

April 2021

# SandRose

Magazine

BAYAN



Kingdom of Saudi Arabia Section

**united &  
EMPOWERED**



# CONTRIBUTORS

## APRIL 2021 EDITION

**EDITOR-IN-CHIEF**  
Hala AlHashmi

**EDITORIAL ADVISOR**  
Salma Al-Hashimi

**CREATIVE ADVISOR**  
Anas Ruhman

**ASSISTANT EDITOR**  
Sarah Alruwaily

**SENIOR EDITORS**  
Ammar Siddiqui  
Ali Al Towilib  
Reem Alsadoun  
Yazeed AlDughaiter

**ASSOCIATE EDITORS**  
Yara Alzahid  
Norah Al Sunaidi  
Bushra Alawwad

**CONTRIBUTORS**  
Nouf Alotaibi  
Mohamed Alsomali

**GRAPHIC DESIGNER**  
Sara Sami  
[behance.com/sarasami](https://www.behance.com/sarasami)

**COVER DESIGN ARTIST**  
Bayan Zomarah

 [byanzartist](https://www.instagram.com/byanzartist)



### FOLLOW US ON SOCIAL MEDIA!



**Twitter:** @spe\_ksa



**Instagram:** @spe\_ksa



**LinkedIn:** SPE – Kingdom of Saudi Arabia Section



**Snapchat:** Scan below for an instant add!



### DOWNLOAD OUR APP

using this QR code to enjoy our Augmented Reality feature for the upcoming editions and to gain access to events, photo galleries, membership information and all SandRose publications:



### CHECK OUT THE DIGITAL VERSIONS OF THIS EDITION OF SANDROSE USING THE QR CODES BELOW!

<https://spe-ksa.org/>



PDF Articles



Online Version

### We want to hear from you.

To contribute in future editions, or share with us your feedback, please reach us on:

[sandrose@spe-ksa.org](mailto:sandrose@spe-ksa.org)

**NEW  
FEATURE!**

**SHARE YOUR FAVORITE PIECES  
BY SCANNING THE QR CODES  
ACCOMPANYING EACH ARTICLE  
AND FEATURE!**

**04** Message from the Editor-in-Chief

**05** Meet the SandRose Team

**06** Message from the Chairman

**07** Meet the SPE-KSA Executive Board



**10** SPE-KSA D&I Committee

**16** SPE-DLP: Big Data and Machine Learning in Reservoir Analysis

**17** Webinar: IR 4.0 in Well Integrity Management

**18** Webinar: Nanotechnology

**19** Webinar: Upskill for Digital Transformation

**20** SPE-DLP: Digitizing Wellbores

**21** SPE-KSA Ambassador's Program

**22** Energy4Me



**23** Virtual Python Bootcamp

**24** SPE-KAUST Trip to Harrat Rahat

**25** University Outreach Sessions

**26** SPE-KSA WiDS Sponsorship

**27** Our Young Writers

**28** Launch of ELEV8

**30** Sponsorship Article by Nesr

**36** Alahsa Trip

**38** Al-Ula Trip



**40** SPE Chapters Around the World

**43** Book Recommendations

**44** Downhole Drone by Mohammed Al Dabbous

**46** Behavioral Changes by Fatima Almarzoug

**48** Don't Wait, Vaccinate by Layal Al Khatib

# MESSAGE FROM THE EDITOR-IN-CHIEF

I'm pleased to present you with this edition of SandRose Magazine, which marks the 7th edition for the 2019-2021 term. I'm especially proud of this edition because its theme revolves around a topic close to my heart, Diversity & Inclusion. You will find that the contents of this magazine, from the articles to the book recommendations, encompass this theme and, more importantly, introduce the newest addition to the SPE- KSA Executive Board, D&I. Additionally, our cover page closely addresses this theme, specifically the concept of "inclusion" and also belatedly celebrates Women's International Day. As someone who has been an active member with SPE- KSA for a few years now, I know that this society inherently embodies D&I in its culture and operations, and that the formation of a D&I committee will formalize and further embed this culture.

Diversity & Inclusion, although often misinterpreted as "female inclusion", is about creating a culture that accepts and actively involves individuals and groups from different races, ages, genders, ethnicities, religions, and disabilities. Furthermore, it's about accepting all beings, with their different personalities, skill sets, abilities, experiences and knowledge bases. Diversity & Inclusion is an all-encompassing term, and goes beyond gender. In this day and age, and with the advancement in thought and exposure, D&I should be second nature. In fact, D&I should not feel like a "mandate" on organizations, but rather a business strategy and a critical pillar that they can leverage to grow and develop.

The formation of this committee is a testament to the fact that SPE-KSA continues to move forward and grow, despite the challenging times that the whole world continues to face. In our efforts to continue elevating our members' knowledge bases and skills, the Technical & Professional Programs team continued to host its webinars and the Young Professionals team launched Elev8, a program designed to enhance participants' career skills. The Student Outreach team continued its mission of introducing students of all ages to the world of oil & gas and SPE-KSA. The Trips & Social Activities team continued to organize community events that promote volunteerism, health & wellbeing and cultural exploration. SandRose continues to become a platform for contributors to showcase their work and share their ideas, knowledge and experiences with our readers. However, all of the above would not be possible without the teams that enable and support our activities – thank you to the SPE- KSA Information Technology, Public Relations, Event Management, Treasury and Planning & Coordination teams.

As usual, a note of gratitude goes out to all editors, authors, artists, designers and contributors to SandRose Magazine. A special thank you goes out to Nesr for their sponsorship of this edition and their contributions. We thank you for believing in SandRose and choosing it to be a platform on which you share your contributions.

**HALA A. ALHASHMI**  
Editor-in-Chief



# MEET THE SANDROSE TEAM



**Salma Al-Hashimi**  
Chief Editor Advisor



**Anas Ruhman**  
Creative Advisor



**Sarah Alruwaily**  
Assistant Editor



**Ammar Siddiqui**  
Senior Editor



**Fatemah Abudeeb**  
Senior Editor



**Ali Al Towilib**  
Senior Editor



**Reem Alsadoun**  
Senior Editor



**Hala Alwagdani**  
Senior Editor



**Yazeed Al Dughaiter**  
Senior Editor



**Yara Alzahid**  
Associate Editor



**Norah Al Sunaidi**  
Associate Editor



**Mustafa Alkhowaildi**  
Associate Editor



**Bushra Alawwad**  
Associate Editor



**Malikah Sharif**  
Contributor



**Nouf Alotaibi**  
Contributor



# MESSAGE FROM THE CHAIRMAN

A Diversity & Inclusion (D&I) culture is not only about an organization’s brand and reputation, as much as it is about cultivating a sense of belonging for everyone within. In a diverse and inclusive environment, the true potential within every member is revealed through equitable access to resources and opportunities. This is a great opportunity to reiterate my message in the November 2019 SandRose edition, that “Our Section’s Diversity is Our True Strength”, reinforcing SPE-KSA’s firm commitment to disseminating a D&I culture into its community.

We at SPE-KSA pride ourselves on the diversity of our volunteers, who come from a range of differences in gender, nationality, age, educational backgrounds, and professional positions. The unique traits in every volunteer are harnessed in a D&I culture, enabling them to deliver top performance. For many years, SPE-KSA has cultivated an environment where every volunteer can openly come forward with their thoughts, ideas, and opinions. As a result, I have witnessed firsthand how our volunteers invest their hearts into their work, yielding greater productivity, creativity, and stronger decision-making.

Embracing a D&I culture is a moral imperative on SPE-KSA, as it is simply: the right thing to do. D&I protects the dignity of all people by acknowledging their humanity and improving their well-being. Promoting D&I as a concept is insufficient to its effectiveness; it has to be a cornerstone culture within every organization striving for success. SPE-KSA values D&I, not only due to the reaped achievements, but also due to its ability to affirm the safety and well-being of our members.

With that in mind, it brings me great pleasure to introduce a new addition to SPE-KSA’s Executive Board, Diversity and Inclusion (D&I), that will be active by the beginning of the 2021/2023 term. This key milestone towards embracing D&I shall enable our members to further build awareness on the significance of a D&I culture and ensure compliance on all levels with our D&I strategy.

It is only logical, and ethical, to promote a D&I culture, and it falls parallel with our Vision that aims to truly reflect the people of our society in our workforce.

**ABDULAZIZ K. AL SUFAYAN**  
Chairman, SPE-KSA



# SPE-KSA 2020-2021 EXECUTIVE BOARD



**Nassir Abalkhail**  
Technical Programs  
Chairperson



**Mohammed Al-Nahas**  
Young Professionals  
Chairperson



**Saad Al-Mudara**  
Treasurer



**Mohammed Al-Mishkhas**  
Trips & Social Activities  
Chairperson



**Othman Al-Qasim**  
Membership Chairperson



**Abdulrahman Al-Naim**  
Information Technology  
Chairperson



**Hala Al-Hashmi**  
SandRose  
Editor-in-Chief



**Abdulrahman Al-Musare**  
Planning & Coordination  
Chairperson



**Abdullah Al-Mulhim**  
Event Management  
Chairperson



**Seba Al-Maghlouth**  
Student Outreach  
Chairperson



**Abdulaziz Al-Suwailem**  
Public Relations  
Chairperson

## JOIN SPE-KSA FAMILY NOW!

SPE-KSA section is considered one of the largest and most decorated SPE sections in the world with more than 10,500 members.

For more information about how to join SPE-KSA family, visit [spe-ksa.org/membership/](https://spe-ksa.org/membership/)





# fuelling global recovery through sustainable energy



*"We are honored to welcome the global energy industry to Dhahran for the 14th edition of the International Petroleum Technology Conference. As one of our industry's premier gatherings, IPTC 2022 will showcase upstream sector resilience, technological advancement, and ecosystem evolution during these critical times. Join us as we bring together thought leaders, technologists, and strategists to share their views on how innovation and collaboration will shape our role in a circular carbon economy, and pave the way for sustainability, economic growth, and prosperity for generations to come."*

## **Nasir K. Al-Naimi**

IPTC 2022 Executive Committee Chair  
Senior Vice President,  
Upstream, Saudi Aramco

exclusive host

أرامكو السعودية  
saudi aramco



## **Call for Papers Now Open!**

Technical categories for paper submission:



Geoscience



IOR/EOR



Unconventional



Sustainability



HSE



IR 4.0



Reservoir  
Engineering



Integrated Reservoir  
Engineering and Geoscience



Drilling and  
Completions



Midstream  
Operations



Production  
Engineering



Paper submission online:  
<https://go.iptcnet.org/papers22>

Submission deadline:  
**30 June 2021**

sponsoring societies



Kingdom of Saudi Arabia

# 2022 reconnect

21-23 February | Dhahran Expo



# SPE-KSA LAUNCHES D&I COMMITTEE

Diversity & Inclusion: Path to harmony amongst individuals and communities

In recent years, we have been hearing a lot of buzz on diversity and inclusion, or D&I. These two terms are often confused and used interchangeably, however, they are both very distinct from one another. In more detail, **diversity** is any dimension that can be used to differentiate groups and people from one another. It refers to the existence of variations of different characteristics in a group of people. These characteristics or dimensions could be self-evident, such as national origin, age, race, ethnicity, religion, beliefs, gender, marital status and socioeconomic status or they could be more inherent, such as educational background, training, sector experience, organisational tenure, or even personality (e.g. introverts and extroverts).

Individuals from diverse backgrounds who are viewed as "different" are extremely valuable and can offer their organizations a diverse set of perspectives, work and life experiences, as well as religious and cultural differences. The power of diversity can only be unleashed when we recognize these differences and learn to respect and value all individuals and their backgrounds.

This brings us to the second half of the title, **inclusion**. Inclusion is an organizational effort and set of practices through which different groups or individuals with diverse backgrounds are culturally and socially accepted, welcomed, and equally treated.



An Inclusive culture makes people feel respected and valued for who they are as an individual or group, so that they can do their best at work. The process of inclusion fosters an environment where each individual feels valued and essential to the success of his/her organization. Evidence shows that when people feel valued, they function at full capacity and feel that they are a part of the organization's mission. This cultural shift creates higher performing organizations where motivation and morale soar. In simple terms, diversity is the actual mix of people and inclusion is the act of creating a healthy environment that brings the best out of this mix.

## Why do we need D&I in our workplace?

The benefits of a diverse and inclusive workforce not only include creating social harmony at work for the employees, but also increases productivity and profitability that help the organisation succeed in the global marketplace. In a recent Harvard Business Review article, the authors state that inclusion can have a myriad of benefits: "If workers feel like they belong, companies reap substantial bottom-line benefits. High belonging was linked to a whopping 56% increase in job performance, a 50% drop in turnover risk, and a 75% reduction in sick days. For a 10,000-person company, this would result in annual savings of more than \$52 million."

According to a recent Forbes article, the benefits of a diverse and inclusive workforce can be summed up in the following points:

- Bigger talent pool
- Increased employee engagement and trust
- New perspectives and innovation
- Better decision-making
- Improved performance
- Stronger business results and profits

The Society of Petroleum Engineers is committed to diversity and inclusion in the Oil and Gas industry, with a focus on three pillars: advocacy, collaboration, and education. In 2020, SPE International officially launched the Diversity & Inclusion (D&I) committee, which originally stemmed from the Women in Energy (WIN) committee that was established in 2016.

In accordance to SPE International, SPE-KSA is launching its own D&I committee. This will be a joint effort with members from national and international oil companies in the region. The committee has one main goal: advance the society's commitment to diversity and inclusion within the oil and gas community, while ensuring that D&I upholds the local cultural and societal context.

The SPE-KSA D&I Committee is planned to be launched in June 2021, with four roles: committee chair, deputy chair, advisor and three focus area leads. The three focus areas are: science, technology, engineering, and mathematics (STEM) lead; event programming lead; and communications and social media lead. The team will be selected based on technical and cultural backgrounds in an effort to promote the spirit of the committee.

The mission of this committee is to:

- Uphold the legacy of Women in Energy Standing Committee, which was created to promote

leadership, representation, and recognition of women within SPE

- Provide and support platforms that enable members to share their ideas surrounding diversity and inclusion
- Provide support to local SPE chapters supported by the SPE-KSA section in the creation and maintenance of diversity and inclusion committees
- Collaborate, support, and advise on topics relating to diversity and inclusion within SPE and external to SPE
- Promote diversity and inclusion in STEM

SPE-KSA has been practicing D&I for the past years and implementing it deep within their strategies. The leaders of the committees within SPE-KSA have always been considered diverse, as the board elects a diverse set of leaders, in terms of gender, age, culture and in some years, nationalities. The leaders of those teams also ensure diversity within their members and volunteers.

The Professional and Technical Programs committee, over the years, has hosted many technical and professional talks given by a diverse pool of high-profile individuals of different genders, nationalities, backgrounds, educational institutes, so on and so forth. Examples of speakers include:

- H.E. Engineer Abdullah Al-Sawaha, Saudi Arabia Minister of Communications & Information Technology
- H.E. Engineer Fahad Al-Jubair, Mayor of Eastern Province
- H.E. Mr. Mohammed El-Kuwaiz, Chairman of Saudi Capital Market Authority
- Mr. Amin Nasser, CEO of Saudi Aramco





- Ms. Rania Nashar, CEO of Samba Financial Group
- Dr. Maha Al Muneef, Executive Director of the National Family Safety Program
- Dr. Ivan Marten, Vice Chairman of Energy Practice, The Boston Consulting Group
- Mr. Olivier Le Peuch, CEO of Schlumberger
- Mr. Ed Abbo, President & CTO of C3.ai

The Young Professionals and Student Outreach committees partnered up to host the Endogenous competition to tackle major problems in the industry, and all the teams were formed with a conscious effort to ensure diversity in background, thought, nationality and gender.

Saudi

Endogenous	2020	2021
Finalists	46	50
Males	27	28
Females	19	22
Young Professionals	41	33
Student	5	17
Nationalities	5	6
Countries	1	4

Comparisons	2020	2021
Male %	59%	56%
Female %	41%	44%
Young Professionals %	89%	66%
Students %	11%	34%

These figures highlight the following:

- Significant female participation levels (41% and 44%) compared to the female % of the workforce in the sector
- Impressive improvement in the participation of students (11% to 34% of total participants in one year)
- Diverse pool of nationalities (5 and 6 nationalities in 2020 & 2021)
- Turning challenges into D&I opportunities: Capitalizing on technology to make the world smaller (From exclusive participation in KSA to having four countries: KSA, Uganda, Pakistan, India; in addition to having an SME from Texas)

The Trips & Social activities team within SPE-KSA continuously hosts events that include a diverse audience. An example of such events is the Saudi 89th National Day Celebration. The event took place in SciTech Al-Khobar, as an active effort to expand our reach to the community and cover a wider audience. In fact, around 5,000 visitors attended the location where the event took place. The event involved several cultural activities targeting all age groups and was proudly covered by Saudi TV and several social media influencers. Additionally, the team continuously supports D&I activities and is actively involved in topics that involve the wider community. A perfect example is the Breast Cancer Awareness campaign that was held in 2019, where the team hosted families and individuals in its “Turn Up the Pink” event and actively participated in AlShargiyah Wardiyah, the biggest annual Breast Cancer Awareness campaign in the Eastern Province.





Another example of a social activity that fostered a diverse audience is the Afforestation Activity (Greening the Kingdom) organized by the Trips & Social Activities committee. The activity was inspired by one of Vision 2030's initiatives which is planting 1,000,000 trees around the Kingdom. This event is the first of a series of activities under the umbrella of afforestation. The event was delivered with a genuine high level of enthusiasm under the spirit of preserving our Kingdom, which would eventually contribute to saving the planet as whole. The participants included families of different cultural backgrounds, age and gender. The spirit of the event promoted a diverse and inclusive nature that one aims to achieve. This is one of an array of efforts that bring diverse groups and individuals together to serve a bigger purpose and support the community.

The establishment of the D&I committee within SPE-KSA will solidify the current D&I efforts and will further enforce the D&I culture within the SPE community and beyond. Diversity & Inclusion is a unique venue for community development and growth and, if utilized correctly, can elevate communities to the next level. Awareness of the importance of Diversity & Inclusion is the path to the harmony of individuals and communities, and this is what the SPE-KSA D&I committee will strive to deliver.

Written By: Yara Alzahid





# Call for applications: SPE-KSA 2021/2023 Executive Board

Applications are now open for the 2021-2023 Executive Board.

Be a part of a vibrant section that is part of shaping the future of the industry.

The application window will remain open until **May 31, 2021.**



Executive Board Chairperson



Technical and Professional Programs



Trips and Social Activities



Information Technology



Conference Management



Diversity and Inclusion



Public Relations



Young Professionals



Student Outreach



SandRose



Membership



Treasury



Event Management



2019/2021 | SPE-KSA Section Executive Board

spe-ksa.org

14



## SPE DLP: BIG DATA AND MACHINE LEARNING IN RESERVOIR ANALYSIS

January 11<sup>th</sup>, 2021

SPE-KSA, in collaboration with SPE International, held the second webinar of the SPE Distinguished Lecturer Program (DLP) for the 2020-2021 season. The attendance for the second installment of the DLP lectures was around 45, all gathered to listen to Professor Horne's technical presentation about Big data and machine learning in reservoir analysis.

In this webinar, Roland Horne showed that machine learning is a promising tool to interpret well transient data. Such methods can be used to denoise and deconvolve the pressure signal efficiently and recover the full reservoir behavior. The machine learning framework has also been extended to multi-well testing and flow rate reconstruction.

The webinar was 1 hour long, 15 minutes of which were dedicated to a live Q&A session where attendees led an interactive discussion with the speaker regarding some of the potential uses of tools and techniques in reservoir engineering and analysis.

**Written By:** Nassir A. Abalkhail



**ROLAND HORNE**  
Thomas Davies Barrow  
Professor of Earth Sciences  
Stanford University

## SPE-KSA WEBINAR SERIES: IR 4.0 APPLICATIONS IN WELL INTEGRITY MANAGEMENT

February 9<sup>th</sup>, 2021

The SPE-KSA Webinar Series continued for the year 2020-2021 with a webinar presented by Mohammed Al-Ajmi, titled "IR 4.0 Applications in Well Integrity Management". The webinar was attended by 50 members of engineering and science backgrounds to learn more about potential uses of IR4.0 tools in managing well integrity.

In this webinar, Mohammed touched on various well integrity issues and the tools used to assess casing integrity and corrosion. Furthermore, Mohammed demonstrated the powerful utilization of statistical approaches in two correlated Well Integrity and Downhole Corrosion challenges.

The webinar was 1 hour long, 15 minutes of which were dedicated to a live Q&A session where attendees led an interactive discussion with the speaker regarding some of the potential uses of IR4.0 tools and techniques in well integrity.

**Written By:** Nassir A. Abalkhail



**MOHAMMED AL-AJMI**  
Operations Manager  
Petrogistics



scan to share



scan to share



# SPE-KSA WEBINAR SERIES: NANOTECHNOLOGY IN RESERVOIR APPLICATIONS

March 3<sup>rd</sup>, 2021

The SPE-KSA Webinar Series continued for the year 2020-2021 with a webinar presented by Dr. Amr Abdel-Fattah, titled "Nanotechnology in Reservoir Applications". The webinar was attended by 70 members of engineering and science backgrounds to learn more about the countless opportunities nanotechnology brings to the industry.

In this webinar, Dr. Abdel-Fattah touched on various applications and opportunities for nanotechnology utilization. Furthermore, Dr. Abdel-Fattah demonstrated the countless opportunities for oil recovery and reservoir characterization applications.

The webinar was 1 hour long, 15 minutes of which were dedicated to a live Q&A session where attendees led an interactive discussion with the speaker regarding some potential uses of nanotechnology in different areas of the oil & gas industry.

To view this webinar, visit SPE-KSA's YouTube channel:  
[https://www.youtube.com/watch?v=JV\\_AI3gKm7Q](https://www.youtube.com/watch?v=JV_AI3gKm7Q)



scan to share

Written By: Nassir A. Abalkhail



**DR. AMR ABDEL-FATTAH**

SPE Distinguished Lecturer and Team Leader of Saudi Aramco's In-Situ Sensing and Intervention team in EXPEC ARC

# SPE-KSA WEBINAR SERIES: HOW TO UPSKILL FOR DIGITAL LEARNING TRANSFORMATION

March 23<sup>rd</sup>, 2021

The SPE-KSA Webinar Series continued during the year 2020-2021, with a webinar presented by Elizabeth Hannah, titled "How to Upskill for Digital Learning Transformation". The webinar was attended by 40 members of engineering, science, HR and training & development backgrounds to learn more about the required skills for an effective digital learning transformation.

In this webinar, Elizabeth spoke about digital learning and the need for a quick transformation. Furthermore, Elizabeth highlighted the various opportunities that digital learning brings and how it would change learning as we know it.

The webinar was 1 hour long, 15 minutes of which were dedicated to a live Q&A session where attendees led an interactive discussion with the speaker regarding the different online learning techniques and tools.

To view this webinar, visit SPE-KSA's YouTube channel:  
<https://www.youtube.com/watch?v=uqZ7OdDcRFA&t=2157s>



scan to share

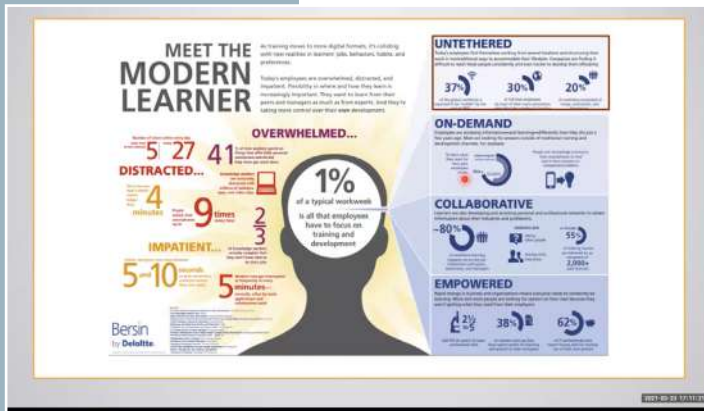
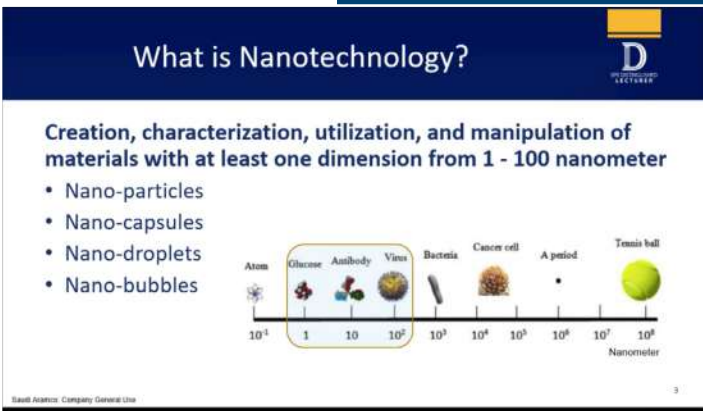
Written By: Nassir A. Abalkhail



**ELIZABETH HANNAH**

Associate director of Learning Delivery, The Association for Talent Development (ATD)

Possible Solutions	
Challenge	Possible Solution
Material quantities and cost	Target-delivery Hybrid nanomaterials High payload encapsulation
Synthesis cost	On site, one-pot chemistry In-situ formulation (capitalize on chemical potential)
Pumping cost	Injectable and Autonomous (via harvesting reservoir natural gradients)
New infrastructures/facilities	Start with nanomaterials that can utilize existing infrastructures/facilities
Stability and mobility under high salinity & temperature conditions	Functionalization and encapsulation Self-induced stability mechanisms Harvest reservoir chemistry to induce stability and mobility
Inconsistent and hard to predict performance	Standardize lab and field tests Reservoir-on-a-chip Collaborative R&D between O&G players More field tests and knowledge sharing



scan to share



## SPE DLP: DIGITIZING WELLBORES, IS THERE A VALUE?

April 6<sup>th</sup>, 2021

SPE-KSA, in collaboration with SPE International, held the third webinar of the SPE Distinguished Lecturer Program (DLP) for the 2020-2021 season. The attendance for the second installment of the DLP lectures was around 50 who gathered to listen to Mr. Varma's technical presentation about the efforts and benefits of digitizing wellbores.

In this webinar, Varma illustrated how digital transformation is changing the way wells are monitored and produced. Such new technologies can be used for permanent monitoring of pressure, temperature, distributed temperature and acoustic data to create a step change in hydrocarbon asset management, especially when combined with the range of choices available for downhole flow control.

The webinar was 1 hour long, 15 minutes of which were dedicated to a live Q&A session where attendees led an interactive discussion with the speaker regarding some of the potential pros and cons of digitizing wellbores and the economic impact that might have.

Written By: Nassir A. Abalkhail



**VARMA  
GOTTUMUKKALA**  
Principal Production  
and Reservoir Engineer  
*Schlumberger*

**Well Production Challenges**

Drilling a well to target depth does not guarantee maximum oil production. Challenges include

- early gas/water breakthrough
- poor drainage/sweep
- well integrity failures (leaks)
- lack of downhole data
- need for intervention

**Well Types and Challenges**

**Digital Solution – Flow Control Valves**

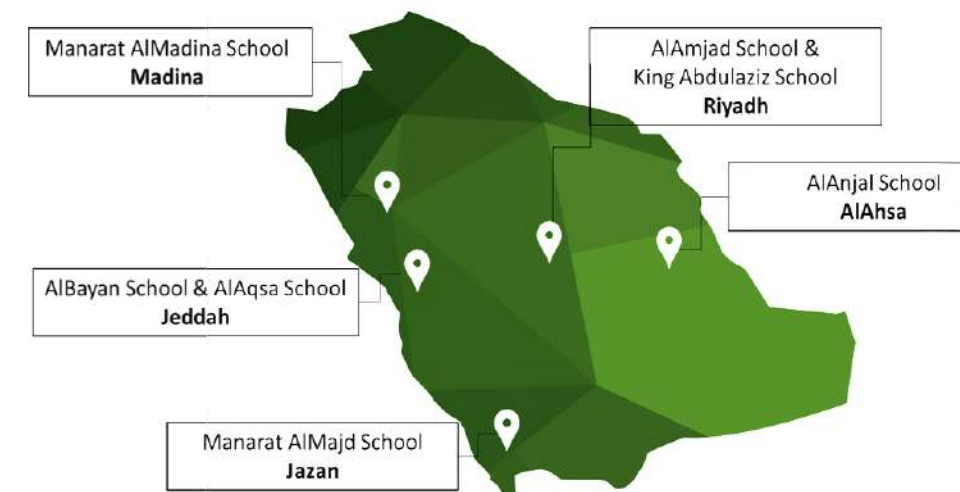
Auto control  
Optimal valve position  
skin, pressure depletion  
Productivity index, reservoir pressure  
Flow Rate Estimate, Pannulus, Phasing, AEs

## School Outreach

## KINGDOM'S AMBASSADORS PROGRAM

The Kingdom's Ambassadors Program aims to share knowledge about the O&G industry with high school students across the Kingdom. This year, we reached out to 7 schools in 5 cities (Riyadh, AlAhsa, Jeddah, Madina, and Jazan) with more than 650 participants. The students were excited to learn about the industry and the role of petroleum engineers. The Student Outreach team would like to thank the amazing volunteers for a job well done!

Written By: Sarah Alamer



scan to share



scan to share



## Continuous Collaborations

# SPE-KSA SO TRAINS A 3RD BATCH OF ENERGY4ME TRAINERS

March 13<sup>th</sup>, 2021

SPE-KSA Energy4Me (E4ME) trainers Hamoud Alkhaldi, Bayan Wasfi, Zainab Alsaihati, and Mohammed Alategue conducted a virtual training session on Zoom to train a new batch of E4ME ambassadors.

The E4ME initiative aims to provide students with an understanding of the hydrocarbon life cycle by conducting fun and exciting experiments.

As part of the training program, trainees were provided with the necessary tools and logic behind the experiments to ensure optimum delivery to students in future sessions and events, such as the 2021 MEOS & GEOS, both planned to be held in Bahrain.

Since September 2019, the section has trained 32 members to implement its role in educating the public about the industry and its vital role in the energy sector.

The section's E4ME contribution went beyond local schools and events, as its ambassadors extended their support in training members of international sections in countries like Ghana and the UAE.

Written By: Rabab Al-Meshikhes



scan to share

## Skill Development

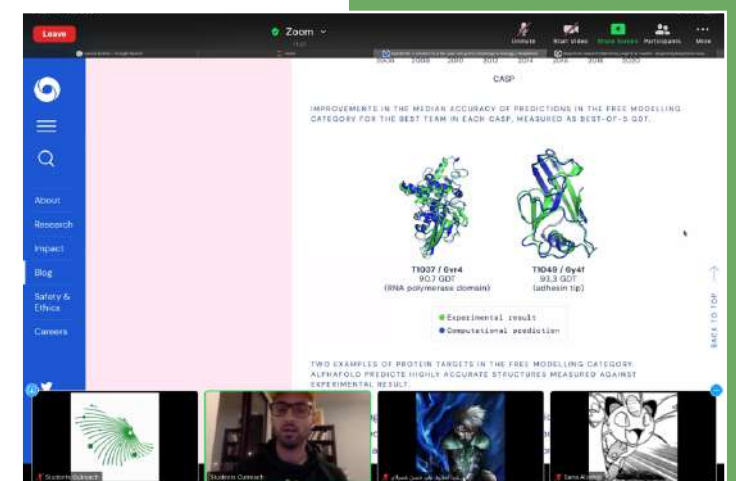
# SPE-KSA VIRTUAL PYTHON BOOTCAMP WITH RIDWAN JALALI

Here in student outreach, we believe in diversifying one's skills to adapt to future challenges. One of the most recommended and highly demanded technical skills is programming using Python language.

Student Outreach collaborated with one of the young, bright developers from Saudi Aramco, **Ridwan Jalal**, to prepare and develop a Python boot camp for high school students.

Eighteen students from around the Kingdom attended the boot camp for four days, during which Ridwan took the audience on a quick journey from Python basics to advanced machine learning models. The students were active throughout the four-day sessions and practiced utilizing open-source code to explore and develop solutions.

Part of our responsibilities in Student Outreach is to bridge the gap between students and professionals. We aspire to continue achieving our goals while inspiring students to pursue a path in the technology and energy industry.



scan to share



### Student Engagement

## DISCOVERING HARRAT RAHAT WITH SPE-KAUST

KAUST's SPE Student Chapter recently organized a trip to Harrat Rahat, a volcanic lava field in the western part of Saudi Arabia. The primary goal of the participants was to better understand the interactions between Red Sea formation, the faulting and fracturing during the breakup phase, and the emplacement of the lava field East of the Red Sea Escarpment. The group also visited outcrops displaying contacts between rift sediments and lava deposits. The trip was concluded with a hike to the top of one of the volcanoes, despite the strong wind, intensive rain, and very low temperature!

The field trip was sponsored by professor Hoteit's Advanced Reservoir Modeling & Simulation Group (ARMS) and was led by Jakub Fedorik and Antoine Delaunay, geologists from Professor Afifi's Arabian Plate Geology group (APG) at KAUST.

Written By: SPE-KAUST



### University Outreach

## SPE AWARENESS SESSIONS

November 2020 – March 2021

As a continuation of the Student Outreach (SO) mission to reach out to university students all across the Kingdom, the SO team managed to deliver seven SPE awareness sessions to over 600 students and faculty members from different majors and backgrounds. The sessions' objective was to give a comprehensive introduction of SPE by going through the historical milestones of the society, demonstrating the structure of SPE-KSA teams with their respective functions and sharing important on-going activities and membership benefits for the students. Moreover, such knowledge-sharing opportunities encourage students of all ages to join the SPE community, as they get to learn about the various activities and initiatives that are designed for the younger generations.

The sessions were given to seven universities and institutions across the Kingdom through Zoom meetings during the 2020-2021 term. The sessions were highly received by the audience who shared their positive feedback both during and after the sessions. The collective team effort and collaboration from the universities' representatives was a key factor in the sessions' successful execution. Therefore, a commendable appreciation goes to SPE presidents and SPE focal points of King Fahd University of Petroleum & Minerals (KFUPM), King Abdullah University of Science & Technology (KAUST), King Saud University (KSU), King Faisal University (KFU), Prince Mohammed Bin Fahd University (PMU), Alasala University and SPSP institution.

The sessions that were delivered represent a significant pillar of Student Outreach, which aims to bridge the gap between students and professionals. The sessions were an excellent channel for understanding the students' concerns and addressing all of their inquiries related to the professional sector. SO team is keen on encompassing a larger audience to benefit from the various learning opportunities and resources. Currently, we have five active chapters in different universities across the Kingdom, and we are looking forward to expanding university chapters to accommodate more students. This is to increase SPE's follower base from student communities, effectively giving them the advantage to be actively connected to the industry.

Written By: Ali Alhuwail & Meshal Alshalan

### Session Presenters:

**AHMED MOKHTAR**  
ALASALA University  
Nov 15, 2020

**ABDOLRAHMAN ALSAIF**  
KSU  
session on Dec 7, 2020

**ABDULAZIZ ALKHATEEB**  
KFU  
session on Dec 8, 2020

**MOHAMMED ALATIGUE**  
PMU  
session on Dec 10, 2020

**MUTLAQ ALOTAIBI**  
SPSP  
session on Dec 27, 2020

**WALA'A AMAIRI**  
KAUST  
session on Jan 24, 2021

**ALI ALHUWAIL**  
KFUPM  
session on Mar 4, 2021



scan to share



scan to share



## SPE-KSA Sponsorships

### SPE-KSA SPONSORS 2021 WIDS IN KSA

For the second year in a row, SPE-KSA sponsored the "2021 Women in Data Science in KSA," along with government entities and leading Saudi companies in data science and governance.

Our sponsorship of this event reinforces SPE-KSA's goal to support women in STEM fields and enrich data science and governance's local content. Women in Data Science (WiDS) is a Stanford University initiative that aims to inspire and educate data scientists worldwide, regardless of gender, and support women in the field. WiDS hosts a global conference with 150+ regional events worldwide, including Saudi Arabia.

The event was held for over seven days, and accommodated a total of 37,000 attendees with 61 lectures, 106 speakers, and 8 workshops. WiDS covered data science in business, health, education, smart cities and energy, in 13 different cities in the Kingdom, including the Eastern Province.

We are proud to have sponsored such an event to empower students, women, data scientists, alongside the Ministry of Communications and Information Technology (MCIT) and Saudi Data & AI Authority (SDAIA), a strategic partner of WiDS Saudi Arabia.



## “OUR YOUNG WRITERS

### “WHY PURSUE A CAREER IN STEM?”

When students choose to pursue a career in STEM, they are not only getting the level of education that is deemed as amongst the most challenging, but they are also gaining some of the most important life skills needed in a fast-paced, changing world. STEM education develops critical thinkers, improves science literacy, and allows the next generation of innovators to flourish.

When considering STEM, a lot of students think of the famous rumor that the field is over-condensed. A lot of people are going into STEM, so why should I? Well, as we face the benefits and challenges of globalization and a knowledge-based economy in the twenty-first century, scientific and technological advances have become increasingly important. Students must improve their STEM skills well beyond what was previously deemed as appropriate in order to succeed in this modern information-based and highly technical society. STEM forces students to look at the world at a larger scale. It teaches them a way of thinking that far exceeds any other - a way of thinking that enables them to keep up with the ever-changing world around them. With the recent pandemic outbreak, these statements are being strongly reinforced. Many people lost their jobs, but people with a STEM degree were able to remain resilient in their job options, due to the high technical knowledge and skills in the jobs they perform. Science, Technology, Engineering, and Math are important in every single day of our lives. Without STEM, the world would have never reached the level of intellectuality that it has reached today.

So finally, why pursue a career in STEM? Because with a STEM background, you are not only able to achieve your own dreams, but you are also able to help others, have a skillful job in a fast-paced economy, and make the world a better place for people all around the world.



**DEEM B. ALAUJAN**  
High School Student  
Dhahran Ahliyya Schools







## SPE-KSA YOUNG PROFESSIONALS TEAM LAUNCHES ELEV8

The SPE-KSA Young Professionals team launched “ELEV8”, its newest virtual program, targeting young professionals and university students from all around the world. ELEV8 is a self-taught, four-week program that will be offered from April 5th to April 28th. This program sheds light on the critical methodologies of the most important career skills through simple and engaging video-based experiences. Each skill that is taught in ELEV8 boosts the participants’ business quotient and enables them to best-prepare for prospective real-life experiences and our dynamic environment.

Learning career skills is key to becoming a *self-sufficient* professional. ELEV8 supports participants in exploring eight of the most in-demand skills in business today, while taking a deep dive into four of them: *Organization Structure, Strategic Project Planning and Management, Decision-Supporting Research and Real-World Financial Analysis.*

Written By: Fatimah Al-Balawi

Organization Structure	Strategic Project Planning and Management	Decision-Supporting Research	Real-World Financial Analysis
Understanding and evaluating different types of organizations and the roles and opportunities they offer will give you a competitive advantage.	Every successful business is centered around delivering projects on time and within budget. Whether you're building an app or a city, Strategic Project Planning will help you do it better.	Every decision you make should be informed and supported by factual data. When you present, you'll need to construct a strong, data-driven argument that supports your decision.	Every organization needs to make and manage money well to survive. Understanding the latest core financial analysis strategies will help you do both.

ELEV8 was exclusively offered to SPE-KSA by Fullbridge, a world-leading educational technology company that equips individuals with the necessary tools that bridge the knowledge and skills gap. ELEV8 is the most diverse virtual program in the history of SPE-KSA, with more than 300 participants from 20 different countries and various technical backgrounds and companies.

A kick-off event took place virtually on April 5th, 2021 to welcome all participants. Special remarks were given by Abdulaziz Al Sufayan, SPE-KSA Chairman: “ELEV8 is yet another great program we are offering with our partners at Fullbridge to develop the next generation of leaders and experts in Saudi Arabia and beyond.” He added: “It fills me with pleasure to see this record number of young minds, eager to learn and develop for a brighter future, not only for themselves but also for their countries and the world.” The kick-off event was hosted by Steve Brazell, CEO of Fullbridge, who stated: “the four critical skills that you are going to learn during this program are supportive of everything you do in your personal and your professional life. They all come together, they work in sync to really help you grow and succeed”.

ELEV8 is yet another testament to SPE-KSA's continuous commitment to develop its most valuable asset, its people, for an ever-more dynamic future.

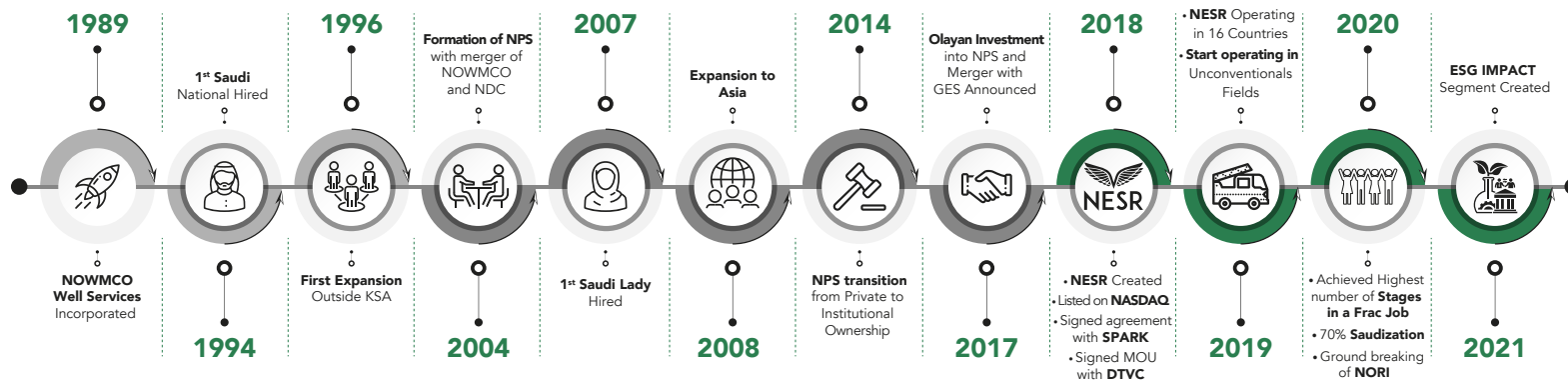






## The National Champion of MENA

### The Journey



The company was established in 1989 by Saudi entrepreneurs as the 1st Saudi homegrown company venturing into complex and capital-intensive barrier services. In the following decades, the company expanded from a single segment offering to multiple segments in several countries.



In 2014, the company transformed from a family-owned company to an institutionally owned company and got Apicorp, Waha Capital and others to be part of the journey. Later in 2017, Olayan took a major stake in the company and via NESR vehicle, the company became the 1st Saudi company to list on the NASDAQ. That was an instrumental decision to unlock opportunities and attract international cutting-edge technologies to the Kingdom.

Today, NESR is the biggest national oilfield services company from the MENA region and one of the few major players in this sector of the oil & gas industry. NESR's vision is aligned with Saudi Vision 2030, focusing on sustainability, localization and diversity.

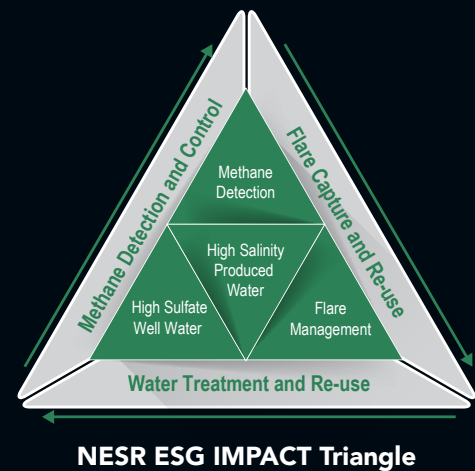
## Environmental, Social and Governance (ESG) IMPACT is ..... ESG in Action

Since inception, NESR has prioritized positive impact on communities through economic empowerment and local value creation. In January 2021, we announced the creation of the ESG IMPACT segment, which will operate independently from the existing Production and Drilling & Evaluation Services segments.

***"The ESG IMPACT segment will address key issues that are relevant to the communities in which we operate, such as water conservation and aquifer protection, and tackle larger global challenges like climate change mitigation, where we can make a significant impact as an industry. The Oil and Gas industry has long acted as a catalyst for global growth and has been a foundation upon which the global economy has been built over the last century. Going forward, we believe our industry can lead and address complex global challenges by adopting, adapting, improving the performance of our industry, and minimizing our collective environmental footprint through leveraging our tremendous research, engineering, and project management capabilities across the globe."***

**SHERIF FODA**  
CHAIRMAN OF THE  
BOARD AND CEO OF NESR

NESR continues to be focused on improving its ESG performance and on delivering services in the most effective, efficient, and sustainable manner. We introduced innovative energy solutions captured within the NESR ESG IMPACT Triangle. The Climate Change mitigation product line will focus on the objective of establishing real-time monitoring of greenhouse gas (GHG) emissions from oilfield operations, including wellhead, gathering stations, and gas processing facilities. In addition, it will focus on flare gas treatment and its capture and transportation to the nearest power plant or gas gathering station.



***"We are working very closely with Saudi Aramco to impact several projects including high salinity produced water treatment to freshwater quality with an objective of zero liquid discharge (ZLD). The fresh quality water can be used for multiple applications within the oilfield, e.g., smart water Enhanced Oil Recovery, crude washing to remove salt, reservoir pressure management, and drilling & completions to name a few. Such water can also be used for industrial and agricultural applications."***

**MOIN MUHAMMAD**  
VICE PRESIDENT  
TECHNOLOGY



scan to share



The Water Conservation and Management product line will focus on delivering fresh water from produced water that is today either wasted or injected for reservoir pressure management or into disposal wells. Our objective is to provide field-based solutions that deliver fresh water from produced water as well as to deliver alternatives to

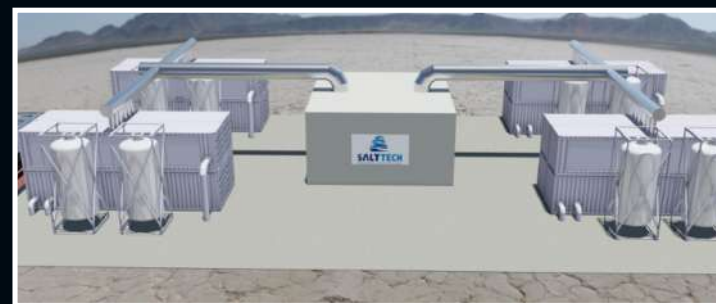
traditional industry use of higher quality aquifer water for oilfield applications. We are currently working with Salttech SA, a water-treatment technology company based in the Netherlands, on developing several plants (25,000 to 100,000 bbl/day) to convert high salinity produced water into fresh water.



## NESR partner SALTTECH DyVar technology can treat high salinity produced water to fresh water with zero liquid discharge (ZLD) capabilities

In the aquifer space, our focus is on providing water from previously unusable water resources due to high sulphate content in order to reduce industry reliance on high quality aquifers. We are evaluating potential plant and field capabilities with CleanTeQ, an Australian-based clean technology company that currently operates an antimony treatment plant in Oman.

In March 2021, NESR announced its participation in the initial investment round of an innovative geothermal technology company ICE. With this technology, we aim to support our customers to reduce their carbon footprint by capturing geothermal energy to generate electric power. In essence, thermal energy which was previously untapped and was being dissipated into the atmosphere will now be harnessed to replace existing energy sources.



## Salttech modular 40,000 bbl/day produced water treatment plant rendering



## CleanTeQ Water DESALX® (2-Stage CIF®) removes hardness, sulphates and provides TDS reduction

## Open Platform: A New Way of Investing in Research and Development

In 2020, NESR broke ground on NESR Oilfield Research and Innovation Center (NORI), which is designed as an open platform that will host international and local innovators to develop oilfield research and innovative technologies in Saudi Arabia. NORI will build local capabilities and provide employment opportunities in Saudi Arabia and facilitate collaboration with academic

institutions, including King Fahd University of Petroleum and Minerals. The agreement to establish NORI was signed in September 2018 between NESR and Dhahran Techno Valley Company (DTVC) in alignment with Saudi Aramco's IKTV program to enhance NESR's local content while also adding significant value to Dhahran Techno Valley and the Saudi oil and gas industry.



**NAIF AL-HADRAMI**  
EXECUTIVE DIRECTOR,  
SAUDI ARABIA

**"NORI's mandate is aligned with Saudi Vision 2030, which emphasizes the importance of strengthening the technology sector in general, and energy technologies in particular, in order to support the knowledge-based economy, and maximize the creation of startups. Once completed, NORI will develop fit-for-purpose techniques and technologies for Saudi Arabia and the whole region. Our plan is to bring our technical partners from North America and the rest of the world to NORI, which will allow them to customize and develop technologies in Saudi Arabia for the local industry."**

NORI was designed to comply with Leadership in Energy and Environmental Design (LEED) certification requirements and is projected to consume 20% less energy than comparable buildings in Saudi Arabia. We estimate that approximately 5% of the energy consumed at NORI will be generated from renewable energy sources. NORI incorporates high-efficiency HVAC systems, insulation, LED lighting, low-flow plumbing fixtures and irrigation systems, and other sustainable building materials. We have also installed building management systems, and sustainable water management plans have been included in the design of the project. For example, rainwater collection and dispersion systems are installed,



and sustainable landscaping has been adopted in the design of the center. Native plants were incorporated into the design to reduce water consumption in the desert environment of Saudi Arabia.

## Generating Local Value through IKTV



**SUHA SAIF**  
CORPORATE STRATEGY  
CHAMPION

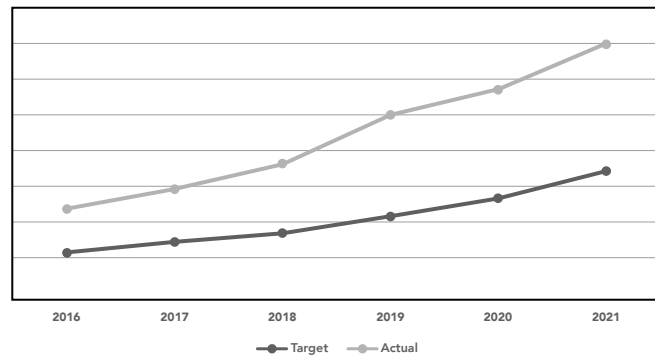
**"We pride ourselves on being the "National Champion" of the MENA region. Our focus on enhancing our contribution to the communities in which we operate includes hiring and developing local talent, manufacturing locally, increasing local procurement, investing in cutting-edge research and development, building a flagship manufacturing facility at King Salman Energy Park, and supporting the growth of small and medium enterprises in Saudi Arabia."**



As of 2019, over 75% of the employee workforce in most of the countries where we have operations, was comprised of nationals of such countries, including three countries of operation which were entirely nationalized. Currently our Saudization reached 70% and our plan is to increase it further in the future.

To strengthen local supply chains, more than 80% of our total procurement budget was spent on local suppliers,

**NESR IKTVA Target vs. Actual**



and we increased our local spend on goods & services since 2017 from 10.0% to 40%.

We spent more than 3,100 hours developing and training local suppliers in 2019. Over the last three years we developed several of our local suppliers of chemicals and substituted exported chemicals with locally manufactured products. Our supplier development program includes improving warehouse facilities, systems, chemical technical efficiency, and engaging our labs and engineers in enhancing the local know-how of chemicals among our suppliers.

In addition, we developed a local frac chemical supplier and a chemical blending facility in Saudi Arabia to supply our unconventional fracturing jobs. We trained local staff to manage fluid quality assurance and delivery to field locations. We also introduced a new oil fracturing proppant supplier to the local market and facilitated communication and collaboration between suppliers and NESR's researchers and engineers.

## SPARK: Developing the Energy Infrastructure of the Kingdom

In 2018, NESR was one of the first companies to sign a land lease agreement with Aramco to build a state-of-the-art operating facility in King Salman Energy Park (SPARK). NESR is looking forward to relocating to the energy city, which will position Saudi Arabia as a global energy, industrial and technology hub.

NESR is aligned with SPARK's localization goals within the Kingdom's energy supply chain and the strategic goals of IKTVA and Saudi Vision 2030. The flagship operating facility will host all our product lines as well as that of our technical partners including manufacturing facilities.



## Improving Frac Efficiency in Saudi Arabia

With the expansion of Saudi Aramco's unconventional program, NESR was determined to enter the Saudi Frac market and become the premier Frac services company in Saudi Arabia (KSA). To accomplish this, we devised an approach focused on collaboration, technological adoption, and localization.

### Collaboration

NESR's Frac Journey started with an effective collaboration with our client to improve Frac operations' efficiencies in KSA. We developed plans, adopted international best practices, utilized latest technologies, and incorporated lessons learned while adequately planning for the high summer temperatures of the Kingdom. We also partnered with a leading US Frac company, which gave us instant access to US unconventional experience and equipment. Through meticulous planning and seamless execution, we managed to deliver the highest stage count by a single fleet ever seen in the MENA region.



**Importation of Frac equipment from USA to KSA**

### Localization

Our commitment to hiring and developing local talent not only aligns with our local content value creation targets but also enhances our operational resilience in the face of global disruptions. This became evident in our Frac operations.

We heavily invested in training Saudi talent in unconventional operations in the USA. Our Saudi crew learned to operate and maintain equipment in a fast-paced environment. To incentivize our crew, we implemented a unique bonus structure that rewarded performance. We also developed our relationships with key suppliers to improve available fluids, proppant logistics and other areas critical to our long-term success.

Our investments paid dividends when just 6 months later, a 100% Saudi crew completely ran our Saudi Frac operations, maintaining 100% capacity at all times, including during the absence of the US crew and at the height of lockdowns due to COVID-19.

Our success proved that in times of crisis, being a local company that develops local talent and invests in transferring knowledge and expertise to local populations is a competitive advantage.



### Technological Adoption & Adaption

NESR implemented technologies and best practices that could readily be adopted from Frac operations in the USA and adapted them to the environment of KSA when necessary. Through improved equipment design, technology utilization to remove non-productive time, and careful planning to ensure performance even in high summer temperatures, we stopped at nothing in our pursuit of excellent performance.

## Environmental Footprint Management

We have been a part of multiple collaborative efforts to drive home our commitment to sustainability. We partnered with plug providers to improve plug design, leading to reduction in water consumption for plug and perforation operations. Introducing a pump down O-ring around plugs improved efficiency and reduced the required rate and volume of water consumed. We estimate that plug upgrades introduced in 2020 will save an estimated 5 MM gallons of water per year. Through the effective design process our client has optimized, we were able to reduce our Frac fleet's greenhouse gas emissions, cutting our carbon footprint by 30%, and reducing diesel consumption.

NESR has implemented several initiatives to manage the environmental footprint associated with our hydraulic fracturing operation such as:

**1. Salt tolerant Fracturing Fluid System:** NESR has developed a salt tolerant fracturing fluid system capable of formulating hydraulic fracturing fluids with produced water. This formulation is also able to use brackish and sea water with minimal to no treatment required, eliminating the need to source the fresh ground water. In addition, the use of produced water for hydraulic fracturing can eliminate/reduce carbon footprint associated with the trucking/piping of produced water to disposal wells.

**2. Chemical Loading:** Loading chemicals in bulk tanks eliminated handling during Frac operations, reduced wastage and our environmental footprint and enhanced our logistics.

**3. Auto Fueling System:** NESR has deployed a closed auto fueling system to supply diesel to fuel large fleets of equipment simultaneously, thus eliminating spills, hazards towards fracturing crew, and overfill risk. The auto fueling system also improves efficiency through the reduction of nonproductive time.

**4. Produced Water Treatment:** NESR has partnered with a company that treats produced water. This allows us to provide our customers with specific and differentiated technical water treatment solutions, so they can achieve their production goals in an environmentally responsible manner.

**5. Proactive Maintenance:** Having spare units and moving planned maintenance off the critical path significantly reduced downtime between stages.

**6. Modified Rigup:** By optimizing rigup and utilizing LEAN principles, we saved time and limited physical exertion of crews in the heat.

We are proud of what we have accomplished in a single year. From introducing a major service line into a country, to delivering the highest stage count by a single fleet ever seen in MENA, executed by a 100% local crew, all done during a time of lockdowns and movement restrictions due to COVID-19. We are well on track to meet our goal of becoming MENA's premier Frac services partner of choice.



# TRIP TO ALAHSA

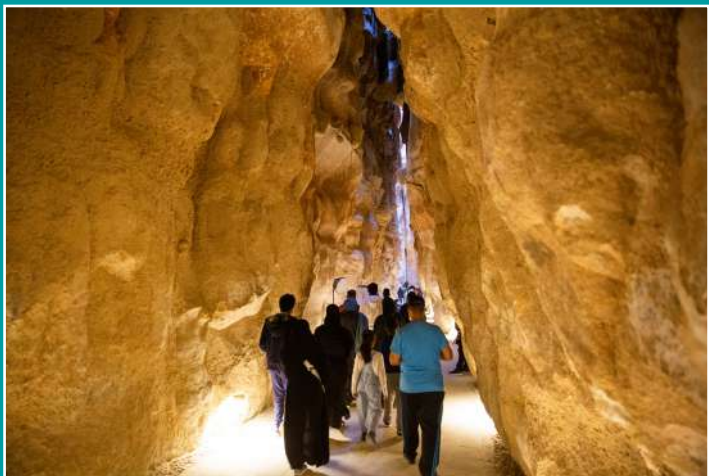
January 23<sup>rd</sup>, 2021

The Trips & Social Activities team continues to organize local trips that focus on cultural exploration and fostering social connections. In January, T&SA organized a day trip to Alahsa in the Eastern region of Saudi Arabia. The aim of this trip was to explore this traditional oasis, one of Saudi Arabia's exotic sites.

A group of 23 participants gathered at the departure location on the morning of January 23<sup>rd</sup>, and headed to Alahsa to begin their journey. All COVID-19 precautionary measures were followed throughout the trip. The first stop was Jawatha Mosque, followed by the Pottery shop. After that, the group visited Al-Qarah Mountain, which is located between Al Twaitheer village and Al-Qarah village. After having a traditional lunch at one of the most well-known restaurants in the city, the group headed to The Princes' School. The last stop was Al Qaisariya Market, where the group explored the hidden gems in the market and picked up traditional souvenirs before heading back.

**Event Lead:** Abdulaziz Alaqeel

**Written By:** Arwa AlHilal





## TRIP TO AL-ULA

March 11<sup>th</sup>, 2021

The SPE-KSA T&SA team held another exciting, cultural trip to one of the most exotic locations in Saudi Arabia, Al-Ula. A group of 22 individuals joined the trip that began on the morning of March 11th. The participants arrived to Al-Ula in the afternoon and directly headed to the Husaak Center, where they received a briefing on the trip and camped for two nights. On the first night, the team enjoyed an exceptional stargazing experience on the mountains at Gharamil area. The next day, the team had an early start with breakfast before going on a 6KM hike around the mountains and enjoying the magnificent views of Al-Ula, an area that was once utilized by the Ottomans years ago to monitor convoys passing by the area. Later that day, the team then had lunch at a pleasant local garden and, in the evening, went back to the center for a fun game night. The team wrapped up their trip with a tour of Al-Ula and a visit to the famous historic site, Madain Saleh.

**Event Lead:** Nahed Aldossary

**Written By:** Arwa AlHilal



scan to share





## SOCIETY OF PETROLEUM ENGINEERS - AMERICAN UNIVERSITY IN CAIRO CHAPTER

### 2020: A year to remember for SPE-AUC

#### *An Accelerated Digital Transformation Approach*

The 2020 COVID-19 pandemic has affected various businesses, educational experiences and personal wellbeing across the entire globe. As of today, it has reached every community and had an impact either directly or indirectly on our daily lives. The magnitude, however, varies from one country or region to another depending on the technological advancements, response efforts and infrastructures in place. Fortunately for us at the Society of Petroleum Engineers –

American University at Cairo Chapter (SPE-AUC), we have been lucky to have continued our outreach to our members by enhancing the educational experience, while actively engaging with our communities at this challenging time thanks to the communications and technology infrastructure in our campus and the city. The immediate shift to a virtual world meant we had to align our efforts in shifting gears towards a new strategy and execution plan.



Despite the difficulty of adapting to this swift change, SPE-AUC has managed to expand its members outreach through its online social media outlets. To do so, we have recruited and appointed new board members to overlook our online operations throughout the year, which yielded a 200% increase in the number of followers on our online platforms, ultimately increasing the overall number of engagements compared to 2019. In an effort to attract new SPE members, SPE-AUC organized an “orientation day” for 2020 AUC freshman level students, and successfully registered new members to join the team and become active members in the university, chapter and society.

#### *Missed Opportunities Led to Bigger Successes*

As every other entity around the world, 2020 came with its challenges and forceful change in direction. Changing our approach in executing our plans did not mean changing our goals and vision. Despite the challenges, 2020 has been a successful year for SPE-AUC. The chapter added new virtual tools to its inventory, which improved communication and the carrying out of virtual events. However, the successful 2020 journey did not come with an easy start.



SPE-AUC and other SPE chapters in Egypt prepared and finalized the launch of its mega-conference, the Petroleum Arabians Conference and Exhibition (PACE), in the first quarter of 2020, which was eventually cancelled due to the early stages of the pandemic in Egypt.

Since then, the SPE-AUC chapter focused on implementing its virtual outreach strategy. SPE-AUC launched its website by the end of the spring semester. By summer 2020, SPE-AUC and the AUC Petroleum department began collaborating with the Arab Oil and Gas Academy internship program. This program provided a wide range of courses in different disciplines in Petroleum Engineering that were delivered by an elite line-up of speakers and industry professionals. The successful rollout of the program graduated more than 50 AUC Petroleum engineering students by the end of the summer of 2020. Since the launch of the internship, the Arab Oil and Gas Academy program has increased its activity and online engagement to over 20,000 members on its online platform, with 500 enrollments in each internship provided by the Academy.

In the fall of 2020, the SPE-AUC Chapter focused heavily on its marketing strategies. Our Social media platforms proved to be powerful tools in promoting events. With the increased traffic and engagements, SPE-AUC started

developing its social networking outlets, which enabled the chapter to reach the maximum number of students and market events. Furthermore, and in an effort to conclude 2020 on a strong note, in the fourth quarter of the year SPE-AUC worked on delivering two more major events for its members. It collaborated with the Society of Exploration Geophysicists (SEG) SUEZ Chapter in providing a wireline online internship and organized an orientation session about the petroleum industry in conjunction with AUC Petroleum department for students seeking enrollment in the petroleum engineering department.

#### *2020 Paved the Way for a Revamped 2021 Schedule*

The 2020 planning and adaptation process enhanced the chapter’s capabilities, enabling it to implement events that are more complex in 2021. The SPE-AUC Chapter organized the Petroleum Arabians Conference and Exhibition (PACE) event (initially scheduled for 2020) in March 2021, collaborating with SUEZ, Cairo, and Alexandria SPE Chapters. This year, the virtual event will be held on a more robust platform, which will combine all chapters’ efforts in producing an experience for our members on par with the in-person events held in the past. Moreover, SPE-AUC is organizing orientation





sessions on how to write SPE technical papers provided by one of the Petroleum Engineering professors at AUC. The chapter will be conducting technical sessions by collaborating with Oil and Gas service companies. Finally, the last project for SPE-AUC in the spring semester will be to provide skill workshops to SPE members and others who are interested in extracurricular activities and skills such as fundraising, marketing, and logistics. The SPE-AUC chapter will host professionals to deliver these workshops, and such projects are intended to empower members and preserve the continuity of the chapter and give back to the community through volunteering and social activity events.

### Silver Linings of the Challenging Experience

This past year came with its challenges, but also provided us with opportunities and ways to improve on current practices. SPE-AUC members have built on their resilience, technical skills and leadership potential through carrying out and delivering on their promise of member engagement and knowledge sharing. 2020 has taught us how to benefit from unexpected circumstances, despite the challenges, through a full digital transformation in our strategy and approach. Moreover, it pushed us to creatively explore logistical and financial alternatives for the conventional way of organizing events. Furthermore, the importance of communication is another valuable outcome of this particular year and it is one that we will continue to build on for years to come. We are more prepared for 2021 and our upcoming technical and social events, and we extend our invitation with open arms to our friends at SPE-KSA to visit our campus and attend our events.



In celebration of Women's International Day, SandRose brings you a selected collection of inspiring female authors who were able to spark a conversation and paint the imagination of millions



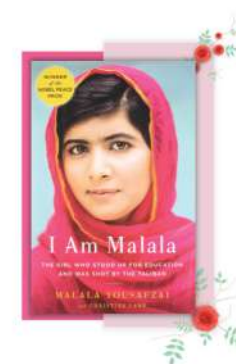
**Nouf Alotaibi**  
Petroleum Engineer  
Saudi Aramco

#### **I Am Malala** by Malala Yousafzai

*"We were scared, but our fear was not as strong as our courage."*

This captivating autobiography speaks about a girl who refused to be silenced, and fought for her right to an education.

Malala Yousafzai, a Nobel peace prize winner, writes about a family uprooted by global terrorism, of the fight for girls' education, of a father who, himself a school owner, championed and encouraged Malala to write and attend school, and of brave parents who have a fierce love for their daughter in a society that prizes sons.

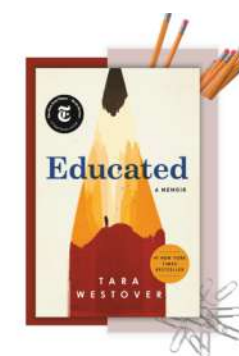


#### **Educated** by Tara Westover

*"An education is not so much about making a living as making a person."*

Tara Westover was born in a Mormon Family, raised without any formal education, and devoid of any connection to the outside world. One day, she decided to educate herself, and went on a quest for knowledge that took her through continents. Her quest was full of struggle, grief, and broken family ties.

This coming of age book tells the tale of a young woman who learnt the heart of education, and how it can offer the perspective to see one's life through new eyes and the will to change it.



#### **The Goldfinch** by Donna Tartt

*"When you feel homesick," he said, 'just look up. Because the moon is the same wherever you go.'"*

A Pulitzer Prize winner, Donna Tartt, writes a beautiful novel on drama, mystery, and a power struggle that follow a young boy named Theo and an accident that would tear his life apart. With memorable characters full of life and thrilling suspense, this story will take you through a spectrum of emotions.



scan to share



## IF IT CAN REACH THE SKIES, IT CAN MANEUVER DOWNHOLE: The Oil Field Downhole Drone



**Mohammed Al Dabbous**  
Team Leader and Patent Inventor  
NAPED OE, Saudi Aramco

Oil and gas wells are drilled to depths, thousands of feet beneath the surface of the Earth, to reach oil and gas reservoirs. Petroleum engineers need to have continuous and precise information about subsurface conditions to enable effective decision making and to safely produce oil and gas resources. Towards this goal, the advent of horizontal drilling has introduced significant gains in well productivity, which also comes at the cost of increased operational complexity. Any inefficiencies in the drilling and production processes will result in higher expenditures for operating companies along with the associated logistical costs and manpower. For this reason, the processes of drilling and producing these wells are continuously being revised and optimized to minimize the capital expenditures associated with the equipment, personnel, and logistic services needed to construct and maintain these wells.

To this end, petroleum engineers are constantly diagnosing their wells, much like how doctors diagnose their patients. Wells can become “sick” and have to be treated based on their symptoms just like human patients. Low pressures, high temperatures, and excess water production are all common ailments of oil and gas wells. If these issues are not treated in a timely and efficient manner, the well’s productivity will deteriorate to a point where it ends up “dead” or no longer economically viable.

Well intervention is a discipline in petroleum engineering that is dedicated to diagnosing and treating “sick” wells to enhance their productivity. Well intervention is one of

the primary pillars of production engineering and is the first step of diagnosing any “disease” that may afflict these wells. Logging jobs are one type of well intervention that is conducted to retrieve several parameters, including but not limited to: oil and gas flow rates, water production relative to overall production or “water cut”, as well as temperature and pressure measurements.

Heavy equipment such as coiled tubing (CT) are utilized to maneuver the logging equipment downhole oil and gas wells. This heavy equipment consists of steel tubes with a diameter usually ranging between 1-3.25 inches. The CT method took thirty years of continuous research until it was patented by Clyde Bannister in 1934; however, it was not utilized in the industry until the year 1962 in California. Coiled tubing was used as a means of moving an assembly of sensors that were run into the depths of oil and gas wells. Although it was more cost-effective than other alternatives at the time, this heavy equipment is far from inexpensive due to costs associated with the equipment, personnel, and logistics. Furthermore, CT is prone to getting stuck downhole an oil or gas well because of the heterogeneity of the downhole environment consisting of different types of rocks, solid chemicals, or piping distortions due to the corrosion and erosion of the piping materials. This was identified as an opportunity for a new and innovative approach to retrieving crucial diagnostic information from these wells in a more efficient and cost-effective approach. Moreover, this efficiency gap in CT led to the development of the downhole drone patent.

When we hear the term “drone”, our eyes inherently dart up to the skies. However, in this article our drone will dive deep, thousands of feet below the surface of the earth, in a journey to the depths of oil and gas wells. The idea of the invention was inspired by a movie called “Good Kill”, which tells the story of a gamer who became a drone pilot in the US army, with a mission to fight all over the world using drones. This ignited a thought: If drones can be used in the air, there must be a way to utilize them at subsurface. This thought then resulted in the idea of the downhole drone.

To enhance the efficiency of well intervention, the drone is to be utilized and directed toward an oil and gas well in subsurface wells. The autonomous submersible oil and gas well drone comprises a circular shaped housing, and a propulsion system with one or more spinner blades located at the front and rear sides. This drone is adaptable for wellbore surveillance and logging and features: a body, cylindrical structure for stabilization, rechargeable spinners, digital temperature and pressure sensors, gradiometer, gyroscope or GPS, and a wireless communication package. The drone is dropped into a well from the surface and falls into the lowest section of the hole by gravity. At this point, the drone then moves into the production section of the well by its own propulsion as directed by the surface control system. At selected locations of the productive zone, the drone stops and takes flow velocity measurements by rotating two propulsion spinners. These spinners are rechargeable as well, converting mechanical energy into electrical energy necessary for charging.

This patented Saudi Aramco invention essentially eliminates the need for costly and time-consuming CT logging jobs. Beyond that, not only does this technology

reduce the environmental footprint normally associated with logging jobs by eliminating the need for the conventionally required equipment and personnel transportation, but it also contributes towards eliminating HSE risks by taking personnel out of the equation.

This technology is just one example of the many positively disruptive impacts that IR 4.0 has had on the oil and gas industry at large, and well intervention in particular. This patented Saudi Aramco technology presents significant time and cost savings, but it also promotes operational efficiency in terms of reducing manpower requirements and minimizing environmental impacts while delivering well logging data at high fidelity. Innovations such as this provide crucial diagnostic information about oil and gas wells in a safe, cost- and time-effective manner, and will also contribute towards more meaningful investments in human capital by leveraging cutting edge technologies.



Figure 1 Visualization of downhole drone





# STAGES OF CHANGE MODEL

## The Key to Cultivating Long-Lasting Behavioral Changes



**Fatima Almarzoog**  
Petroleum Engineer  
Saudi Aramco

Have you ever made a list of resolutions for the New Year but found yourself breaking all your promises? Well, you are not alone. Researchers at the University of Scranton in Pennsylvania found that only 77% of people stick to their New Year's resolutions during the first week. After six months, this figure dips to only 46%. By the end of the year, only 8% adhere to their resolutions in pursuit of personal betterment [1]. However, despite these slim odds, we all find ourselves writing New Year's resolutions that we have yet to achieve.

Whatever your goal may be – to lose weight, eat healthy, or quit smoking – establishing lasting habitual behaviors is a simple process. However, it requires time and effort. Fortunately, habits can be formed using a systematic approach – one that many behavior-change experts define as the Transtheoretical Model of Change (TTM), more commonly known as the Stage-of-Change Model.

The TTM was first developed in the late 1970s by psychiatrists James Prochaska and Carlo DiClemente. The two psychiatrists examined the experience of smokers who willingly quit versus those requiring further treatment. The study revealed that people who adopted healthier habits and successfully quit smoking were ready to do so.

Thus, the TTM model focuses on one's ability to make decisions, ignoring social or biological influences [2]. It provides a framework through which individuals can better understand their behaviors and become more strategic when approaching behavioral change.

### Stages of Change

The model predicts that the stages and processes people undergo for behavioral change are more or less the same. They require gradual progression and tend to be cyclical. Relapse is an inevitable part of the process and is fundamental to change. It is vital to understand the key elements that make up the TTM to recognize the reason we fail to achieve our resolutions. The model posits five main stages of change: **Precontemplation, Contemplation, Preparation, Action, and Maintenance** [2].

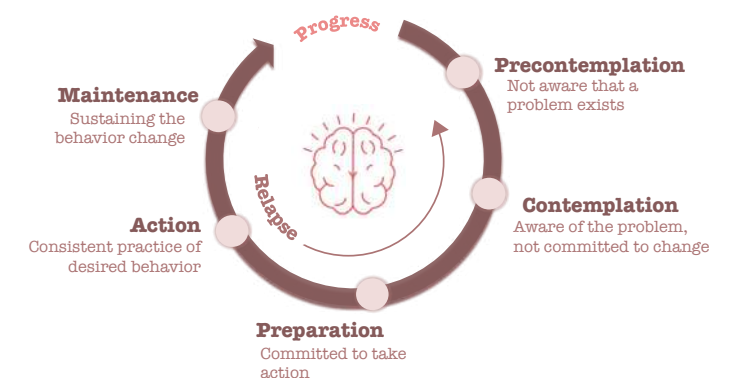
**Precontemplation** is the first stage. In this stage, people are unaware of the negative consequences of their behaviors and do not intend to take action in the foreseeable future. To move to the contemplation stage, one must experience cognitive dissonance to become more aware of their problematic behavior and acknowledge the negative consequences it produces. Beginning to make conscious risk assessments and analyzing actions can be helpful in moving to the next stage of change.

**Contemplation or Behavioral Procrastination** is the second stage. In this stage, people start weighing the associated pros and cons of adopting behavioral changes. During this time, individuals are still ambivalent about adopting healthier habits as they view the change as more attractive than the actions they need to take for the change to occur.

In the subsequent stage, **Preparation**, people are aware that there are no unique solutions for changing a behavior. Having a solid plan in place allows individuals at this stage to feel decisive, committed, and confident about making changes. The focus in this stage is to build a trial-and-error mindset, understanding that gradual yet consistent change is better than no change at all.

The **Action** stage is where people begin taking direct actions to achieve their goals and remain consistent for six months. This stage requires time and energy. According to Prochaska and DiClemente, those who reach the Action stage become conscious of the direct results of their actions to adopt positive lifestyle changes.

**Maintenance**, the final stage of change, is recognized by the continuous action of positive behavior for more than six months. At this stage, individuals recognize the significant benefits the new behavior contributes to their lifestyle.



### Relapses Are Bound to Happen

As you begin your endeavor to make a positive behavioral change, be aware that relapses are a common part of the process of making enduring changes. After months of effort and hard work, slipping back into old behaviors can be discouraging and may bring about feelings of failure, disappointment, and low self-efficacy. However, relapses should not be viewed as a sign of failure. Instead, they should be seen as short-term challenges that can be overcome.

When a relapse occurs, having a proper action plan in place can ensure that you stay on track and avoid falling back into old habits. Here are some strategies that can help prevent relapses from occurring:

- **Identify triggers that lead to a relapse.**
- **Recognize barriers to success.**
- **Reaffirm your goal and commitment to change.**

### Final Word

Quitting negative behaviors and adopting positive behavioral changes is not an easy process. The TTM provides a basic understanding of the spectrum of change and the steps necessary to progress to the ideal stage of maintenance. Just as in the study done by Prochaska and DiClemente, one must be ready to change to work through each stage and achieve one's goals.

### References

- [1] M. Ufberg, "Pacific Standards," 1 January 2019. [Online]. Available: <https://psmag.com/news/what-research-says-about-sticking-to-new-years-resolutions>.
- [2] Prochaska, James & DiClemente, Carlo. (1983). Stages and Processes of Self-Change of Smoking - Toward an Integrative Model of Change. *Journal of consulting and clinical psychology*. 51. 390-5.



scan to share



## Don't wait, vaccinate. We can't spell "immunity" without "U."



**Layal Al Khatib**

M.S. Senior Communications Professional  
Johns Hopkins Aramco Healthcare

No deaths have been reported as a result of taking any of the vaccines.

"Don't wait for the next best thing," Dr. Jaffar Al-Tawfiq, the director of Infection Control at JHAH and a leading international COVID-19 expert, advised, "Take the COVID-19 vaccine that is available, as the approved COVID-19 vaccines can stop hospitalization and death." Being vaccinated does not necessarily make you immune from getting infected by SARS-CoV-2, but if you are infected and vaccinated, the inoculation will stop COVID-19 from progressing to serious illness and hospitalization.

### End in sight

Waiting until other people around you get vaccinated, or waiting for what you think is the "right" type of vaccine, can be detrimental. With every day that passes without being vaccinated, you are increasing your risk of being exposed to SARS-CoV-2, becoming infected, and assisting in the spread of the virus throughout your community.

The finish line to this pandemic is near, and only you can help us achieve population immunity with your support and active participation by taking the COVID-19 vaccine, encouraging your loved ones to do the same, and continuing to abide by JHAH's 3 Ws: Wash or sanitize your hands, Wear a mask, and Watch your distance.



Vaccines are successful public health measures that greatly reduce infectious diseases, and are proven to be safe and effective. They have helped protect the world from devastating diseases such as polio, measles, influenza, tetanus, and hepatitis.

Yet, even with their successful history, trust in the COVID-19 vaccination process is still fragile. Misinformation, conspiracy theories, and rumors all contribute to an unnecessary fear of and doubt in even the most educated populations across the globe, resulting in "vaccine hesitancy." This causes a lag in the number of people taking the vaccine and, therefore, prolongs the spread of infectious disease.

Amid the current global pandemic, the race to population immunity is a worldwide challenge that can only be overcome by everyone taking the vaccine.

### No vaccine fatalities

Focusing on the rate of effectiveness for each type of COVID-19 vaccine can distract us from the proven fact that all the vaccines are 100% effective in stopping deaths and have greatly reduced hospitalizations during vaccine trials.

### What you should do today:

Get vaccinated as soon as possible, protecting yourself and your loved ones from spreading the virus. As eligible medical recipients of Saudi Aramco and JHAH employees and dependents, aged 18 years and over, can now make same-day and next-day appointments for their first-dose vaccinations and protect themselves from COVID-19.

- Visit [JHAH.com](https://www.jhah.com) > New Coronavirus > COVID-19 Vaccination for eligibility, hours of service, directions, and FAQs
- JHAH-registered individuals can use their MyChart accounts to book
- Alternatively, all eligible individuals can book by calling the friendly JHAH Contact Center at 800 305 4444.



### Questions about the COVID-19 Vaccination Program?

If you have questions about the JHAH COVID-19 Vaccination Program please speak to the JHAH team on 800-305-4444, or visit the FAQs on [JHAH.com](https://www.jhah.com). For specific questions about the vaccine please call the MOH on 937.

800-305-4444 | [www.jhah.com](https://www.jhah.com)



scan to share





spe-ksa.org