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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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 | 1140 - 1300 hrs (UTC+2)

Moderator

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

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

Fabrice Dupros
Principal Member of Technical Staff
AMD

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	**Intelligent Well Sequencing: A Reinforcement Learning Approach for Optimal Drilling Scheduling -** K. Pechko[1]*, S. Bazhukov[1], M. Simonov[1], V. Kim[1] [1]Independent
10:30	**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. Badrais[2], J. Betteridge[1,2] [1]Devito Codes; [2]Imperial College London
10:55	**Morning Coffee Break and Group Photo Opportunity for HPC**
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], M. Alsharif[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)

14:00	**Keynote 2 - The US NSF Leadership Class Computing Facility at the Texas Advanced Computing Center: Challenges and Opportunities for HPC in the Age of AI -** Dr. Dan Stanzione (Texas Advanced Computing Center)
14:30	**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
14:55	**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)
15:20	**Optimizing Compute Resource Utilization by Analysing and Profiling a Reservoir Simulation Application -** M. Al Salboukh[1]*, A. Turki[1], A. Bu Khamsin[1] [1]Aramco
15:45	**Afternoon Coffee Break**

Session 3: Mixed Precision Computing
Session Chairs: Gerard Gorman (Imperial College London) & Diego Klahr (TotalEnergies)

16:10	**Mixed Precision Storage for Seismic Applications -** H. Ltaief[1,2], R. Kriemann[2]*, V. Le Fevre[2], V. Etienne[2] [1]KAUST; [2]AlgoDoers
16:35	**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
17:00	**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
17:25	**Half Precision Wave Simulation -** L. Gao[1]*, K. Harms[1] [1]Argonne National Laboratory
17:50	**Discussion Session / Session Q & A**
18:20	**Closing Remarks**
18:30	**Close of Day 1**
18:30	**Icebreaker Reception**

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**

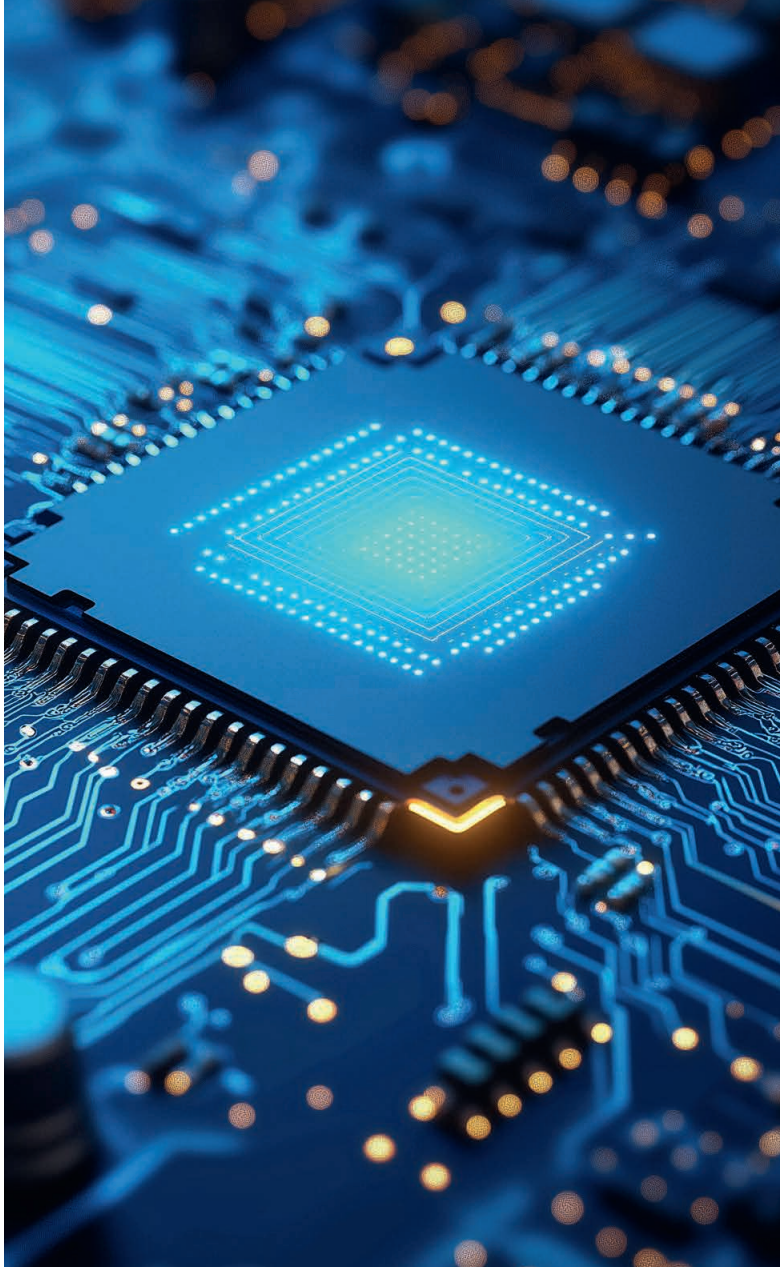
Poster Session at the Hotel

08:30	**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. Yviquel[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 Wyzykowski[1]*, L. Soares[2] [1]Supercomputing Center for Industrial Innovation, SENAI CIMATEC; [2]Repsol Sinopec
	Reducing Risks through Seismic Inversion and comprehensive Prospectivity Analysis - N. Desgoutte[1]*, V. Thomas[1], N. Lucet[1], R. Baillet[1] [1]Beicip Franlab
	Reviving legacy 4D Seismic Data to Reveal Subtle Oil Slumping Signals in the Grane Field - M. Wilk-Lopes[1]*, G. Sarsengaliyeva[1], A. Handzlik-Walat[1], H. Neffati Rouai[1], G.R. Hall[2], F. Büker[2], M. Beiki[2] [1]SLB; [2]Equinor
	PVA Method - a New Approach for Phase Velocity Analysis of Rayleigh Waves - A. Costa[1]*, P. Pizzuti[1], R. Costa[1], F. Rodrigues[1], M. Tschoepke[1] [1]AFC Geofisica Ltda
	Pitfalls and Limitations in the Statistical Analysis of High-Frequency Imaged Data - M. Hussein Kamel, W. Mohamed Mabrouk, A. MOHAMED[1]* [1]Sawaed UAE
09:45	**Group A - Finish BSC visit**
09:45	**Group B - BSC Visit / Group A returns to hotel**
10:30	**Bus departs hotel with Groups C & D**
11:00	**Arrival at BSC grounds - Groups C & D**
11:00	**Group C - BSC visit / Group D - wait at Vertex/ Garden**
11:45	**Group C - Finish BSC visit**
11:45	**Group D - BSC visit / Group C- wait at Vertex/ Garden**
12:30	**Group C&D finish; bus returns to hotel**
13:00	**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)

14:00	**Opening Address - High Performance Compute in the AI Era - Edomondo Orlotti (Core42)**
14:30	**Keynote 1 - Turnaround Time Reduction of Velocity Model Building Flows** - Bertrand Duquet (TotalEnergies)
15:00	**Next-Gen Geophysics: How AI Hardware is Reshaping Computational Methods** - M. Ravasi[1]*, I. Vasconcelos[2], L. Casasanta[3] [1]Shearwater GeoServices



15:20	**Technology Roadmap - Where are you Going with an Industry Led by the AI? by the AI?** - F. Pautre[1]* [1]Viridien
15:40	**Discussion Session / Session Q & A**
16:10	**Afternoon Coffee Break**

Session 5: Performance Analysis and Optimization Part I

Session Chairs: Vincent Etienne (AlgoDoers) & Florent Pautre (Viridien)

16:30	**GPU Multiprocessing Throughput of Reservoir Simulation: A Cross-Vendor and Cross-Generation Analysis** - M. Khait[1]* [1]Stone Ridge Technology
16:55	**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
17:20	**Closing Remarks**
17:25	**Close of Day 2**
19:30	**Gala Dinner - My Way Restaurant**

Oral Presentations | Wednesday 8 October 2025

FILIPINAS MEETING ROOM	
08:00	**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: Geosciences & HPC Part II Session Chairs: Nicola Bienati (ENI) & Gareth O'Brien (Microsoft)	
09:15	**Python-Fortran FWI Framework -** E. Bergounioux[1]*, D. Vanzo[1], C. Rivera[1] [1]TOTALENERGIES
09:40	**Transofrmer 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
10:05	**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
10:30	**Discussion Session / Session Q & A**
11:05	**Morning Coffee Break**

Panel Discussion: Impact of Generative/ Agentic AI in the Energy Industry Moderator: Matteo Ravasi (SHEARWATER Geoservices)	
11:40	Panelists: • Michele Isernia, Think Onward • Gareth O'Brien, Microsoft • Prof. Tariq A. Alkhalifah, KAUST • Fabrice Dupros, AMD
12:40	**Panel Discussion**
13:00	**Lunch Break at EL NIDO Restaurant (Seated Buffet Lunch)**
Session 7: Next-Generation Programming Languages and Models Session Chairs: TBC	
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	**Building abstractions for advanced timestepping in Devito -** J. Betteridge[1]*, T. Nemeth[2], J. Washbourne[2], M. Louboutin[1], F. Luporini[1], E. Caunt[1], G. Gorman[1] [1]Devito Codes; [2]Chevron Technical Center, a division of Chevron U.S.A. Inc.
14:50	**Discussion Session / Session Q & A**
15:20	**Closing Remarks**
15:30	**Afternoon Coffee Break**
16:00	**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

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