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ASSOCIATION OF
GEOSCIENTISTS &
ENGINEERS



Sixth EAGE Workshop on Naturally Fractured Rocks

4-8 APRIL 2027 • AL KHOBAR, SAUDI ARABIA

- **Programme**

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TECHNICAL COMMITTEE

EAGE would like to thank the Technical Committee who are essential to this workshop by empowering EAGE to drive innovation & technical progress.

Mandefro B Woldeamanuel (Co-Chair)	Aramco
Pascal Richard (Co-Chair)	PR Geology
Ahmed Baghdadi	Baker Hughes
Michael Welch	DTU
Yuri Panara	ENI
Thomas Finkbeiner	KAUST
Israa Abu-Mahfouz	KFUPM
Prof. Stephan Matthai	Melbourne University
Gamal Sultan	SLB
Hamid Nick	Technical University of Denmark (DTU)
Soliva Roger	University of Montpellier
Niccolo Menegoni	University of Pavia
Vincenzo La Bruna	Federal University of Rio Grande do Norte
Mattia Martinelli	ENI
Jeffer Caldeira	Petrobras

WORKSHOP OVERVIEW

About the event

Join us for the continuation of the successful **EAGE Workshop Series on Naturally Fractured Rocks (NFR)**, taking place in the Kingdom of Saudi Arabia in Q2 2027, under the theme: “**Naturally Fractured Rocks for Sustainable Energy – Can virtual reality and other emerging technologies help improve our characterization for understanding and modelling of subsurface fluid movements?**”

For 2027, the workshop has evolved into a **unique five-day technical experience**, bringing together **field learning, industry technology, expert technical exchange** and advanced training.

The programme begins with a **field trip to the famous Dammam Dome**, where oil was discovered in 1938, followed by a visit to the **SLB Dhahran Carbonate Research Centre**. This is followed by **two days of technical presentations** and concludes with a **two-day Joint Short Course** on Integrated Fracture Reservoir Characterization and Modelling and Multi-phase Flow, Upscaling and the Construction of Fractured Reservoir Models, led by **Prof. Stephan K. Matthai and Dr. Pascal D. Richard**.

The five-day programme provides participants with an opportunity to **connect field observations and industry technology with the latest technical thinking and advanced approaches to fractured reservoir characterization and modelling**.

One programme. Five days.

Field Experience → Industry Technology →
Technical Exchange → Advanced Training





STRATEGIC PROGRAMME

Opening Address Speaker



Ahmed Al Otaibi

Director in Gas Reservoir Characterization
Department
Aramco

Keynote Speakers



Stephan Matthai

Professor for Geotechnical Engineering
University of Melbourne
Keynote Title: Fluid Inertia, Flow
dynamics, Fluid Rheology in Natural
Fracture Networks



Mokhles Mezghani

Senior Research Science Consultant
Aramco
Keynote Title: Artificial Intelligence for
Geological Rock Sample Analysis



Pascal Richard

Structural Geologist
PR Geology
Keynote Title: Accessing the Inaccessible:
How Virtual Reality Reveals the Previously
Unseen



Niccolo Menegoni

Assistant Professor
University of Pavia
Keynote Title: Fracture Quantification
from Digital Outcrops: Automation,
Precision and Subsurface Scaling

SHORT COURSES

Joint Short Course

(Integrated Fracture Reservoir Characterization and
Modelling and Multi-phase Flow, Upscaling and the
Construction of Fractured Reservoir Models - Prof. Stephan
K. Matthai & Dr. Pascal D. Richard)
Wednesday, 7 April 2027 and Thursday, 8 April 2027.



Stephan Matthai

Professor for Geotechnical Engineering
University of Melbourne



Pascal Richard

Structural Geologist
PR Geology

GENERAL INFORMATION

Venue Information

Venue: voco al Khobar | Sultana 1 & 2 Ballroom
Address: Dhahran Road, Al-Thuqbah, King Abdullah Street,
Al Khobar Saudi Arabia

How to Get There: Transportation

voco al Khobar is conveniently located approximately 69
kilometers from King Fahad International Airport (DMM).
The journey typically takes 43 minutes depending on traffic.

By Hotel Airport Shuttle:

Please provide your flight details to the hotel's reservation
team at least 24 hours in advance.

By Taxi or Ride-Sharing:

Airport taxis - Readily available 24/7 at the designated taxi
stand outside the Arrival terminal.
Ride sharing - Apps like Careem and Uber operate in Saudi
Arabia.

Badge collection will open at the following times:

5-8 April 2027	8:00 am - 8:30 am (UTC +3)	Sultana 1 & 2 Ballroom Foyer, voco Al Khobar
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Upload Desk

If you have any questions about the technical programme or wish to upload their presentation slides on-site, please refer to EAGE Staff at the AV Console at the following times. Speakers are encouraged to upload/email their presentation slides in advance of the session.

Upload Onsite

5-6 April 2027	8:00 am - 8:45 am (UTC +3)	Sultana 1 & 2 Ballroom, voco Al Khobar
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Photo and Video Regulations

Photography and video/audio recording of any kind are strictly prohibited in the technical sessions.

Wi-Fi

Delegates may connect to free Wi-Fi at the venue. Wifi details will be provided onsite.

Deliverables

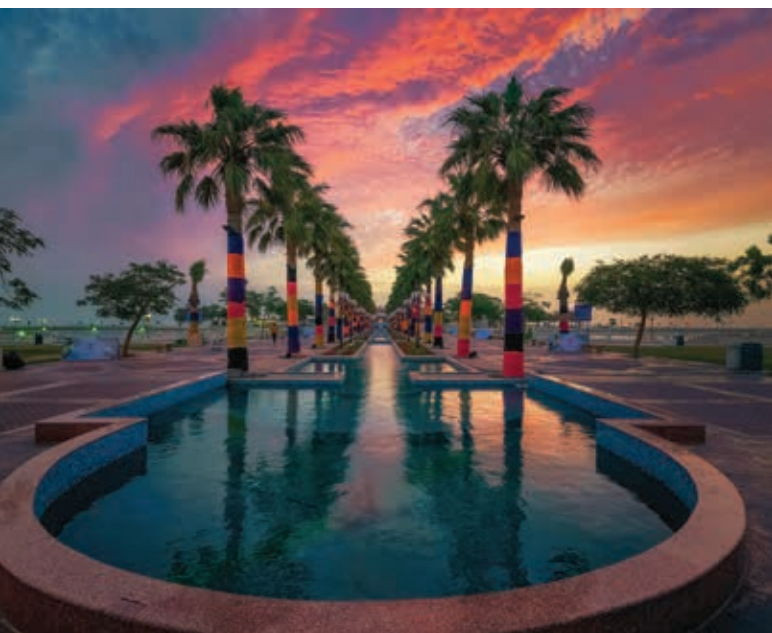
The following are included in the delegate fee

- Access to workshop technical sessions
- Daily Luncheon
- Daily Morning and Afternoon refreshments
- Event proceedings via EAGE's EarthDoc (for EAGE members only)
- Complimentary EAGE Membership will be included for the remainder of 2027 (for fully paid non-members)

FIELD DAY

Sunday 4 April 2027

DAY 1	
09:00	Dammam Dome Field Trip, Schlumberger Dhahran Carbonate Research Centre visit & Baker Hughes Dhahran Technology Center



TECHNICAL PROGRAMME

Oral Presentations | Monday 5 April 2027

DAY 2	
08:00	Registration and Welcome Coffee
08:30	HSSE by voco® Al Khobar
08:35	Welcome by Workshop Co-Chairs Dr. Mandefro Belayneh Woldeamanuel (Aramco) & Pascal D. Richard (PRgeology)
08:45	Opening Address: Ahmed Al Otaibi (Director in Gas Reservoir Characterization Department - Aramco)
SESSION 1: New Insights into NFR Part I Session Chairs: Niccolo Menegoni (University of Pavia) & Gamal Sultan (SLB)	
09:15	Keynote 1 - Fluid Inertia, Flow dynamics, Fluid Rheology in Natural Fracture Networks - Stephan Matthai (University of Melbourne)
09:45	The Impact of Mapping Dissolution Features in Subsurface Carbonates in Reducing Subsurface Uncertainty - M. Belayneh Woldeamanuel ^{1*} ¹ Aramco
10:05	Integrated Seismic Imaging and Fracture Characterization for Naturally Fractured Carbonate Reservoirs, Kohat-Potwar Basin, Pakistan - A. Asghar ^{1*} , Z. Hussain ¹ , A.H. Palekar ¹ , S. Iqbal ¹ ¹ Pakistan Petroleum Limited
POSTER SESSION	
10:25	Lightning Session
	Outcrop-derived Mechanical Stratigraphy and Conceptual Fracture Model of the Lower Cretaceous Shu'aiba Formation - R. Iakusheva ^{1*} , N. Menegoni ² , Y. Panara ¹ , S. Patino Guaneme ¹ , V. Vahrenkamp ¹ ¹ KAUST; ² University of Pavia
	Explicit integration of seismic fracture lineaments into reservoir models: Towards improved history match - D. Chaudhuri ¹ , D. Nanda ^{1*} ¹ Rezlytix Technologies Private Limited
	Characterization of Fracture Storage Capacity and Flow Potential for Carbonate Reservoirs Enabled by Digital Rock Physics - F. Alsinan ¹ , A. Kazak ^{1*} , A. Alsinan ¹ ¹ Aramco
10:25	Stress Constraints and Hydraulic Fracture Conductivity in the Jizan Group, Saudi Arabia: Implications for CO₂ Mineralization - N.F. Corzo Rivera ¹ , N. Menegoni ³ , D. Bero ² , J. Fedorik ⁴ , S. Arkadaskiy ⁴ , Z. Ahmed ⁴ , N. Kunnummal ⁴ , E.H. Oelkers ⁵ , M. Marchesi ⁶ , M. Addassi ² , A. Omar ² , S.R. Gislason ⁵ , G. Bjornsson ⁷ , A. Afifi ² , H. Hoteit ² , T. Finkbeiner ^{2*} ¹ University Of Campinas (unicamp); ² King Abdullah University of Science and Technology (KAUST); ³ University of Pavia; ⁴ Environmental Protection Department, Saudi Aramco; ⁵ Institute of Earth Sciences, University of Iceland; ⁶ Dipartimento di Scienze della Terra, Sapienza Università di Roma; ⁷ Warm Arctic ehf
	Salinity Contrast for Deploying High-Resolution Resistivity Imaging in Subsurface Formation - M. Belayneh Woldeamanuel, M. Aljaseem, M. Gouda ¹ Saudi Aramco
10:35	AM Coffee Break - Foyer

Disclaimer: The Technical Programme is confirmed as of publishing date and may be subject to change without prior notice.

Oral Presentations | Monday 5 April 2027

SESSION 2: Tools & Methods Part I	
Session Chairs: Israa Abu-Mahfouz (KFUPM) & Ahmed Baghdadi (Baker Hughes)	
11:05	Keynote 2 - Artificial Intelligence for Geological Rock Sample Analysis - Mokhles Mezghani (Aramco)
11:35	Fault zones: How detailed do we need to model them? - P.D. Richard^{1*}, B. Lu², G. Chen², N. Menegoni³, T. Finkbeiner⁴ ¹ PRGeology; ² Dimue Technologies; ³ University of Pavia, Department of Earth and Environmental Sciences; ⁴ Physical Sciences & Engineering Division, King Abdullah University of Science and Technology
11:55	Integrated Fracture Characterization and Modeling in the Majiagou Formation Carbonates, Ordos Basin - J. Li^{1*}, X. Zhang², B. Zhao³, P. Richard⁴, B. Lu², X. Luo³ ¹ Nanjing University; ² Dimue Technologies; ³ Northwest University; ⁴ PRGeology
12:15	Fracture Characterization and Well Test Response Analysis of Carbonate Reservoirs in Northern China - B. Zhao^{1*}, J. Li², X. LUO¹, B. LU³, X. ZHANG³ ¹ Northwest University; ² Nanjing University; ³ Dimue Technologies
12:35	Calibrating Natural Fracture Networks from Lost Circulation Data: A Geomechanically-Constrained DFN Workflow - N. Tripathi^{1*} ¹ Saudi Aramco
12:55	Discussion Session
13:10	Seated Lunch Buffet - Horizon Restaurant
SESSION 3: Application Domains Part I	
Session Chairs: Mandefro B Woldeamanuel (Aramco) & Michael Welch (DTU)	
14:10	Dynamic Fracture Indicators and Injector–Producer Connectivity in Carbonate Reservoirs - R. Gutierrez^{1*} ¹ Sib
14:30	Optimizing mud-cap strategy leveraging downhole equivalent static density measurements during total-losses– A Cretaceous carbonate case study - A. Baghdadi^{1*}, S. Sen² ¹ Baker Hughes, Saudi Arabia; ² Baker Hughes, India
14:50	3D Coupled Geomechanical Modeling of Fault Reactivation under Tectonic Stress and Fluid Flow - O. Hamid^{1*}, M. Qureshi¹ ¹ Saudi Aramco; ² Exploration application services Dept
15:10	Fracture characterisation and fracture modelling of faulted anticlines in North Pakistan - P. Richard^{1*}, S. Muhammad², H.Azaz², T. Maryam², B. Lu³, G. Chen³ ¹ PR Geology, ² Mari Energies, ³ Dimue Technologies
15:30	PM Coffee Break

Oral Presentations | Monday 5 April 2027

SESSION 4: Application Domains Part II	
Session Chairs: Pascal Richard (PR Geology) & Thomas Finkbeiner (KAUST)	
16:00	Fracture Domain Characterization Using Multi-Well Pressure Transient Analysis and 3D Geomechanical Modelling - A. Alnasser^{1*}, L. N. Alhussain¹, A. A. Alsanaa¹, O. Hamid¹, O. E. Camarago¹ ¹ Saudi Aramco
16:20	Multi-Disciplinary Fracture Characterization and Calibrated DFN Modelling in a Stacked Carbonate System: Awali Field (Bahrain) - L. Micarelli^{1*}, A. Abousetta², R. Alsaffar², O. Gast¹, T. Piolle¹, A. Radhi², J. Robert¹ ¹ Beicip-Franlab; ² Babco Upstream
16:40	Enhancing Reservoir Modeling with Integrated Geomechanical Fracture Characterization and Prediction - Q. Li^{1*}, A. Nashar¹, M. Qureshi¹ ¹ Saudi Aramco
17:00	Automated Fracture Detection in Unwrapped 360° Core Images Using the Segmentation-Models-PyTorch Framework - M. Abdrabu^{1*}, T. Seers, E. Rayev, N. Malki ¹ Saudi Aramco
17:20	Can Fractures Deform? Folded Calcite Veins in Mudrocks as a Record of Early Diagenetic Compaction and Burial - I. Abu-Mahfouz[*] ¹ KFUPM
17:40	Discussion Session & Closing Remarks
18:00	Close of Day 2
18:00	Informal Discussion around Virtual Reality & any other topics

Oral Presentations | Tuesday 6 April 2027

DAY 3	
08:00	Registration and Welcome Coffee
08:30	Welcome by Workshop Co-Chairs Dr. Mandefro Belayneh Woldeamanuel (Aramco) & Pascal D. Richard (PRGeology)
SESSION 5: Application Domains Part III	
Session Chairs: Rayan Kanfar (DGS) & Prof. Stephan Matthai (Melbourne University)	
08:35	Keynote 3 - Accessing the Inaccessible: How Virtual Reality Reveals the Previously Unseen - Pascal Richard (PR Geology)
09:05	From Loss Control to Permeability Enhancement: Geomechanical Strategies for Naturally Fractured Carbonates, Middle East - A. Baghdadi^{1*} ¹ Baker Hughes
09:25	Contrast of Natural and Tectonic Fractures: Seismic Evidence from the Saudi Arabia - A. Muzaffar^{1*}, H. Muhammad¹, A.K. Abdul Aziz¹ ¹ Saudi Aramco
09:45	Understanding Fracture Controlled Heterogeneity in Carbonates Through Integrated Borehole Image and Sonic Imaging - O. Akinyose¹, M. Al Mubarak^{2*}, C. Cavalleri² ¹ Saudi Aramco; ² SLB
10:05	Discussion Session
10:20	AM Coffee Break

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Oral Presentations | Tuesday 6 April 2027

SESSION 6: Application Domains Part IV	
Session Chairs: Mandefro B Woldeamanuel (Aramco) & Israa Abu-Mahfouz (KFUPM)	
10:50	Geothermal project fault zone characterization and modeling, Lausanne area, Switzerland - P.D. Richard ^{1*} , N. Giroud ² , C. Volery ² , B. Deriaz ² , N. Olry ² , A. Hürlimann ³ , A. Hürlimann ³ , N. Menegoni ⁴ , B. Lu ⁵ , T. Finkbeiner ⁶ ¹ PRGeology; ² GEOL SA; ³ Pro-Gaia Invest SA; ⁴ University of Pavia, Department of Earth and Environmental Sciences; ⁵ Dimue Technologies; ⁶ Physical Sciences & Engineering Division, King Abdullah University of Science and Technology
11:10	Subsurface characterization of fracture networks for CO2 mineralization in altered basalts, SW Saudi Arabia - N. Menegoni ^{1,2*} , J. Fedorik ³ , Y. Panara ² , D. Berno ² , M. Addassi ² , A. Omar ² , E. Oelkers ^{2,4} , A. Afifi ² , H. Hoteit ² , S. Arkadaskiy ³ , N. Kunnumal ³ , Z. Ahmed ³ , S. Gislason ⁴ , G. Bjornsson ⁵ , T. Finkbeiner ² ¹ University of Pavia; ² King Abdullah University of Science and Technology; ³ Saudi Aramco; ⁴ University of Iceland; ⁵ Warm Arctic
11:30	Discussion Session
11:45	Seated Lunch Buffet - Horizon Restaurant
SESSION 7: New Insights into NFR Part II	
Session Chairs: Gamal Sultan (SLB) & Mattia Martinelli (Eni S.p.A)	
12:45	Keynote 4 - Fracture Quantification from Digital Outcrops: Automation, Precision and Subsurface Scaling - Niccolo Menegoni (University of Pavia)
13:15	Selecting Appropriate Hydraulic Fracturing Methods for Wells in Deep and Tight Sandstone Fractured Reservoirs - K. Xia ^{1*} , A. Qahtani ¹ Saudi Aramco
13:35	Clumped Isotope Thermometry and Stable Isotope of Carbonate Veins, Wadi Nakhar, Oman Mountains - M. Moustafa ^{1*} , M.A.K. El-Ghali ¹ , I.A. Abbasi ¹ , A. Herlambang ² , M. Qasim ¹ , M. Farfour ¹ , S. Al Shaaibi ¹ , M.S. Al-Jabri ¹ ¹ Department of Earth Sciences, College of Science, Sultan Qaboos University; ² King Fahd University of Petroleum and Minerals, Department of Geosciences, College of Petroleum Engineering and Geosciences, Dhahran
13:55	Insights of Fracture Characterizations for Well Placement in Tight Gas Reservoirs - W. Wang ¹ , T. Sodagar ¹ , M.J. Mahdi ¹ , E.A. Halawani ^{1*} ¹ Saudi Aramco
14:15	Microfractures, layer-bound fractures and unconfined fractures: Insights from modelling and observation - M. Welch ^{1*} ¹ Danish Technical University
14:35	Sub-Seismic Fracture Characterization from seismic curvature: Mitigating Pitfalls via Textural Attributes and DFN calibration - M. Martinelli ^{1*} , L. Bianchin ¹ , R. Lorenzet ¹ , C. Albertini ¹ ¹ Eni S.p.A
14:55	Discussion Session
15:10	PM Coffee Break

Oral Presentations | Tuesday 6 April 2027

SESSION 8: Tools & Methods Part II	
Session Chairs: Pascal Richard (PR Geology) & Thomas Finkbeiner (KAUST)	
15:40	Enhancing Mechanical Earth Model Quality via Micro-Rebound Testing: A High-Resolution Approach - N. Almelaian ^{1*} ¹ Saudi Aramco
16:00	PRfrac: An Integrated Platform for Fracture Characterization and Discrete Fracture Network Modelling - P.D. Richard ^{1*} , J. Zhang ² , B. Lu ² , G. Chen ² , J. Li ² ¹ PRGeology; ² Dimue Technologies
16:20	QuantaFrac: An Integrated 3D Workflow for Quantitative Fracture Characterization from Digital Outcrop Models - S. Patino-Guaneme ^{1*} , V. Vahrenkamp ¹ ¹ King Abdullah University of Science and Technology
16:40	A Holistic Review of Understanding Fracture Behavior Across Reservoir Development Stages - G. Sultan ^{1*} , M. Lal Khaitan ² , D. Solohaga ² , M. Dernaika ³ , B. Mansour ³ , R. Plateaux ² , S. Siddiqi ³ , E. Siqueira Muniz ³ ¹ SLB; ² SLB; ³ SLB
17:00	Integrated LWD Conventional and High-Resolution Micro-Resistivity Imaging Tools Enable Optimized Well Placement and Completions Design - M. Fouda ¹ , A. Awadh ¹ , T. Gezeeri ^{2*} ¹ Halliburton; ² Kuwait Oil Company
17:20	Integrated Seismic Attributes and ML Approaches for Fracture Characterization in the Teapot Dome Naturally Fractured Reservoir - M. Khan ^{1*} , S.S. Ali ¹ , H. Khan ¹ , S. Awfi ¹ ¹ Saudi Aramco
17:40	Integrated Seismic and Machine Learning Approach for Fault Architecture and Structural Deformation Analysis: Application to CO2 Storage - M. Aljaseem ^{1*} , I. Abu-Mahfouz ² , F.Z. Benkhatab ² , M. Khan ² ¹ Aramco; ² KFUPM
18:00	Vein extraction using deep learning in 2D digital outcrop models of the Natih Formation in Oman - A.E. Sanchez Garcia ^{1*} , D. Wamriew ¹ , N. Menegoni ² , P. Richard ³ , T. Finkbeiner ¹ ¹ King Abdullah University Of Science And Technology, Physical Science and Engineering; ² University of Pavia, Department of Earth and Environmental Sciences; ³ PRGeology
18:20	Discussion Session & Closing Remarks
18:40	Close of Day 3
18:40	Informal Discussion around Virtual Reality & any other topics

JOINT SHORT COURSE

Wednesday 7 April 2027 &
Thursday 8 April 2027

DAY 4	
08:00 - 16:00	Joint Short Course (Integrated Fracture Reservoir Characterization and Modelling and Multi-phase Flow, Upscaling and the Construction of Fractured Reservoir Models - Prof. Stephan K. Matthai & Dr. Pascal D. Richard)

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ALL INCLUSIVE REGISTRATION FEES

(All registration rates are in USD)

REGISTERED AND PAID	Early Registration 20/08/26 - 21/09/26	Regular Registration 22/9/26 - 12/10/6	Late Registration 13/10/26 - 29/10/26
EAGE Member ^{1,5}	1450	1745	1985
EAGE Bronze/Silver/Gold Member ^{1,5}	1270	1565	1795
EAGE Platinum Member ^{1,5}	1270	1270	1270
Non-member ³	1565	1860	2100
EAGE Student Green Member ^{1,2,5}	625	695	750
EAGE Student Bronze/Silver/Gold Member ^{1,2,5}	550	605	665
Student Non-member ^{2,3,4}	665	725	78

OUR SPONSORS

EAGE sincerely appreciates the unwavering support of our workshop sponsors.



CONTACT

For more information on the workshop, please get in touch with the EAGE MEA team via middle_east@eage.org or +971 4 369 3897.



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