

APPLICATION OF ARTIFICIAL INTELLIGENCE AND ADVANCED ANALYTICS TO THE OILFIELD

May 17, 2019
EUCI Conference Center
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OVERVIEW

The Industrial Internet of Things (IIoT) has been hyped as a major disrupter of the status quo and transformational in its impact on the business due to its ability to connect things and people in new ways and provide unique services and enabling capabilities not previously possible, or certainly not as cost-effective. While this may be true in other industries, especially those with a retail consumer component, oil & gas is taking a more measured approach given lower oil prices, lower investment overall and a reputation for a conservative approach to the uptake of new technologies. The industry usually wants to see proof of a good business case before overcoming a general resistance to changes.

The advances in information intensity of the oilfield is being matched by advances in data storage, high performance computing and unstructured distributed file systems (NoSQL). Statistical programming languages (Python) have enabled machine learning and advanced statistics, whose mathematics have long been known, to be applied to larger data sets with relative ease such that data analysis and interpretation can take place in near real-time, leading to applications that can directly support field operations.

- The Pros and Cons of physics-based models, statistics-based models and data-driven models
- How is AI (artificial intelligence) impacting the Digital Oilfield
- The future of AI-as-a-coworker
- Emerging technology developments continue to challenge the oilfield

LEARNING OUTCOMES

- Clarify what is meant by the Digital Oilfield 2.0 and the current areas of interest for the Oil and Gas industry
- Identify the levels of the Digital Oilfield IT stack with a focus on the data foundation level
- Discuss the differences between “first principle” physics based models, prediction models based on well known statistical techniques and new “data-driven” models developed with artificial intelligence and machine learning approaches
- Examine the pros and cons of new digital technology and emerging architecture patterns that could dramatically change the current field automation paradigm
- Analyze the impact of automation, smart equipment and processes, advanced analytics, robotics and drones on the future of oilfield operations

WHO SHOULD ATTEND

This course will provide an introductory set of information about the Digital Oilfield specifically focusing on the convergence of technology, systems, practices and required skills from the two key disciplines of Operational Technology and Information Technology for professionals working at oil and gas operators, oilfield service companies and technology firms trying to develop new products into this market including:

- Project managers involved with digital transformation programs
- Data Scientists and Domain Experts working on advanced analytics projects
- Asset team managers responsible for deployment of new digital oilfield 2.0 solutions
- Information technologists involved in support of oilfield operations (communications, data and applications) especially those involved in data management
- System architects charged with developing systems that link field and corporate information architectures
- Service company managers and product managers who are responsible for products and services that support oilfield operations

AGENDA

FRIDAY, MAY 17, 2019

8:00 - 8:30 am**Registration and Continental Breakfast****8:30 - 10:00 am****The Pros and Cons of physics-based models, statistics-based models and data-driven models**

Domain experts are usually more comfortable building models for simulation and prediction when they know the science (physics, chemistry, etc.) behind it or they can use a mathematical formula that has been validated by laboratory testing or by many years of use. However, the digital oilfield 2.0 is running into a number of new challenges, especially with unconventional reservoirs, where neither the physics is well understood or traditional regression formulas fit very well. The good news is that we have a lot of data from these processes to work with and a new branch of mathematics to provide new solutions. That new branch of mathematics is artificial intelligence and machine learning and our new prediction models are data-driven.

- Understanding of the data foundation for typical oil and gas exploration and production functions, data federation, data integration challenges, data modeling
- Review of often used analytical techniques (regression analysis, neural networks, machine learning, deep learning)
- Review of Business Intelligence (reporting), Data Visualization (dashboards, data story telling) and Artificial Intelligence approaches, the strengths and weaknesses of each.
- Review of the principles of artificial intelligence and machine learning techniques

10:00 - 10:30 am**Networking and Refreshment Break****10:30 am -12:00 pm****How is AI impacting the Digital Oilfield**

The interest is turning from understanding the fundamentals of artificial intelligence to seeing the practical application of AI on digital oilfield 2.0 solutions. Many companies are hiring data scientists on their staffs but the most successful ones are creating new units which combine the data science experts with domain experts, agile project managers and data stewards (sometimes called data wranglers) to form the core of project teams focused on building data-driven solutions to challenging oilfield problems.

- Center of Excellence for advanced analytics
- GE's Smart Signal enables predictive maintenance on critical equipment
- Equinor teams up with AI firm Ambyint for artificial lift optimization in the Bakken
- Shell drills the first AI well in the Permian Basin and other use case examples

12:00 - 1:00 pm**Group Luncheon**

AGENDA

FRIDAY, MAY 17, 2019 (CONTINUED)

1:00 am - 2:30 pm

The Future of AI-as-a-Coworker

There is no denying that improvements in technology allow machines to perform tasks that were once performed best by humans. This is at the heart of the technological displacement we see throughout the economy. The key question going forward is whether humans will maintain an advantage in any cognitive or physical activity. The answer to this question will determine whether the future of the economy is one in which humans continue to play a relevant part, or one in which humans are left behind.

The reality is that it can be hard for even us humans to be certain we're keeping the use of an AI process (or any other type of analytics process) within the correct context. Getting algorithms to handle context automatically is much harder than getting them to do what they are trained to do. Hence, the assertions that context is an Achilles' heel of AI and that the onus today is on humans to handle contextual issues. "One machine can do the work of fifty ordinary men. No machine can do the work of one extraordinary man," American writer Elbert Hubbard.

- Is AI more than just a new analytics tool?
- Will new developments in the field of digital assistants find a role in the digital oilfield?
- Will AI pass the "Turing Test" for oil & gas solutions?
- Will you be working for an AI in the future?

2:30 - 3:00 pm

Networking Break

3:00 - 4:30 pm

Emerging technology developments continue to challenge the oilfield

The final section of the workshop is a look into the future of additional digital technology developments that are now in the R&D and demonstration phases.

- Blockchain,
- Cloud, edge and fog computing,
- Artificial reality and augmented reality
- Drones and AUVs

4:30 - 5:00 pm

Summary and Questions

5:00 pm

End of Day

COURSE INSTRUCTOR



Jim Crompton

Jim retired from Chevron in 2013 after almost 37 years with the oil major. After moving to Colorado, Jim established Reflections Data Consulting LLC to continue his work in the area of data management and analytics for the Oil & Gas industry.

Jim was a Distinguished Lecturer for the Society of Petroleum Engineers in 2010-2011, speaking on the topic of "Putting the Focus on Data." He is a frequent speaker at conferences on Digital/Intelligent Energy. His interests lie in the full spectrum of the information value chain from data capture, data management, data visualization, data access, modeling and analytics, simulations and serious gaming.

Jim graduated from the Colorado School of Mines (BS in Geophysical Engineering in 1974 and MS in Geophysics in 1976) before joining Chevron in Denver, Colorado. He later earned an MBA degree (1996) from Our Lady of the Lake University (San Antonio, Texas).

In 1999, Crompton was elected to the position of chair of the general committee of PIDX (Petroleum Industry Data Exchange), the API electronic commerce subcommittee. Jim was able to influence the direction of the standards setting activities towards emerging technologies, such as XML, and new electronic business models in the energy industry.

In acknowledgement of his contributions in applications of information technology to business problems, Jim was named a Chevron Fellow in 2002. In 2013, Jim co-authored a book, titled 'The Future Belongs to the Digital Engineer' with Dr. Dutch Holland, focusing on the issues of the impact of emerging digital technology on oil and gas operations. He is currently working on his second book with Steve Cooper of EnergyIQ, 'The Digital Journey of the Oil and Gas Industry'.

In 2017, Jim was named as the PNEC Cornerstone award winner. Jim is on the board of the SPE Digital Energy Technology Section (DETS), and is working on a subcommittee developing a digital academy curriculum for SPE. Starting January, 2018, Jim is an adjunct teaching faculty member in the Petroleum Engineering Department at the Colorado School of Mines teaching a course in 'Petroleum Data Analytics'.

REQUIREMENTS FOR SUCCESSFUL COMPLETION

Participants must sign in/out each day and be in attendance for the entirety of the course to be eligible for continuing education credit.

INSTRUCTIONAL METHODS

The course will use case studies and power point presentations

EVENT LOCATION

EUCI Conference Center

4601 DTC Blvd., B-100
Denver, CO 80237

NEARBY HOTELS

Preferred Hotel

Hyatt Place Denver Tech Center

8300 E. Crescent Parkway, Greenwood Village, CO 80111 (0.9 miles away)

Call Central Reservations at **888-492-8847** and ask for the EUCI rate of US \$149 plus applicable tax (**CODE: EUCI**) or visit [Hyatt Place Denver Tech Center - EUCI](#)

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0.6 miles away

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EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

EUCI is authorized by IACET to offer 0.7 CEUs for the course.

EVENT LOCATION

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4601 DTC Blvd., B-100
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- BUNDLE PRICE FOR ALL 3 EVENTS INTRODUCTION TO DIGITAL OILFIELD 2.0, CONVERGENCE OF OT AND IT AND APPLICATION OF ARTIFICIAL INTELLIGENCE AND ADVANCED ANALYTICS TO THE OILFIELD COURSES**
MAY 15-17, 2019: US \$2695
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OR Enclosed is a check for \$ _____ to cover _____ registrations.

Substitutions & Cancellations

Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before April 12, 2019 in order to be refunded and will be subject to a US \$195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course cancellation, EUCI's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices at (201) 871-0474.