

The top half of the image features a dark background with a stylized profile of a human head on the left, filled with glowing blue circuitry and binary code. To the right, there is a colorful, abstract landscape with a gradient from blue to yellow to red, overlaid with a network of white lines and dots. In the top left corner, there is a green square containing the EAGE logo and its full name.

EAGE

EUROPEAN
ASSOCIATION OF
GEOLOGISTS &
ENGINEERS

First EAGE Workshop on the Role of Artificial Intelligence in Full Waveform Inversion

12-13 SEPTEMBER 2024 • CARTAGENA, COLOMBIA

- **First Announcement**

WWW.EAGE.ORG

TECHNICAL COMMITTEE MEMBERS

Adel Khali	CGG
Yaxun Tang	Exxonmobil
Manish Agarwal	Santos Ltd
Xin Cheng	SLB
Paul Williamson	TotalEnergies
Tariq Alkhalifah	Kaust
Felix Herrmann	Georgia Tech
Youzuo Lin	LANL
René-Edouard Plessix	(Shell)
Robert Ferguson	University of Calgary
Jan H van de Mortel	Independent
Haibin Di	SLB
Kris Innanen	CREWES, University of Calgary
Roberto Pereira	CGG
Zhigang ZHANG	CGG
Larry Velasco	SLB

WORKSHOP OVERVIEW

The First EAGE Workshop on the Role of Artificial Intelligence in Full Waveform Inversion likely aimed to explore the node of two critical areas in geophysics: Full Waveform Inversion (FWI) and Artificial Intelligence (AI). FWI is a sophisticated technique used to create detailed images of subsurface structures by comparing observed seismic waveforms with simulated ones. AI, on the other hand, offers powerful tools for optimizing complex processes, handling vast datasets, and enhancing the accuracy of predictive models.

This workshop likely provided a platform for researchers, practitioners, and industry professionals to discuss how AI can be leveraged to improve FWI algorithms and workflows. Topics of discussion might have included:

Introduction to Full Waveform Inversion (FWI): An overview of FWI principles, methodologies, and applications in geophysics. **Current Challenges in FWI:** Discussion on the limitations and challenges faced in traditional FWI approaches, such as computational complexity and sensitivity to initial models.

Integration of AI Techniques: Exploration of how AI techniques, including machine learning and deep learning, can enhance FWI by improving computational efficiency, regularization, and inversion stability.

Case Studies and Applications: Presentation of real-world examples and case studies showcasing the successful integration of AI in FWI for subsurface imaging and exploration.

Future Directions and Opportunities: Examination of emerging trends, research directions, and opportunities for further advancements in AI-driven FWI methodologies. Participants likely had the opportunity to engage in discussions, share their experiences, present research findings, and network with peers and experts in the field. Overall, this workshop likely served as a valuable forum for advancing understanding and collaboration at the intersection of AI and FWI within the geophysics comm.

CALL FOR ABSTRACTS OPEN NOW

Method development 1: Formulations

- ML as inversion engine: is end-to-end the goal?
- Physics-guided networks: neural operators and PINNs
- ML and multiparameter/multiphysics inversion
- Can we use ML to compensate for modelling deficiencies?
- Does ML make sense for modelling?
- Unsupervised/semi-supervised methods to leverage available labels

Method development 2: Uncertainty Quantification

- Do ML variational methods outperform MCMC
- ML for Bayesian inversion - computing priors
- ML for intelligent regularization
- Can ML bring UQ more naturally into FWI outputs?

Computation

- HPC for ML - parallelisation models for moving to scale
- Handling seismic data volumes in ML
- Cloud computing for ML-FWI - the good and the bad

Applications 1: Pre-processing and initialization

- Pre-processing: spectral extrapolation and denoising
- Alleviating scarcity of labelled data
- Initial model building
- Can FWI-ML be trained with synthetic data?
- Post-processing: interpretation

Applications 2: field data issues and case studies

- Applications and benchmarking
- Open data - availabilities and opportunities
- QC and validation
- VMB, characterization and monitoring
- Beyond O&G: applications for the energy transition





"This workshop likely provided a platform for researchers, practitioners, and industry professionals to discuss how AI can be leveraged to improve FWI algorithms and workflows"

LOCATION

EAGE is pleased to announce the First EAGE Workshop on The Role of AI in FWI.

This event will take place in the city of Cartagena, which is located on the shores of the Caribbean Sea. Its colorful streets full of charm make it the gateway to South America. The city adds to its charms the attractions of an intense nightlife, cultural festivals and exuberant landscapes.

The city's beaches invite you to go sightseeing, rest and have fun with the refreshing breeze and the warm waters of the sea. The weather in Cartagena de Indias is very pleasant, as its tropical climate will allow you to enjoy its beaches and other charms.

VENUE

Radisson Cartagena Ocean Pavillion Hotel
Carrera 9 #22-850, Provincia de Cartagena, Bolivar

REGISTRATION OPEN NOW

REGISTERED AND PAID	EARLY 5 MARCH - 12 JULY	REGULAR 13 JULY - 13 AUGUST	LATE 14 AUGUST - 13 SEPTEMBER
EAGE/SUT Green Member ^{1,5}	\$1.065	\$1.315	\$1.515
EAGE Bronze/Silver/Gold Member ^{1,5}	\$915	\$1.165	\$1.365
EAGE Platinum Member ^{1,5}	\$915	\$915	\$915
Non-member ³	\$1.165	\$1.415	\$1.615
EAGE/SUT Student Member ^{1,2,5}	\$620	\$620	\$620
Student Non Member	\$695	\$695	\$695

SPONSORING

The **First EAGE Workshop on the Role of Artificial Intelligence in Full Waveform Inversion** offers excellent sponsorship opportunities giving your brand high visibility with the ability to reach a large and targeted audience. For more information about sponsorship, please refer to the Sponsor Guide on the event website or contact us at corporaterelations@eage.org.

KEYNOTE SPEAKERS

We are excited to announce the first Keynote Speaker of our Workshop!



Tariq Alkhalifah
Kaust

IMPORTANT DATES

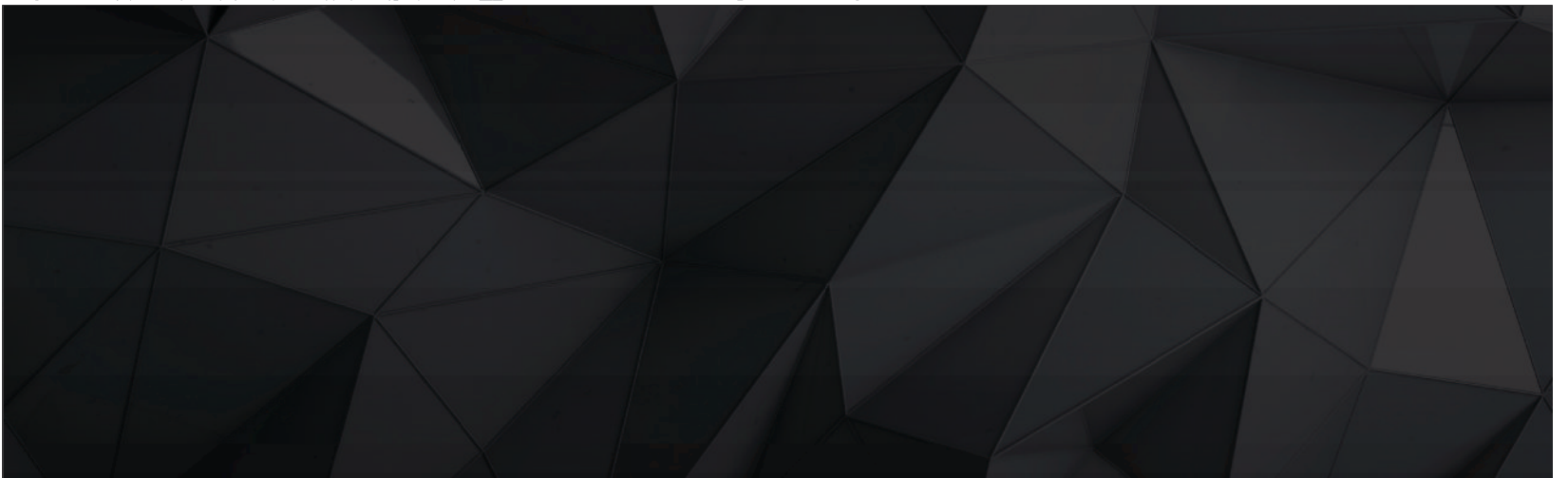
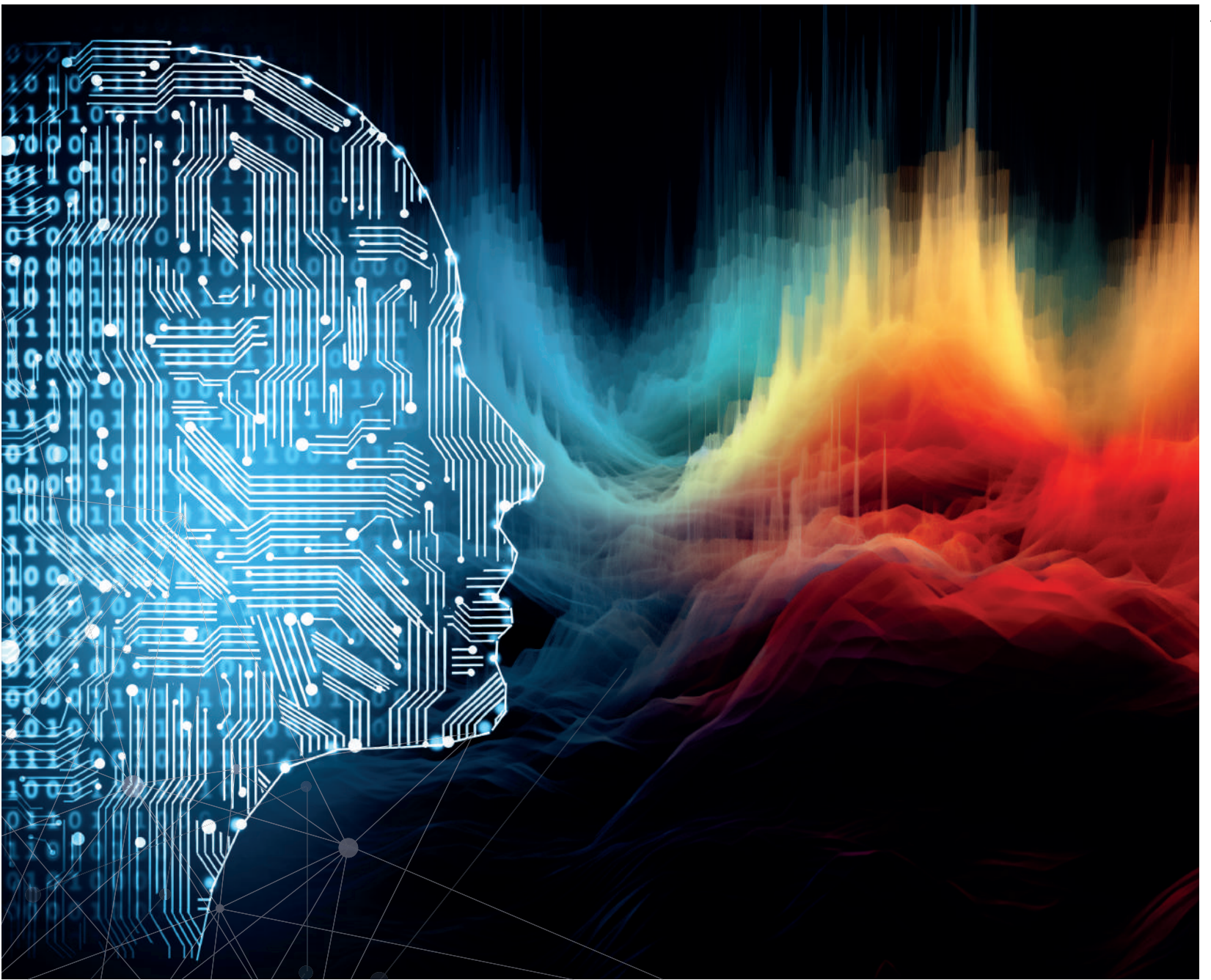
Workshop dates	12-13 September 2024
Icebreaker Reception	12 September 2024
Call for abstracts deadline	22 May 2024

CONTACT

The **First EAGE Workshop on the Role of Artificial Intelligence in Full Waveform Inversion** is organized by the EAGE Latin America Office,. For enquiries please contact by email lan@eage.org.

For up to-date information visit:





EUROPE OFFICE	MIDDLE EAST/AFRICA OFFICE	ASIA PACIFIC OFFICE	AMERICAS OFFICE
+31 88 995 5055	+971 4 369 3897	+60 3 272 201 40	+57 310 8610709
EAGE@EAGE.ORG	MIDDLE_EAST@EAGE.ORG	ASIAPACIFIC@EAGE.ORG	AMERICAS@EAGE.ORG

HEAD OFFICE • KOSTERIJLAND 48 • 3981 AJ BUNNIK • THE NETHERLANDS • +31 88 995 5055 • EAGE@EAGE.ORG

www.eage.org



join us on social media!