EMERSON

AAPG International Conference and Exhibition 2019

August 27-30, 2019

Hilton Buenos Aires Hotel
Buenos Aires, Argentina

Demo Schedule

Wednesday, August 28	Title	Supporting Technologies
9:00	Emerson E&P Software - We See Subsurface Digital Transformation Driving Profitability Across the Entire Value Chain	Emerson E&P Software
9:45	Quantify Uncertainty throughout Formation Evaluation Workflows	Geolog™
10:30	Big Loop: From Reservoir Engineering to Geology	Big Loop™
11:15	Diffraction Imaging for Reliable High-resolution Interpretation	EarthStudy 360™, SeisEarth™
12:00	Improving Velocity Model Building in a Complex Environment	SKUA-GOCAD™
14:00	Integrated Petrophysical Interpretation to Unlock Unconventional Reservoirs	Geolog™
14:30	Next-Generation Cloud Solutions	Emerson E&P Software
15:00	Use Machine Learning Techniques to Enrich the Data Available to Seismic Interpreters	Stratimagic™, SeisFacies™, Rock Type Classification
15:30	Application of Deep Learning along Directional Image Gathers for High-Definition Classification of Subsurface Features	EarthStudy 360™, Deep Learning
16:00	Seismic interpretation: An Approach to Capturing Seismic Uncertainties	Roxar™ RMS, SeisEarth™
16:45	Happy Hour	
Thursday, August 29		
9:00	Integrated Petrophysical Interpretation to Unlock Unconventional Reservoirs	Geolog™
9:45	Improving Velocity Model Building in a Complex Environment	SKUA-GOCAD™
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16:00	Emerson E&P Software - We See Subsurface Digital Transformation Driving Profitability Across the Entire Value Chain	Emerson E&P Software
16:45	Happy Hour	
Friday, August 30		
9:00	Integrated Petrophysical Interpretation to Unlock Unconventional Reservoirs	Geolog™
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12:00	Big Loop: From Reservoir Engineering to Geology	Big Loop™

Abstracts

Emerson E&P Software - We See Subsurface Digital Transformation Driving Profitability Across the Entire Value Chain
Wednesday, 9:00; Thursday, 16:00
Presented by Gerardo González

At Emerson Exploration & Production Software, we see how our technology helps operators avoid unproductive exploratory drilling, maximize efficiency in planning, and gain the most from existing reserves. We see our new end-to-end E&P portfolio, comprising Paradigm and Roxar technologies, increasing oil recovery, while our automated subsurface workflows and new Open Data platform promise new levels of efficiency and collaboration across the entire value chain.

With a substantial history of innovation that has time and again been proven to solve industry and customer challenges, Emerson E&P Software is uniquely positioned to embrace the digital transformation leap that is driving the use of data and results analytics, while leveraging cloud technology to turn all available information into value that will empower our customers to make informed decisions.

Come and see for yourself why companies are choosing Emerson to partner with them on their digital transformation journey.

Supporting Technology: Emerson E&P Software

Quantify Uncertainty throughout Formation Evaluation Workflows
Wednesday, 9:45; Thursday, 12:00
Presented by Kim McLean

Petrophysical analysis and formation evaluation provide vital inputs to most, if not all, geoscience workflows. Key information regarding porosity, permeability, shale volume and saturation as well as other mineral volumes, together with the identification of fluid contacts and the free water level, all guide and aid subsequent modeling and reservoir simulation. The ability to provide a level of uncertainty around these various petrophysical inputs increases confidence in reserves estimation and producibility, enabling better, more informed economic decisions. Geolog, Emerson's best-in-class formation evaluation application, allows Monte Carlo uncertainty to be performed in a wide variety of petrophysical workflows, producing a customizable uncertainty range with each output: Whether running environmental corrections, performing deterministic or optimizing petrophysical analysis, verifying an oil/water contact, or simply running a user-created algorithm.

Supporting Technology: Geolog™

Big Loop: From Reservoir Engineering to Geology
Wednesday,10:30; Thursday, 11:15; Friday, 12:00
Presented by Vinicius Ramos

Big Loop is an automated, ensemble-based workflow that tightly integrates the static and dynamic domains. Subsurface uncertainties, captured at every stage of the modeling process, are used as inputs within a repeatable workflow running from seismic to simulation. The system efficiently generates ensembles of models, calibrated to all available static and dynamic data, and consistent with the underlying geology. These give a more reliable estimation of hydrocarbons in place and future production, leading to better informed decisions about future development scenarios. Through collaboration between disciplines, cycle times are reduced, a common understanding of the reservoir is achieved, and knowledge is able to flow back up the modeling chain. In this presentation, the principles and key benefits of Big Loop are outlined, with a focus on how information loops in such a workflow; how the multidisciplinary models, conditioned to data from the dynamic domain, can provide insights into the static model.

Supporting Technology: Big Loop™

Diffraction Imaging for Reliable High-resolution Interpretation
Wednesday, 11:15; Thursday, 10:30
Presented by Bruno de Ribet

In an effort to obtain a more accurate definition of the reservoir, E&P companies have made huge investments in acquiring rich seismic data with wide azimuth and long offset, especially in fractured and subsalt reservoirs. Traditional seismic image volumes generated from these surveys capture the composite response of the subsurface to wavefronts propagating from all subsurface angles and from all directions or azimuths. While these volumes of data are appealing to the seismic interpreter in defining major structural and stratigraphic events, small faults, discontinuities, and other reservoir heterogeneities are often masked or lost in conventional seismic imaging procedures.

While improved fault recovery and imaging is a natural outcome of the process, diffraction imaging can also reveal high-resolution heterogeneities in a reservoir that are not recovered in standard seismic imaging workflows. These images can reveal controlling stratigraphic features that can influence field development and drilling decisions.

Supporting Technologies: EarthStudy 360™, SeisEarth™

Improving Velocity Model Building in a Complex Environment
Wednesday, 12:00; Thursday, 9:45
Presented by Gabriela Marinho

Velocity models are a key input in many steps of our workflows, including imaging, time-to-depth conversion, pore pressure prediction, seismic inversion and others. Many workflows exist, honoring different requirements and constraints.

Using the power of SKUA UVT Transform™ to quickly build an accurate chronostratigraphic model, users now have access to a solution that unifies all the capabilities in a single tool. A precise image of both the structure and the stratigraphy can now be easily respected while providing a sealed model that can be used to properly describe the velocity variations.

Supporting Technology: SKUA-GOCAD™

Integrated Petrophysical Interpretation to Unlock Unconventional Reservoirs
Wednesday, 14:00; Thursday, 9:00; Friday, 9:00
Presented by Kim McLean

Unconventional shale reservoirs will continue to be a focus of the energy industry in Argentina for the foreseeable future. The bulk of the costs incurred in producing shale reservoirs comes from frac design and completions. With the price of oil still somewhat volatile, it is in the interest of energy companies to use data on hand to plan their horizontal wells so that they can stay in the zone, and ultimately complete the wells in the optimal zone of interest.

Shale reservoirs tend to be heterogeneous in nature, with facies that differ in mineralogy, and as a result, geomechanical properties. What if a company could integrate knowledge of the geomechanical rock properties from their pilot wells into their well planning?

We present a workflow that evaluates the mineralogy and geomechanical rock properties of an offset well, and incorporate that information into the planning stages of a horizontal well. Ideally, the geologist could take advantage of their knowledge of geomechanical facies and optimally place a well so that it leads to better placement within the reservoir sweet spot.

Supporting Technology: Geolog™

Next-Generation Cloud Solutions
Wednesday, 14:30; Thursday, 15:30; Friday,10:30
Presented by Jorge Assumpção

The cloud is a key component of the industry's digital transformation, facilitating access to fit-for-purpose subsurface software solutions and hardware instances. Cloud platforms provide flexible, low-cost access to compute resources, minimizing large upfront investments in hardware and ongoing maintenance. Emerson E&P Software provides a simple yet effective way of allowing users of subsurface geoscience and engineering applications to take advantage of the cloud platform, with multiple implementation models for accessing existing and new web-based technologies.

In this presentation, we showcase Emerson's cloud platform solution for desktop and high-performance computing (HPC) applications. Interactive applications can be run in a multi-user environment, mimicking the on-premise setup. This allows data and results to be readily shared by different users in the asset team working on the same projects. HPC cloud solutions allow the setup of a virtual cluster with any number of compute nodes (CPUs/GPUs) in minutes, and run Emerson's HPC applications (migrations, tomography, processing, etc.) on the most modern and optimized hardware configurations, consuming the optimal computation capacity for the task.

Supporting Technology: Emerson E&P Software

Use Machine Learning Techniques to Enrich the Data Available to Seismic Interpreters
Wednesday, 15:00; Thursday, 15:00; Friday, 9:45
Presented by: Bruno de Ribet

This presentation shows the evolution of seismic facies classification to extract hidden information and patterns for geoscientists in an exploration and reservoir characterization projects. It includes a review of unsupervised and supervised methods with different technologies for the recognition of seismic patterns, as well as an investigation of the classification by waveform to a multi-attribute approach that considers a reprocessing by principal component analysis to extract more from seismic.

On the other hand, the true integration of well and seismic data has always been a challenge because of their different responses and resolutions. To resolve these ambiguities, machine learning methods are being introduced that change the applicability of seismic data from an exploration context to a valuable prospect development tool. This presentation introduces a new method based on an association of neural networks to resolve reservoir facies heterogeneity distribution and discusses its applicability.

Supporting Technologies: Stratimagic™, SeisFacies™, Rock Type Classification

Application of Deep Learning along Directional Image Gathers for High-Definition Classification of Subsurface Features
Wednesday, 15:30; Thursday, 14:00; Friday, 11:15
Presented by Ronit Levy

This presentation shows a full-azimuth imaging technology performed in the Local Angle Domain, for characterizing subsurface features from migrated seismic data. With this technology, the surface recorded seismic data are simultaneously mapped to the subsurface and partitioned into high-resolution, multi-dimensional bins at each subsurface grid point. Summing the mapped seismic wavefield along the opening angle axis decomposes the data into full-azimuth directivity angle gathers. Since different subsurface features are associated with different directivity values, the directivity domain enables separation of the features according to their subsurface directivity.

On the other hand, Deep Learning involves training a convolutional neural network (CNN) with many examples of geometrical features. Neural networks consist of multiple layers, where each layer contains a set of learnable filters. We use an off-the-shelf network where all but the last of its neural layers are trained on a variety of images, not necessarily seismic. We then train the last layer using the different principal directivities.

To test this method, we used data from the Eagle Ford unconventional shale play. We first performed LAD imaging to create the full-azimuth directional gathers. We then applied the method to the data. The results clearly showed noise reduction and enhancement in the reflector's continuity, and higher resolution of fault lines.

Supporting Technologies: EarthStudy 360™, Deep Learning

Seismic interpretation: An Approach to Capturing Seismic Uncertainties
Tuesday, 16:00; Wednesday, 14:30
Presented by Vinicius Ramos

Seismic interpretation is one of the most important steps in reservoir characterization. However, uncertainties related to seismic noise, wavelet resolution constraints and energy scattering, among other effects, are inherently present in seismic data. The combined effect of these uncertainty sources contributes to masking seismic reflections, providing a dramatic loss of accuracy when performing seismic interpretation. Roxar RMS Software can guide the interpreter/geomodeler through the interpretation in the presence of seismic uncertainties. The uncertainty sources can then be treated as variables in a probabilistic analysis, foreseeing the impact of these inputs on the reservoir geological model. Thus, in complex geological situations such as pre-salt areas, the stochastic approach should be taken over the deterministic one, due to a better estimation of the impact of all possible scenarios in the resulting models and volume calculations.

Supporting Technology: Roxar™ RMS, SeisEarth™

EMERSON™