



WORKSHOP

SPE/AAPG Joint Workshop

TECHNICAL PROGRAM

4-6 October 2010 | The Lodge at Vail, Vail, Colorado, USA

www.spe.org/meetings

Naturally Fractured Reservoirs

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Natural fractures are recognized as having a significant impact on reservoir performance. They are important in carbonate and sandstone reservoirs, plus tight gas sands, shale gas and coal-bed methane reservoirs. However, there is no clear methodology integrating the wealth of fracture characterization techniques to reservoir performance. The intent of this workshop is to present recent advances in the areas of geological, geophysical, geomechanical, and engineering integration of natural fracture systems. Discussions will be on the characterization and integration of naturally fractured reservoirs for reservoir engineering applications. Case histories of naturally fractured reservoirs with emphasis on horizontal/deviated well performance and water and/or gas injection will be also presented.

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General Information:

Americans With Disabilities Act

Our events and functions are accessible to all attendees with wheelchairs. If you require special arrangements, please contact our staff at the Registration Desk.

Alcohol Policy

SPE recognizes the legitimate serving of alcoholic beverages in the process of conducting business and social activities. We also recognize that the use and consumption of alcohol carries with it the requirement for all attendees to consume those beverages responsibly.

Commercialism

In remaining consistent with workshop objectives and SPE guidelines, commercialism in presentations will not be permitted. Company logos should be used only to indicate the affiliation of the presenter(s).

Continuing Education Units

Attendees will receive 2.0 CEUs.

One CEU equals 10 contact hours of participation. CEUs will be awarded through SPE Professional Development for participation and completion of SPE workshop. A permanent record of a participant's involvement and awarding of CEUs will be maintained by SPE.

Documentation

Following the workshop, a URL containing released copies of the workshop presentations will be available to attendees. A summary report of the workshop will also be made available. The copyright of the report will belong to SPE.

Guest/Spouse

Only registered guests are permitted to attend the receptions.

Electronic Devices

As a courtesy to the speakers and your fellow registrants, please turn off all electronic devices during presentations.

Name Badges

Please wear your badge at all times. It is a courtesy to your fellow registrants, speakers and sponsors.

Photography Policy

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Workshop Format

Workshops maximize the exchange of ideas among attendees and presenters through brief technical presentations followed by extended Q&A periods. Focused topics attract an informed audience eager to discuss issues critical to advancing both technology and best practices.

Many of the presentations are in the form of case studies, highlighting engineering achievements and lessons learned. In order to stimulate frank discussion, no proceedings are published and members of the press are not invited to attend.

Schedule at a Glance:

Sunday, 3 October

1800-1930 **Welcome Reception** – *Cucina Rustica*

Monday, 4 October

0700-0800 **Registration and Continental Breakfast** – *International Ballroom Foyer*
All technical sessions will be located in the International Ballroom

0800-0815 **Chairman's Welcome**

0815-0945 **SESSION I: ADVANCES IN STATIC RESERVOIR CHARACTERIZATION**

0945-1015 **Coffee Break** – *International Ballroom Foyer*

1015-1145 **SESSION II: ADVANCES IN DYNAMIC RESERVOIR CHARACTERIZATION**

1145-1300 **Lunch** – *Cucina Rustica*

1300-1430 **SESSION III: FRACTURED UNCONVENTIONAL RESERVOIRS**

1430-1500 **Coffee Break** – *International Ballroom Foyer*

1500-1700 **SESSION IV: FRACTURED UNCONVENTIONAL RESERVOIRS (CONTINUED)**

1700-1900 **Reception** – *Arrabella at Vail Square, Great Room*

Tuesday, 5 October

0700-0800 **Registration and Continental Breakfast** – *International Ballroom Foyer*
All technical sessions will be located in the International Ballroom

0800-0930 **SESSION V: BETTER INTEGRATION BETWEEN GEOLOGICAL DATA ACQUISITION AND RESERVOIR MODELING**

0930-1000 **Coffee Break** – *International Ballroom Foyer*

1000-1130 **SESSION VI: NUMERICAL RESERVOIR MODELING**

1130-1300 **Lunch** – *Wildflower Restaurant*

1300-1430 **SESSION VII: FRACTURE DIAGNOSTICS AND MEASUREMENTS**

1430-1500 **Coffee Break** – *International Ballroom Foyer*

1500-1630 **SESSION VIII: GEOMECHANICS OF NATURALLY FRACTURED RESERVOIRS**

1630-1700 **Closing Comments**

1700-1800 **Reception** – *Cucina Rustica*

Wednesday, 6 October

0700-0800 **Continental Breakfast** – *Cucina Rustica*
All technical sessions will be located in Cucina Rustica

0800-0900 **SESSION IX: ENHANCED OIL RECOVERY IN NATURALLY FRACTURED RESERVOIRS**

0900-0930 **Coffee Break** – *Cucina Rustica*

0930-1130 **SESSION X: ENHANCED OIL RECOVERY IN NATURALLY FRACTURED RESERVOIRS (CONTINUED)**

Sunday, 3 October

1800-1930 **Welcome Reception**

Sponsored by: 

Monday, 4 October

0700-0800 **Registration and Continental Breakfast**

Sponsored by: 

0800-0815 **Chairman's Welcome – David Schechter, Texas A&M University**

0815-0945 **SESSION I: ADVANCES IN STATIC RESERVOIR CHARACTERIZATION**

Chair: Scott Cooper, Cooper Geological Consulting

Laird Thompson, Utah Faults, Fractures and Fluids

Presentation 1: Living with Fracture Realities – Developing Techniques for Integrating Geologic Fracture Data into Engineering Models

John Lorenz, Geoflight LLC

Presentation 2: Spatial Variability of Fracture-Enhanced Shale Gas Production, Raton Basin

Colin O'Farrell, Pioneer Natural Resources

Presentation 3: Integrated Static and Dynamic Characteration of Naturally Fractured Reservoirs in Cantarell Field, Mexico

Feng Shen, GeoReservoir Research

0945-1015 **Coffee Break**

1015-1145 **SESSION II: ADVANCES IN DYNAMIC RESERVOIR CHARACTERIZATION**

Chairs: David Schechter, Texas A&M University

Francisco Garcia-Hernandez, Pemex

Presentation 1: Fracture Characterization and Dynamic Modeling In a Brownfield Carbonate Reservoir

Deepankar Biswas, Sitelark

Presentation 2: Integrating Static and Dynamic Models Through Fracture Network Simulation of Well Tests

Thomas Doe, Golder Associates

Presentation 3: Dynamic Characterization of Porosity on Fractured and Vugular Cores

Andres Moctezuma Berthier, Instituto Mexicano del Petroleo

1145-1300 **Lunch**

Sponsored by: 

1300-1430 **SESSION III: FRACTURED UNCONVENTIONAL RESERVOIRS**

Chairs: Craig Cipolla, Schlumberger

John Lorenz, Geoflight LLC

Presentation 1: Modeling Fluid Invasion and Hydraulic Fracture Propagation in Fractured Hydrocarbon Reservoirs

John McLennan, University of Utah

Presentation 2: Field Scale Laboratory Studies Played a Pivotal Role in the Characterization and Behavior of Naturally Fractured Reservoirs

Paul Branagan, Branagan & Associates Inc

Presentation 3: Modeling Hydraulic Fracture Propagation in Fracture Reservoirs

Marisela Sanchez-Nagel, Itasca Houston

1430-1500

Coffee Break

1500-1700

SESSION IV: FRACTURED UNCONVENTIONAL RESERVOIRS (continued)

Chairs: Gildardo Osorio, BP

Andres Moctezuma Berthier, Instituto Mexicano del Petroleo

Presentation 1: Use of Seismic Emission Tomography (SET) for Direct Mapping of Frac Induced Fracture Networks and Their Connection to Natural Permeability Field

Laird Thompson, Utah Faults, Fractures and Fluids

Presentation 2: Microseismic Mapping to Reservoir Simulation – Understanding Well Performance in Fractured Shales

Craig Cipolla, Schlumberger

Presentation 3: Integration of Microseismic, Production Data and Numerical Simulation to Evaluate Uncertainties in Unconventional Reservoirs. What is the Impact on Estimated Ultimate Recovery?

Chet Ozgen, Nitec LLC

Presentation 4: Accurate Simulation of Non-Darcy Flow in Stimulated Fractured Shale Reservoirs

Barry Rubin, CMG

1700-1900

Reception

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Tuesday, 5 October

0700-0800

Registration

Continental Breakfast

0800-0930

SESSION V: BETTER INTEGRATION BETWEEN GEOLOGICAL DATA ACQUISITION AND RESERVOIR MODELING

Chairs: Faustino Monroy-Santiago, Pemex

Carlos Estrada, Vermilion Energy

Presentation 1: SDPS - A Practical Methodology to Reservoir Characterization in Naturally Fractured Carbonates

Faustino Monroy-Santiago, Pemex

Presentation 2: 3D Modeling and Characterization of Naturally Fractured Reservoirs - Costero Field, Integrated Approach

Jesús García Hernández, Pemex

Presentation 3: Fracture Analysis and Its Relationships to Faults in the Cretaceous-Tertiary Boundary Calcareous Breccia in the Akal Block of the Cantarell Field

Gustavo Murillo, Instituto Mexicano del Petroleo

0930-1000

Coffee Break

1000-1130

SESSION VI: NUMERICAL RESERVOIR MODELING

Chairs: Andres Moctezuma Berthier, Instituto Mexicano del Petroleo

Fernando Rodríguez-de la Garza, Pemex

Presentation 1: Field Scale Applications of Discrete Fracture Models

Robin Hui, Chevron

Presentation 2: Simulation of Discrete Fracture Networks Using Flexible Voronoi Gridding

David Schechter, Texas A&M University

Presentation 3: NFlow – A Simple Discrete-Fracture Reservoir Simulator

Seth King, National Energy Technology Lab

1130-1300

Lunch

1300-1430

SESSION VII: FRACTURE DIAGNOSTICS AND MEASUREMENTS

Chairs: Francisco García-Hernández, Pemex

David Schechter, Texas A&M University

Presentation 1: Successful Characterization and Development of the Fractured Niobrara Shale Using the Seismically Driven CFM Approach

Ahmed Ouenes, Prism Seismic

Presentation 2: Natural Fractures in the Tensleep Formation – Types of Data That Can Be Recorded and Their Uses

Scott Cooper, Cooper Geological Consulting

Presentation 3: Optimizing the Development of a Naturally Fractured Field by Use of 3D Geomechanical Model – Case Study

Daniel García-Gavito, Pemex

1430-1500 **Coffee Break**

1500-1630 **SESSION VIII: GEOMECHANICS OF NATURALLY FRACTURED RESERVOIRS**

Chairs: John Lorenz, Geoflight LLC

Scott Cooper, Cooper Geological Consulting

Presentation 1: Stress Sensitivity of Naturally Fractured Reservoirs – A Myth or a Reality?

Gildardo Osorio, BP

Presentation 2: Modeling Shear-Enhanced Permeability as the Mechanism for Fluid Flow in Fractured Reservoirs - A Promising Improvement to Predicting Reservoir Production

Colleen Barton, GeoMechanics International

Presentation 3: Networks – Between, Within and of Fractures

Duane Smith, National Energy Technology Laboratory

1630-1700 **Closing Comments**

1700-1800 **Reception**

Wednesday, 6 October

0700-0800 **Continental Breakfast**

0800-0900 **SESSION IX: ENHANCED OIL RECOVERY IN NATURALLY FRACTURED RESERVOIRS**

Chairs: Francisco García-Hernández, Pemex

David Schechter, Texas A&M University

Presentation 1: Field Development and Reservoir Performance of the Naturally Fractured Yates Field

Erwin Putra, Kinder Morgan

Presentation 2: Chemical EOR: From Quantum Mechanics to Reservoir Technology

José Martínez, IMP

0900-0930 **Coffee Break**

0930-1130 **SESSION X: ENHANCED OIL RECOVERY IN NATURALLY FRACTURED RESERVOIRS (continued)**

Chairs: Francisco García-Hernández, Pemex

David Schechter, Texas A&M University

Presentation 1: Experiments of Gravitational Drainage by Gas Injection on Fractured and Vugular Cores

Erick Luna, IMP

Presentation 2: Issues in EOR Pilot Testing of the Giant Naturally Fractured Offshore Reservoirs of Mexico

Fernando Rodríguez, PEMEX

Lessons Learned and Open Dialogue

2010

19-21 October	Canadian Unconventional Resources and International Petroleum Conference	Calgary, Alberta, Canada
5-10 December	AAPG/SPE/SEG/SPWLA Hedburg Research Conference: Critical Assessment of Shale Resource Plays	Austin, TX, USA

2011

18-19 January	AAPG/SPE Deepwater/Ultra Deepwater Workshop	Houston, TX, USA
24-26 January	Hydraulic Fracturing Technology Conference	Woodlands, TX, USA
27 January	Hydraulic Fracturing Summit: Ensuring Ground Water Protection	Woodlands, TX, USA
14-18 March	AAPG/SEG/SPE Enhanced Geothermal Systems Workshop	Napa, CA, USA
Spring	Horizontal Well Completions in North America Shales Workshop	TBD
Spring	Fiber Optics Workshop	TBD
3-5 May	Tight Reservoir Completions: Technology Applications and Best Practices Workshop	Banff, Alberta, Canada
15-20 May	Beyond Conventional Sand Control Forum	Santa Fe, NM, USA
22-27 May	Reservoir Surveillance and Data Acquisition Forum	Santa Fe, NM, USA
6-8 June	R&D Symposium	Austin, TX, USA
19-20 July	SPE/AAPG/SPEE Reserves and Resources Estimation and Reporting – Moving Forward Symposium	Houston, TX, USA