This SPE workshop will discuss technologies that are used to optimize reservoir and field development and operations.

Multiple fiber-optic monitoring systems are currently used, offering reliable temperature, pressure, flow, strain, acoustic and seismic measurements. Sessions will focus on distributed and multi-point sensing systems, such as DTS and DAS, deployed to provide reservoir and well diagnostics, and surveillance.

Attendees will hear extensive case studies and field deployment examples of the technical and economic benefits of these systems, receive guidance for developing work flows, and identify best practices.

Who We Are

SPE is the largest individual member organization serving managers, engineers, scientists and other professionals worldwide in the upstream segment of the oil and gas industry.
General Information

Accessibility
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 an 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 all attendees.

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 and Recording Policy
SPE reserves the exclusive rights to all video/audio recording or reproductions of the workshop. Unauthorized video/audio recording is expressly prohibited in the session room(s) or poster area, whether by video, still or digital camera, mobile phone, or any other means or form of reproduction.

Any person attending may be photographed or videotaped, and by your attendance, you give permission to use your image in possible future marketing publications including print, online, and video.

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.

Carina® Sensing System
breakthrough performance enabled by Constellation™ fibers

» Seismic acquisition
  Data quality beyond that of geophones

» Microseismic monitoring
  High sensitivity for lower microseismic event detection

» Strain monitoring
  Early crosswell strain monitoring

» Proppant allocation
  Fine resolution, wide dynamic range
  for treatment monitoring

» Production allocation
  High sensitivity for dynamic production monitoring

» Flow metering
  Non-Intrusive wellhead production monitoring

» Subsea well monitoring
  Operating over long tie-back installations

www.silixa.com  sales@silixa.com  T: +44 (0) 20 8327 4210 / +1 832 772 3333
Monday, August 27, 2018
1730–1900
Welcome Reception
Onyx Room

Tuesday, August 28, 2018
0700–0800
Registration Check-in and Breakfast
Grand Ballroom Foyer
0800–0810
Chairperson’s Welcome
0810–0845
Keynote Presentation:
Future Directions in Fiber-Optic Sensing - From Quantum-Based Data Acquisition to Advanced Machine Learning
Alan Cohen, U.S. Department of Energy
0845–1015
Session 1: Seismic Imaging
Session Chairs: Barry Freifeld, Lawrence Berkeley National Lab
Steve Hirshblond, Shell
• Presentation 1: Distributed Acoustic Sensing Measurements for Reservoir Characterization in the Anadarko Basin
  Dan Kahn, Devon Energy
• Presentation 2: DAS VSP from the Containment and Monitoring Institute Field Research Station in Newell County, Alberta, Canada
  Heather Hardeman, Fotech Solutions
• Presentation 3: Permanent Reservoir Monitoring using DAS VSP and Surface Orbital Vibrators: Field Trials from the CO2CRC Otway Project
  Barry Freifeld, Lawrence Berkeley National Lab
1015–1045
Coffee Break
Grand Ballroom Foyer
1045–1215
Session 2: Emerging and Enabling Technologies
Session Chairs: John Lovell, MicroSilicon
Wolfgang Deeg, Devon
• Presentation 1: Point Heating and Optical Fiber Monitoring for Flow Movement Investigation
  Frank Selker, SelkerMetrics
• Presentation 2: Evaluation of Distributed and Engineered Acoustic Sensors for Multiphase Flow Measurements including Phase Allocation Using a Machine Learning Technique
  Garth Naldrett, Silixa
• Presentation 3: Enhancing the Temperature Performance of DTS Measurements when using a Combined DTS/DAS Configuration
  Gareth Lees, AP Sensing
1215–1315
Lunch
5280 Suite

1315–1445
Session 3: Completion and Stimulation Design Optimization
Session Chairs: Chris Baldwin, Weatherford
Eric Holley, Halliburton

• Presentation 1: Combination of Distributed Sensing and Point Flow Measurements: What is the Value?
Pierre Ramondenc, Schlumberger

• Presentation 2: Development of a Completion Model for the Monitoring of EOR in Wells with Heavy and Extra Heavy Crude in the Largest Deposit in Latin America
Gerardo Peña, Rosneft

• Presentation 3: Successful Applications using Real-Time Fiber Optic Technology in Kuwait
Sam Gorgi, Pinnacle, a Halliburton Company

1445–1500
Coffee Break
Grand Ballroom Foyer

1500–1700
Session 4: Stimulation Diagnostics
Session Chairs: Paul Huckabee, Shell
Pierre Ramondenc, Schlumberger

• Presentation 1: New Near-Wellbore Hydraulic Fracture Geometry Insights from the Integration of Fiber Optics and Downhole Pressure Gauge Data
Gustavo Uguessto, Shell

• Presentation 2: Fiber Optics in Completions: Real Time Stage Optimization
Price Stark, Pinnacle, a Halliburton Company

• Presentation 3: A Frac Monitoring Case Study in the Montney
Carson Laing, OptaSense

• Presentation 4: Completions Optimization Utilizing Multiple Wells Fiber Optics Data with Intervention Type Fiber
Jennifer Charbonneau, Oasis Petroleum

1700–1830
Networking Reception
Brown Palace Club

---

WELL & RESERVOIR MONITORING

Distributed Temperature Sensing (DTS)

- Superior reliability and ruggedness
- Outdoor, rack mount & portable
- Outstanding worldwide support
- Singlemode and multimode

Distributed Acoustic Sensing (DAS)

- Upstream, midstream and downstream
- Leading performance
- Hydraulic fracture monitoring
- In-well flow profiling of production and injection wells

Leading the Way with Passion.

www.apsensing.com
America’s Sales Office: 214 471-3460
**Wednesday, August 29, 2018**

0700–0800  
**Breakfast**  
Grand Ballroom Foyer

0800–0930  
**Session 5: New Technologies**  
Session Chairs: Tommy Langnes, BP  
Bill Shroyer, SageRider

- Presentation 1: Real-time Cement Displacement and Long-term Zonal Isolation Monitoring using Distributed Fiber Optic Sensors  
  Qian Wu, The University of Texas at Austin
- Presentation 2: Fiber Optic Resistivity Sensing  
  Glenn Wilson, Halliburton
- Presentation 3: Downhole Distributed Fiber Optic Production Logging Tool  
  Garth Naldrett, Silixa

0930–1000  
**Coffee Break**  
Grand Ballroom Foyer

1000–1200  
**Session 6: Fiber Deployment**  
Session Chairs: Bill Shroyer, SageRider  
Doug Norton, Fiber Optic Pipeline Solutions

- Presentation 1: Best Practices of 10 Years of Using Distributed Measurements as Part of Coiled Tubing Interventions  
  Pierre Ramondenc, Schlumberger
- Presentation 2: A New and Cost-Effective Approach to Fiber-Optic Well Interventions  
  Tad Bostick, Well-SENSE
- Presentation 3: Mapping the Orientation of Downhole Sensing Cables and Control Lines Using a Hybrid Distributed and Engineered Acoustic Sensing System  
  Mahmoud Farhadiroushan, Silixa
- Presentation 4: Conveyance-Agnostic DAS Seismic Tomography  
  Glenn Wilson, Halliburton

1200–1300  
**Lunch**  
5280 Suite

1300–1430  
**Session 7: Data Management, Visualization, Big Data, and Data Fusion**  
Session Chairs: Steve Hirshblond, Shell  
Kelly Hughes, Chevron

- Presentation 1: Fiber Optics Data and Cloud Technologies  
  Kanwal Gupta, Chevron
- Presentation 2: Sparse Representation of Distributed Acoustic Sensor  
  Matt McDonald, Fotech Solutions
- Presentation 3: Digital Transformation of Wells and Reservoir Surveillance Using Distributed Fibre Optics  
  Tommy Langnes, BP

---

**OptaSense**  
a QinetiQ company  
Learn more at: [www.optasense.com/oilfield-services](http://www.optasense.com/oilfield-services)
BP optimizes drainage of more than 100 million barrels of secondary oil.

WellWatcher BriteBlue® multimode DTS fiber provided continuous temperature profiles of individual reservoir zones, which enabled the effects of depletion to be monitored over time. As a result, BP adjusted its strategy for water injection and oil drainage—facilitating the drainage of more than 100 million barrels of secondary oil and also eliminating the need to run production logging tools.

Find out more at slb.com/wellwatcher
1000–1130
Session 10: Consortia Review
Session Chairs: Eric Holley, Halliburton
Wolfgang Deeg, Devon

Brief overviews from the various organizations that are involved with formulating standards and protocols for the industry will be provided. A focus on current and planned activities for each organization will also be discussed.

• Presentation 1: Energistics – Energy Standards
  Ross Philo, Energistics

• Presentation 2: FOSA – Fiber Optic Sensing Association
  Mike Hines, OFS

• Presentation 3: SEAFOM
  Chris Baldwin, Weatherford

POSTER PRESENTATIONS
Displayed Wednesday and Thursday during coffee breaks

Novel Methods for Interpretation of In-Well Temperature Measurements
Khafiz Muradov, Heriot-Watt University

Subsurface Flow Profiling for Hydraulic Fracturing with Downhole Fiber Optic Distributed Temperature Sensing
Burton Mendonca, Pamban Energy Systems

Notes:

LIOS WELL.DONE
Reliable temperature and strain sensing

Distributed Temperature Sensing with real-time resolution better than 0.08°C and fast measurements over long distances up to 70 km.

Distributed Strain Sensing for real-time shearing and deformation monitoring.

All in maintenance-free industrial units designed for harsh environments.
ISD Accelerates the Asset Learning Curve by Combining the World’s Leading Frac Company with our Industry Leading Diagnostics

Solve the most fiscally critical challenges:

» Real-time decision making on the job site
» Solve your well and fracture spacing challenges
» Make intelligent data driven decisions guided by experts