

SBGf/SEG  
WORKSHOP

RIO DE JANEIRO, BRAZIL

15-16 MAY 2018



MACHINE LEARNING

GRAND MERCURE RIO DE JANEIRO COPACABANA

Co-Organized by:



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## PROGRAM OVERVIEW

### Tuesday, 15 May

Workshop: 8:00 - 18:00

Icebreaker reception: 18:00 - 20:00

### Wednesday, 16 May

Workshop: 8:00 - 18:00

### Thursday, 17 May

NVIDIA Training in Machine Learning: 8:30 - 17:30

(Note – this event requires separate registration)

## GENERAL INFORMATION

### Icebreaker Reception

All participants are invited to the Icebreaker reception which will be held on Tuesday, 15 May, at 18:00 - 20:00, located at the swimming pool area of the hotel.

The Icebreaker reception is sponsored by



### Catering

Coffee breaks and lunch are included in the registration fee.

### Badges

Our strict security rules require all workshop participants to wear their badge for identification. No one will be allowed into the workshop area without an appropriate badge (this applies to participants and contractors).

## ORAL PRESENTATIONS

Each presenter has a 30-minute time slot (twenty minutes for presentation and ten minutes for discussion). We strongly recommend that all presenters test and upload their slides onto the network the day before its scheduled presentation.

## LANGUAGE

The official language of the Workshop is English. Please note that simultaneous translation is not provided during the presentations.

## WORKSHOP POLICIES

We would like to remind all attendees that reproduction (notes, photos, recordings) and use of any of the workshop presentations is prohibited. Attendees actively partaking in any form of reproduction will be asked to leave the session. Please note that proceedings are not provided for this workshop.

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## ORGANIZING COMMITTEE

**Pedro Mário Cruz e Silva** (SBGf Co-Chair), NVidia; **Klaus Soffried** (SEG Co-Chair), Amazon Web Services

## TECHNICAL COMMITTEE

**Elita Abreu**, Petrobras; **Lucas Balancin**, Petrobras; **Gregori Fabre**, Total; **Hal Green**, Geophysical Insights; **Matt Hall**, Agile Geoscience; **Paulo Johann**, Petrobras; **Marcilio Matos**, Matos Engineering; **Carlos Rodriguez**, Independent Consultant; **Yang Xue**, Shell

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## TECHNICAL PROGRAM

### TUESDAY 15 MAY

**CHAIRS: CÉSAR CALDERON (PETROBRAS) & PEDRO MÁRIO SILVA (NVÍDIA)**

8:00	Onsite registration	
8:30	Opening session	
8:45	<b>KEYNOTE: "DEEP LEARNING FOR GEOSCIENCE IN OIL AND GAS"</b>	<b>MAURÍCIO ARAYA (SHELL)*</b>
9:30	Geostatistics 2.0: spatial interpolation in the age of big data	Ítalo Gomes Gonçalves (Universidade Federal do Pampa)*
10:00	Property prediction from seismic attributes using a boosted ensemble Machine Learning scheme	Motaz Alfarraj (Georgia Institute of Technology), Nishant Keni (Georgia Institute of Technology), Ghassan AlRegib (Georgia Institute of Technology)*
10:30	Coffee break	

10:45	Methodology of seismic interpretation and well data integration using machine learning for multi-attribute facies classification	Alex Laier Bordignon (Institute of Pure and Applied Mathematics of Federal Fluminense University)*, Rogério Santos (IGEO - Federal Fluminense University), Eliane Alves UFF-IGEO (IGEO - Federal Fluminense University), Hélio Côrtes Vieira Lopes (DI - PUC-Rio)
11:15	Comparative study of permeability estimates of a carbonate reservoir in Campos Basin using well logs together with an empirical model and Machine Learning approaches	Rhanderson Gomes (UENF/CCT/LENEP), Abel Carrasquilla (UENF/CCT/LENEP)*
11:45	Artificial Intelligence for prediction of severe fluid losses in pre-salt carbonates	Sandra Buzini Duarte (Petrobras), Viviane Farroco da Silva (Petrobras)*, Matheus Cafaro Arouca Sobreira (Petrobras), Candida Menezes de Jesus (Petrobras), Vitor Alcantara Batista (Petrobras), Fernando Gomes de Melo E Silva (Petrobras), Lenita de Souza Fioriti (Petrobras), Carlos Henrique Marques de Sá (Petrobras), Sebastião de Andrade Loureiro (Petrobras)
12:15	Lunch	
13:30	Delimitation of electrofacies and oil-water contacts in carbonate reservoirs using well logs together with linear and nonlinear mathematical techniques	Tamires Soares (UENF/CCT/LENEP)*, Abel Carrasquilla (UENF/CCT/LENEP)

### CHAIRS: DANIEL THOMÉ (PETROBRAS) & KLAUS SOFFRIED (AMAZON WEB SERVICES)

14:00	Reservoir characterization through Artificial Neural Networks (ANN) approach and its value in field development - Case Study: Egina field – Deep offshore Nigeria	Antoine Massala (Total)*, Keskes Noomane (Total)
14:30	Bayesian networks for decisions under uncertainty in basin modeling	Tanvi Dhiren Chheda (Department of Geological Sciences, Stanford University)
15:00	Coffee break	
15:15	A data-driven methodology for integrating geological measurements from unconventional reservoirs and production data for sweet spot identification	Jorge Guevara Diaz (IBM Research)*, Bianca Zadrozny (IBM Research), Matthias Kormaksson (IBM Research), Alvaro Bueno (IBM Research), Helon Hultmann (IBM Research), Ligang Lu (Shell Intl E&P, Inc), John Tolle (Shell Intl E&P, Inc.), Jan Limbeck (Shell Intl E&P, Inc), Mingqi Wu (Shell Intl E&P, Inc), Detlef Hohl (Shell Intl E&P, Inc)
15:45	Integrating 3D seismic and well log data for improved estimation of lithological characteristics in the northern Santos Basin using Machine Learning techniques	François Lafferriere (Kognitus)*, Félix Gonçalves (Kognitus)
16:15	Bridging gaps between natural and seismic image analysis	Muhammad Amir Shafiq (Georgia Institute of Technology), Mohit Prabhushankar (Georgia Institute of Technology), Haibin Di (Georgia Institute of Technology), Ghassan AlRegib (Georgia Institute of Technology)*
16:45	Deep convolutional autoencoder for petroleum reservoir connectivity recovery	Rodrigo Exterkoetter (LTrace Geophysical Solutions)*, Fernando Bordignon (LTrace Geophysical Solutions), Leandro Passos de Figueiredo (LTrace Geophysical Solutions), Mauro Roisenberg (UFSC), Bruno Barbosa Rodrigues (Petrobras)
17:15	<b>KEYNOTE: THE VALUE OF NVIDIA GPUS IN DEEP LEARNING AND G&amp;G SUCCESS STORIES</b>	Paul Holzhauser* (Nvidia)
17:45	Closing session	
18:00	Icebreaker reception	

### WEDNESDAY 16 MAY

#### CHAIRS: LUCAS BALANCIN (PETROBRAS) & YANG XUE (SHELL)

8:30	<b>KEYNOTE: ARTIFICIAL INTELLIGENCE FOR OIL &amp; GAS: HOW AI TECHNOLOGIES WILL CHANGE THE WAY WE WORK</b>	<b>ULISSES T. MELLO (IBM RESEARCH)*</b>
9:00	Automatic diffraction apex region detection using convolutional neural networks	Lucas de Magalhães Araújo (Centro de Estudos de Petróleo e Instituto de Computação/Unicamp), Fabíola Martins Campos de Oliveira (Centro de Estudos de Petróleo e Instituto de Computação/Unicamp), Jorge Henrique Faccipieri Junior (Centro de Estudos de Petróleo/Unicamp), Sandra Avila (Instituto de Computação/Unicamp), Martin Tygel (Centro de Estudos de Petróleo/Unicamp), Pedro Mário Cruz e Silva (NVIDIA), Edson Borin (Centro de Estudos de Petróleo e Instituto de Computação/Unicamp)*

9:30	Transfer learning with deep convolutional neural networks for seismic shot-gather quality classification	Bruno Pereira Dias (PETROBRAS)*, André Bulcão (PETROBRAS), Alexandre Gonçalves Evsukoff (COPPE/UFRJ)
10:00	Machine Learning to reduce cycle time in 4D seismic data assimilation	Yang Xue (Shell International Exploration and Production)*, Mariela Araujo (Shell International Exploration and Production), Jorge Lopez (Shell International Exploration and Production)
10:30	Deep convolutional network for seismic compression	João Paulo Peçanha Navarro (Metta Innovations)*, Pedro Mário Cruz e Silva (NVIDIA), Patrícia Cordeiro Pampanelli (Metta Innovations), Aurélio Moraes Figueiredo (Metta Innovations)
10:45	Coffee break	
11:00	Seismic facies prediction using multiple machine learning approaches	Long Jin (Shell)*
11:30	Sensitivity analysis in a Machine Learning methodology for reservoir analogues	Reinaldo Mozart da Gama e Silva (IBM Research), Laura Sant Anna Gualda Pereira (IBM Research), Emilio Vital Brazil (IBM Research)*, Rogério Abreu de Paula (IBM Research), Renato Fontoura de Gusmao Cerqueira (IBM Research), Ulisses Mello (IBM Research)
12:00	Lithology classification with incomplete data	Erick Costa e Silva Talarico (Petrobras)*, Ruy Luiz Milidiú (PUC-Rio)
12:30	Lunch	
<b>CHAIRS: ELITA ABREU (PETROBRAS) &amp; RICARDO FERNANDES (PETROBRAS)</b>		
13:45	Machine Learning provides faster, higher-quality reservoir insights	Bruno de Ribet (Paradigm)*
14:15	Danet-FCN3: 3D Semantic segmentation of facies in seismic cubes	Daniel Salles Chevitarese (IBM Research)*, Daniela de Mattos Szwarcman (IBM Research), Bianca Zadrozny (IBM Research)
14:45	Reducing mineral exploration risk in the Yukon Plateau	Telma Aisengart (Geosoft)*, Jose Luis Ando (Geosoft), Alex Fuentes (IGS – International Geoscience Services), Nigel Halsall (Geosoft), Edward Lewis (IGS – International Geoscience Services), Peter Pitfield (IGS – International Geoscience Services), Taronish Pithawala (Geosoft), Paul Turner (IGS – International Geoscience Services), Slawomir Wojcik (IGS – International Geoscience Services)
15:15	Coffee break	
15:30	Automated Machine Learning in your Machine Learning pipeline	Ivan Marroquin (Geophysical Insights)*
16:00	Implicit geological modeling with Gaussian Process Classification	Ítalo Gomes Gonçalves (Universidade Federal do Pampa)*, Felipe Guadagnin (Universidade Federal do Pampa), Sissa Kumaira (Universidade Federal do Pampa)
16:30	Weakly-supervised subsurface structure labeling	Yazeed Alaudah (Georgia Institute of Technology), Ghassan AlRegib (Georgia Institute of Technology)*
17:00	Overview of augmented intelligence	João Augusto A. Coimbra* (Microsoft)
17:30	Closing session	

## THURSDAY 17 MAY

### NVIDIA TRAINING IN MACHINE LEARNING

**8:30-17:30**

**VENUE: MICROSOFT OFFICES**

**RUA VISCONDE DE INHAÚMA, #83 - 10TH FLOOR - DOWNTOWN**

8:30 Nvidia Machine Learning training

12:00 Lunch

13:30 Nvidia Machine Learning training

17:30 End of third day

For the third day, we are providing a basic training in Machine Learning for 30 attendees. This training is free of charge. You may register on day one of the SBGf workshop (please visit the registration desk for further details). Attendees are required to bring their own laptops to use in the training session. Lunch is not included. Attendance is limited to 30 attendees; please be certain to register early.

This Training is sponsored by Microsoft and NVIDIA.

