512, 256, 128, 64, 32, 16, and 8 units. The deep learning model had a root mean square error of 245 MSCF/Day, 254 MSCF/Day, and 248 MSCF/Day for the validation, cross validation, and holdout set respectively. Comparing the gradient boost and deep learning model cross validation results (Figure 15), it is apparent that the models approximately estimate La Salle county's gas production rate.
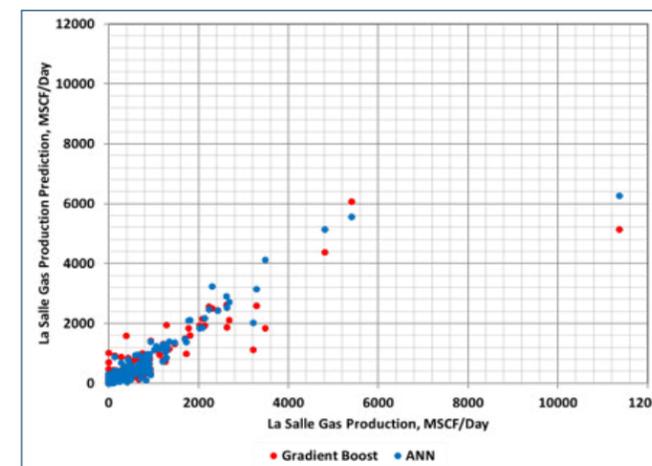

Figure 15: *Cross Validation Results for Gas Production Machine Learning Prediction from La Salle County Data*

Feature importance comparisons, shown in Figure 16, illustrate the primary differences and similarities between the gradient boost and the deep learning model. Together, both models indicate that tubing diameter, number of fractures, and bottom hole pressure were not essential to predicting gas production. This was because there was not enough variability in these parameters as indicated in Table 4. These parameters were assumed to be a constant parameter for machine learning purposes. Looking at the other parameters, both models indicate that varied ranking of importance with time being the most important parameter. Both models can be compared to fitting production decline data using a decline curve equation as a function of time and other hyper parameters. The primary difference with using machine learning and gradient boost is that additional parameters beyond hyper parameters directly influence the performance of the respective models and thus provide more robustness in predicting a decline when compared to traditional decline curve methods.

Figure 16: *Relative Feature of Importance (a) Gradient Boost (b) ANN.*

(a)

(b)

Deploying the prediction across all La Salle's data, Figure 17 shows the effectiveness of both models in predicting average gas production through normalized time. Deploying both transfer learning models to Dimmit, Frio, McMullen, and Webb county demonstrates the effectiveness in predicting the cumulative production (Figure 18) using machine learning and deep learning.

Figure 17: *La Salle Average Gas Production Comparison*

Figure 18: *Cumulative Gas Production Prediction for Eagle Ford Counties Using Transfer Learning.*

CONCLUSIONS

Transfer learning was applied to Eagle Ford production in two primary ways which are half fracture length prediction and gas production prediction. Both applications reveal the usefulness in using transfer learning to predict gas production and cumulative volume approximately.

Using transfer learning for half fracture length provided an avenue to history match gas production using machine learning. For that application, transfer learning was demonstrated by transferring the machine learning gained from training the probabilistic hydraulic fracturing simulations and applying it to the Eagle Ford production history for history matching.

Applying transfer learning for gas production prediction provided a method to estimate gas production in un-drilled locations. For that application, transfer learning was demonstrated by transferring the machine learning and deep learning gained from training La Salle County's shale data and applying it to specific nearby counties for estimating cumulative gas volume.

Career in focus:
Energy Economics & Finance

In this edition of SandRose, we feature a professionals from the energy industry. We asked them a series of questions about their career of choice

Name: *Abdulaziz Al Sufayan*
Job title: *Assistant to the Senior Vice President of Petroleum Engineering and Development at Saudi Aramco & SPE-KSA Chairman 2019-2021*

Describe your career path. How has pursuing a masters in the realm of finance and economics helped you as an O&G professional?

I started my career as a Petroleum Engineer in the field between Abu Ali Island's causeways and the offshore platforms of Berri field. After that, I moved to Reservoir Management where I assumed varied positions among several fields, mainly on the offshore side. In 2016, I moved to the Production & Facilities Development department. During my time there, I realized the importance of building financial acumen as I was dealing with several Upstream projects and increments. I enrolled in a variety of courses in the topics of finance, contracting, and leadership. In 2020, I took on the role of Division Head in the Gas Reservoir Management Department. As I undertook more management roles, my understanding of the importance of financial acumen to my career progression only grew.

As a Petroleum Engineer and an O&G professional, I decided to pursue a master's degree in finance. I believe that the master's degree equipped me with the necessary tools to understand how decisions on all levels have an impact on energy markets and companies' financials. These decisions could be in the realm of project finance, budgeting, and valuation.

In addition, as a petroleum engineer, you are likely already familiar with risk management. With that being said, a background in finance can provide you with additional statistical tools and frameworks to assess and mitigate financial risks associated with new and existing projects.

Moreover, and most importantly, an understanding of corporate finance can help you to better understand the financial decisions made by your organization, and how they impact the company's operations and performance. This can help you to make more informed engineering decisions, and also position you for potential opportunities in finance-related roles.

A master's degree in finance can complement your background as a petroleum engineer and broaden your industry perspective. In addition, financial acumen is valuable knowledge, not only for leaders, but all individuals regardless of their role.
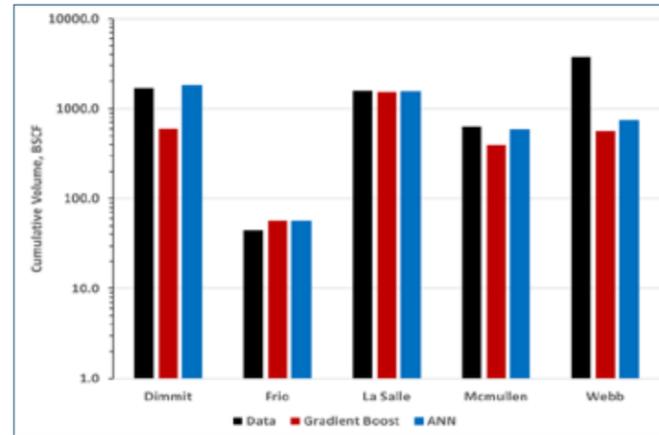
Q2: How and where does your role fit within the context of the O&G industry?

I currently work as the Assistant to the Senior Vice President of Petroleum Engineering and Development within the Upstream Business Line in Saudi Aramco leading administrative, contractual, HR, as well as training and development of a 2000+ employee organization. My responsibilities typically include supporting executive management in the development and implementation of strategic agendas, managing financial and administrative operations, executing corporate development plans and strategies, along with developing and implementing strategies to realize corporate opportunities.

Q3: How has the fiscal landscape of the O&G industry shifted over the course of the ongoing energy transition?

Looking around at what's happening in the world, you can clearly witness and feel the significant changes to the fiscal landscape of our industry that was brought on by the ongoing energy transition in addition to other major factors such as geopolitical issues. An example is Environmental, Social, and Governance (ESG) factors have become progressively more important for investors and stakeholders in the O&G industry. Companies that are perceived as being sustainable and responsible are more likely to attract investments and secure long-term contracts.

Some investors were also hesitant to invest in O&G in support of a more rigorous energy transition. This underinvestment has unfortunately led to supply crunches and volatility in O&G prices. However, after realizing the importance of O&G as a sustainable, secure, and affordable source of energy, there has been a steady shift back to the O&G industry, especially with those companies that have more robust sustainability and lower carbon emission efforts.

On the other hand, governments around the world are now executing carbon pricing policies to reduce carbon emissions and mitigate climate change. This has resulted in additional costs for O&G companies, who now need to pay for their carbon emissions.

We can also witness the shift towards natural gas as a cleaner energy source, and its use has increased over the past few years. This has led to an increase in investment in natural gas infrastructure, such as pipelines and liquefied natural gas (LNG) terminals.

Q4: How if at all has the volatility of the financial sector impacted the O&G industry?

In my opinion, the impact of financial markets volatility over the O&G industry was significant on:

- access to capital for their operations and investments projects,
- investors' confidence and ability to raise capital,
- projects financing by increasing the cost of borrowing affecting the economic viability of projects,
- mergers and acquisitions (M&A) activities by delaying or further revisions to M&A plans,
- and finally hedging strategies effectiveness and cost as well as the ability to secure favorable terms for derivative contracts.

This can affect the overall financial performance of O&G companies.

Q5: How would you recommend our readers to prepare for studying finance (whether or not they have a finance background)?

Finance is a unique field with many challenges, yet plenty of opportunities professionally and personally. In order to prepare for studying finance or executive finance, I would highly recommend:

- familiarizing yourself with financial terminologies,
- keeping up with financial news and publications,

- staying up to date on the latest trends and developments in finance,
- considering taking introductory courses in finance and accounting,
- reading and understanding the financial statements of several big companies,
- and finally, getting involved in some valuation of different stocks and their trends.

Q6: What advice can you offer professionals considering an advanced degree outside of their core profession or academic background?

Honestly, pursuing an advanced degree outside of your core profession or academic background can be an extremely challenging yet very rewarding experience. It also depends highly on the person's passion and the way they see themselves. By doing your research, seeking advice, and being prepared to work harder, you can make the most of this opportunity and achieve your goals.

I would highly advice professionals considering getting degrees outside of their core profession the following:

- Before pursuing an advanced degree in a new field, it's important to identify your goals and what you hope to achieve with this degree.
- Your previous experiences can be a valuable asset when pursuing an advanced degree in a new field. Reflect on the skills and knowledge you've gained and think about how they can be applied to your new field.
- Always seek advice from professionals that you trust, especially in the field you're interested in and seek their advice on what to expect and how to prepare.
- Be prepared to work harder, ask questions, and seek help when needed. Don't be afraid to reach out to professors and classmates for guidance.
- While you might not own the experience in the new field, there are likely to be transferable skills from your previous experiences that can be applied to your new career. I found my engineering background skills very helpful in certain areas within finance, more specifically in risk management and modeling.

Pursuing an advanced degree outside of your profession and academic background is no free lunch! Many will experience tough moments and find themselves having to juggle work and education alongside their own personal commitments. Nevertheless, if you are able to manage to borrow some time and invest it in this smoothly, you shall achieve a high time efficiency skillset, which can be only characterized as the perfect arbitrage strategy!

SandRose Technical Paper Digest

Curated by Nora Hamidaddin, Associate Editor SandRose Magazine

In this section, we curate several recommendations for technical papers from subject matter experts on topics relating to their respective disciplines.

Cement Evaluation, Logging

CEMENT SHEATH EVALUATION

Recommended by Hussein Al-Shabebi, Well Integrity & Production Logging Team Lead, Baker Hughes

Document API-TR-10TR1 published in American Petroleum Institute, 2008.

This API Technical Report discusses the cement sheath evaluation. It focuses on logging and evaluation, presenting both the technology and the application from the end user's point of view. Great effort was made to ensure that new technical developments are incorporated, and different views and perspectives are represented. It is useful to field and Geoscience personnel as it includes sections on tools capability, selection, running procedure and log QC. It discusses how to best incorporate log interpretation and cementing data into an overall determination of zonal isolation, and it attempts to remedy logs misunderstanding.

EOR-Enhanced Oil Recovery

EXPERIMENTAL STUDY OF CRUDE OIL EMULSION STABILITY BY SURFACTANT AND NANOPARTICLES

Recommended by Zainab Al-Abdulmohsen, DCF – Technical Specialist, Baker Hughes

Almohsin, A. M.; Alabdulmohsen, Z.; Bai. B.; Neogi, P. 2018. Paper SPE-190440-MS presented at the SPE EOR Conference in Oman, 2018.

Nanoparticle-stabilized emulsions have attracted many researchers' attention in recent years due to many of their specific characteristics and advantages over conventional emulsions stabilized by surfactants or by nanoparticles. For example, the solid nanoparticles can be irreversibly attached to the oil-water interface and form a rigid nanoparticle monolayer on the droplet surfaces, which induces highly stable emulsions. Those emulsions can withstand harsh conditions. Compared to colloidal particles, nanoparticles are one hundred times smaller, and emulsions stabilized by nanoparticles can travel a long distance in reservoirs without much retention.

https://doi.org/10.2118/190440-MS

Experimental Study of Crude Oil Emulsion Stability by Surfactant and Nanoparticles | SPE EOR Conference at Oil and Gas West Asia | OnePetro

Reservoir Simulation and Description, Machine and Deep Learning, Artificial Intelligence

"REINFORCEMENT LEARNING" IN RESERVOIR SIMULATION AND FIELD DEVELOPMENT OPTIMIZATION

Recommended by Thamer Sulaimani and Marko Maucec, Petroleum Engineer, Saudi Aramco

Nasir Y, He J, Hu C, Tanaka S, Wang K and Wen X (2021). Deep Reinforcement Learning for Constrained Field Development Optimization in Subsurface Two-phase Flow. Frontiers in Applied Mathematics and Statistics Journal. Vol. 7. https://doi.org/10.3389/fams.2021.689934

This paper is an excellent example of the promising applications of AI in the oil and gas industry. Although limited to two-phase flow, the paper sets the ground for the reservoir simulation practitioners who are interested in applying reinforcement learning (action-reward loop) to field development optimization. The authors present a deep reinforcement learning-based AI agent that generates optimized development scenarios given only basic description of the reservoir with minimal computational cost. The developed method incorporates rock and fluid properties, is applicable in 2D and 3D domains, outperforms traditional population-based optimization algorithms, and can be generalized to account for geological uncertainty.

Reservoir Description, Reservoir Simulation, Dimensional Analysis

PITFALLS OF 3D SATURATION MODELLING IN THE MIDDLE EAST AND IMPORTANCE OF DIMENSIONAL ANALYSIS

Recommended by Lautaro Rayo, Petroleum Engineer, Saudi Aramco;

O'Meara, D. "Pitfalls of 3D Saturation Modelling in the Middle East." Paper presented at the SPE Reservoir Characterization and Simulation Conference and Exhibition, Abu Dhabi, UAE, September 2019. doi: https://doi.org/10.2118/196634-MS

The author Daniel O'Meara gives a refreshing look at "Saturation-Height" modeling – very chilling that you will want to stop calling it that way. The paper is a renewed attempt at convincing Oil and Gas professionals about the beauty and usefulness of Dimensional Analysis, a methodology which constitutes the bedrock of empirical physics and engineering, but that is so often forgotten in papers, books, and peer review meetings. After reading this article, you will better understand how physical models describe data, with wide applications in Engineering and Machine Learning.

The Prominent Role of Women in STEM
Breaking Barrier and Driving Innovations

By Sarah Alaskar
– SPE-KSA D&I Publication Team Member

When thinking of the word scientist and engineer, an image of a woman in a lab coat or hard hat also comes to mind. There is undoubtedly a sufficient number of successful female role models in STEM, particularly in the Kingdom of Saudi Arabia. STEM fields once dominated by men are seeing a growing participation of females. The gradual shift in perception is mainly due to the immense efforts in woman's empowerment. This case is demonstrated in Saudi Arabia, where a new generation of female scientists, mathematicians, and engineers are breaking through barriers and driving innovation in STEM (science, technology, engineering, and math) fields. These pioneering women demonstrate that gender is not a barrier to their success in STEM. Meanwhile, their extraordinary achievements are serving as an inspiration to future generations of STEM professionals.

There are many benefits to increasing the representation of females in STEM fields. First, the role of women in STEM promotes diverse perspectives as females bring different life experiences crucial to solving complex industry problems. Females can also fuel creativity and enhance collaboration, improving work quality and output. Finally, increased participation of females allows for a more diverse STEM workforce, leading to increased economic growth and competitiveness as it taps into a broader pool of talents and backgrounds.

Current Challenges

Although there are many benefits to having women in STEM, there are equally as many challenges. One challenge is the constant struggle to overcome cultural and societal barriers that can deter them from advancing in their respective careers. More mentorship opportunities are needed in STEM fields with the lowest female representation to achieve gender parity. Women need to see other women succeeding to believe that it is possible for them to do the same. However, the lack of supportive policies and infrastructure in some workplaces can also make it difficult for women to balance their professional and personal lives. One example of this is that in many cases, the load for child rearing, although shared between both parents, is more heavily skewed towards the mother in most cases. Interventions as simple as providing a lactation room for nursing mothers is a minor adjustment that could make the most significant difference. Therefore tailoring policies and infrastructures to accommodate the unique challenges faced by females in the workforce can have positive outcomes on the contribution of women in STEM fields. Additionally, networking opportunities can help women in STEM fields navigate the challenges they face and learn from other female pioneers around them.

Kingdom Efforts and Female Role Models

With the introduction of the Vision 2030 social and economic reforms, female participation has risen from 19% to 33%. Women in the kingdom currently represent 58 percent of university students, many pursuing STEM.

In recent years, Saudi Arabia has made significant advancements toward empowering STEM profession-based females, and there is certainly no shortage of role models. Some notable examples of females in STEM include Dr. Hayat Sindi, a pioneer medical scientist who invented a novel disease-diagnosing device that can be used on-site to detect illnesses promptly. Another inspiring example is Mishaal Ashemimry, the first Saudi woman to join NASA and the first female aerospace engineer in the Gulf region. Alshemimry is a professor at the University of Miami Mechanical and Aerospace Department, and she founded MISHAAL Aerospace to fulfill her lifelong ambition of developing rockets. These are just a few examples of the many Saudi females contributing to STEM fields.

Dr. Hayat Al Sindi
Medical Scientist

Mishaal Ashemimry
Aerospace Engineer & Founder of MISHAAL Aerospace

Strategies for Encouraging Women in STEM

- Providing mentorship and sponsorship opportunities
- Offering flexible work arrangements
- Promoting diversity and inclusion
- Supporting women's advancement

Women in STEM fields are finding their way around these obstacles to keep on advancing the wheel of innovation. By pushing boundaries and challenging norms, women in STEM are not only bringing forth a new wave of motivation for generations to come but also reversing the tide of barriers into breakthroughs.

Frankenstein AI
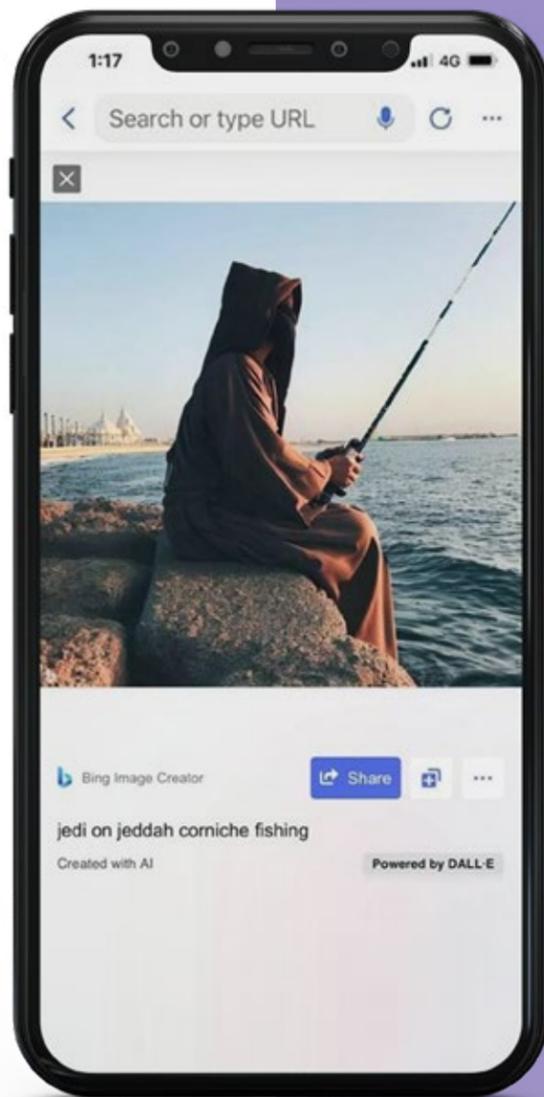
By Muhammad Khakwani,
Senior System Consultant at Saudi Aramco

One stormy evening in the early 1800s, on the shores of Lake Geneva, Lord Byron gathers his fellow poets and writers. As the evening wears on, he asks those present to write a scary story each; perhaps the thunder and lightning add to the mood du soir. Mary Shelley pens an idea, which becomes the Frankenstein novel, and John Polidori writes about vampires.

The thoughts for two epic tales, Dracula and Frankenstein, were born that evening. I am no expert on vampires and their relevance today, but with Frankenstein we can draw some interesting parallels.

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Some say Mary Shelley's Frankenstein was the first science fiction novel. A genre to let imagination run free and tell a story without constraints. Then, something changed; what seemed like fiction in the past has become more and more like reality. Fast-changing times. In an effort to make the impossible possible, tech companies are elbowing each other out of the way to get to the front. The first to do this are reaping the rewards, while others risk becoming irrelevant just as fast as they surface. A sign on the entrance of Facebook's head office used to read "Move Fast and Break Things," promoting the culture needed to survive.

And moving fast we are. Look back a decade and you will wonder how bills got paid and how you kept in touch with family and friends without instant messaging and mobile banking services. The need for speed is paying no heed to the implications that may hold negative connotations. Are we rushing forward without looking before we leap? Maybe, but if I don't leap, the one next to me in the race will, and then he will be ahead of me. Who has time for philosophical discussions when there are technical barriers to break through?
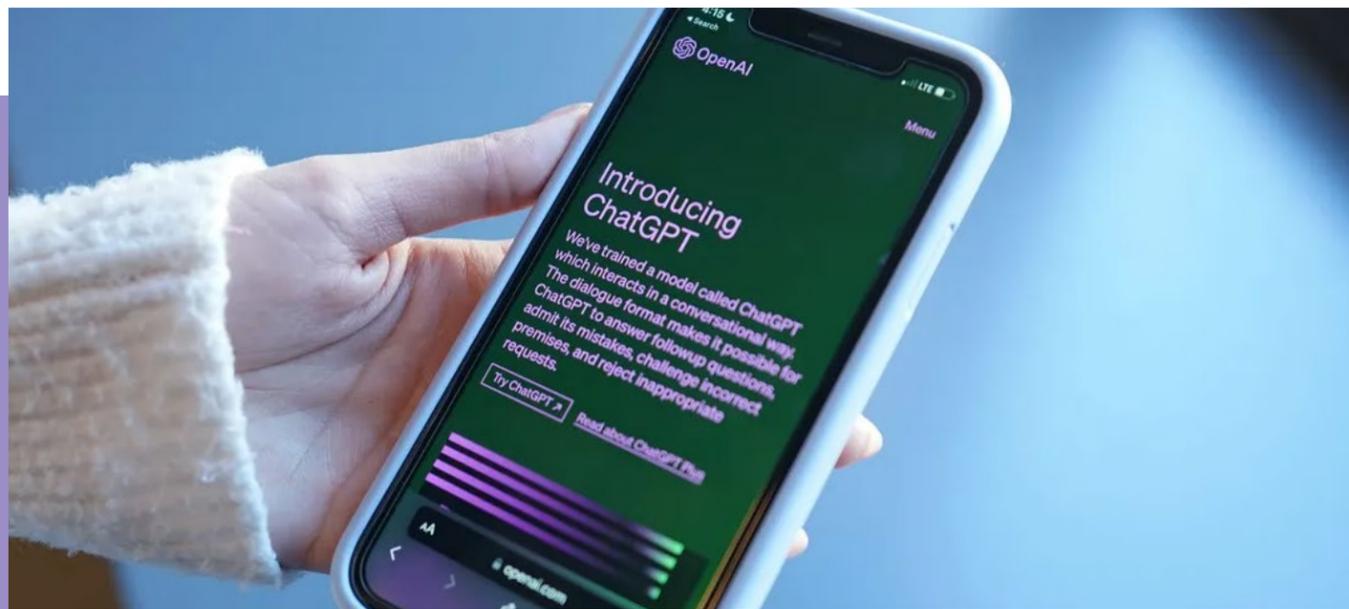
Searches for information moved from the library to Google. The news cycle moved from the evening bulletin to 24 hours and ultimately pushed to devices in our pockets. "Ring ding," notifications arrive in real-time in the form of short messages beeping on my phone, every time something happens with one of my registered interests. Like most people, I think I have perfected the art of sneaking a look during meetings or family dinners. Jokes told between friends are now messages or video clips shared on WhatsApp. Who has time to tell an anecdote; just forward it. Better yet, create a group and then reach all at once.

So far so good. It is not bad, really. Different perhaps, certainly for older people, while the younger generations find it perfectly normal.

The convenience outweighs any harm, and we are always willing to pay the price. That said, there are harmful side effects and they come in different flavors. Too much screen time. The blue light effect staring at phones late at night causing sleep disarray. Less outdoor activity and physical time spent with friends and more online and in chat rooms. Fraud and identify theft. Private videos going viral. Fake videos and news.

The tale of Frankenstein is about a person who uses scientific methods to make a creature from dead bodies. Not medieval magic. This time it is science based experiments that yield the phenomenal results. Dr. Frankenstein succeeds where others have failed and brings to life this creature, which will have intelligent faculties. As the story is told people are horrified by this new creation. The creation, which sparks interest

The technology industry might want to do some of that before AI is perceived as a Frankenstein; an uncontrollable monster of our creation.

at first, is intelligent and able to converse, but it is soon rejected by people and seen as a monster.

Drawing a philosophical parallel, that is just where we might be today with artificial intelligence. The new technologies of ChatGPT are making Google searches look positively boring. A new age is dawning and this one is so real. It is actually causing the frontrunners to pause and take a breath. The new code powering AI platforms like ChatGPT is so good it can pass the bar exam to become a lawyer, write term papers for students, write code for programmers, answer medical questions like a doctor, and write poems for you in case you are having trouble expressing your feelings.

The danger is that the work it does is so good that it can be really misleading. We are not talking about politicians deflecting questions by calling them "fake news." These are actually believable images and text, which are so close to reality it is hard to tell them apart. A free image creator application now uses AI to generate images based on text you supply it. Take a look at a Star Wars Jedi fishing on the Jiddah corniche. The image comes complete with a shadow. AI-produced images can be quite ridiculous and entertaining, such as a deer shopping in Milan.

The problems caused can be spread of misinformation and plagiarism, and reckless use of these new tools.

One can be malicious and supply images of people into this technology, and ask it to create images or videos, which can be potentially damaging and show others in a bad light. One such application showed a person who is begging his parents to send money as he has been taken hostage. The technology mimicked the person's face, facial expressions, emotions, and voice, and the parents could not tell the difference. Investigating authorities asked families to set up code words and secret passwords, which would be known only to them in case they were targeted by such criminal intent.

The voices urging caution have been muted in the past, but the ones urging caution now are causing alarm bells.

The lead AI pioneer in Google has quit over the dangers posed by this technology. It may be time for a pause. It may be time for thought. It may be time to put up safeguards before we go too far down this road.

As an analogy, consider when the motor car was invented. People wanted to talk about getting to places

quickly and reliably and move goods and build roads. The ones talking about accidents and fatalities were probably not very popular at the time. However, at some point, the need for traffic rules and regulation became necessary. The industry had to adapt to promote safe motoring.
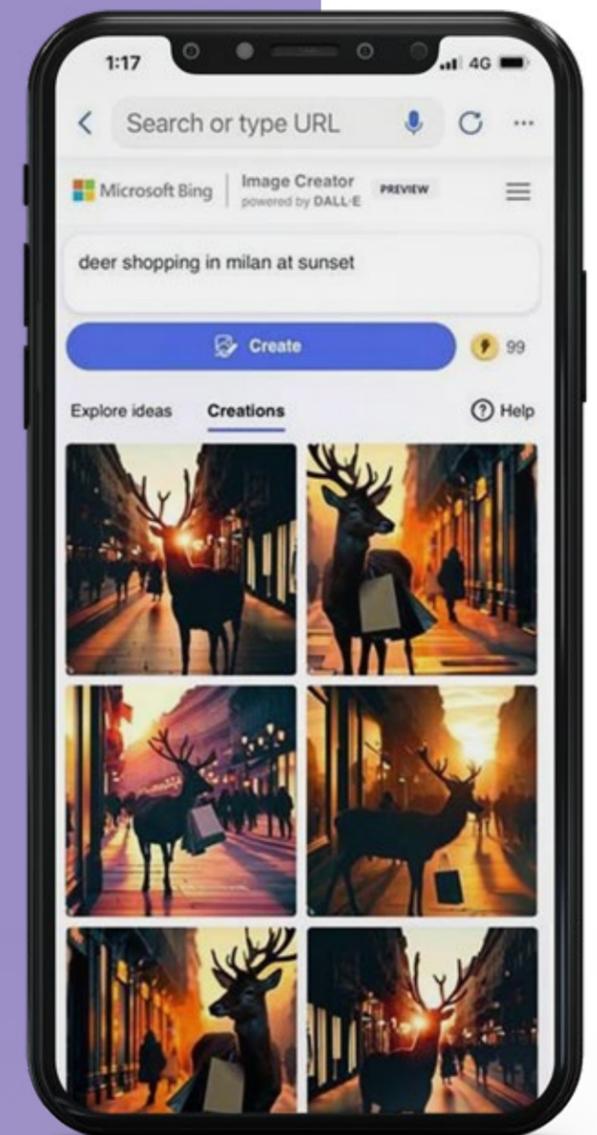
The technology industry might want to do some of that before AI is perceived as a Frankenstein; an uncontrollable monster of our creation.

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The Myth of Work-Life Balance

The concept of work-life balance has been around for decades, but it is increasingly being seen as a myth. The idea that we can achieve perfect balance between our work and personal lives is simply not realistic in today's world.

There are a number of reasons why work-life balance is a myth. First, our work lives are increasingly demanding. We are expected to be available 24/7, and we are constantly bombarded with emails, texts, and phone calls. This makes it difficult to truly disconnect from work, even when we are not at the office.

Second, our personal lives are also more complex than ever before. We juggle multiple roles, such as spouse, parent, friend, and volunteer. This can be a lot to balance, and it can be challenging to find time for everything.

Finally, the very idea of work-life balance is based on a false dichotomy. It suggests that our work and personal lives are two separate spheres when in reality, they are interconnected. Our work affects our personal lives, and our personal lives affect our work.

So, what does this mean for us? Does the myth of work-life balance mean that we should just give up and accept that we will never be able to achieve balance? Not necessarily.

There are still things we can do to improve our work-life "harmony." This means finding ways to integrate our work and personal lives in a way that is sustainable and fulfilling.

Improving your work-life harmony is not always easy, but it is possible. By following the tips, you can find a way to integrate your work and personal lives in a way that is sustainable and fulfilling.

Is work-life balance even possible?

Some people believe that work-life balance is simply not possible in today's world. They argue that the demands of work are simply too great and that there is not enough time to do everything.

However others believe that work-life balance is possible, but it requires a different mindset. They argue that we need to stop thinking of work and life as two separate spheres and instead see them as interconnected.

If we can change our mindset, then we can start to find ways to integrate our work and personal lives in a way that is sustainable and fulfilling. This may mean making some changes to our work-life habits, such as setting boundaries, delegating tasks, and taking breaks. It may also mean making some changes to our expectations. We may need to accept that we cannot do everything and that it is okay to say no to some things.

In addition to the tips above, here are a few more things you can do to improve your work-life harmony:

- Take care of your physical and mental health. This means eating a healthy diet, getting enough sleep, and exercising regularly. When you are physically and mentally healthy, you are better able to cope with stress and manage your time effectively.

- Find a job that you are passionate about. When you love what you do, it is easier to find a balance between work and life. You will be more motivated to work hard, and you will be more likely to find satisfaction in your work.

- Build a strong support system. Having a strong support system of friends, family, and colleagues can help you through the tough times. When you have people to lean on, it is easier to

If we are willing to make some changes, then work-life balance is possible. It may not be easy, but it is worth it.

Tips for improving your work-life harmony

- **Set Boundaries**. It is important to set clear boundaries between your work and personal life. This means not checking work emails or taking work calls outside of work hours. It also means setting aside time for yourself each day to relax and recharge.

- **Delegate**. If you are feeling overwhelmed by work, don't be afraid to delegate tasks to others. This will free up your time so that you can focus on the things that are most important to you.

- **Take Breaks**. It is important to take breaks throughout the day, even if it is just for a few minutes. Get up and move around, or step outside for some fresh air. Taking breaks will help you stay refreshed and focused.

- **Say No**. It is okay to say no to requests that will take up too much of your time or energy. If you are feeling overextended, don't be afraid to decline invitations or commitments.

- **Find Ways To Integrate Your Work And Personal Lives**. This could mean taking a class related to your work, volunteering for a cause you care about, or working from home one day a week.

Young Leaders
Advisory Board

YLAB Global Leaders Dialogue with Mr. Abdulaziz Al-Gudaimi

The Young Leaders Advisory Board (YLAB) regularly arranges Global Leaders Dialogue events, which are a valuable opportunity for Saudi Aramco's youth to engage with prominent leaders from the energy industry and beyond in order to learn from their rich experiences. In the latest edition of this event, YLAB hosted Mr. Abdulaziz Al-Gudaimi, who is a veteran of Saudi Aramco. Mr. Al-Gudaimi's illustrious career spanned 35 years in a variety of roles all the way up to the company's corporate management, including but not limited to leading New Business Development, Chemicals, and Corporate Planning (now Strategy & Market Analysis), as well as serving as a Board member of multiple companies.

This session, much like Mr. Al-Gudaimi's career, was characterized by a drive to support and empower the next generation of leaders to build upon the positive impact he created over the course of his career. Mr. Al-Gudaimi offered frank and valuable feedback about both his

professional experiences and his post-retirement life. He also continues to give back to today's leaders in-the-making by teaching at King Fahd University of Petroleum & Minerals (KFUPM) on the subjects of Transactions, Mergers, and Acquisitions (M&A).

In retrospect, Mr. Al-Gudaimi shared that in his view, two of the most important life decisions to make are one's choice of education and their choice of partner, seeing as both shape the trajectory of one's adult life.

He also noted on the shifts in the company's strategy and business environment throughout his career, including the Initial Public Offering (IPO). This had a variety of repercussions on the company's strategic direction, which in his case included restructuring company assets to better adapt to the new economic environment. Other notable paradigm shifts also included the prominence of the energy transition, which included a variety of new technology and

product domains such as hydrogen and renewables, both of which are key pillars of the company's lofty net-zero ambitions, which is targeted by 2050 – i.e. 10 years earlier than the Kingdom's own net-zero target.

The session also included advice for the youth on the importance of balancing both their work and family lives, as well as how to manage their personal finances by allocating a reasonable proportion of one's income between spending, savings, and investments. In closing, he counseled young professionals to take measured risks, invest in their personal relationships and professional networks, and to develop their leadership skills.

The session was characterized by lively discussions and a high degree of interactivity between the audience and Mr. Al-Gudaimi, all in line with YLAB's vision of preparing the company for the youth, and preparing the youth for the company.

SPE-KSA's T&PP May 2023 End-of-Term Dinner Meeting
AI+X and the Future of Academia

By Abdullah Almubarak, SPE-KSA T&PP Team Member

On May 29th, 2023, SPE-KSA's Technical and Professional Programs (T&PP) team hosted its end-of-term dinner meeting of 2021-2023. The keynote speaker and guest of honor was the President of King Fahd University of Petroleum & Minerals, Dr. Muhammad Al-Saggaf. The dinner also held a momentous occasion in oil and gas industry, the anniversary of 90 glorious years of Saudi Aramco.

ABOUT THE SPEAKER
Dr. Muhammad Al-Saggaf, the 6th President of King Fahd University of Petroleum & Minerals, and the first since the University became independent.

He started his career at KFUPM, then spent 30 years in Saudi Aramco, culminating in his position as Senior Vice President of Operations & Business Services, before re-joining the University in January 2020.

He holds a B.S. degree in mathematics from KFUPM, M.S. and Ph.D. degrees in geophysics from the Massachusetts Institute of Technology, an MBA from KFUPM, and a graduate of Harvard Business School's Program for Management Development.

Dr. Al-Saggaf received several international awards, including the J. Clarence Karcher Award from the Society of Exploration Geophysicists (SEG), the Lester C. Uren Technical Excellence Award, the Distinguished Member Award from the Society of Petroleum Engineers (SPE), and the Eisenhower Fellowship. Dr. Al-Saggaf has authored several refereed technical papers and founded a new technical journal.

REFLECTIONS AND KEY TAKEAWAYS
During his talk, Dr. Al-Saggaf delivered an inspiring speech that focused on the future of academia in the context of digital transformation, the economy, and talent acquisition. He emphasized on the cruciality of talent in driving innovation in various sectors and contributing to economic growth.

Following that, Dr. Al-Saggaf stressed on investments in multiple sectors. Most importantly, the role of equipping diverse talents in growing and shaping the economy. He illustrated that there are three types of talents: (1) Economy Burdening Talent, (2) Economy Maintaining Talent, and (3) Economy Creating Talent. The speaker advised to invest in the economy, creating talent as they pave the way for enriching and introducing new sectors.

Dr. Al-Saggaf also shed light on the pivotal role of academia in bringing new frontiers of digital solutions. He highlighted new sub-majors that steer the career path of the new generation of young talents. Such as:

- *Hydrogen Mobility*
- *Cloud Computing*
- *Artificial Intelligence*
- *Cybersecurity*
- *Gene Sequencing*
- *VR and Metaverse*
- *Robotics*

In addition, Dr. Al-Saggaf demonstrated multiple industry-linked master's programs that speed up the growth of the economy. Hence, King Fahad University of Petroleum & Minerals designed purposeful programs that align with the Kingdom of Saudi Arabia's 2030 vision. These accelerated master's program will sharpen the technical skills of our new generation by equipping them with the required industrial mindsets. The key takeaway from Dr. Al-Saggaf was that the industry's future relies on current investments in young talents for a thriving economy.

SPE-KSA Recognizes its Sponsors

During the dinner meeting, SPE-KSA chapter concluded the term with recognizing the key pillars of SPE-KSA's term success, our sponsors, for their unwavering and continuous support.

Gold Sponsor — Weatherford

Gold Sponsor — Rawabi Holding

Platinum Sponsor — aramco
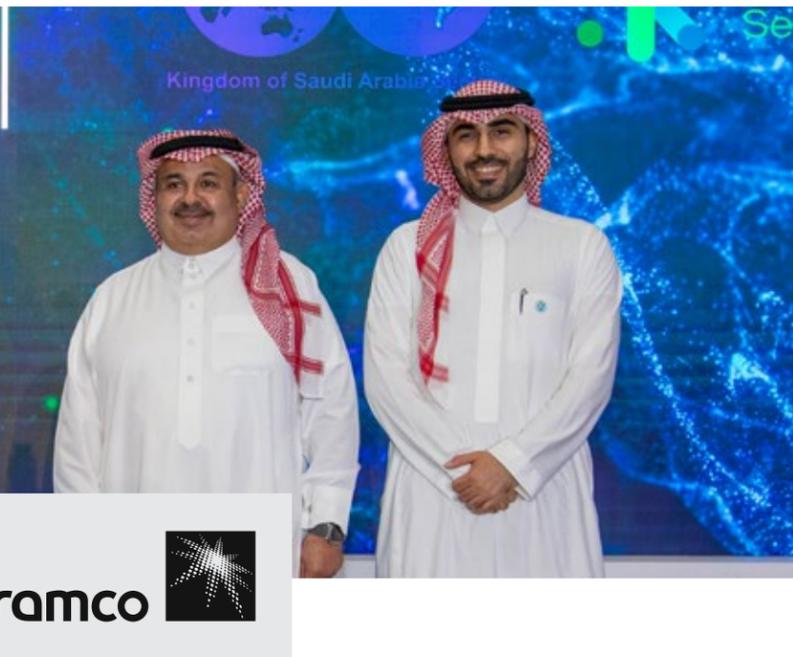
Silver Sponsor — TAQA

Silver Sponsor — NESR

Diamond Sponsor — slb

Diamond Sponsor — Baker Hughes

Bronze Sponsor — HALLIBURTON

With that SPE-KSA, has concluded the dinner meetings series with an outstanding celebration of the 90th years anniversary of Saudi Aramco. This have not been achieved without your remarkable support and contributions to the 2021-2023 term. SPE-KSA is looking forward to host more fruitful events alongside with the support of its management, key sponsors and members.

SPE-KSA's T&PP March Dinner Meeting
AI and Technology Transformation Journey with Mr. Sylvain Duranton

On the 13th of March of 2023, SPE-KSA's T&PP hosted its 4th dinner meeting featuring Sylvain Duranton, the Global Leader of BCG X and a member of BCG's Executive Committee.

INTRODUCING BCG X

BCG X is the tech, build, and design unit of the Boston Consulting Group (BCG). Turbocharging BCG's deep industry and functional expertise, BCG X brings together advanced tech knowledge and ambitious entrepreneurship to help organizations enable innovation at scale. With nearly 3,000 technologists, scientists, programmers, engineers, and human-centered designers located across 80+ cities, BCG X builds and designs platforms and software to address the world's most important challenges and opportunities. Teaming across practices and in close collaboration with clients, their end-to-end global team unlocks new possibilities. Together, they're creating the bold and disruptive products, services, and businesses of tomorrow.

ABOUT THE SPEAKER

Sylvain was the Global leader and founder of BCG GAMMA, BCG's AI and Data + Analytics Unit. Sylvain holds an MBA from INSEAD Business School and a bachelor's degree in mathematics and sociology from École Polytechnique and MINES Paris Tech.

The dinner meeting was emceed by Khlood Matar, a petroleum engineer from Saudi Aramco and SPE-KSA PR team member. The agenda for the night included a presentation by Mr. Duranton, followed by a Q&A moderated by Saudi Aramco Communications Advisor Hala AlHashmi. The March dinner meeting also has the unique distinction of being attended by SPE International board of directors, as well as many members of the SPE-KSA community from executive management, industry professionals, and students

SPE-KSA's T&PP January Dinner Meeting
Meeting The Pillars of the Saudi Economy: Learning from the First to Grow the Third Featuring Mr. Robert Wilt

On the 23rd of January of 2023, SPE-KSA's T&PP hosted its 3rd dinner featuring the Chief Executive Officer of the Saudi Arabian Mining Company (Ma'aden). The dinner meeting was emceed by Meshal Alsana, a petroleum engineer from Saudi Aramco and T&PP team member.

JANUARY DINNER MEETING
During the dinner meeting, Mr. Wilt spoke about the history and the transformation of the Saudi Arabian Mining Company (Ma'aden) under Vision 2030 reforms. Founded in 1997, the company was established by royal decree with a mandate to develop Saudi Arabia's minerals sector to diversify beyond oil and petrochemicals, fulfilling the third pillar of Vision 2030 and in line with the Kingdom's and the United Nations

Sustainable Development (UN SDG). Since its 2008 IPO, Ma'aden has successfully diversified from being a gold-producing company by building abundant, world-class phosphate, aluminum, industrial minerals, and copper concentrate operations and has set its sight going global by marketing its products worldwide as they develop new locations and building new industrial plants. During the session, Mr. Wilt also spoke about Ma'aden's commitment to attracting, developing, and retaining local talent needed to build Saudi's modern mining industry. The company has launched multiple programs to develop the next generation of talent by partnering with the Ministry of Education and local schools and universities, as well as launching in-house programs for professional development.

ABOUT THE SPEAKER
Mr. Wilt's role is to govern and lead Saudi Arabia's national mining champion. Prior to joining Maáden between February 2020 and January 2022, Robert was President and CEO of Sofia Foods, one of Canada's largest food processing companies. He was also the former President of Metals Group at Precision Castparts Corporation, a Berkshire Hathaway company, where he managed two subsidiary aerospace and industrial companies with a combined total global revenue of $2.5 billion. Mr. Wilt also spent 17 years at Alcoa, culminating as Executive Vice President and President of Global, its Primary Products business. Robert began his career in the U.S. Army. He served as a combat engineer officer in the 101st Airborne Division, and he is a veteran of

the first Iraq war. Robert holds an MBA from Harvard Business School and a Bachelor's Degree in Engineering Management from the United States Military Academy at West Point, New York.

Overall the January 2023 T&PP dinner meeting was well received, with many members of the SPE-KSA community from industry leaders, executive management, professionals, and students in attendance.

SPE-KSA's Diversity and Inclusion Finale: Unlocking Human Energy
Sharing best practices of DE&I

By Abdullah Almubarak, SPE-KSA T&PP Team Member

As the SPE-KSA 2021-2023 term draws close, the Diversity & Inclusion Committee is proud to commemorate its two-year journey with an exceptional event. Over the past two years, the committee has worked tirelessly to raise awareness towards important causes and celebrate every individual within our community. The committee has accomplished its mission of promoting diversity and inclusion.

As we look ahead to the upcoming term and expand our reach, the committee has revised its mission to include Equity. On May 14th, 2023, we successfully conducted an event entitled "Unlocking Human Energy: Sharing Best Practices of Diversity, Equity and Inclusion" at the Grand Hyatt Ballroom in Al-Khobar.

The event featured a panel discussion on the importance of Diversity, Equity, and Inclusion in organizations. The panel hosted a number of exceptional and experienced individuals who shared their insights. The panel was moderated by Abdulrahman Al-Shuhail, a Geophysicist at the EXPEC Advanced Research Center in Saudi Aramco, with three exceptional guest speakers: Ghassan Mirdad, CEO of Arabian Drilling, Giedre Malinauskaite, Chief Strategy Officer of CNTXT, and Suha Alsaif, Sustainability Director at NESR.

The panel discussion was highly constructive and insightful, focusing on the importance of adopting DE&I practices into an organization to foster creativity, eliminate barriers, and gain fresh perspectives. The panelists also shed some light on diverse team members' unique qualities, such as the ability to support and inspire one another.

Over 250 guests attended the event, where they had the privilege of engaging in constructive discussions and sharing their views. The event's outcome was extremely positive and impactful, as it was well-received by all attendees with positive feedback.

The Diversity & Inclusion Committee can reflect on its accomplishments with pride and joy, as it has successfully achieved its mission of promoting diversity, equity, and inclusion. We look forward to continuing this journey and making SPE-KSA an even more equitable and inclusive organization in the future.

SPE-KSA D&I: International Women's Day Highlight

By Nora Alsudairi, SPE-KSA D&I Publications Team

Women in STEM have made remarkable contributions to the fields of science, technology, engineering, and mathematics, shaping the world we live in today. SPE-KSA D&I committee conducted an activity on March 7th for 3 consecutive days, honoring International Women's Day, at the Core Area, Basement of EXPEC I and EXPEC II. This activity highlighted the efforts of outstanding women in Science, Technology, Engineering, and Math (STEM). We installed 3 booths demonstrating the major achievements of 6 anonymous female scientists and engineers. At each booth, visitors from multiple departments had the chance to engage and guess the leaders in STEM, leaving a mark in their memory.
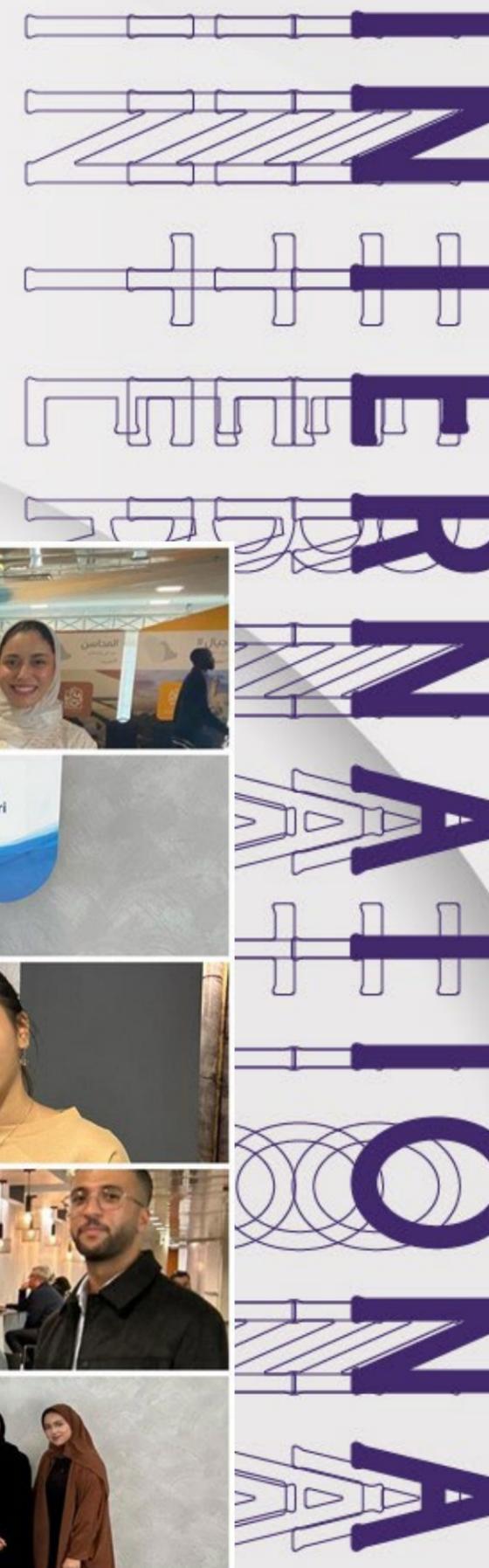
SPE-KSA Student Outreach Activities
SPE Student Chapters Establishment In The First Quarter of 2023

By Abdulrahim Mulhim

SPE-KSA's student outreach team's exceptional work during the first quarter of 2023 paid its dividends by adding three student chapters in the eastern and western provinces. The new chapters were established at the Imam Abdulrahman bin Faisal University, Alasala Colleges, and University of Business and Technology (UBT), raising the number of SPE University Chapters in kingdom to nine chapters. The main objective of the chapters is to provide the students with an operating framework for society activity at a university level. The team's commitment to outreach universities kingdom wide reflects SPE-KSA mission and vision to bridge the gap between academia and the energy industry.

The newly added chapters, along with SPE-JIC were the first to join SPE family for more than 10 years. Furthermore, UBT chapter is considered as the first SPE student chapter in Jeddah, which will serve as a base to expand SPE-KSA footprint in the western province. Overall, SPE-KSA will be enabled to outreach and engage with at least additional 1000 students across the kingdom as a result of establishing these chapters.

Student Outreach Team Celebrates Reaching +1000 Students Across the Kingdom

By Abdullah F. Bubshait, Nayef Almugrin, SO team members

As a result of the team's strategic planning and dedication, the Student Outreach (SO) Team is celebrating reaching +1000 student members all over the kingdom. This achievement signifies a momentous milestone for SPE-KSA, with an astonishing increase of 137%, resulting in advancing SPE-KSA's worldwide ranking from the 26th to 5th place in students' memberships and number of university chapters. It reflects the growing interest and enthusiasm of the students to join SPE and benefit from its various programs and activities. The relentless efforts of the Student Outreach (SO) Team have paved the way to provide students with opportunities to develop their skills, network with industry professionals, and learn about the latest trends and technologies in the oil and gas sector.

SPE-KSA Student Outreach (SO) Team is always looking for new ways to expand its reach and impact by welcoming any suggestions or feedback from students, faculty members, or SPE members on how to improve its activities and initiatives and also invites anyone who is interested in volunteering or collaborating with them to contact them directly.

The Student Outreach (SO) Team would like to thank all students who have joined SPE and participated in its events and assured to continue its efforts to inspire and empower the next generation of engineers in the kingdom.

University Outreach Activities & Visits
By Ghaida Aljuhani, Lujain Alawami, and Nayef Almugrin - SPE-KSA Student Outreach Team

SPE-KSA Student Outreach – University Flagship 1st and 2nd Rig Visit

By Nayef Almugrin, Ghaida Aljuhani and Batool Alsunbul - SPE-KSA Student Outreach

The Student Outreach Team organized the 1st and 2nd University Flagship Rig Visits on January 17th and June 14th, respectively, at Drilling and Workover (D&WO) facilities at Saudi Aramco. More than 600 student applications were received, and a total of 60 university students from diverse backgrounds and universities within the kingdom attended both visits. The visits aimed to provide them with real-life experience and expand their knowledge of the oil and gas industry. The students had the opportunity to visit an oil drilling rig, in addition of various supporting facilities within D&WO, observing its operations firsthand.

During the 1st University Flagship rig visit, the day began with a tour of the Real-Time Operating Center (RTOC) in the Drilling and Workover Department. The students were introduced to the RTOC's main drilling principles and techniques, as well as the monitoring system that is used to remotely monitor hundreds of oil and gas rigs around the kingdom. Following the RTOC tour, the students were divided into two groups and visited two different rigs. During the field trip, students were able to witness an operational rig and be exposed to the main components of the rig including the monkey board, doghouse and electrical control house.

During the 2nd University Flagship rig visit, the students began with a trip to the rig site, followed by a visit to the RTOC. Following their visit to the RTOC, the students attended the Safety Zone of the Drilling and Workover Training Division, where they were educated on the significance of safety culture in maintaining an incident-free workplace. Lastly, the students had the opportunity to visit the Drilling and Workover Well Control School, where they were able to witness various types of well control simulators and safely simulate and test real-time operations prior to drilling.

Both visits provided the students with a comprehensive understanding of drilling rigs and the vast natural resources they provide, which can ultimately benefit society and the country's economy.

Saudi Aramco PE&D Visit

On March 1st, the Student Outreach Team organized a site visit in collaboration with Petroleum Engineering & Development (PE&D) in Saudi Aramco. Amongst +250 student applications, 35 passionate students have been selected from 8 different universities across the kingdom from diverse disciplines and backgrounds. The students visited 5 diverse destinations during the visit, these were:

- Upstream Innovation Center (UIC)
- Geosteering Operation Center (GOC)
- Upstream Professional Development Center (UPDC)
- Exploration and Petroleum Engineering Center - Advanced Research Center (EXPEC ARC)
- EXPEC Computer Center (ECC).

Discovering today's advanced technologies in the oil & gas industry and how the wells are monitored nowadays, in addition to witnessing the various upstream educational centers and 4IR technologies which have been a significant opportunity to expand their expertise in the field. Incredible participation from the enthusiastic young students during the visit to be marked as a success in helping them to connect their studies to the world and business today, as well as an outstanding engagement with the employees filling their curiosity and concerns.

SPE-KSA's YP and SO Tapping into the Power of Tomorrow's Youth: MEOS GEO Young Professionals and Students Program

By Ghaida Al Juhani, YP and SO Team member

Giving the youth greater prominence when mapping the future of energy has never been more important than now. SPE-KSA continues to empower and invest in young individuals.

During the Middle East Oil, Gas & Geoscience Show (MEOS/GEO), as part of the Young Professionals and Students Program (YPS), SPE-KSA's Young Professionals and Student Outreach Teams have conducted two successful programs to nurture and cultivate the next generation of young talents by equipping them with knowledge and leadership skills to excel in the field of energy.

The first program is a workshop titled "Emerging Leaders" session that attempts to expose young participants to actual leadership issues in order to increase their knowledge of the abilities they need to develop. More than 100 young professionals and students from diverse nationalities and educational backgrounds attended the program, exhibited remarkable involvement, and provided positive feedback on it.

The second program is a workshop titled "Energy4me: Train the Teacher". In the workshop, teachers conducted several first-hand interactive experiments to learn more about oil and gas concepts and processes. The workshop's aim is to spread energy knowledge in an accessible manner, spark curiosity, and draw upcoming young talent to the sector. The program was well-attended, with over 30 teachers representing more than 5 international schools within the Kingdom of Bahrain. The knowledge gained by teachers is expected to be transferred to over 3000 students to attract bright young people to the exciting world of engineering.

Youth has a huge potential to play an active role in the energy transition; therefore, it is important to empower the youth of today for a sustainable and smooth energy transition.

SPE-KSA Outstanding Participation In Gotech Student Education Week Program

By Fawaz Alboghail and Abdulrahman Alrumaih

In collaboration with "The Gas &Oil Technology Showcase and Conference (GOTECH)" in Dubai from 13-15 of March, SPE-KSA's Student Outreach Team has supported four exceptional Saudi undergraduate students to receive a fully funded sponsorship to participate in the Student Education Week program in the conference. SPE-KSA representatives showed remarkable engagement and outstanding performance, where 2 Saudi Students, Majed Al-Essa from KFUPM and Abdulaziz Boareesh from PMU, respectively, have competed against +65 international students and won the 1st and 3rd place for the best sustainability project which was sponsored by Dragon Oil. This is a testament of the caliber of SPE-KSA students.

Majed Al-Essa, KFUPM undergrad student won the 1st place award in the program sustainability challenge.

SPE-KSA selected sponsored students

Students Abstract Workshop
Student Outreach Committee & 2024 IPTC SPE Technical Sub-Committee

By Danna Khattab

SPE-KSA's Student Outreach Team have conducted A Student Abstract Workshop in collaboration with the IPTC 2024 SPE subcommittee at King Fahad University of Petroleum and Minerals, on Tuesday,30th of May, 2023.

Dr. Yaser Alduailej, a respected professional in the industry, led a workshop on the art of writing successful abstracts. Dr. Alduailej completed his academic journey with a BSc in Chemistry, a MSc in Petroleum Engineering, and a PhD in Petroleum Engineering. He has authored and co-authored more than 17 technical papers and holds 4 granted patents. Additionally, he is an active member of the Society of Petroleum Engineers.

The workshop drew more than 50 students from various universities and young professionals, and Dr. Alduailej engaged the attendees in a discussion about the importance of abstracts in the scientific community. He then provided a step-by-step guide detailing various methods and approaches for writing effective abstracts. At the end of the workshop, Dr. Alduailej shared valuable tips on what to do and not to do while writing an abstract.

The workshop was highly productive and engaged the audience thoroughly, with many questions being asked and insightful discussions taking place.

2023 Q1 University Visits

By Ali Alshuwaikhat, Khalid Almasri, Batool Alsunbul and Abdulaziz Alsubaie - SPE-KSA Student Outreach Team

As part of SPE-KSA Student Outreach responsibilities to support and motivate the Kingdom's university students to excel, achieve, and boost their knowledge in technical and non-technical aspects, the team has conducted several visits to the active student chapters in KFUPM, KFU, KSU, and PMU over the past three months. The objectives of these visits were to share knowledge, enhance and strengthen communication between professionals and academia, create synergy between SPE-KSA and student chapters, discuss collaboration opportunities, and set mutual goals to ensure the chapters' success and showcase their active participation.

King Fahd University of Petroleum & Minerals (KFUPM) Visit

Considered as one of the most active SPE Student Chapters in the region, SPE-KFUPM has been recently achieving remarkable milestones in the chapter's history, awarded 2022 SPE Presidential Awards and ATCE Paper Contest, SPE-KSA team conducted a visit to College of Petroleum & Geoscience (CPG) to meet with the Chapter members and faculty advisors. The main subjects discussed in the meeting included recent accomplishments, their upcoming participation in regional and international contests and conferences, planned activities such as PetroGame contest, inspired by the International SPE PetroBowl, and upcoming visits to research centers and O&G service providers in the region, in collaboration with SPE-KSA team.

King Faisal University (KFU) Visit

The objective of this visit was to introduce SPE to university students at KFU, and initiate the chapter once again! The presentation highlighted the benefits of joining SPE which includes the large community of students and esteemed professionals across the globe. It also focused on providing an overview of the several SPE-KSA committees, followed by the various programs and initiatives each committee has to offer. Such an elaboration allowed better communication to students enabling the showcase of SPE-KSA continuous efforts with an insight on the organization's initiatives that give back to the community. There was an attendance of around 100 students from different engineering majors, who kept engaging with the SPE-KSA members and showed interest in being part of the SPE. Following a fruitful session, Student Outreach members met with the Department Head of Engineering, Dr. Abdulrahman AlMithin in which an assurance was given that the University's support will always be provided for future SPE-KFU events or programs.

King Saud University (KSU) Visit & Knowledge Competition

As part of SPE-KSA Student Outreach Team's strategy to expand its presence in the academic field, the team successfully conducted a visit to King Saud University in Riyadh to strengthen the relationship and explore collaborations, the team met with students, faculty members, and chairmen of petroleum engineering and geosciences departments. Additionally, the Student Chapter held a competition under the name of "Test Your Knowledge". The aim of the competition was to ensure the solid fundamentals of the petroleum engineering students through 150 different questions covering the various subjects in petroleum engineering. A total number of 6 groups registered in the competition and played in the initial stage, through a series of stages 2 teams qualified to the finals. All participants received giveaways for their engagement and participation, with special prizes for the first and second place. SPE-KSA will continue its efforts in supporting the students with different learning opportunities.

Prince Mohammed Bin Fahd University (PMU) Hosts a Technical Session by Former SPE President

SPE-PMU was established a year ago in 2022. Despite that, the chapter's members have accomplished remarkable efforts since then to expand the chapter and extend the technical knowledge among members. The process that the chapter took for developing and moving gradually toward an advanced level was done through participating in various activities, arranging several field visits, attending technical events, and playing a part in global conferences. With High quality of leadership skills, SPE-PMU team was able to dramatically increase the number of members through SPE events and programs, which were held in and outside the university boundaries.

On 28 February, SPE-PMU student chapter planned an event that was attended by a large number of students who are interested in the future of energy. This event took place at prince Mohammad bin Fahd University where they successfully hosted a technical session that was led by 2019 SPE president Dr. Sami Alnuaim who discussed the topic of Energy Transition. Besides that, SPE-PMU students participated in many events, such as PMU WINTER festival was an interactive event that was joined by many societies and social clubs that made the event fruitful, where SPE PMU students shared their journey and experience with the university students.

Baker Hughes Visit

The team conducted a university student visit to Baker Hughes facility in Dhahran, on Thursday, February 9th Out of 200 student applications were received, 32 outstanding students were selected, representing 7 in-kingdom universities with diverse engineering & geosciences backgrounds. The program started with an overview of the company's history, core business, and possible training and career opportunities, presented by the Regional Managing Director of Baker Hughes. This was followed by a tour to the different laboratories, where the students got to see different technologies, such as the 3D metal printing machine with its designing process, and the drilling fluids lab, where several innovations that are being deployed in the field got presented. The students had the chance to visit the real-time operations center that monitors Saudi Aramco D&WO rigs. During the visit, the participants showed an outstanding engagement with the engineers, had an in-depth experience, and got exposure to the professional work environment.

Formation of New SPE Chapter Board at KAUST Ushers in a Promising Era for 2023-2024

The formation of a new board for the Society of Petroleum Engineers (SPE) Student Chapter at King Abdullah University of Science and Technology (KAUST) heralds the onset of a vibrant and promising academic year for 2023-2024. Determined to uphold and build upon the esteemed legacy of the previous chapter, which was honored with the KAUST Seeds Award for Best Student Chapter, the new board is set to achieve remarkable milestones.

Comprising a dynamic and diverse assembly of students, the SPE Chapter Board is committed to fostering a thriving community. This will be achieved through multidisciplinary collaborations, engaging technical events, and workshops that aim at professional and technical development in various fields, including the field of petroleum engineering. A highlight of the 2023-2024 agenda is the board's emphasis on sustainable energy strategies and solutions with integrating discussions and educational activities focusing on Circular Carbon Economy approaches and technologies.

Under the skillful leadership of President Feras Rowaihy, an Aramco-sponsored Ph.D. student with an impressive track record of experience in leading multidisciplinary teams, the new SPE KAUST Student Chapter Board synergizes innovation, collaboration, technical development, and a sustainability focus. It is poised to make significant strides in enriching both the academic and social landscape of KAUST and beyond.

SPE-KSA Student Outreach
Meet the Experts 2023

By Nora AlSudairi - SPE-KSA Student Outreach Coordinator

SPE-KSA Student Outreach Team held Meet the Experts virtual webinar on January 26th, 2023. The value of this program expands beyond the conventional way of knowledge exchange as it enables a transparent relationship between academia and the professional industry to facilitate and cultivate students' and young professionals' growth to successfully transition to the professional world. In addition, the program creates an immersive and interactive experience by connecting students & young professionals to experienced professionals to exchange knowledge and learn more about the professional sector.

The webinar included one technical presentation titled "Petroleum Economics", delivered by Principal Consultant from O&G Knowledge Sharing, Eng. Mohammed Mian, discussing technical and economic challenges in the industry. It was followed by a soft skills session on "Career Opportunities in the Oil & Gas Industry," presented by Field Development and Engagement Manager from SLB, Eng. Hassan Alahdal.

Petroleum Economics session discussed the O&G industry challenges, global O&G demand, and reserves assessment. After elaborating on the global challenges in O&G industry, came the value of the second session in the program, Career Opportunities in the O&G Industry. The second session introduced an overview of the O&G industry, career paths overview, pool of majors, engineers & petro-technical progression, and shared profiles examples.

Both sessions witnessed strong participation of students and young professionals, with over 100 registrations from students and young professionals from different universities and oil & gas companies in the kingdom. This exemplifies the enthusiasm and eagerness to learn more about the discussed topic before, during and even after the session. It is the team's topmost priority to develop and empower our youth and future talents by creating unique experiences, such as Meet the Experts, tailored specifically to connect them with experienced professionals and leaders in the industry and enable them to have a smooth transition between academia and professional career.

Meet the Expert
Guest Speakers

Petroleum Economics
Eng. Mohammad Mian
Principal Consultant
O&G Knowledge Sharing

Career Opportunities in the Oil & Gas Industry
Eng. Hassan Alahdal
Field Development & Engagement Manager
SLB

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SPE-KSA Student Outreach Committee
Pave you Career Path: Resume Workshop

By Muhannad Alattas, Student Outreach Events & Managements team member

On January 28th, 2023, SPE-KSA's Student Outreach Committee, have successfully conducted its first "Pave Your Career Path: Resume Workshop" at the Kempinski Hotel in Al Othman towers.

The event was tailored for university students and fresh graduates to help them jumpstart their careers and smoothen their transition from academia to professional environments. The event included multiple fruitful sessions presented by experienced speakers focusing on resume-building skills, job interview training, and developing a professional online profile to prepare the participants for the job-market requirements.

Abir Chatila, a management and professional trainer with a master's degree in Educational Leadership and certifications in coaching and mentoring, was the lead instructor for this event. She shared her experience of more than 25 years with the participants, where professional resume-building skills were focused on. During the session, Abir broke down the resume into five main sectors, allowing the participants to focus on each sector individually while simultaneously creating their resume. This interactive approach encouraged the participants to ask questions and get the most out of the session. Additionally, Doha Alattas an experienced career advisor and professional trainer from Aramco HR played a major role during the session where she led the activities.

Following the resume session, a linked-in profile optimization presentation was shared with the participants. Highlighting the importance of a professional online presence. Moreover, the workshop included a mock interview where participants had the chance to experience the interviewing process in different industries, such as Oil & Gas, Pharmaceutical, Fashion, Food, and Energy sectors. Several participants were selected to be the HR representatives of these companies, and then they performed mock interviews on the rest of the attendees. This activity aimed to

familiarize the participants with the type of questions they can be asked during interviews, in addition to preparing them to conduct themselves appropriately. Finally, as part of the SPE-KSA Student Outreach Committee's giveaways, a professional photographer was brought to take professional pictures of the participants. Where these photos can be used in their resume or linked-in profile.

Ultimately, as part of the Student Outreach Committee's eagerness and continuous efforts to develop and shape future generations, this workshop had a holistic approach where all the major items of employment requirements were covered. Providing the participants with a complete package of skills, knowledge and tools for their career journey.

Youthful Bonds
Young Professionals Take Steps to Spread Their Knowledge and Experience

Dalia Al Maghlouth, SPE-KSA School Outreach Team Member

The School Outreach Team of the Society of Petroleum Engineers - Kingdom of Saudi Arabia (SPE-KSA) has been actively engaged in promoting education and awareness about the energy industry among young students. Most recently, they have successfully organized visits to various educational institutions, where they shared knowledge to inspire future generations to pursue careers in the energy sector.

Alaziziyah Private Schools Visit: Fostering the Talents of Tomorrow

On Thursday, March 30, 2023, the School Outreach Team members Leyla Almailo, Maram Aljishi, and Moneera Alsharif visited Alaziziyah Private Schools in Khobar. The team's aim was to educate and inspire over 260 female middle and high school students about the oil journey and its various stages, including exploration, drilling, production, refining, and sales. Similar to the previous visit, the team conducted Energy4me experiments, showcasing practical applications of petroleum engineering concepts. The students exhibited great enthusiasm and active participation, reflecting the promising talents of Saudi Arabia's next generation. The visit strengthened the connection between the

students and the energy sector, providing them with unique learning opportunities and inspiring them to consider careers in the industry.

The SPE-KSA School Outreach Program continues to make significant strides in promoting awareness and inspiring Saudi Arabia's youth to pursue careers in the energy sector. Through their visits to educational institutions, they have engaged with students, shared knowledge, and conducted interactive experiments, leaving a lasting impact on young minds. These efforts not only expand engagement between students and the energy sector but also contribute to the development of Saudi Arabia's future workforce. SPE-KSA remains committed to providing unique learning opportunities and inspiring the youth to contribute to the growth of the energy industry.

SPE-KSA's T&SA Visits the Shaybah Wildlife Sanctuary

SPE-KSA's Trips and Social Activities Team arranged to visit Shaybah Wildlife Sanctuary on December 18th -19st, 2022. The visit included several activities such as the GOSP-2 tour, Shaybah Wildlife Sanctuary, and live shows. The main goal of the events is to have a memorable, spiritual, educational, and recreational once-in-a-lifetime experience at Shaybah. along with a Pledge to the Environment.

Shaybah Wildlife Sanctuary is one of Saudi Aramco voluntary sustainability community initiatives to contribute to biodiversity restoration. Located adjacent to the mega-facilities in the area, the fenced sanctuary now protects dozens of native plant and animal species.

For a country that is mostly desert, Saudi Arabia has a surprisingly diverse population of wild animals and plants to restore these critically important habitats.

Likewise, the company has reintroduced Arabian oryx, Arabian gazelle, and red-necked ostrich into the vast Shaybah Wildlife Sanctuary in the Rub' al-Khali desert.

On December 19th,2022, we kicked off the trip with an overview of the GOSP-2 and its complex operation when it comes to Oil, Gas and Energy production, then started the tour to the Sanctuary with our first stop at Shaybah Wildlife Sanctuary Center, where we got introduced to the eco-system, exposed to the different sand layers, exotic desert roses and plantations, in addition to the extraordinary species roaming around this Sanctuary.

Lastly, conclude this one-of-a-kind experience by enjoying the natural sunset from the top of the Dune, surrounded by this beautiful red sand with a view over the entire brilliant camp, while a traditional musical band playing in the background elevated the whole atmosphere to another level. Not to forget the outstanding hospitality of Shaybah people.

A special thanks go to Abdulaziz Fathi, Faisal Bash, and Murtadha Altaroti for successfully leading this visit, and utmost appreciation goes to SPE-KSA team and its volunteers for their excellent efforts. This event could not have been possible without your energy, commitment, and support.

SPE-KSA IT: Experience Safety with Virtual Reality

The Society of Petroleum Engineers, Kingdom of Saudi Arabia section (SPE-KSA) in collaboration with Upstream's EXPEC Computer Center (ECC) and Loss Prevention, delivered 'Experience Safety with Virtual Reality' an event aimed at promoting safety using immersive technology. The week-long event took place on June 4-8 at EXPEC Dhahran and included an interactive booth which attracted hundreds of visitors.

Visitors to the booth benefited from a range of immersive safety scenarios, such as exploring hazard recognition, confined space entry, and remote travel requirements. Notable visits by Saudi Aramco's senior management include Dr. Ashraf Tahini, VP of EXPEC Computer Center, and Mr. Faisal Nughaimish, VP & Chief Petroleum Engineer, and Vice-chairman Board of Directors (SPE-KSA), among other members of management.

The showcase was designed to replicate real-world scenarios in a safe and controlled environment, allowing employees to practice their response to emergencies without any risk to their physical well-being. The virtual reality technology used in the simulations was highly realistic, with 360-degree visuals and sound effects that created an immersive experience.

The event also featured a talk by Abdulrahman Alamer, who is a safety engineer with more than 8 years of experience in the oil and gas industry. Abdulrahman discussed the benefits of implementing virtual reality technology in workplace safety training and presented examples of actual simulations that are currently being developed and implemented. He highlighted the importance of creating engaging and interactive training programs that can hold employees' attention and help them retain critical safety information. Attendees were encouraged to explore the potential of virtual reality technology in enhancing their existing safety training programs and to consider the long-term benefits of investing in this technology.

Hundreds of guests visited the showcase, the outcome of which was extremely positive and impactful.

Sandrose Reviews

By Basmah Alotaibi and Faisal Al Hunaidi,
Associate Editors SandRose Magazine

Welcome to this edition of SandRose Reviews! We are thrilled to bring you a captivating assortment of media that delves into the intricacies of human energy. From the challenges of time management to profound stoic teachings, we have curated a diverse selection for your exploration. Whether you prefer to immerse yourself in a book, documentary, or podcast, we guarantee you will gain valuable insights and unique perspectives. Take a look at our handpicked recommendations below!

We invite you, our valued readers, to participate in our "Recs from Our Readers" segment. If you have a recommendation you›d like to share, please send it to SandRose for the opportunity to be featured in our future editions!

Recs from our Readers

We are thrilled to share a delightful collection of media submissions from the SandRose community. Immerse yourself in this edition›s remarkable reader selections, available for your enjoyment below!

Books

Basem Alshoura,
Petroleum Engineer

**The Power of Charm
By Brian Tracy & Ron Arden**

It's well-known that people should not judge a book by its cover, but The Power of Charm is one of the few books that defy this famous adage. In this book, you realize how the small details of your daily interactions with people can affect how you are perceived, from how you sit to how you shift your eyes when speaking to someone; Brian Tracy and Ron Arden give a detailed qualitative and quantitative approach to how someone can become more charming across their social sphere. It is truly fascinating how such minute details can make a difference to friends, family, and strangers alike. I'm pleased that I trusted my first impression of this book, as it is the resource you need to develop your communication abilities to the fullest.

Film

Nawaf AlGhamdi,
Assistant Engineer

Who Made These Circles in the Sahara? (2022)

Who Made These Circles in the Sahara? is a captivating documentary by Vox that delves into the mystery of the vast uniform circles spanning central Algeria. The short film seamlessly unravels the enigma surrounding these seemingly random formations through mesmerizing satellite imagery and enlightening interviews with experts. The combination of compelling visuals and insightful analysis allows viewers to embark on a mesmerizing journey of discovery, leaving them spellbound by the intricate origins and significance of these mysterious circles in the Sahara.

Podcast

Zahrah Marhoon,
Petroleum Engineer

Finjan Thmanyah: Mental Health at the Workplace

The latest episode of «Finjan Thmanyah» podcast in Arabic explores workplace psychology in Saudi Arabia, providing practical advice and insightful perspectives on enhancing mental health at work. The discussion also sheds light on cultural and societal factors that impact job satisfaction. Overall, this engaging episode is an excellent resource for anyone looking to thrive in their work environment.

Books

Amjaad AlMakki,
Petroleum Engineer

**Stoner
By John Edward Williams**

This book talks about Stoner, who is a ridiculously un-spectacular character. I was so hooked by the fact that nothing special or tempting occurred in the first three lines of its introduction. No poetic entries or sudden question marks forced me to continue reading, looking for a point of astonishment. No matter how many pages I turned, nothing was extraordinary, yet I couldn't stop reading it. By then, I was simply so attracted to the domestic and warm hints of his ordinary life. It was more of a long, intimate chat with an old friend than of a novel, which made me reluctant to neither stop the conversation nor close the book.

Film

Abdulrahman Tayar
Petroleum Engineer

Mind Field

Mind Field is a captivating and thought-provoking web series that explores various aspects of human behavior and neuroscience. Presented by Michael Stevens, the show delves into topics such as perception, memory, and consciousness through a combination of scientific experiments and interviews. The series offers insights into the mysteries of the human mind that are both fascinating and enlightening. If you have an interest in psychology, neuroscience, or human behavior, Mind Field is definitely worth checking out, as it will leave you with a greater appreciation for the complexity and wonder of the human brain.

Podcast

Hatim Tarter
Petroleum Engineer

Cosmic Chronicles: Unveiling the Wonders of Space

Prepare to embark on an awe-inspiring journey through the depths of space with «Cosmic Chronicles,» a captivating podcast that explores the mysteries of the universe like black holes, life in space, and exoplanets. Dr. Sanders has a remarkable ability to make complex astrophysical concepts accessible and engaging through this podcast. What sets «Cosmic Chronicles» apart is its human perspective in this wide universe exploration. "Cosmic Chronicles" is a treasure trove of knowledge that fuels curiosity and ignites the imagination. Dr. Amelia Sanders and her team have created a podcast that educates, entertains, and inspires the listeners.

Books
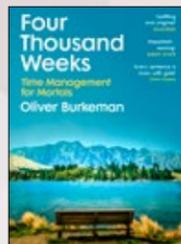
Four Thousand Weeks: Time Management for Mortals
by Oliver Burkeman

"What if we stopped trying to do everything?"

Almost all of us have experienced the sensation of being overwhelmed with our long list of to-do's in hopes of obtaining a more meaningful life. Time management is one of the most crucial skills to guarantee such a life. However, the main question is how can we optimize our short time on this earth with an average human lifespan of about four thousand weeks!

Unlike other productivity books, this book indulges the realization that our time is limited and we can't possibly do everything, so what if we stopped? Burkeman takes you on a comforting journey by sharing his experience of being a productivity geek trying to do everything. The author's philosophy is structured around acceptance of our finitude and limitations rather than denying it. It's an uplifting and empowering take on a more realistic exploration of our daily quests. By doing so we can embrace our true potential by narrowing our focus on what truly matters without over stimulating our mental health.

If you enjoyed Four Thousand Weeks, you'd enjoy Stolen Focus.

Film

Chasing Coral (2017)

«The ocean is not separate from us; we are all connected to the ocean.»

The world of coral reefs has always been a mysterious domain that only divers can explore, seeking its beauty and complexity. These reefs serve as nurseries for marine life, with about a quarter of all underwater creatures relying on them for survival. Over a billion people depend on coral reefs for nutrients and oxygen. The documentary reflects on the future of these thriving organisms and features discussions with scientists to better understand the causes of coral bleaching.

Take a dip in this remarkable journey and join the filmmakers of Chasing Coral as they explore underwater wonders worldwide. Chasing Coral pays homage to the beauty and delicacy of our planet's coral reefs. The filmmakers hope to induce curiosity and an incessant call to action in the current generation because good passion means good work, which will improve the world.

If you liked "Chasing Coral," make sure not to miss out on "Chasing Ice."

Podcasts
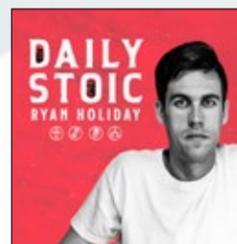
Daily Stoic

"The good things in life cost what they cost. The unnecessary things are not worth it at any price. The key is being aware of the difference."

The Daily Stoic podcast, hosted by Ryan Holiday, integrates snippets of Stoic wisdom into our daily lives. With a deep understanding of complex philosophical concepts, Holiday guides listeners through themes of gratitude and self-improvement, offering valuable perspectives.

Holiday, the author of Ego is the Enemy, encourages us to examine our beliefs and behaviors while embracing virtues critically. The podcast regularly features guest interviews that provide diverse insights into the application of Stoicism in our modern real-world situations. These conversations enrich our comprehension of Stoic philosophy and its relevance, fostering personal growth and introspection.

Ryan Holiday's talent for distilling ancient wisdom into actionable daily advice and the podcast's superb production quality and thought-provoking guest interviews make it an essential listen for anyone seeking a more purposeful and virtuous life.

If you found Daily Stoic enjoyable, make sure to check out Stoic Meditations by Massimo Pigliucci for another insightful listening experience.

Books

Creativity, Inc.: Overcoming the Unseen Forces That Stand in the Way of True Inspiration
by Ed Catmull, Amy Wallace

"Failure isn‹t a necessary evil. It is not the opposite of success. It is a necessary consequence of doing something new."

Creativity Inc. by Ed Catmull and Amy Wallace is a compelling and illuminating book covering the innovation world. Drawing from his experience as the co-founder of Pixar Animation Studios, Catmull shares insights on fostering ingenuity within organizations.

Catmull takes readers on an adventure through the remarkable rise of Pixar and its creative process. He openly discusses the challenges encountered along the way, emphasizing the importance of building a culture that nurtures and embraces creativity. Pixar's co-founder also explores how learning from mistakes and cultivating a safe environment for risk-taking can lead to breakthrough innovations.

Creativity Inc. is a thought-provoking read that inspires and empowers individuals to stimulate creativity within themselves and their organizations. Ed Catmull's expertise and candid storytelling make this book an invaluable resource for anyone passionate about unlocking the true potential of creativity and innovation.

If Creativity, Inc. piqued your interest, Start with Why by Simon Sinek is next on your thoughtful reads!

Film

Shenzhen: The Silicon Valley of Hardware (2016)

Shenzhen: The Silicon Valley of Hardware, directed by Scotty Allen, examines the "Silicon Valley of Hardware" city for its revolutionary hardware-prototyping culture and unique manufacturing ecosystems. The tech hub's bustling streets, relentless energy, and entrepreneurial spirit permeate the city of Shenzhen.

The storytelling of the people behind the products allows us to witness entrepreneurs' voyages from conceptualizing to product development, shedding light on their challenges and triumphs. The film provides interviews with locals and foreigners, from makers and engineers to industry leaders; we gain insights into the rapid evolution of hardware technology and its high regard for an open-source philosophy impacting global innovation.

Shenzhen: The Silicon Valley of Hardware captures the vibrant culture and spirit of innovation that defines Shenzhen today, a must-watch for those interested in the boundless potential of human ingenuity.

If you enjoyed "Shenzhen: The Silicon Valley of Hardware", give "Machine Learning: Living in the Age of AI" a watch.

Podcasts

Thmanyah: Eight Questions

Eight questions is a fascinating youtube series produced by Thmanyah to interview people of various backgrounds addressing misconceptions and stereotypes they face regularly. These interviews are a great way to widen our perspective on jobs we rarely know about or need to expand our understanding of. Eight Questions is a growing series that provides a diverse and inclusive environment which is accessible to explore on the go.

One of the episodes hosts a consultant neurosurgeon that responds to the eight questions on how his critical job is viewed. Considering that the brain is the most complex and precious organ in the human body, a number of questions arise when thinking of this particular job. For example, Is it possible to lose memory after having surgery? What about gaining new skills or talents? Delving into this interesting interview will respond to these questions and more.

Thmanyah is a great source of many great shows and pieces of work that delivers special and meaningful content. This makes Eight questions a marvelous pool of knowledge to dive into.

Sandrose Reviews

SPE-KSA Executive Board Recommendations

For this edition of SandRose Reviews, we bring you a set of recommendations from some members of the SPE-KSA Executive Board.

Books

Dr. Yara Alzahid,
D&I Chairperson SPE-KSA
Executive Board (2021-2023)

Think Again
By Adam Grant

I am excited to share my review of Adam Grant's book, Think Again. Grant's work has consistently positioned him as one of my favorite psychology writers, and this book further solidifies his reputation. Think Again delves into the concept of intellectual humility, challenging readers to embrace the unknown, question their own beliefs, and become comfortable with not having all the answers. One of the key insights from the book is the transformative power of admitting when we don't know something and actively seeking critical feedback. Grant shows that leaders who exhibit this kind of humility are more likely to lead productive and innovative teams, fostering a culture of continuous learning. I highly recommend Think Again to anyone seeking to expand their mindset and thrive in an ever-changing environment. This book is a must-read for those who are ready to challenge their conventional wisdom and unlock new levels of growth and success.

Film

Seba Almaglouth,
T&PP Chairperson SPE-KSA
Executive Board (2021-2023)

Moneyball

Moneyball captivated me with its unique blend of sports, drama, and human emotions. The film tells the true story of Oakland A's general manager, Billy Beane, played by Brad Pitt, who revolutionizes baseball by using data-driven analytics to build a competitive team on a tight budget. As someone who appreciates both sports and innovative thinking, I found the movie engaging and inspiring. The performances by Brad Pitt and Jonah Hill were exceptional, making the characters relatable and the story even more compelling. Moneyball left a lasting impression on me, reminding me of the importance of challenging conventional wisdom and embracing out-of-the-box thinking to overcome obstacles and achieve success.

Podcast

Mohammed Al-Somali,
Information Technology
Chairperson Chairperson SPE-KSA
Executive Board (2021-2023)

سوالف بزنز

The podcast is presented by مشهور الدبيان and is for those who are passionate about business and entrepreneurship. In each episode, a unique individual shares their experiences in the fast-paced world of business, tailored for both newcomers and experienced entrepreneurs.

Food Allergies and Child Care

By Johns Hopkins Aramco Healthcare

Food allergies have become increasingly prevalent among children, creating significant challenges for parents and healthcare professionals. Food allergies can develop at any age but are more common in children. It is estimated that 5-8% of children worldwide have a food allergy.

Understanding Food Allergies

Food allergies occur when the immune system mistakenly identifies certain proteins in food as harmful and causes an allergic reaction. The most common food allergens in children include milk, eggs, peanuts, tree nuts, soy, wheat, fish and shellfish. Allergic reactions can range from mild symptoms like hives and itching to severe reactions such as anaphylaxis, which can be life-threatening.

Causes of Food Allergies

The exact cause of pediatric food allergies are not fully understood; however, several factors have been identified as potential contributors. One significant factor is the child's genetic predisposition. If one or both parents have allergies, the child is more likely to develop them. Early exposure to certain foods, such as peanuts or eggs, has also been linked to food allergies. Other potential causes include a weakened immune system, environmental factors and the hygiene hypothesis, which suggests that excessive cleanliness may hinder development of the immune system.

Challenges

Pediatric food allergies present numerous challenges for both children and their families. One of the primary challenges is the potential for accidental exposure to allergens, often leading to severe reactions. This risk necessitates constant vigilance and careful monitoring of the child's diet. Another challenge is the impact on a child's quality of life. Allergies can restrict a child's dietary choices, making participation in various activities and enjoying meals with friends difficult.

Signs and Symptoms:
Detecting Food Allergies in Children

Detecting food allergies in children can be challenging as symptoms can vary widely and may be mistaken for other conditions. Some common symptoms include:

1. **Skin reactions**: Itchy rash, hives or eczema.
2. **Digestive problems:** Nausea, vomiting, diarrhea or abdominal pain.
3. **Respiratory issues:** Sneezing, wheezing, shortness of breath or coughing.
4. **Swelling:** of the lips, tongue or throat.
5. **Cardiovascular changes:** Low blood pressure, dizziness or fainting.

Diagnostic Methods

If you suspect your child has a food allergy, it is important to consult a healthcare professional who will conduct a thorough evaluation, which may include:

1. **Medical history:** The doctor will ask about your child's symptoms, frequency and duration.
2. **Skin prick test:** Small amounts of allergens are placed on the skin to check for a reaction.
3. **Blood tests:** measuring the levels of specific antibodies in the blood can indicate an allergic reaction.
4. **Oral food challenge:** Under medical supervision, your child may be given small amounts of the suspected allergen to observe any adverse reactions.

Safeguarding Children with Food Allergies

Once a child has been diagnosed with a food allergy, it is essential to safeguard his or her health and well-being. Here are some strategies that can help:

1. **Education and Awareness:** about food allergies, including recognizing symptoms, avoiding allergens and appropriately responding to allergic reactions.
2. **Allergen Avoidance:** Avoiding allergenic food by carefully reading food labels and being aware of hidden allergens in processed foods.
3. **Emergency Action Plan:** work with the child's healthcare provider to develop an emergency action plan. This plan should outline steps to be taken in case of an allergic reaction.
4. **Supportive Environment:** Communicate with teachers, friends or other parents to create a supportive environment where the child's dietary needs are properly respected and addressed.
5. **Regular Follow-up:** Regular follow-up appointments with a healthcare provider are important to monitor the child's allergies and make any necessary adjustments.

if you suspect that your child may have an allergy, discuss it with his or her JHAH pediatrician who may refer you to a JHAH pediatric allergy specialist.

Student Chapter

SPE-KSA Student Chapter in Focus:
King Fahd University of Petroleum & Minerals

By Nasiru Salahu Muhammed - SPE-KFUPM board Member

CHAPTER'S ROLE

By offering a variety of delivered activities, the SPE-KFUPM Student Chapter aims to improve students exposure to both technical and non-technical facets of the energy sector and boost awareness of extracurricular activities at the King Fahd University of Petroleum and Minerals (KFUPM). This will give KFUPM students the opportunity to participate in voluntary activities that will enhance their future resumes.

RECENT ACTIVITIES

Two SPE-KFUPM & ARMA-KFUPM joint field trips were organized. The first field trip (March 13, 2022) was a visit to the National Oilwell Varco Company. The tour included a brief introduction to drilling basics, drill bits, and the bottom hole assembly, where students were shown the drill bits manufacturing processes. In the second field trip (March 29, 2022), Alkhorayef Petroleum Company hosted both the SPE and ARMA KFUPM chapters along with students and faculty members. During this visit, assemblies of logging tools, design, manufacturing procedures, and functions were discussed to enhance the understanding of the session

participants, with emphasis on the use of the tools in the Kingdom of Saudi Arabia.

Subsequently, the SPE-KFUPM section continues to widen its horizon as it undertook the first-ever Energy4me initiative, where high school students were encouraged to pursue a career in Petroleum Engineering and Geosciences related programs. In this event, basic but high-tech lab equipment was used to showcase the concept of the Darcy experiment in a bit to provide the high school students with hands-on experience to boost their morals.

In addition, the SPE-KFUPM in its weekly and special seminar series, hosted Prof. Mohan Kelkar, from the University of Tulsa (October 26, 2022), where a technical talk titled "Energy Transition" was discussed. This event was timely, as the students, researchers, and faculty members enjoyed the role it has to play to achieve a near-net-zero energy mix in the future.

SPE-KFUPM was chosen by SPE–KSA in collaboration with the College of Petroleum Engineering and Geosciences, to host the Data Science University Bootcamp. This boot camp hosted students from different

universities and majors across the Eastern Province such as KFUPM, Prince Mohammad Bin Fahd University (PMU), Imam Abdulrahman Bin Faisal University (IAU), and Al-Asala Colleges. This boot camp was kicked off by Mr. Ridwan Jalali from Saudi Aramco who presented a comprehensive overview of Python, Data Science, and the requisite tools for all the participants to flourish in academia and professional industry. The event lasted for 3 days (30 October - 01 November 2022) and covered Python Fundamentals, Data Science and Scientific Computation and Computer Vision & Machine Learning.
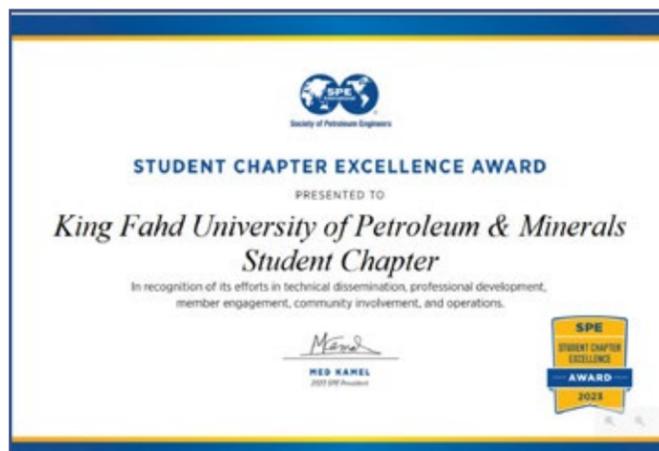

EnergyTransition Seminar

EnergyTransition Seminar

SPE-KFUPM Received 2022 Presidential Award

Ahmed Gowida won the 1st plane in International SPE Paper Contest - PhD Division held along with ATCE 2022

ACHIEVEMENTS

The 2022 ATCE was exceptional for SPE-KFUPM, the chapter received the 2022 Presidential Award on the 4th of October. Alongside the chapter's recognition, Mr. Ahmed Gowida won first place in the 2022 International SPE Paper Contest – Ph.D. Division at ATCE 2022. In addition, the SPE-KFUPM Petrobowl team participated in the international Petrobowl Championship.

KFUPM SPE Student Chapter has actively participated in the 2023 Gas and Oil Technology Showcase & Conference (GOTECH) held in Dubai, UAE between the 13th and 15th of March. KFUPM SPE Student Chapter members have won several contests including regional student paper contests (SPC) for the Middle East and North Africa region (MENA). KFUPM SPE Student Chapter have achieved the 1st place in SPC for both BSc & PhD divisions, 2nd & 3rd places in SPC for MSc division, and 1st place in GOTECH SPE Student Experience presentation contest. Moreover, KFUPM SPE Student Chapter members will represent the region in BSc & PhD divisions during SPE international SPC in 2023 ATCE.

FUTURE

The chapter's plan is to increase the number of SPE members within the college and the university at large. This will boost the chapter's morale to provide technical seminars on current energy sector issues such as thermal energy, hydrogen storage, carbon capture and storage, advanced data analytics and more to increase the number of SPE members. Moreover, SPE-KFUPM will have more enriching non-technical seminars such as health and environment-related topics. Filling the gap between the industry and academia is also another future objective that will be achieved through conducting trips to warehouses and R&D centers for the oil & gas companies.

SPE-KFUPM PetroBowl Team
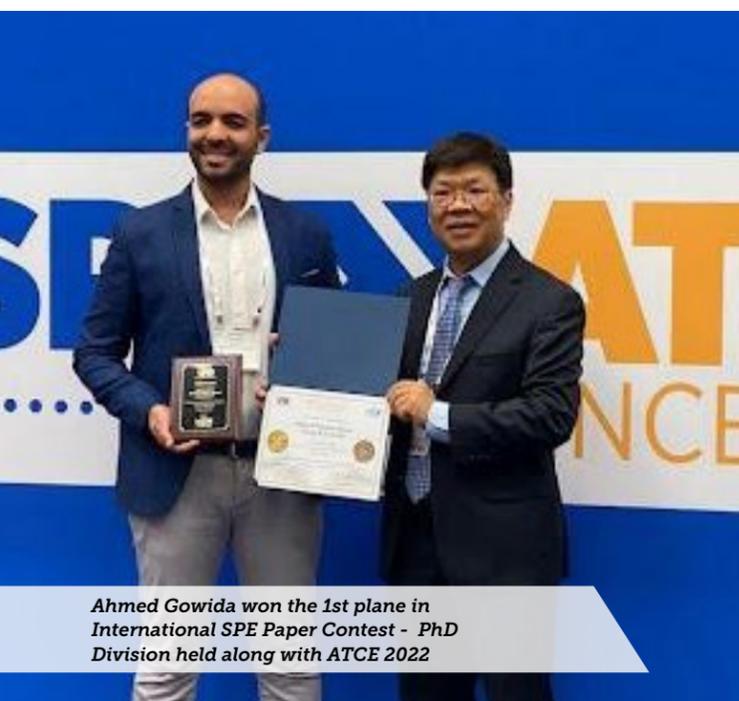
"The Presidential Award for Outstanding Student Chapter recognizes the highest-ranked 5% of the 400+ student chapters all over the world. Receiving the 2022 Presidential Award for outstanding Student Chapter is a testament to the hard work and dedication of the SPE-KFUPM student chapter. The support by KFUPM-CPG, our commitment to providing students with valuable technical and non-technical experiences, along with the success of the team effort, sets us apart and drives us towards excellence. This award not only recognizes our achievements of the past years but also serves as a call to action to continue our efforts in creating more achievements led by our young future scientists and engineers. We are proud to have such a dedicated and driven group of students."

- Dr. Sulaiman A. Alarifi - Faculty Advisor, SPE-KFUPM Student Chapter

IN THIS SECTION WE SHARE PHOTO SUBMISSIONS FROM OUR READERS, SHARING THEIR UNIQUE ABILITY TO CAPTURE IMAGES THAT SPEAK TO THEM

"I fell in love with the night sky the first time I camped in Saudi Arabia. I was never into night photography before that until I saw the blanket of stars taking over us that first night I spent in the desert. Ever since then I've been on a mission to explore different parts of Saudi in hopes of capturing the Milky Way and the serene experience you gain while camping. This photo was taken on my road trip to Abha two years ago."

-Sara Sami, Photographer

Follow Sara on instagram @agirlfrombahrain

ISO **200**

AUTO   ISO **50**   ISO **100**   ISO **200**   ISO **400**   ISO **800**   ISO **1600**   ISO **3200**