EAGE

EUROPEAN ASSOCIATION OF GEOSCIENTISTS & ENGINEERS

# EDUCATION DAYS
# BEIJING 2019

20 JUNE - 2 JULY 2019 | BEIJING, CHINA

EAGE EDUCATION

www.LearningGeoscience.org

## Short Course Programme

**20 – 21 JUNE 2019**

**Rock Physics and Computational Geophysics**
Dr José Carcione (OGS)

**27 – 28 JUNE 2019**

**Seismic Diffraction – Modelling, Imaging and Applications**
Prof. Evgeny Landa (Tel Aviv University, Israel) and Dr Tijmen Jan Moser (Moser Geophysical Services, Netherlands)

**1 - 2 JULY 2019**

**New Applications of Machine Learning to Oil & Gas Exploration and Production**
Dr. Bernard Montaron (Fraimwork SAS)

*Short course will be conducted in English.*
*Translator service is available for all short course.*
*Same short course is available in Kuala Lumpur and Perth as well.*

## Accreditation

In March 2013 EAGE became the first official Continuing Professional Development (CPD) Provider of the "European Geologist" title, which is a professional accreditation established by the European Federation of Geologists (EFG). In order to obtain and maintain this title, the holder must provide a record of high quality CPD activities, which include the short courses like the ones presented during the Education Days. For an overview of the provided points for EAGE Short Courses and for more information about this accreditation system and corresponding EAGE learning activities please visit EAGE website and EurGeol website.

## EAGE Economic Hardship Programme

EAGE recognizes the current challenging status of the industry and, priding itself on the inclusive character of the Association, now has a special economic hardship assistance programme in place to reach out to its members.

### EAGE Short Course discount

EAGE aims to assist its long-term members who are currently unemployed by providing contributions towards educational programmes. Under this element of the EAGE Economic Hardship Programme, members currently unemployed can attend public short courses at the Education Days Beijing for a discounted course fee equal 75 euros for either one- or two-day course. The discounted registration fee is the same as in another supported programme – EAGE Education Tours, where everyone can benefit from a discounted fee.

For more information we would like to refer you to the event website at events.eage.org

## Registration fees

| Registered and paid | Until 7 April | From 8 April-17 June |
|---|---|---|
| EAGE Green Member[1,5] | €760 | €815 |
| EAGE Bronze/Silver/Gold Member | €705 | €760 |
| EAGE Platinum Member[1,5] | €705 | €705 |
| Non-member[3] | €810 | €865 |
| EAGE Student Green Member[1,2,5] | €441 | €473 |
| EAGE Bronze/Silver/Gold Student Member[1,2] | €406 | €437 |
| Student Non-Member[2,3,4] | €466 | €498 |

EAGE registration fees differentiate between EAGE membership recognition levels and non-members. In the table below you can see what the different fees are. First year members have Green membership status which gives you a € 50 discount (€ 25 for students) on the Non-member fee for each EAGE event registration; starting from Bronze status, you can benefit from an even greater reduced EAGE member registration fee.

1. Members please note: To qualify for the member registration fee, your EAGE membership dues for 2019 must have been paid and confirmed. The processing time for membership applications or renewals is around 10 working days.
2. To qualify for the reduced student registration fee:
   - Students must be enrolled in a full-time study programme at a recognized university or institute.
   - The registration must be accompanied by a copy of a student ID card and/or official proof of enrolment.
3. The non-member fee includes EAGE membership for the remainder of 2019. This membership will be activated shortly after the conclusion of the event.
4. Student non-members cannot be older than 34 years of age (when registering).
5. Green membership status gives you a € 50 discount (€ 25 for students) on the Non-Member fee for each EAGE event registration; starting from Bronze status, you can benefit from an even greater reduced EAGE member registration fee.

Fee includes the course material, as well as coffee breaks and lunch.
All invoice amount billed or registration fee shown are net and exclusive of any type of tax.

**20-21 JUNE 2019**

## Rock Physics and Computational Geophysics

Dr José Carcione (OGS)

CPD Points: 10

### Course Description

This course presents the fundamentals of the physical principles and computational techniques for wave propagation in anisotropic, anelastic and porous media, including the analogy between acoustic waves (in the general sense) and electromagnetic (EM) waves. The emphasis is on geophysical applications for hydrocarbon exploration, but researchers in the fields of earthquake seismology, rock physics, and material science, -- including many branches of acoustics of fluids and solids (acoustics of materials, non-destructive testing, etc.) -- may also find the material useful. The course illustrates the use of seismic and EM modeling, with an account of the numerical algorithms for computing synthetic seismograms, diffusion fields and radargrams, with applications in the field of geophysical prospecting, seismology and rock physics, such as evaluation

**DISCIPLINES**

Geophysics · Geology · Reservoir Characterization · Near Surface · Engineering · Training and Development

of methane hydrate content, upscaling techniques, detection of overpressure, Antarctic and permafrost exploration, exploration of the Earth's deep crust, time-lapse for monitoring of CO2 injection, seismic modeling in geothermal fields, seismic inversion, etc.

### About the Instructor

José M. Carcione has the degrees ``Licenciado in Ciencias Físicas" (Buenos Aires University), ``Dottore in Fisica" (Milan University) and Ph.D. in Geophysics (Tel-Aviv University). From 1978 to 1980 he worked at the ``Comisión Nacional de Energía Atómica" at Buenos Aires. From 1981 to 1987 he was employed as a research geophysicist at YPF (national oil company of Argentina). Presently, he is Director of Research at OGS. He was awarded the Alexander von Humboldt scholarship for a post-doc at Hamburg University (1987-1989). In 2007, he received the Anstey award at the EAGE in London and the 2017 EAGE Conrad Schlumberger award in Paris. Carcione published more than 280 journal articles on acoustic and electromagnetic numerical modeling, with applications to oil exploration and environmental geophysics. He is the author of the books "Wave fields in Real Media – Theory and numerical simulation of wave propagation in anisotropic, anelastic, porous and electromagnetic media" (see (Elsevier, 2015, 3rd edition), and "Seismic Exploration of Hydrocarbons in Heterogeneous Reservoirs" (Elsevier, 2015) He has been editor of "Geophysics" since 1999. He has coordinated many projects funded by the EU and private companies. Carcione has been a member of the commission (GEV04) for evaluation of Italian research in the _eld of Earth Sciences (ANVUR) in the periods 2004-2010 and 2011-2014. Carcione has an H-index: 53, according to Google Scholar. For more detail see his website: http://www.lucabaradello.it/carcione/

**27-28 JUNE 2019**

## Seismic Diffraction – Modelling, Imaging and Applications

Dr Tijmen Jan Moser (Moser Geophysical Services, Netherlands)

CPD Points: 10

### Course Description

Diffraction phenomena have been identified as the key seismic manifestation of fractures and other small-scale reservoir heterogeneities. This two-day course will present the current state-of-the-art of diffraction technology and put this in context by a review of its past developments. The course will cover both forward diffraction modeling and diffraction imaging. Case studies of diffraction imaging will be presented covering applications in seismic exploration and other areas of geoscientific interest.

### About the Instructor

Tijmen Jan Moser has a PhD from Utrecht University and has worked as a geophysical consultant for a number of companies and institutes (Amoco, Institut Français du Pétrole, Karlsruhe University, Bergen University, Statoil/Hydro, Geophysical Institute of Israel, Fugro-Jason, Horizon Energy Partners). For the last few years he has been working independently with associations with ZTerra, SGS-Horizon and others. He is based in The Hague, The Netherlands. His main interests include seismic imaging, asymptotic methods, seismic reservoir characterization, diffraction and geothermal exploration. He has authored many influential papers on ray theory and ray methods, Born inversion and modeling, macro-model independent imaging, and diffraction imaging, several of which have received Best Paper awards (SEG, 2005 Honorary mention, EAGE 2007 and 2009, Eotvos Award). He is Editor-in-Chief of Geophysical Prospecting and is serving on SEG's Publication Committee and EAGE's Oil Gas & Geoscience Division Committee. He is a member of SEG and MAA and honorary member of EAGE.

## New Applications of Machine Learning to Oil & Gas Exploration and Production

Dr. Bernard Montaron (Fraimwork SAS)

CPD Points: 10

### Course Description

The course introduction will attempt to answer the question: How will A.I. change the way we work in the Oil and Gas industry in the coming years? Looking at what is underway in other industries and guessing what type of projects are under development in R&D departments in our industry will help answer that question. Oil and Gas examples will be presented corresponding to each of the terms A.I., Machine Learning, and Deep Learning, allowing participants to reach a clear understanding on how they differ.

The course will then focus on Deep Learning (DL) and address all key aspects of developing and applying the technology to Oil and Gas projects.

- What is DL and how different is it from traditional neural networks?
- A peek at the mathematics behind Deep Neural Networks (DNN)
- Typical workflow to design and develop a deep learning application in an E&P project
- Common challenges, difficulties, and pitfalls in deep learning projects
- Software tools and hardware required + Cloud computing vs in-house solutions.

This will be followed by live demonstrations of two DNN-based applications specific to Oil and Gas upstream domains.

First, we'll run software performing automatic fault identification will be run on released seismic data from New Zealand basins to demonstrate how a DNN recognizes faults and how it differs from other algorithms such as ant tracking. Starting from default training, the DNN can gradually learn to recognize faults like the Geophysicist or Structural Geologist. The training set constantly evolves incorporating feedback from human experts.

Second, the identification of resource opportunities in very large repositories of text and image documents will be demonstrated. This will be done with a deep learning application that performs contextual search and linguistic analysis. Unlike keyword search, contextual search extracts information based on its context, just like humans do. And then linguistic analysis is run on the extracted information to identify actionable opportunities. This list of opportunities can then be further evaluated by human experts.

Finally, the course conclusion will summarize key learnings and answer any additional questions/queries from participants.

### About the Instructor

Dr. Bernard Montaron is CEO of Fraimwork SAS, Paris, France, and CTO of Cenozai Sdn Bhd, Kuala Lumpur, Malaysia. Two start-ups, created in mid-2017, that are specialized in the application of Artificial Intelligence to various domains, and provide services to oil and gas companies for exploration and production. In 2015-2017 he was Chief Geoscientist of BeicipTecsol in Kuala Lumpur. Prior to this, Bernard Montaron worked 30 years for Schlumberger where he held a number of positions in R&D and Marketing. He has worked for the oil and gas industry in Europe, in the United States, in the Middle East, in China, and Malaysia. Bernard was General Manager of the Schlumberger Riboud Product Center in Paris - Clamart, France (2002-2003) and he was VP Marketing of Schlumberger Middle East and Schlumberger Europe-Africa-Russia regions (2000-2001). Bernard holds a MSc degree in Physics from ESPCI, Paris, France, and a PhD in Mathematics from University Pierre et Marie Curie, Paris, France. He also has a Machine Learning certificate from Andrew Ng›s course (Stanford Univ./Coursera). Bernard Montaron received the best oral presentation award at the APGCE 2017 conference for his paper on «Deep Learning Technology for Pattern Recognition in Seismic Data – A Practical Approach».

## Contact

For further information about the Education Days Beijing, please contact us at Irene (ing@eage.org)

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