SPE Mid-Continent Section Newsletter

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Mid-Continent Section

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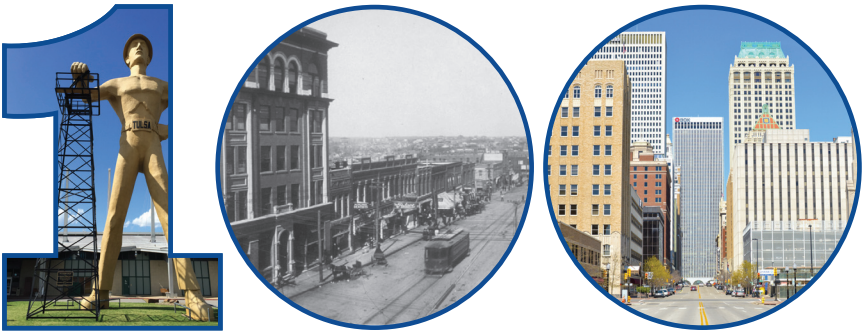

SPE Mid-Continent Section

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Voting members consist of the Executive Committee. The Chairman only votes in the event of a tie. A Motion can be voted upon with a Quorum of the Voting Members present. A Quorum consists of five Voting Members present. An affirmative vote will consist of 51% of the Quorum present. Committee Chairmen and in their absence, the Committee Vice Chairmen are encouraged to attend board meetings and provide representation and committee reports. The editor welcomes newsworthy items about SPE members or events. Please provide a **draft to the newsletter editor by the 25th of the month.** Change of contact information requests should be made to SPE in Richardson, TX, 1-800-456-6863, or service@spe.org.

Chairman's Gavel

Nathan Buchanan, 2017-2018 Chairman

Colleagues:

Our Section's 2018 program is off to a great start. We had a very strong turnout at the January 17 luncheon. I'd like to thank Chad Senters from Core Lab for his taking the time to give his talk: "Diversion - Be Careful What You Ask For".

Our next luncheon will be held February 13 at the Summit Club. Our speaker will be Lloyd Hetrick with Newfield; his topic is "Water Management in the Oklahoma STACK". Please be sure to register online. We will also be holding a joint meeting with TGS and GST on March 6; Jeremy Boak from the Oklahoma Geological Survey will be speaking about induced seismicity in Oklahoma. Srikanta Mishra will be speaking at a luncheon on March 21; the next day, March 22, he will be conducting a short course titled "Applied Statistical Modeling and Data Analytics for Reservoir Performance Analysis.

The 2018 SPE Improved Oil Recovery Conference will be held April 14-18. This is the 21st SPE IOR Conference, and there is a full technical program, several events, and eight short courses being offered. This conference draws in participants from around the world, and I encourage members from the Mid-Continent Section to attend. Registration is now open.

If you are reading this newsletter, you have probably renewed your SPE membership and paid your 2018 dues. However, if you have not, please make sure to renew your membership for 2018. I'd also like to encourage each of you to talk to your friends and coworkers and promote the value of SPE membership. There are dozens of active petroleum engineers in Tulsa that are not SPE members that miss out on the benefits of membership.

I look forward to seeing each of you at our Section's upcoming events.

Nathan Buchanan
2017-2018 Chairman
nsbuchanan@gmail.com

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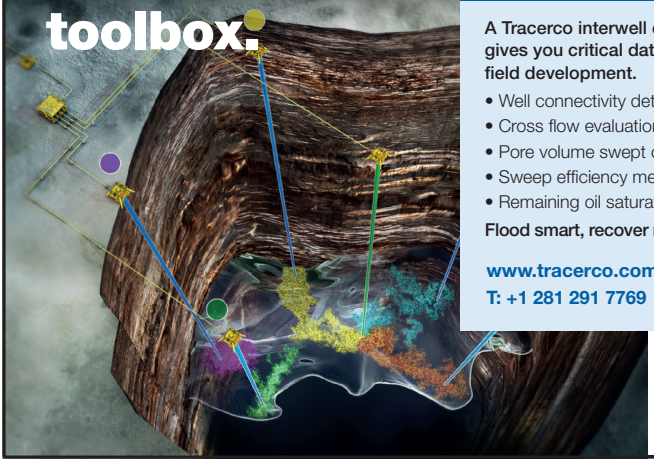

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From Your Editor

Betty Felber, 2017-2018 Editor

February contains at least two days of note—Presidents' Day and Valentine's Day. Be sure to add another day for your activities—our Mid-Continent Luncheon. Come to the Summit Club on February 13th. Join us!!

Don't forget to review the ads in your newsletter. There are some interesting technologies that can help solve some of the scientific challenges that confront you. Look for technologies that can help you do your job faster, economically and accurately. When you find these outstanding technologies, share them with your fellow professionals by talking about the successes you have had.

Also, note the listing of short courses in conjunction with the IOR Conference in April. Surely some of these courses can add value to your technical performance. For attending most of the courses, you will be given a tablet with the course notes on it rather than a paper copy. Go to **www.speior.org** to see the course details. ***You do not have to register for the Conference to attend the short courses.***

Betty Felber
Editor

Calendar of Events

Tuesday, February 13, 2018 - Luncheon Meeting - Summit Club

- Lloyd Hetrick, Newfield "Water Management in the Oklahoma STACK"

Tuesday, March 6, 2018 - Luncheon Meeting joint w/TGS & GST - Summit Club

- Jeremy Boak, Oklahoma Geological Survey "Patterns of seismicity in Oklahoma: Geology matters"

Wednesday, March 21, 2018 - Luncheon Meeting - Summit Club

- Srikanta Mishra, Battelle Memorial Institute "Big Data Analytics: What Can It Do For Petroleum Engineers And Geoscientists?"

Thursday, March 22, 2018 - Short Course - Summit Club

- Srikanta Mishra, Battelle Memorial Institute " Applied Statistical Modeling and Data Analytics for Reservoir Performance Analysis"

Wednesday, April 4, 2018 - Luncheon Meeting - Summit Club

- John Jackson, Unimin Corporation "Mitigating Respirable Crystalline Silica with No Engineering Footprint" ***SAVE THE DATE***

April 14-18, 2018, SPE Improved Oil Recovery Conference - Tulsa

- Short Courses Sat. 14th - Sun. 15th, Technical Program Sessions, Mon. 16th - Wed. 18th - **Register Now** at **www.speior.org.**

All SPE luncheons are held at the Summit Club unless otherwise noted - See p7 for more details.

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SPE Regional Awards 2017-2018

Nominate a Colleague Today

Applaud excellence in the E&P industry by nominating a colleague for an annual award given by the Society of Petroleum Engineers.

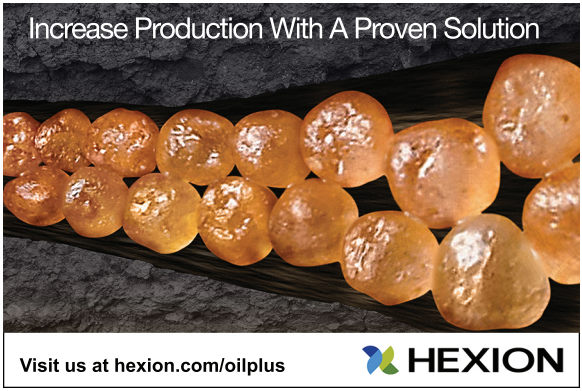
SPE Awards recognize expertise and contributions to the upstream oil and gas industry. The 2018 SPE Awards will be presented at the international and regional levels for:

- Technical contributions
- Professional excellence
- Career achievement
- Service to colleagues
- Industry leadership
- Public service

New this year is the Regional Public Service Award—In 2018 SPE will also recognize distinguished public service of members at the regional level. Learn more at **www.spe.org/awards/regional-public-service-award.php**.

Do you know someone who deserves recognition for outstanding work in the E&P industry?

For more details or to nominate a colleague, go to **www.spe.org/awards**. Regional Award Deadline is March 1, 2018



SPE Mid-Continent Section

Luncheon Meetings

FEBRUARY 2018

TUESDAY, February 13, 2018 - Luncheon Meeting
Location: Summit Club, 30th Floor, Ballroom
Speaker: Lloyd Hetrick, Newfield
Topic: "Water Management in the Oklahoma STACK"

Register: **https://spemc021318.eventbrite.com**

Description
Newfield Exploration is a leader in water management and recycling in Oklahoma. They have completed their extensive water management system that includes fresh water storage, produced water storage, a water recycling facility and a HDPE pipeline system. The pipeline system is also connected to their saltwater disposal wells. The recycling of flowback and produced water is part of Newfield's effort at reducing the volumes of water injected into disposal wells which is consistent with the Oklahoma Corporation Commission's effort to provide mitigation measures that can help to reduce potential induced seismicity. Lloyd will provide a comprehensive look at their water management system.

Speaker
Lloyd Hetrick
Lloyd is the Operations Engineering Advisor for Newfield Exploration Company. He is currently the chair of the API Hydraulic Fracturing Issues Group and represents Newfield on various other industry related committees and groups. Lloyd has worked in the oil and gas industry since his graduation from Texas A&M in 1979. Since joining Newfield in 2010, Lloyd has worked exclusively on unconventional resource development in UT, TX, OK, ND and PA. He is both PE and CSP certified. One of his current responsibilities is overseeing Newfield's efforts at water management and recycling.

MARCH 2018

TUESDAY, March 6, 2018 - Luncheon Meeting joint w/TGS & GST
Location: Summit Club, 30th Floor, Ballroom
Speaker: Jeremy Boak, Oklahoma Geological Survey
Topic: "Patterns of seismicity in Oklahoma: Geology matters"

Register: **https://spemc030618.eventbrite.com**

Description
Oklahoma experienced on average 1.6 earthquakes of Magnitude 3 or greater (M3.0+)

SPE Mid-Continent luncheon meetings are held at the Summit Club** in Tulsa from 11:20-1:00 p.m. unless otherwise noted. SPE Mid-Continent luncheon meetings are held at the Summit Club in Tulsa. To register and pay by credit card, or make a reservation to pay by check or cash at the door, go to the corresponding link for a luncheon. Luncheon cost is $25.00 professional, $10 retired/unemployed, and free for students (limited seating available). Payment by credit card is for advanced registrations ONLY, no credit cards will be accepted at the meeting, only check or cash with a reservation. Registration ends 48 hours prior to the luncheon date. No walk-ins please.

Summit Club | Bank of America Center, 15 West Sixth Street (NE corner of 6th & Boulder) | Tulsa, OK 74119 | 918.582.5243 | Parking details are available at **www.summittulsa.com/club/parking.

from the 1980s through 2008. Since then, seismicity increased to 903 M3.0+ earthquakes in 2015, then declined to 623 in 2016, and ~320 in 2017. >95% of these earthquakes occur over <20% of the area of Oklahoma. Seismic moment peaked in 2016, with three M5.0+ earthquakes, unprecedented in Oklahoma's recorded history. A recent issue of Seismological Research Letters highlights studies of the September 3, 2016 M5.8 Pawnee earthquake, the largest recorded in Oklahoma.

Rising seismicity is attributed to increased injection of saline formation water into underpressured and permeable Arbuckle Group sedimentary rocks, which lie directly on Precambrian crystalline basement. This water came primarily from high water cut wells in the Hunton and Mississippian Limestone plays, with earthquake pulses beginning in 2009 and 2013, respectively. Pressure communication from the Arbuckle Group to faults in the basement is interpreted to have reduced stress on the faults. Stress reduction allows faults aligned favorably with respect to the regional stress field (SHMax = N 85° E) to generate earthquakes. Poroelastic effects have recently been interpreted to play a role as well.

Reduction in earthquake frequency appears to result from a 1.4 million barrel per day decrease in injection in ~700 Arbuckle disposal wells in the area. These reductions occurred in part due to 1) production decline from/shutting in of wells because of the significant oil price drop in 2014 - 2015, and 2) directives of the Oklahoma Corporation Commission following a position paper by the Oklahoma Geological Survey attributing seismicity to injection. This talk will discuss the evolution of Oklahoma seismicity, regulatory actions taken to reduce it, and investigations of earthquakes outside the main Area of Interest apparently in location and time with oil and gas well completion activity.

Speaker
Jeremy Boak
Jeremy Boak started as Director of the Oklahoma Geological Survey in July 2015. He served as the Co-Chair of the Oil Shale Symposia, 2006-2015, a role he started as Director of the Center for Oil Shale Technology and Research (COSTAR) at the Colorado School of Mines.

He was an environmental and nuclear materials project manager at Los Alamos National Laboratory, and manager for performance assessment of Yucca Mountain at the U. S. Department of Energy (DOE) in Nevada. Dr. Boak was an exploration geologist at ARCO Oil and Gas, Inc., in Anchorage, Denver, and Bakersfield.
He received his doctorate in Geological Sciences from Harvard University, for work

on the 3.8 billion year old Isua supracrustal suite, West Greenland. He received AB and MS degrees from Harvard and an MS from the University of Washington, all in Geological Sciences.

Dr. Boak is married to Anna Stafford, a petroleum geologist and oil finder, and has a stepson Chris who plans to return to school this year in engineering.

WEDNESDAY, March 21, 2018 - Luncheon Meeting
Location: Summit Club, 30th Floor, Ballroom
Speaker: Srikanta Mishra, Battelle Memorial Institute
Topic: "Big Data Analytics: What Can It Do For Petroleum Engineers And Geoscientists?"

Register: **https://spemc032118.eventbrite.com**

Description
Big data analytics has become quite the buzzword in recent years, and its growing application in E&P operations promises to be an exciting new development. It involves: (1) acquiring and managing data in large volumes, of different varieties, and at high velocities, and (2) using statistical techniques to "mine" the data and discover hidden patterns of association and relationships in large, complex, multivariate datasets. The ultimate goal is to extract as much intelligence from our ever-expanding trove of data to improve operational efficiencies and make better decisions for optimizing the performance of petroleum reservoirs. However, the subject remains a mystery to most petroleum engineers and geoscientists because of the statistics-heavy jargon and the use of complex algorithms.

In this talk, I will provide a "gentle" introduction to big data analytics by focusing on: (a) easy-to-understand descriptions of the commonly-used concepts and techniques, (b) broad categories of E&P problems that can be solved with big data analytics, and (c) case studies demonstrating the value-added proposition for big data.

The one key idea I would like to offer as a takeaway is this: There is significant potential for data analytics to provide insights that can be translated into actionable information in E&P projects, but petroleum engineers and geoscientists need to have a fundamental understanding of data-driven modeling concepts, their applicability and limitations.

Speaker
Srikanta Mishra
Dr. Srikanta Mishra is Institute Fellow and Chief Scientist (Energy) at Battelle Memorial Institute, the world's largest independent contract R&D organization. He is responsible for developing and managing a geoscience-oriented technology portfolio related to computational modeling and data analytics for geological carbon storage, shale gas development and improved oil recovery projects. Dr. Mishra has taught short courses on uncertainty quantification, statistical modeling and data analytics at various professional conferences and client locations in the US, China, Spain, Japan, Finland, Belgium and Switzerland. He is author of the book "Applied Statistical

Modeling and Data Analytics for the Petroleum Geosciences" recently published by Elsevier, as well as ~200 technical publications. He holds a PhD degree from Stanford University, an MS degree from University of Texas and a BTech degree from Indian School of Mines – all in Petroleum Engineering.

THURSDAY, March 22, 2018 - Short Course
Location: Summit Club, 31st Floor, Library Room
Speaker: Srikanta Mishra, Battelle Memorial Institute
Topic: "Applied Statistical Modeling and Data Analytics for Reservoir Performance Analysis"
Register: **https://spemc032218.eventbrite.com**

Description
The course fee of $400 includes course notes, lunch, and a PDH certificate. A textbook, on which the course is based, is available for purchase at the discounted rate of $100. Purchase of the textbook is recommended but is not required for the course.

The Course
There is a growing trend towards the use of statistical modeling and data analytics for analyzing the performance of petroleum reservoirs. The goal is to "mine the data" and develop data-driven insights to understand and optimize reservoir response. The process involves: (1) acquiring and managing data in large volumes, of different varieties, and at high velocities, and (2) using statistical techniques to discover hidden patterns of association and relationships in these large, complex, multivariate datasets. However, the subject remains a mystery to most petroleum engineers and geoscientists because of the statistics-heavy jargon and the use of complex algorithms.

This workshop will provide an introduction to statistical modeling and data analytics for reservoir performance analysis by focusing on: (a) easy-to-understand descriptions of the commonly-used concepts and techniques, and (b) case studies demonstrating the value-added proposition for these methods. Participants are encouraged to bring their own laptops to follow along the exercises in the workshop. Topics to be covered include:

- Terminology and basic concepts of statistical modeling and data analytics
- Multivariate data reduction and clustering (for finding sub-groups of data that have similar attributes)
- Machine learning for regression and classification (for developing data-driven input-output models from production data as an alternative to physics-based models)
- Proxy construction using experimental design (for building fast statistical surrogate models of reservoir performance from simulator outputs for history matching and uncertainty analysis)
- Uncertainty quantification for performance forecasting

Learning Level
Introductory to Intermediate

Why Attend?
As "big data" becomes more common place, it will be necessary to extract as much intelligence from our ever-expanding trove of dynamic data from petroleum reservoir to improve operational efficiencies and make better decisions. This course provides the background to understand and apply fundamental concepts of classical statistics, as well as emerging concepts from data analytics, in the analysis of reservoir performance related datasets. This will petroleum engineers/geoscientists to efficiently interact with data scientists and develop practical data-driven applications for their assets (without getting lost in the math).

Who Should Attend
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Instructor
Dr. Srikanta Mishra is Institute Fellow and Chief Scientist (Energy) at Battelle Memorial Institute, the world's largest independent contract R&D organization. He is responsible for developing and managing a geoscience-oriented technology portfolio related to computational modeling and data analytics for geological carbon storage, shale gas development and improved oil recovery projects. Dr. Mishra has taught short courses on uncertainty quantification, statistical modeling and data analytics at various professional conferences and client locations in the US, China, Spain, Japan, Finland, Belgium and Switzerland. He is author of the book "Applied Statistical Modeling and Data Analytics for the Petroleum Geosciences" recently published by Elsevier, as well as ~200 technical publications. He holds a PhD degree from Stanford University, an MS degree from University of Texas and a BTech degree from Indian School of Mines – all in Petroleum Engineering.

APRIL 2018

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Location: Summit Club, 30th Floor, Ballroom
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Topic: "Mitigating Respirable Crystalline Silica with No Engineering Footprint"



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http://petrowiki.org/PetroWiki



A Free Service for Mid-Continent Section Members and Their Employers

SPE is offering a free service to section members and their employers for the posting of jobs offered by employers (please, no third party recruiters) seeking to hire SPE members and for members seeking employment. Unless otherwise arranged, ads will stay on the website for one calendar month. To view available jobs go to the section website **www.spemc.org** and select Help Wanted/Situation Wanted. To submit an ad (120 words or less, please) e-mail **spemc@spemc.org** for consideration.

"How wonderful it is that nobody need wait a single moment before starting to improve the world"

– **Anne Frank**

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