



INTERNATIONAL
GEOMECHANICS
SYMPOSIUM

INTERNATIONAL GEOMECHANICS SYMPOSIUM

30 OCTOBER–2 NOVEMBER 2023

AL KHOBAR, SAUDI ARABIA

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INTERNATIONAL GEOMECHANICS SYMPOSIUM

30 OCTOBER–2 NOVEMBER 2023

AL KHOBAR, SAUDI ARABIA

DAY 1

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29 OCTOBER 2023, SUNDAY

FIELD TRIP

- 8:00 - 11:30 **DAMMAM DOME FIELD TRIP**
Capacity: Max 50 persons
- 8:00 - 11:30 **DHAHRAN TECHNO VALLEY FIELD TRIP**
Capacity: Max 60 persons
- 13:00 - 15:30 **EDUCATOR FORUM AT KING FAHD UNIVERSITY OF PETROLEUM & MINERALS (KFUPM)**
- 15:00 - 17:00 **KFUPM CAMPUS TOUR**

30 OCTOBER 2023, MONDAY

- 8:00 - 9:00 **ONSITE REGISTRATION**
- 9:00 - 9:05 **HSE BRIEFING**
- 9:05 - 9:15 **COMMITTEE CHAIRS WELCOME**
- 9:15 - 9:30 **OPENING SPEAKER : ALI AL-SHAIKHI, VP OF RESEARCH AND INNOVATION, KFUPM**
- 9:30 - 10:30 **FELLOW 1**
Priscilla P. Nelson, Colorado School of Mines
Underground Resources for a Sustainable Future
- 10:30 - 11:10 **MODERATED DISCUSSION**
- 11:10 - 11:25 **COFFEE BREAK - 15 MIN**
- 11:25 - 12:25 **FELLOW 2**
Maurice B. Dusseault, University of Waterloo
Subsurface Energy Storage Geomechanics
- 12:25 - 13:05 **MODERATED DISCUSSION**
- 13:05 - 14:05 **LUNCH - 1 HR**
- 14:05 - 15:05 **FELLOW 3**
John McLennan, University of Utah
Geothermal Energy – An Opportunity at Any Temperature, at Any Location
- 15:05 - 15:45 **MODERATED DISCUSSION**
- 15:45 - 16:00 **COFFEE BREAK - 15 MIN**
- 16:00 - 16:25 **KEYNOTE | VIRTUAL**
Mark Zoback
The Geomechanical Challenges of Massive Scale CO2 Sequestration
- 16:25 - 16:40 **MODERATED DISCUSSION**
- 20:00 - 21:00 **GALA DINNER WITH SPONSOR RECOGNITION - SPONSORED BY EXPLORATION DEPARTMENT, SAUDI ARAMCO**

31 OCTOBER 2023, TUESDAY

SESSIONS 1, 2 & 3 (CONCURRENT)

- 7:30 - 8:30 **ONSITE REGISTRATION**
- 8:30 - 8:50 **OPENING SPEAKER : AUS TAWIL, DIRECTOR EXPLORATION EXCELLENCE, SAUDI ARAMCO**
- 8:50 - 10:05 **PRESIDENT'S PANEL**
Moderator : Gang Han
- 10:05 - 10:15 **GROUP PHOTO**
- 10:15 - 10:30 **COFFEE BREAK - 15 MIN**
- 10:30 - 11:50 **SESSION 1: CO2 SEQUESTRATION & UTILIZATION**
Session Chairs: Bassam Bakalh, MoE & Kun Su, Total
- STREAM 1**
 - Frédéric Amour, Danish Offshore Technology Centre**
Carbon storage in depleted Danish chalk reservoirs: characterising the shear and vertical deformation at the field scale and in the near-wellbore area
 - Ikhwanul Hafizi Musa, Petronas**
Pragmatic Methodology for Evaluation of Geomechanical Risks During Feasibility Assessment of Fields in Offshore Peninsular Malaysia for CO2 Geological Storage
 - Haizhu Wang, China University of Petroleum**
Effects of Heterogeneous Wettability on CO2/Oil Flow and Trapping Behavior in Porous Media: A Pore-Scale Simulation
 - Dave Davies, Rockfield Global**
Using ELFEN Horizon to assess geomechanical response of ExxonMobil's GoM ST54 field due to CO2 injection
- 11:50 - 12:50 **LUNCH - 1 HR**

- 10:30 - 11:50 **SESSION 2: FUNDAMENTAL GEOMECHANICS**
Session Chairs : Skaow Kusolsong, PTTEP & Ahmed Radwan, Jagiellonian University
- STREAM 2**
 - Chee Phuat Tan, Petronas**
Successful Pilot Deployment of Wellbore Strengthening Design Criteria and Quantification of Enhanced Fracture Gradient in a Depleted Reservoir in Malay Basin
 - Lang Liu, University of Alberta**
Indication of In-situ Biaxial Stress from Pressuremeter Hold Test
 - Abbas Khaksar, Baker Hughes**
Integrating Fibre Optic Surveys with Petrophysics and Geomechanics for Sand Control Decisions in a Brown Field
- 11:50 - 12:50 **LUNCH - 1 HR**



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31 OCTOBER 2023, TUESDAY

SESSION 1, 2 & 3 (CONCURRENT)

10:30 - 11:50 **SESSION 3: GEOMECHANICS FOR UNCONVENTIONAL**
Session Chairs : Angelica Alvarez, Saudi Aramco & Tianshou Ma, SPU

STREAM 3

Francis Elisabeth, Saudi Aramco
 State of the Art of Conventional vs. Unconventional Geomechanics Characterization

Mohammed Ba Geri, NewPark Drilling Fluids
 Novel Fresh Water-Based Mud System in Highly Reactive Shale Formation: Experimental and Case Studies

Munir Aldin, MetaRock
 A New Confined Swelling Test for Improved Fluid-Shale Compatibility Evaluation

Adam Donald, SLB
 De-Risking Hydraulic Fracture Operations with Geomechanics

11:50 - 12:50 **LUNCH - 1 HR**

SESSIONS 4, 5 & 6 (CONCURRENT)

12:50 - 14:30 **SESSION 4: GEOMECHANICS FOR GEOTHERMAL & NEW ENERGIES**
Session Chairs : Majed Al-Dossary, MoE & Wael El Sherbeny, Baker Hughes

STREAM 1

Jawad Rafiq, King Fahd University of Petroleum and Minerals (KFUPM)
 Unveiling the Potential Geothermal Reservoir in Al-Lith, Saudi Arabia: An Integrated Geologic, Remote Sensing, Geochemical, and Hydrochemical Approach

Daffa Arrofi, King Fahd University of Petroleum and Minerals (KFUPM)
 Integrating Multiparameter Geological Remote Sensing Analysis to Delineate the Jizan Geothermal Reservoir, Southwestern Saudi Arabia

Yuedu Chen, Taiyuan University of Technology
 Thermal performance of a heterogeneous fracture in geothermal reservoirs caused by multi-wells alternating injection and production

Jennifer Market, GeoActive
 Multi-Discipline Geomechanics Techniques: Sharing Best Practices Amongst Hydrocarbon, Mineral Mining, Geothermal, and CCUS Geoscientists

Nik Fadhlán, Petronas
 High Temperature influence in Pore Pressure Prediction – Case Study in Offshore Malaysia

14:30 - 14:40 **COFFEE BREAK - 10 MIN**

31 OCTOBER 2023, TUESDAY

SESSIONS 4, 5 & 6 (CONCURRENT)

12:50 - 14:30 **SESSION 5: PETROLEUM GEOMECHANICS**
Session Chairs : Kanitthorn Adisornsupawat, PTTEP & Wael Ziadatt, Mena Corva

STREAM 2

Ahmed S. Alhawaj, Saudi Aramco
 Unravelling reservoir characteristics through integrative geomechanical approaches

Izzati M Haata, Petronas
 Shale and Sand Pore Pressure Disequilibrium – challenges and mitigation strategy

Skaow Kusolsong, PTTEP
 UPVC test design, interpretation, and simulation for compaction and subsidence

Hamid Nick, Technical University of Denmark
 Impact of Thermo-Hydro-Mechanical-Chemical Coupling on Fluid Flow and Deformation during Water Injection in Chalk Reservoirs

Ainash Shabdirova, Nazarbayev University
 Discrete element modelling of deep cemented sandstone formation using adhesive elasto-plastic contact model

14:30 - 14:40 **COFFEE BREAK - 10 MIN**

12:50 - 14:30 **SESSION 6: DRILLING GEOMECHANICS**
Session Chairs : Abdulrhman Hashim, Saudi Aramco & Guangqing Zhang, CUPB

STREAM 3

Mohamed Fouda, Halliburton
 Innovative Techniques for Wellbore Stability Evaluation Using Logging-While-Drilling Technologies

Ahmed Bahgat, Excellence Logging
 Advanced Hole Cleaning Monitoring in Real-time Improves Drilling performance in Highly Deviated and Horizontal MRC (Maximum Reservoir Contact) Wells Drilled in the Lower Cretaceous Formations.

Li Qiuguo, Saudi Aramco
 Poroelastic and Thermoelastic Considerations in Maximum Horizontal Stress Determination from Wellbore Failures

Ivan Diaz-Granados, SLB
 How to make better decisions by capturing uncertainty in geomechanical wellbore models for drilling applications

Shaikhah Al Zeer, Saudi Aramco
 Advanced performance evaluation of cement sheath

14:30 - 14:40 **COFFEE BREAK - 10 MIN**



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ALL POSTER SESSIONS (CONCURRENT)

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ALL POSTER SESSIONS (CONCURRENT)

14:40 - 15:10 POSTER SESSION 1: CO2 SEQUESTRATION AND UTILISATION

Session Chair : Frédéric Amour, DTU

STREAM 1

Akihisa Takahashi

Detection of Geomechanical Reservoir Deformation in CCS

Andika Perbawa

Monitoring Ultrasonic Velocity of Late Jurassic Carbonate Rocks Saturated by Brine and Supercritical CO2 using Coda Wave Analysis

Youheng Zhang

Numerical Simulation on Interaction between the Supercritical CO2 and Water-Rock in Tarim Basin

14:40 - 15:10 POSTER SESSION 3: SUBSURFACE HYDROGEN AND ENERGY STORAGE

Session Chair : Julian Guerra, SLB

STREAM 3

Rimsha Rais

Subsurface Hydrogen Storage in depleted wells of Balkasar, Filmkasar Fields, Upper Indus Basin, Pakistan.

Mustafa Sari

Petrophysical characterisation and geomechanical testing of rock slat as potential geostorage of hydrogen in Western Australia

Faisal Althukair

Deep learning uncertainty quantification approach for liquid hydrogen storage analysis

14:40 - 15:10 POSTER SESSION 2: GEOMECHANICS FOR GEOTHERMAL & NEW ENERGIES

Session Chair : Marc Hettema, EBN

STREAM 2

Jiacheng Wang

Combining geothermal doublet system with aquifer thermal energy storage system

Abdallah Ghreizy

Subsurface Methane Migration through Degraded Cement and its Contribution to Climate Change

Abdallah Ghreizy

Experimental Investigation on the Influence of Operation and Formation Parameters on the Fracturing Fluid Flowback

14:40 - 15:10 POSTER SESSION 4: PETROLEUM GEOMECHANICS

Session Chair : Nora Alsudairi, Saudi Aramco

STREAM 4

Ruqaya Al Zadjali

Geomechanical Modelling to Assess Cap Rock Integrity for a Thermal EOR Development

Aly Abdelaziz

3D visualization of a complex fracture network formed by true-triaxial testing

Mohammed Ali Saeed Ali

Ratio of Leak-off in Microfractures and Fluid Storage in Principal Fractures during Fracking Operations in Shale: An Eagle Ford Case Study

14:40 - 15:10 POSTER SESSION 5: DRILLING GEOMECHANICS

Session Chair : Salaheldin Elkatatny, KFUPM

STREAM 5

Mohammed Ahmad Suaid

Yielded zone characterization while drilling a wellbore into clastic reservoirs using elastoplastic modeling approaches

Guangfu Zhang

Study on Temperature Field during Drilling and Temperature Reduction by Mud Density Reduction Technology in Deep Shale Gas Well

Mostafa Ahmed Mohamed Saleem

Enhancing Pressure Containment in Deepwater High-Pressure High-Temperature Drilling

14:40 - 15:10 POSTER SESSION 6: STRUCTURAL GEOMECHANICS

Session Chair : Murtada Al-Jawad, KFUPM

STREAM 6

Muhammad Qureshi

Enhancing Fracture Characterization by Adopting Seismic and Geomechanical Restoration Approaches

Yuedu Chen

A low-dimensional parameterization method for discrete fracture networks based on Hough transform and autoencoder

Mohammed M. Al-Fahmi

Low fracture intensity in an anticline bisected by a mega strike-slip fault



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SESSIONS 7, 8 & 9 (CONCURRENT)

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SESSIONS 7, 8 & 9 (CONCURRENT)

15:10 - 16:50 **SESSION 7: SUBSURFACE HYDROGEN AND ENERGY STORAGE**

Session Chairs : Adam Donald, SLB & Osman Hamid, Saudi Aramco

STREAM 1

Matthias Brandt, Institut fuer Gebirgsmechanik

Energy storage in salt caverns with supercritical and transcritical CO2

Pedro Vassalo Maia da Costa, Modecom

Large-scale of hydrogen underground storage in salt caverns: the future of sustainable energy storage

Julie Younes, University of Toronto

Effect of H2 on Salt Caverns During Fast Cycling Injection-Production: Laboratory Characterization & Storage Integrity Workflow

Benoit Brouard, Brouard Consulting

Geomechanical evaluation of an offshore salt cavern for hydrogen storage

Christoph Lüdeling, IfG Institut für Gebirgsmechanik GmbH

Rock Salt Creep and Cavern Design

15:10 - 16:50 **SESSION 8: STRUCTURAL GEOMECHANICS**

Session Chairs : Israa Abu-Mahfouz, KFUPM & Ahmed Bahgat, EXLOG

STREAM 2

Yaser Alzayer, Saudi Aramco

Evidence of Strain Partitioning and Strike-Slip Reactivation during Late Cretaceous Folding in Eastern Arabia

Xu Yang, Southwest Petroleum University

Quantitative Prediction of Tectonic Fractures in the Fourth Member of the Leikoupo Formation in the Pengzhou Area, Sichuan Basin

Jean Busson, TotalEnergies

Caprock fault: Permeability change with reactivation: Experimental review of operational constrains

Masashi Kodama, National Institute of Advanced Industrial Science and Technology

Joint inversion of muography and seismic wave exploration

Chun Liu, PetroChina Hangzhou Research Institute of Geology

Effect of stress vertical zoning on reservoirs: An example from Kuqa foreland thrust belt, Tarim basin

15:10 - 16:50 **SESSION 9: DRILLING GEOMECHANICS**

Session Chairs : Mohammed Aamri, PDO & Hussain Albahrani, Saudi Aramco

STREAM 3

Thomas Finkbeiner, King Abdullah University of Science and Technology (KAUST)

How geomechanics controls drillstring vibration induced wellbore damage

Osman Hamid, Saudi Aramco

Coupling Fluid Flow and Geomechanical Deformation Using AI & FEM Approaches

Hemant Singh, Baker Hughes

Proactive Application of Drilling Geomechanics on Well Planning Resulted in Efficient Well Delivery in Algeria: Planning vs. Implementation

Adam Bere, Rockfield Global

Wellbore Completion Integrity Under Extreme Levels of Fault Loading

Rima Al Faraj, Saudi Aramco

SAGE-WSA and its applications in HPHT Formation

20:00 - 21:00 **DINNER AT GRAND HYATT KHOBAR - SPONSORED BY EXPEC ARC, SAUDI ARAMCO**



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1 NOVEMBER 2023, WEDNESDAY

SESSIONS 10, 11 & 12 (CONCURRENT)

1 NOVEMBER 2023, WEDNESDAY

SESSIONS 10, 11 & 12 (CONCURRENT)

7:30 - 8:30	ONSITE REGISTRATION
8:30 - 8:50	OPENING SPEAKER: ISMAIL SULBI, MINING VP, MA'ADEN
8:50 - 10:10	SESSION 10: MINING ROCK MECHANICS <i>Session Chairs : Ahmed Alnuaim, MIM & Jennifer Market, GeoActive</i>
STREAM 1	
	Jennifer Market, GeoActive The Role of Geomechanics in the Modern Exploration and Production Lifecycle: Hydrocarbons, Mining, and the Energy Transition
	Mohammed Hefni, King Abdulaziz University Reinforcing cemented paste backfill with basalt fiber: A path towards sustainable practice in mine backfilling
	Abdelsalam N.A. Abugarara, Memorial University of Newfoundland Evaluation of Mining Formation through Host and Ore Core Characterization for Recovery Optimization
	Jili Feng, China University of Mining and Technology Investigation on prediction of mechanics parameters of engineering disturbed rock mass using resistivity exploration
10:10 - 10:20	COFFEE BREAK - 10 MIN

8:50 - 10:10	SESSION 11: GEOMECHANICS FOR GEOTHERMAL AND NEW ENERGIES <i>Session Chairs : Ruiling Yang, Orica & Musab Modrra, Saudi Aramco</i>
STREAM 2	
	Mohammed Ba Geri, NewPark Drilling Fluids Drilling Challenges and New Opportunities to Discover and Develop Geothermal Sector in the Middle East – Saudi Arabia: Jizan and Al Lith Area Case Studies
	Jerome Sfeir, Texas A&M Enhanced Geothermal Systems: A Sensitivity Analysis of Critical Performance Factors
	Kareem Ramzy Aboayanah, University of Toronto Investigating Thermal Gradient Cracking and Fracture Process Zone Development in Granitic Rocks
	Jianguo Wang, China University of Mining and Technology Comparative Analysis and Optimization of Supercritical CO ₂ and H ₂ O Performances in Enhanced Geothermal System: A Case Study in the Gonghe Basin
10:10 - 10:20	COFFEE BREAK - 10 MIN

8:50 - 10:10	SESSION 12: FUNDAMENTAL GEOMECHANICS <i>Session Chairs : Thomas Finkbeiner, KAUST & Xiaorong Li, CUPB</i>
STREAM 3	
	Dee Moronkeji, Apache Present-day Stress Field of Western Desert of Egypt from Caliper and Image Logs
	Youcef Bouchachi, Sonatrach Present-day stress of Ahnet basin; a Dipole Shear Waves Anisotropy Approach
	Abhijit Mitra, Premier Corex Failure Characterization of Saturated Rock: Implication for Effective Stress Law
10:10 - 10:20	COFFEE BREAK - 10 MIN



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ALL POSTER SESSIONS (CONCURRENT)

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ALL POSTER SESSIONS (CONCURRENT)

10:20 - 10:50 POSTER SESSION 7: MACHINE LEARNING / AI

Session Chair : Murtadha AlTammar, Saudi Aramco

STREAM 1

Muhammad Qureshi

A novel AI technique to decipher subsurface fault complexity, method to reveal concealed faults

Jianguo Wang

Prediction of Reservoir Fracability Based on Machine Learning Ensemble Algorithm

Yiwei Chen

Carbonate formation pressure prediction method based on machine learning

10:20 - 10:50 POSTER 8: CO2 SEQUESTRATION AND UTILIZATION

Session Chair : Nik Fadhlan Kamaruddin, Petronas

STREAM 2

Yihuai Zhang

The mechanical response during the CO2 storage in carbonate reservoir: an experimental study

Niccolò Menegoni

Fracture characterization of the Jizan Group from wellbore data and analog outcrop studies: implications for subsurface CO2 basalt mineralization

Satya Perumalla

Balancing Surface Facilities & Well Design to comply with Cap-rock Integrity in CCS Projects: Experience from UAE

10:20 - 10:50 POSTER SESSION 11: PETROLEUM GEOMECHANICS

Session Chair : Abhijit Mitra, Premier Corex

STREAM 5

Bing Yang

The effect of stylolites on the p-wave properties of parent carbonate rock

Eman Alabdulmuhsin

Impact of Geology on Geomechanical modelling applications in Carbonate Reservoirs

Faisal Althukair

A deep learning approach to evaluate formation damage in CO2 injection pressure transient analysis tests – a New Zealand aquifer analysis

10:20 - 10:50 POSTER SESSION 12: DRILLING GEOMECHANICS

Session Chair : Khalid Ramadan, KFUPM

STREAM 6

Abdelsalam N.A. Abugharara

Imperial Evaluation through Multi-Parameter Laboratory Drilling Examination for Mining Large Diameter Hole Performance Optimization

Michał Kepiński

Optimising Drilling Efficiency: Unveiling the Significance of Wellbore Ballooning in Challenging Geological Conditions

Tao Pan

Advance prediction method of ROP based on Di-S2S

10:20 - 10:50 POSTER SESSION 9 : FUNDAMENTAL GEOMECHANICS

Session Chair : Abbas Khaksar, Baker Hughes

STREAM 3

Abhijit Mitra

The Influence of Strain Rate on Rock Strength and Stiffness

M Rashad Amir Rashidi

CO2 core-flood injectivity and ultrasonic P velocities acquisitions in Sarawak Carbonates

Najwa Fayyaz

An integrated approach to Petroleum Geomechanics for 3D unconventional reservoir characterization, well integrity and hydraulic fracturing by using drilling operations, seismic modelling, paleo-stress fracture monitoring techniques in Potwar Plateau, NW Himalayas, Pakistan

10:20 - 10:50 POSTER 10: GEOMECHANICS FOR UNCONVENTIONAL

Session Chair : Hala Alqatari, Saudi Aramco

STREAM 4

Li Yuqi

Model of Fractured Horizontal Wells in Shale Oil Reservoirs with Bedding Fractures Considered

Eduardo Gramajo Silva

Characterization and Index Measurements of the Unconventional Gusaiba Rock Member from Qassim Region, Saudi Arabia

Abinash Bal

Transition from Poroelastic to Fluid Dynamic Effect: Understanding Fluid Flow Behaviour in Depleted Shale Gas Reservoirs



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SESSIONS 13, 14 & 15 (CONCURRENT)

1 NOVEMBER 2023, WEDNESDAY

SESSIONS 16, 17 & 18 (CONCURRENT)

10:50 - 12:10 **SESSION 13: BEST OF CHINA ROCK MECHANICS AND ENGINEERING**

Session Chairs : Yongcun Feng, CUPB & Fawu Wang, Tongji University

STREAM 1

Manchao He, President of CSRME, China University of Mining and Technology Beijing

Yonggang Jia, Ocean University of China

Key Technologies and Equipments of Geological Environment Observation in Deep-Sea Development

Weiguo Liang, Taiyuan University of Technology

Study on Carbon Dioxide Sequestration in Deep Coal Beds

Fengshou Zhang, Tongji University

Challenges of Shale Gas Recovery in Sichuan Basin, China

12:10 - 13:10 **LUNCH - 1 HR**

10:50 - 12:10 **SESSION 14: CO2 SEQUESTRATION & UTILIZATION**

Session Chairs : Rached Rached, SINOPEC & Talal Al Shaffoot, KFUPM

STREAM 2

Mustafa Sari, CSIRO Energy

Implication of CO2 injection into calcite-cemented siliciclastic reservoir: Experimental observation during NMR-FBG core flooding assembly

Jijun Miao, SimTech LLC

Realtime CO2 Plume Monitoring and Optimization System through Coupling with Reservoir and Geophysical Calibration

Dan Roberts, Rockfield Global

Accounting for Stress History and Lithology in Geomechanical Models: Implications for Subsurface CO2 Storage Integrity on the Horda Platform

Fengxiang Mao, China University of Petroleum

Modelling and Verification of Transient Flow and Heat Transfer for CO2 Injection Wells — Application to CCUS Project at H3 Block, China

12:10 - 13:10 **LUNCH - 1 HR**

10:50 - 12:10 **SESSION 15: HYDRAULIC FRACTURING**

Session Chairs : Mark McClure, Resfrac & Michal Kępiński, Polish Oil & Gas

STREAM 3

Murtada Saleh Hassan Al-Jawad, KFUPM

Sustaining Acid and Propped Fractured Conductivity in Weak Carbonates through Consolidation

Kaiming Xia, Saudi Aramco

Selecting Hydraulic Fracturing Method for Wells Landed in Deep and Tight Gas Reservoirs

Xin Liu, University of Science and Technology Liaoning

Energy based model with non-symmetrical branch fractures of different roughness

Yazeed Altowairqi, Saudi Aramco

The integration of microseismic applications with advanced seismic interpretation tools: a new workflow for frack design optimization and sweet spotting

12:10 - 13:10 **LUNCH - 1 HR**

13:10 - 14:50 **SESSION 16: MINING ROCK MECHANICS**

Session Chairs : Tariq Mahmoud, Saudi Aramco & Weiguo Liang, TUT

STREAM 1

Ahmed Alnuaim, Ministry of Industry and Mineral Resource

Geotechnical Characterization and Utilization of TBM Waste

Ruilin Yang, Orica Limited

Integral system of monitoring and modeling for blast optimization

Mohammed Sazid, King Abdulaziz University

Simulation of old surface and underground working for assessment of slope stability

Yuedu Chen, Taiyuan University of Technology

Shear softening to hardening behaviors of coal structural plane after supercritical CO2 soaking: experiment and theoretical models

Wang Chenghu, National Institute of Natural Hazards, MEMC

Utilizing high-precision detecting methodology for comprehensive determination of stress fields for tunnelling engineering of Sichuan-Tibet Railway Project

14:50 - 15:00 **COFFEE BREAK - 10 MIN**



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SESSIONS 16, 17 & 18 (CONCURRENT)

1 NOVEMBER 2023, WEDNESDAY

ALL POSTER SESSIONS (CONCURRENT)

13:10 - 14:50 **SESSION 17: CO2 SEQUESTRATION & UTILIZATION**

Session Chairs : Beth Rees, Geosoftware & Mustafa Sari, CSIRO

13:10 - 14:50 **SESSION 18: HYDRAULIC FRACTURING**

Session Chairs : Kan Wu, Texas A&M & Satya Permulla, Baker Hughes

15:00 - 15:50 **POSTER SESSION 13: MACHINE LEARNING / AI**

Session Chair : Izzati Haata, Petronas

15:00 - 15:50 **POSTER 14: FUNDAMENTAL GEOMECHANICS**

Session Chair : Bing Hou, CUPB

STREAM 2

Zhao Feng, Tongji University

A deep-learning-based surrogate model for simulating coupled hydro-mechanical processes during geological CO2 sequestration

Kanitthorn Adisornsupawat, PTTEP

An assessment of wellbore integrity during the planned injection of CO2 within a depleted reservoir through numerical analyses

M Rashad Amir Rashidi, Petronas Reasearch Sdn Bhd

Mechanical Properties Degradation in Depleted Clastic Reservoirs for CO2 Storage

Ali Mortazavi, Nazarbayev University

Investigation of Faults Activation Mechanisms in Carbon (CO2) Storage

Muhammad Hamzi Yakup, Petronas Reaserch Sdn Bhd

Evaluating Highly Porous and Depleted Carbonate Field for CO2 Storage Site Using A Novel Approach of Integrated Coupled Geomechanics-dynamic Modelling

STREAM 3

Ruud Weijermars, KFUPM

Less is More: Sleek Solutions for Improving Hydraulic Fracturing Treatment Design and Well Performance

Mark McClure, ResFrac Corporation

Effective Moduli Approximations to Capture the Effect of Anisotropy on Multistage Hydraulic Fracturing in Shale

Nawaf Abdulrahman A Alghamdi, Saudi Aramco

A Hybrid Approach for Fracability Evaluation

Maoyi Mao, Nanjing University

The hydraulic fracturing simulation based on MatDEM

Xianghui Qin, Chinese Academy of Geological Sciences

A novel method to obtain the shut-in pressure in the hydraulic fracturing test

STREAM 1

Hamzah Al-Sharifi

Evaluation of different tree-based machine learning approaches for formation lithology classification

Osama Mutrif Siddig

Integrating Drilling Data And Machine Learning For Improved Rock Mechanics Prediction

Jijun Miao

Optimizing Refracturing Models in Tight Oil Reservoirs: An Integrated Workflow of Geology and Geomechanics Leveraging Artificial Intelligence

Ashraf Ahmed

White Box Artificial Neural Network Model for Real-Time Bulk Density Forecast

Zhongyu Hu

Fracture morphology evaluation of surrogate model for fast prediction using machine learning

STREAM 2

Deheng Kong

Multiscale rock discontinuity roughness characterization using smartphone photogrammetry

Abdullah Alghamdi

Modelling the effect of seismic scale faults on intra-formational strain within reservoir rocks

Dejian Li

Study on time-varying characteristics and prediction of acoustic emission of granite strainburst with initial temperature damage

Abubakar Isah

Effect of Geomechanical Properties on Rock Wetting Behavior

Bowen Zheng

Study on the anisotropy of shear fracture surface morphology for reservoir shale

14:50 - 15:00 **COFFEE BREAK - 10 MIN**

14:50 - 15:00 **COFFEE BREAK - 10 MIN**

18:00 - 20:00 **VISIT TO ITHRA**



INTERNATIONAL GEOMECHANICS SYMPOSIUM

30 OCTOBER–2 NOVEMBER 2023

AL KHOBAR, SAUDI ARABIA

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1 NOVEMBER 2023, WEDNESDAY

ALL POSTER SESSIONS (CONCURRENT)

1 NOVEMBER 2023, WEDNESDAY

ALL POSTER SESSIONS (CONCURRENT)

15:00 - 15:50

POSTER 15: HYDRAULIC FRACTURING

Session Chair : Gallyam Aidagulov, SLB

STREAM 3

Zhongyu Hu

Geomechanics analysis for high breakdown pressure of deep tight sandstone formation: A case study

Jianbin LI

Study on the mechanism of hydraulic fracture propagation in two sets of fracturecavity carbonate reservoirs

Jiaxin LV

Experimental study on indoor multi-cluster fracturing based on distributed fibre-optical monitoring

Lejia Ren

Optimization of perforation parameters for shale gas horizontal wells in Weiyuan block, Sichuan Basin- A case study of well X1

Tameem Almani

Sensitivity Analysis of the Factors Affecting Formation Breakdown Pressure Using a Computational-Based Approach

15:00 - 15:50

POSTER SESSION 16: PETROLEUM GEOMECHANICS

Session Chair : Giovanni Grasselli, Univeristy of Toronto

STREAM 4

Francis Elisabeth

Regional rock mechanics characterization of a tight sandstone with destructive/non-destructive measurements and artificial intelligence.

Ahmed Alharthi

A Cost-Effective Approach for Obtaining Geomechanics Data using Micro Rebound Hammer Test (MRT)

Sameeh I Batarseh

First Successful High Power Laser Descaling and Its Effect on Wellbore Stability

Zainab Al Ibrahim

Automatic Core to Log Depth Adjustment for Geomechanical Parameters Calibration

Wael El Sherbeny

Consequences Of Formation Petrophysical Characteristics on Both Wellbore Strengthening and Wellbore Stability: A Case Study, East Nile Delta, Egypt

15:00 - 15:50

POSTER SESSION 17: DRILLING GEOMECHANICS

Session Chair : Mustafa Ramadan, KFUPM

STREAM 5

Satya Perumalla

Gaining the Trust of Drillers using Expert System powered by Geomechanics

Nanthakumar Rajaiah

Assessing failure criteria in carbonate reservoirs through geomechanics modeling of underbalance drilling

Rima Al Faraj

Solid Production Prediction in Weak Sandstone Formation Using Finite Element Modeling (FEM) Approaches

Ahmed Ali Alrashed

Modelling the Laser Penetration in Cased Hole Completions: Thermal & Mechanical Effects

Tianshou Ma

Physics-constrained distributed neural network model for 3D in-situ stress prediction

18:00 - 20:00

VISIT TO ITHRA



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2 NOVEMBER 2023, THURSDAY

SESSIONS 19, 20 & 21 (CONCURRENT)

2 NOVEMBER 2023, THURSDAY

SESSIONS 19, 20 & 21 (CONCURRENT)

7:30 - 8:30	ONSITE REGISTRATION
8:30 - 8:50	OPENING SPEAKER : BASSAM BAKALH, SAUDI MINISTRY OF ENERGY
8:50 - 10:10	SESSION 19: SUBSURFACE HYDROGEN AND ENERGY STORAGE <i>Session Chairs : Munir Aldin, MetaRock & Rita Sousa, NYU</i>
STREAM 1	
	Namsu Park, Baker Hughes Hydrogen Storage Risks and Integrity Assurance
	Sara Abu Alsaud, Saudi Aramco Distributed local sensor data optimization for hydrogen storage optimization utilizing a deep learning approach – a Taranaki basin investigation
	Anke Simone Wendt, SLB The Role of Integrated Geomechanics in the Energy Transition—Contributing to a Safer and Cleaner Environment
	Kan Wu, Texas A&M University Completion Design Evaluation based on Data Analysis of Distributed Fiber Optic Sensing
10:10 - 10:20	COFFEE BREAK - 10 MIN

8:50 - 10:10	SESSION 20: CO2 SEQUESTRATION & UTILIZATION <i>Session Chairs : Sahriza Salwani Shah, Petronas & Sergio Fontoura, PUC-Rio</i>
STREAM 2	
	Julian Guerra, SLB Derisking site selection for CO2 injection in UAE through geomechanics forward modeling
	Phil McCurdy, AXIS Developing Comprehensive Models of Completion and Formation Integrity During CO2 Injection into Depleted Reservoirs
	Taher Sodager, Saudi Aramco Feasibility of Time-lapse seismic methods for monitoring CO2 storage in the Devonian Carbonate Reef
	Talal Al Shafloot, KFUPM Experimental Evaluation of Frictional and Hydraulic Behavior of sc-CO2-saturated Fractures During Controlled Rate Slippage
10:10 - 10:20	COFFEE BREAK - 10 MIN

8:50 - 10:10	SESSION 21: HYDRAULIC FRACTURING <i>Session Chairs : Jijun Miao, SimTech & Khalid Ruwaili, Saudi Aramco</i>
STREAM 3	
	Adam Donald, SLB Anisotropic Elastic Constants for Stimulation Design using a novel machine learning aided inversion accounting for borehole fluid velocity
	Aflah Al Yaaribi, Petroleum Development Oman (PDO) Optimization of Hydraulic Stimulation Treatments of Tight Sandstone Gas Reservoirs in Oman with Geomechanical Sensitivity Analysis Using Analytical Simulation Techniques; A Case Study
	Peng Yang, China University of Petroleum Multi-well Pad Hydraulic Fracturing Modeling for Coupling 3D Fracture Propagation and Proppant Migration
	Jijun Miao, SimTech LLC Dynamic 3D Hydraulic Fracture Propagation Considering the Influence of Horizontal Bedding Planes and Natural Fractures in Unconventional Reservoirs
10:10 - 10:20	COFFEE BREAK - 10 MIN



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2 NOVEMBER 2023, THURSDAY

ALL POSTER SESSIONS (CONCURRENT)

2 NOVEMBER 2023, THURSDAY

ALL POSTER SESSIONS (CONCURRENT)

10:20 - 10:50 **POSTER SESSION 18: STRUCTURAL GEOMECHANICS**

Session Chair : **Ahmed Hawaj, Saudi Aramco**

STREAM 1

Nora Alsudairi

4D Geomechanical Modeling Application for Successful Drilling Operations

Chuhao Huang

A FEM-DFN model for the interaction and propagation of multi-cluster fractures during variable fluid-viscosity injection in layered shale oil reservoir

Zhao Zexi

Application of time-varying frequency-divisional deconvolution to reservoir prediction in complex fault block areas

10:20 - 10:50 **POSTER 19: FUNDAMENTAL GEOMECHANICS**

Session Chair : **Chuangzhou Wu, Zhejiang University**

STREAM 2

Michał Kepiński

Ductile behavior of anhydrites during multistage failure triaxial tests

Yiwei Chen

Modeling squirt dispersion and attenuation of ultrasonic in fluid-saturated rocks at the core scale

Mohammed Farfour

A new Quick Look Interpretation: Theory and Application

10:20 - 10:50 **POSTER SESSION 22: HYDRAULIC FRACTURING**

Session Chair : **Yuedu Chen, TUT**

STREAM 5

Tameem Almani

Predicting Formation Breakdown Pressures for Arbitrary Wellbore Orientation Using Machine Learning Techniques

Ahmed Ali Alrashed

Sensitivity of Stress Distribution to the Change in Rock's Geomechanical Properties During Laser Heating

Sergey Stanchits

Parameters of granite Hydraulic Fracturing induced by waterless fluid injections

10:20 - 10:50 **POSTER SESSION 23 : SUBSURFACE HYDROGEN AND ENERGY STORAGE**

Session Chair : **Ikhwanul Hafizi Musa, Petronas**

STREAM 6

Nora Alsudairi

The Role of Geomechanics on Hydrogen Extraction

Ahmed Alsaif

Impurity Measurement for Sustainable Hydrogen Fuel Utilizing Analytical Methods Based on ISO 21087:2019

Sara Abu Alsaad

Enhancing recovery from natural hydrogen reservoirs – an AI-driven Logging while drilling optimization methodology

10:20 - 10:50 **POSTER 20: DRILLING GEOMECHANICS**

Session Chair : **Fengshou Zhang, Tongji University**

STREAM 3

Sarah Alamer

1D/3D Clustering Techniques of Geomechanical and Reservoir Properties to Overcome Stimulation Challenges

Runhai Feng

Lithology Identification using Drill Bit Sounds

Rached Rached

Numerical Tool for Multilateral Well Stability Analysis: FEM-Based Approach

10:20 - 10:50 **POSTER 21: SAND PRODUCTION AND SAND CONTROL**

Session Chair : **Mohamed Fouda, Halliburton**

STREAM 4

Abbas Khaksar

Sand Production Prediction for an Offshore Well with a Shallow Unconsolidated Reservoir Zone, Mako Gas Field, Natuna Sea, Indonesia

Xiaorong Li

Study on Sand Production Mechanism of Fractured Reservoir in Dina Gas Field

Abbas Khaksar

Validation of Geomechanical Sanding Predictions with Subsequent Production and Water Injection in a Rejuvenated Oil Field, Offshore Malaysia



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2 NOVEMBER 2023, THURSDAY

SESSIONS 22, 23 & 24 (CONCURRENT)

2 NOVEMBER 2023, THURSDAY

SESSIONS 22, 23 & 24 (CONCURRENT)

SESSIONS 25, 26 & 27 (CONCURRENT)

10:50 - 12:10 **SESSION 22: GEOMECHANICS FOR GEOTHERMAL & NEW ENERGIES**

10:50 - 12:10 **SESSION 23: CO2 SEQUESTRATION & UTILIZATION**

10:50 - 12:10 **SESSION 24: HYDRAULIC FRACTURING**

13:10 - 14:50 **SESSION 25: INTEGRATED CASE STUDIES**

STREAM 1

STREAM 2

STREAM 3

STREAM 1

Session Chairs : Israa Abu-Mahfouz, KFUPM & Elsa Maalouf, AUB

Session Chairs : Tan Chee Phuat, Petronas & Juan Carlos Chavez, Axis WellTechnology

Session Chairs : Francis Elisabeth, Saudi Aramco & Ivan Diaz Granados, SLB

Session Chair : Fengshou Zhang, CSRME & Ruqaya Zadjali, PDO

Wael El Sherbeny, Baker Hughes

Understandings of captured lessons-learned enhances learning curve of geothermal development and production, methodology & global Case Histories

Karsten Fischer, SLB

Defining the impact of far-field stress uncertainty on the confidence of fault criticality analyses from 3D geomechanical simulations for CCS project

Johannes Vossen, Baker Hughes

Geomechanical Analyses of Hydraulic Fracturing Efficiency and Challenges in a Tight Clastic Reservoir: Experiences over Years

Ting Huang, Changqing Oil Field Company

The technology of development regime transformation in super-low permeability oil reservoir to significantly improve recovery efficiency: case study in HQ oilfield, Ordos Basin, China

Marc Hettema, EBN

Maximum Earthquake Moment Magnitude Induced by Gas Depletion and Geothermal Injection: Similarities and Differences.

Kun SU, TotalEnergies

Prediction of hydraulic and thermal induced fracture due to CO2 injection using equivalent inclusion method

Mohammed Hamed Salim AL-Aamri, Petroleum Development Oman (PDO)

Mineralogical based Geomechanical model assisted hydraulic Fracture design for Fiber Optics well: Tested in a tight gas Sandstone reservoir

Marek Jarosiński, Polish Geological Institute

Stress profiling within fault-and-thrust-belt considering a structural strain: the case of a deep borehole in the Outer Carpathians (Poland)

Yingchun Li, Dalian University of Technology

Hydraulic fracturing for excavation-enhanced geothermal system (E-EGS): Review, opportunities and challenges

Jun Matsushima, The University of Tokyo

Estimation of CO2 saturation and geomechanical parameters by combination of cosmic-ray muons and seismic exploration: Laboratory scale experiment

Chuhao Huang, Chengdu University of Technology

A new technology of combined network fracturing for shale oil reservoir in Jiyang Depression

Prajit Chakrabarti, Baker Hughes

Characterization of Maximum Horizontal Stress from wellbore failures – A case study from the tight Paleozoic Hamra Quartzite oil reservoir of Oued Mya Basin, Algeria

Chun'an Tang, Dalian University of Technology

Extraction-enhanced geothermal system: Strategic transformation from mineral mining to heat mining

Vlasios Leontidis, IFP Energies nouvelles

Sensitivity of impurities to CO2 flow in injection wells

Ali Shawaf, University of Wyoming

The Impact of Formation Anisotropy and Stresses on Fracture Geometry – A Case Study in Jafurah's Tuwaiq Mountain Formation (TMF), Saudi Arabia

Ersi Xu, PetroChina Southwest Oil & Gas Field Company

A Comprehensive Evaluation of Diagnostic Fracture Injection Testing for Shale Gas Horizontal Wells in Southern Sichuan Basin, China

12:10 - 13:10 **LUNCH - 1 HR**

12:10 - 13:10 **LUNCH - 1 HR**

12:10 - 13:10 **LUNCH - 1 HR**

14:50 - 15:00 **COFFEE BREAK - 10 MIN**



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2 NOVEMBER 2023, THURSDAY

SESSIONS 25, 26 & 27 (CONCURRENT)

2 NOVEMBER 2023, THURSDAY

SESSIONS 28, 29 & 30 (CONCURRENT)

13:10 - 14:50 **SESSION 26: CO2 SEQUESTRATION & UTILIZATION**
Session Chairs : Marc Hettema, EBN & Youcef Bouchachi, Sonatrach

STREAM 2

Svetlana Zhigulskiy, Gazpromneft Science and Technology Centre
 Two-way coupling simulation and geomechanical modelling of fault activation related to Carbon Capture and Storage

Takumi Onuma, University of Tokyo
 A Consideration on Key Reservoir Parameter for Surface Displacement at CCS/CCUS Sites

Sahriza Salwani Md Shah, PETRONAS Research Sdn Bhd
 Impact of CO2 and H2S exposure on tensile strength of carbonate rock for CO2 storage evaluation

Muhammad Hamzi Yakup, PETRONAS
 CO2 Thermal Behaviour and Associated Geomechanics Risks Evaluations for the First Malaysian Offshore CCS Project Utilizing Full Field And Near Wellbore Thermal Modelling Approaches

Kun Su, TotalEnergies
 Possible scenarios of CO2 injection through a thermal induced fracture predicted by an analytical mode

14:50 - 15:00 **COFFEE BREAK - 10 MIN**

13:10 - 14:50 **SESSION 27: HYDRAULIC FRACKING**
Session Chairs : Adam Bere, Rockfield & Igor Faoro, Stratum

STREAM 3

Boon S. Ooi, KAUST
 Distributed Fiber-Optic Sensing in the Oil and Gas Industry

Xuanhe Tang, Chengdu University of Technology
 Complex well-interferences during multi-wells hydraulic fracturing in Weirong deep shale gas reservoir

Bo Zheng, Chinese Academy of Sciences
 Investigation on the geomechanical parameters distribution and the hydraulic fracturing processes of the Lucaogou shale oil reservoirs

Haoyong Huang, PetroChina Southwest Oil & Gas Field Company
 A Geomechanics Model-Driven solutions On Frac Hits And Casing Deformation In Ultradeep Shale Hydraulic Fracturing

Tao You, Hohai University
 On poroelastic strain energy degradation in the variational phase-field models for hydraulic fracture in oil or gas shale

14:50 - 15:00 **COFFEE BREAK - 10 MIN**

15:00 - 16:00 **SESSION 28: INTEGRATED CASE STUDIES**
Session Chair : Rashad Amir Rashidi, Petronas

STREAM 1

Araceli Martinez Pacheco, SLB
 Digital Enablement of Dynamic Risk Management to Drive Operational Efficiency through a Real-Time International Operations Integrity Center

Hemant Singh, Baker Hughes
 Deepwater Field Development Decision- You Must Consider Geomechanical Risks

Prajit Chakrabarti, Baker Hughes
 Integration of 1-D geomechanical model for Minimum Horizontal Stress Estimation and validation with micro-frac tests - cases study from Touggourt field, Algeria

16:00 - 16:20 **SYMPOSIUM CLOSING - 20 MIN**

15:00 - 16:00 **SESSION 29: STRUTRUAL GEOMECHANICS**
Session Chairs: Yaser Alzayer, Saudi Aramco

STREAM 2

Lejia Ren, CUPB
 Experiments and analysis on different mineral fabric shale fracturing by a CT visualized multi-functional experimental equipment

Quan Gan, Chongqing University
 Influence of stress transfer on triggering fault instability in a double faults enhanced geothermal system

Songfeng Guo, China Academy of Sciences
 Stress Disturbance around Xianshuihe Fault Zone and Implication for Fault Stability and Tectonic Dynamics

16:00 - 16:20 **SYMPOSIUM CLOSING - 20 MIN**



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SESSIONS 28, 29 & 30 (CONCURRENT)

15:00 - 16:00

SESSION 30: HYDRAULIC FRACTURING

Session Chair : Murtada Al-Jawad, KFUPM

Ali Oshaish, KFUPM

Fracture Propagation-Rate and Fracture Half-Length Estimation for Individual Fracturing Stage through Dynamic Balancing of Fluid Pressures: Eagle Ford Case Study

Jiaxin Lv, CUPB

Fractures interaction and propagation mechanism of layer-penetrating fracturing on deep tight oil reservoir

Jinzhi Mou, Northeast Petroleum University

Mechanism of Near wellbore Fracture Initiation during Hydraulic Fracturing of Horizontal Wells with In-plane perforation

16:00 - 16:20

SYMPOSIUM CLOSING - 20 MIN

STREAM 3