



EAGE

EUROPEAN
ASSOCIATION OF
GEOSCIENTISTS &
ENGINEERS

Empowering the Energy Shift: The Role of HPC in Sustainable Innovation

NINTH EAGE HIGH PERFORMANCE COMPUTING WORKSHOP

6-8 OCTOBER 2025 • BARCELONA, SPAIN

• Programme

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PLATINUM SPONSOR



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OVERVIEW

High-performance computing continues to be an effective driving force of our energy business and, in the midst of the energy transition, it will help extend our knowledge boundaries by solving novel, complex and large-scale industrial computational problems. Since its inception, a decade ago, this workshop became a place to exchange and compare experiences all the while acting as a window into the latest upcoming and future evolutions of high-performance computing technologies for our industry.

For its 9th edition, the workshop will be held in Barcelona close to the Barcelona Supercomputing Center (BSC). An on-site visit to the datacenter is planned during the event. The workshop generally consists of a single track event with poster session(s), a panel and built-in time for discussions. With a range of topics spanning the latest deep code optimizations up to practical applications of quantum computing, the technical committee is looking forward to your contribution at the workshop.



TOPICS

06 & 08 October 2025

Emerging HPC Technologies

- High-Performance Data Analytics, Machine Learning and Deep Learning
- Convergence and Overlapping of HPC and Data Analytics
- Quantum Computing
- Next Generation Programming Models and Languages
- High-Performance Cloud Computing (HPCC)
- System Architectures for Exascale Computing
- High-Performance IoT-based solutions
- Neuromorphic Computing
- Software Stacks
- Software Engineering for HPC
- HPC DevOps

Geosciences & HPC

- Seismic Imaging, Modeling & Inversion
- Reservoir Modeling and Simulation
- Joint Inversion of Geophysical and Engineering Data
- Designing Upstream Applications for Exascale Computing
- Upstream Data Visualization (Distributed and Remote Visualization)
- Digital Rock Physics
- Seismic Processing
- Electromagnetic Modeling and Inversion
- Combining Geosciences with AI
- Performance Analysis and Optimization
- HPC Case Histories and Field Studies
- Mixed Precision Computing
- Energy Efficient Computing
- Numerical Methods and Solvers
- Data Intensive Computing (High Performance I/O and File Systems)
- Fabrics for Upstream HPC

HPC for the Energy Transition

- Fusion Simulation
- Green Hydrogen
- Carbon Capture and Storage
- Solar Power Plant, Wind Farm, Geothermal & Hydroelectric Energy
- Weather and Climate Modelling
- Electrical Power Grid & Grid Energy Storage
- Earth Observation for Energy

07 October 2025

NEW Joint Session Topic

Leveraging the Computing Revolution in the AI era

The relentless pace of change of HPC technologies, to which the Geosciences have always been accustomed to, is now compounding with the extraordinary acceleration brought about by artificial intelligence. Every day new opportunities for innovation in data processing pipelines emerge, very often accompanied by new technological challenges. At the same time, data density and resolution are constantly increasing, and the latency between data acquisition and processing is constantly shrinking and even becoming non-existent when we process data on the edge. This joint session will try to address the landscape of this new and unprecedented scenario. How are the HPC and data processing communities reacting? Is there a convergence path that can maximize benefits without disrupting



established data processing ecosystems? Are there any lessons we can learn from past revolutions, such as when we borrowed GPUs from game consoles? Has generative AI already had a transformative impact on our data, just like it is having on text, sound, images, and video? As the evolution of HPC hardware is inevitably increasingly driven by AI requirements, is there a viable way to leverage it to speed-up conventional and well established data processing approaches, or is it time for a radical paradigm change?

Opening Address Speaker



Prof. Jesus Labarta
Director of the Computer Sciences Research
Department
BSC

Keynote Speakers



John Brittan
VP Geophysics for the Imaging & Technology
Group
TGS



Dr. Dan Stanzione
Associate Vice President for Research
University of Texas at Austin



Keith Gray
VP for Computational Science and
Engineering
TotalEnergies

JOINT SESSION SPEAKERS

Opening Address Speaker



Edmondo Orlotti
Chief Strategy Officer
Core42

Keynote Speaker



Bertrand Duquet
Senior Advisor
TotalEnergies

Invited Speakers



Matteo Ravasi
Senior Research Advisor and
AI/MLOps Engineer
SHEARWATER Geoservices



Florent Pautre
Manager of Computational Science Team
Viridien

PANEL DISCUSSION: IMPACT OF GENERATIVE/ AGENTIC AI IN THE ENERGY INDUSTRY

Wednesday, 8 October 2025 | 1145 - 1300 hrs (UTC+2)

Panelists



Prof. Tariq A. Alkhalifah
Professor in the Physical Sciences and
Engineering Division
KAUST



Gareth O'Brien
Principal Programme Manager
Microsoft



Michele Isernia
Head of Sales
ThinkOnward

TECHNICAL PROGRAMME

Oral Presentations | Monday 6 October 2025

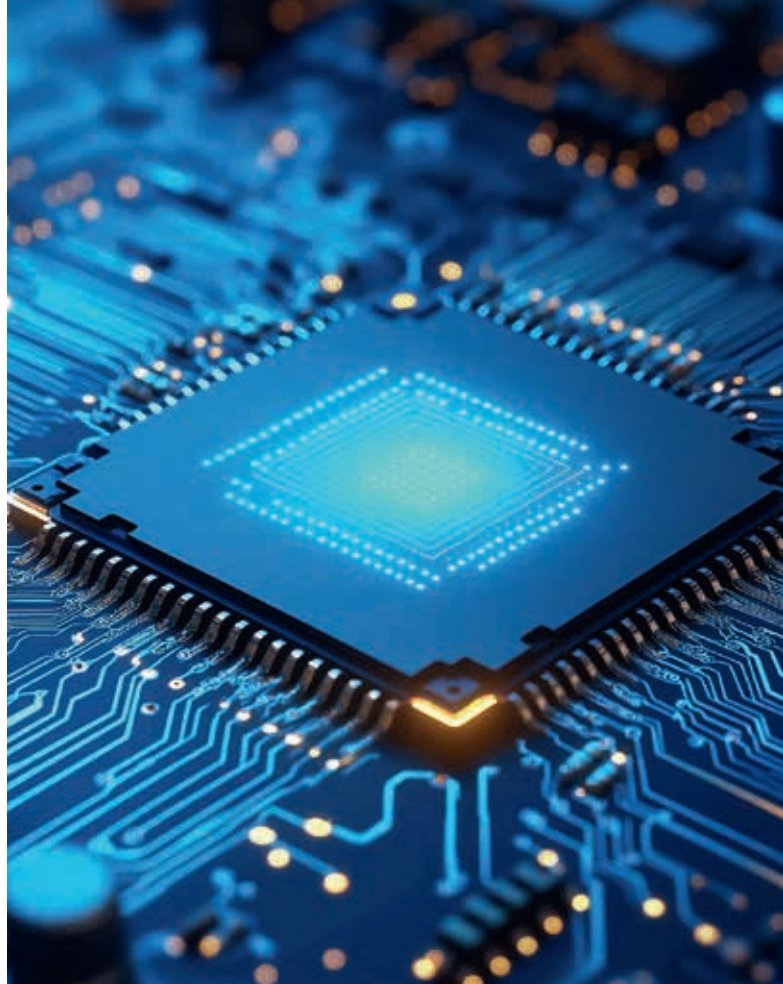
FILIPINAS MEETING ROOM	
08:00	Registration & Welcome Coffee
08:30	HSSE/ Welcome (Co-Chairs)
08:45	Opening Address (Levels of Detail in Performance Analysis) by Jesus Labarta (BSC)
09:10	Keynote 1 - Enabling Energy Research through High Performance Computing - Keith Gray (TotalEnergies)
Session 1: Emerging HPC Technologies Session Chairs: Saber Feki (KAUST) & Gareth O'Brien (Microsoft)	
09:40	HPC6, the Supercomputer Driving the ENI Energy Transition - A. D'Auria ^{1*} ¹ Eni
10:05	Morning Coffee Break and Joint Group Photo Opportunity with DPW
10:35	Intelligent Well Sequencing: A Reinforcement Learning Approach for Optimal Drilling Scheduling - K. Pechko ^{1*} , S. Bazhukov ¹ , M. Simonov ¹ , V. Kim ¹ ¹ Digital Technologies in Industry Association
11:00	Emerging AI Hardware enables Low Power, High throughput Seismic Imaging on the Edge - E. Caunt ^{1,2*} , M. Louboutin ¹ , F. Luporini ¹ , G. Gorman ^{1,2} , M. Badraï ² , J. Betteridge ^{1,2} ¹ Devito Codes; ² Imperial College London
11:25	Quantum Annealing Assisted Workflow for Sparse Spike Deconvolution - H. AlSalem ^{1*} , H.Y. Choong ² , M. Dukalski ² , Y.S. Kim ¹ , M. AlAjaji ¹ ¹ Aramco; ² Aramco Global Research Center
11:50	Maintainable Development of Performant User-Friendly Seismic Processing - M. Nauta ^{1*} , N. Wilson ¹ , L. Casasanta ¹ ¹ SHEARWATER
12:15	Discussion Session / Session Q & A
12:55	Lunch Break at EL NIDO Restaurant (Seated Buffet Lunch)
Session 2 : Geosciences & HPC Part I Session Chairs: Lorenzo Casasanta (SHEARWATER Geoservices) & Dmitriy Tishechkin (Amazon)	
13:55	Keynote 2 - Dr. Dan Stanzione (Texas Advanced Computing Center)
14:25	Most Energetic Traveltime Depth Migration with Neural Networks - G. Manzi ² , M. Caporal ^{1*} , N. Bienati ¹ , A. Tognarelli ² , M. Aleardi ² ¹ Eni; ² University of Pisa
14:50	High-Performance Computing for Coupled Subsurface Processes: Parallelization of a Geomechanics Multiphysics FEM code. - A. Perez ^{1*} , D. Garolera ² , J.M. Segura ¹ , L. Barandiaran ² , E. Ibañez ¹ , I. Carol ³ ¹ REPSOL, S.A.; ² Dracsys, S.L.; ³ Technical University of Catalonia (UPC)
15:15	Optimizing Compute Resource Utilization by Analysing and Profiling a Reservoir Simulation Application - M. Al Salbough ^{1*} , A. Turki ¹ , A. Bu Khamisin ¹ ¹ Aramco
15:40	Afternoon Coffee Break

Session 3 : Geosciences & HPC Part II	
Session Chairs: Nicola Bienati (ENI) & Gareth O'Brien (Microsoft)	
16:05	Python-Fortran FWI Framework - E. Bergounioux ^{1*} , D. Vanzo ¹ , C. Rivera ¹ ¹ TOTALENERGIES
16:30	Transformer based Low-Frequency Extrapolation: a Novel Approach to Fine-Tuning - D.U. Leonzio ² , P. Bestagini ² , L. Russo ¹ , M. Caporal ^{1*} , N. Bienati ¹ ¹ Eni; ² Polytechnic University of Milan
16:55	Auto-regressive Neural Operators for Efficient Wavefield Simulation - S. Brahmachary ¹ , A. Panda ¹ , H. Sethi ^{2*} , D. Dutta ³ , A. Chandran ³ , P. Devarakota ³ , A. St-Cyr ³ ¹ Shell; ² Nvidia; ³ Shell
17:20	Discussion Session / Session Q & A
18:00	Closing Remarks
18:10	Close of Day 1



Oral Presentations | Tuesday 7 October 2025

MANILA & FILIPINAS MEETING ROOMS	
08:00	Welcome Coffee
08:30	Welcome By Chairs - Review of Day 1 and Highlight Day 2 - Departure from Hotel
Session 4 : BSC/CNS Field Trip / Poster Session	
09:00	Group 1 leaves for BSC
09:45	Any Delays & Coffee
Poster Session at the Hotel	
10:05	Optimizing Reservoir Simulations with Cloud-Based HPC: A Scalable and Cost-Efficient Approach - G.A. Haugland ^{1*} ¹ Cegal A Modified Sobolev-Norm Loss for Physics-Informed Seismic Wave Modeling - R. Rodrigues ^{1*} , G. Araujo ¹ , H. Yvique ¹ , J. Costa ² ¹ State University of Campinas; ² Universidade Federal do Pará Enhancing Energy sector Cloud-based Computer Vision with Multi-Instance GPU - L. Boillot ^{1*} , A. Amrani ¹ ¹ TotalEnergies Acoustic Wave Modeling Using the Astaroth Framework - O. Ladino ¹ , B. Spinelli Coelho ¹ , A. Brasil Vieira Wyzkowski ^{1*} , L. Soares ² ¹ Supercomputing Center for Industrial Innovation, SENAI CIMATEC; ² Repsol Sinopec
10:05	Group 2 leaves for BSC
10:50	Any Delays & Coffee
11:10	Group 3 - Plenary Presentation by a BSC representative
11:55	Any Delays & Coffee
12:15	Group 4 - Plenary Presentation by a BSC representative
13:00	Return to Hotel
13:30	Lunch Break at EL NIDO Restaurant (Seated Buffet Lunch)
Joint Session - Leveraging the Computing Revolution in the AI era	
Session Chairs: Davide Calcagni (ENI) / Steve Pitman (Independent Consultant) & Nicola Bienati (ENI) / Gerard Gorman (Imperial College London)	
14:30	Opening Address - High Performance Compute in the AI Era - Edomondo Orlotti (Core42)
15:00	Keynote 1 - Turnaround Time Reduction of Velocity Model Building Flows - Bertrand Duquet (TotalEnergies)
15:30	Next-Gen Geophysics: How AI Hardware is Reshaping Computational Methods - M. Ravasi ^{1*} , I. Vasconcelos ² , L. Casasanta ³ ¹ Shearwater GeoServices
15:50	Technology Roadmap - Where are you Going with an Industry Led by the AI? by the AI? - F. Pautre ^{1*} ¹ Viridien
16:10	Afternoon Coffee Break



Session 5: Mixed Precision Computing

Session Chairs: Gerard Gorman (Imperial College London) & Jordan Pomeroy (ExxonMobil)

16:40	Mixed Precision Storage for Seismic Applications - H. Ltaief ^{1,2} , R. Kriemann ^{2*} , V. Le Fevre ² , V. Etienne ² ¹ KAUST; ² AlgoDoers
17:05	Half-Precision Seismic Modeling in 3D Anisotropic Media - H. Sethi ^{1*} , S. Kainkaryam ¹ , G. Barnier ¹ , D. Datta ² , R. Plessix ³ , F. Hoxha ¹ , P. Dimitrov ¹ ¹ NVIDIA Corp; ² Shell International Exploration and Production Inc.; ³ Shell Global Solutions International B.V
17:30	Accelerating 3D Stencil Computations with Tensor Cores and TF32 - V. Arslan ^{1*} , A. Hincelin ¹ , G. Royle ¹ , G. Thomas Collignon ² , G. Barnier ² ¹ Viridien; ² nvidia
17:55	Half Precision Wave Simulation - L. Gao ^{1*} , K. Harms ¹ ¹ Argonne National Laboratory
18:20	Discussion Session / Session Q & A
18:30	Closing Remarks
18:35	Close of Day 2
19:00	Gala Dinner - My Way Restaurant

Oral Presentations | Wednesday 8 October 2025

FILIPINAS MEETING ROOM	
07:30	Welcome Coffee
08:30	Welcome By Chairs - Review of Day 2 and Highlight Day 3
08:45	Keynote 3 - Streamlining Seismic Imaging at Scale on the Cloud - John Brittan (TGS)
Session 6: Performance Analysis and Optimization Part I Session Chairs: Vincent Etienne (AlgoDoers) & Florent Pautre (Viridien)	
09:15	GPU Multiprocessing Throughput of Reservoir Simulation: A Cross-Vendor and Cross-Generation Analysis - M. Khait ^{1*} ¹ Stone Ridge Technology
09:40	Towards Sustainable HPC: Energy Aware Benchmarking of FWI CPU Power Caps and Thread Trade-offs - A. Abdelhalim ¹ , A. Nasr ¹ , S. Feki ^{2*} ¹ Brightskies Technologies; ² King Abdullah University of Science and Technology
10:05	Morning Coffee Break
10:35	Automatic Generation of Matrix-Free Routines for PDE Solvers with Devito via PETSc - Z. Leibowitz ^{1*} , R. Nelson ¹ , F. Luporini ² , M. Louboutin ² , M. Knepley ³ , L. Mitchell, J. Betteridge ² , E. Caunt ² , G. Bisbas ¹ , M. Piggott ¹ , G. Gorman ^{1,2} ¹ Imperial College London; ² Devito Codes; ³ University at Buffalo
11:00	Discussion Session / Session Q & A

Panel Discussion: Impact of Generative/Agentic AI in the Energy Industry	
Moderator: TBC	
11:45	Panelists: • Michele Isernia, Think Onward • Gareth O'Brien, Microsoft • Prof. Tariq A. Alkhalifah, KAUST • NVIDIA
12:00	Panel Discussion
13:00	Lunch Break at EL NIDO Restaurant (Seated Buffet Lunch)
14:00	Automatic Generation of Matrix-Free Routines for PDE Solvers with Devito via PETSc - Z. Leibowitz ^{1*} , R. Nelson ¹ , F. Luporini ² , M. Louboutin ² , M. Knepley ³ , L. Mitchell, J. Betteridge ² , E. Caunt ² , G. Bisbas ¹ , M. Piggott ¹ , G. Gorman ^{1,2} ¹ Imperial College London; ² Devito Codes; ³ University at Buffalo
14:25	Discussion Session / Session Q & A
15:15	Afternoon Coffee Break
15:05	Closing Remarks
15:45	Close of Workshop

REGISTRATION

REGISTERED AND PAID	Early Registration 2/5/25 - 1/9/25	Regular Registration 2/9/25 - 23/9/25	Late Registration 24/9/25 - 8/10/25
EAGE Green Member ^{1,5}	1095	1350	1555
EAGE Bronze/Silver/Gold Member ^{1,5}	940	1195	1395
EAGE Platinum Member ^{1,5}	940	940	940
Non-member ³	1195	1450	1655
EAGE Student Green Member ^{1,2,5}	395	445	495
EAGE Student Bronze/Silver/Gold Member ^{1,2,5}	320	370	420
Student Non-member ^{2,3,4}	420	470	520

Register now!





VENUE

Hotel 1898 LA RAMBLA

La Rambla, 109, First Floor, Ciutat Vella,
08002 Barcelona, Spain.

CONTACT

For more information on the workshop, please get in touch with the EAGE MEA team via middle_east@eage.org or +971 4 369 3897.

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