

EAGE

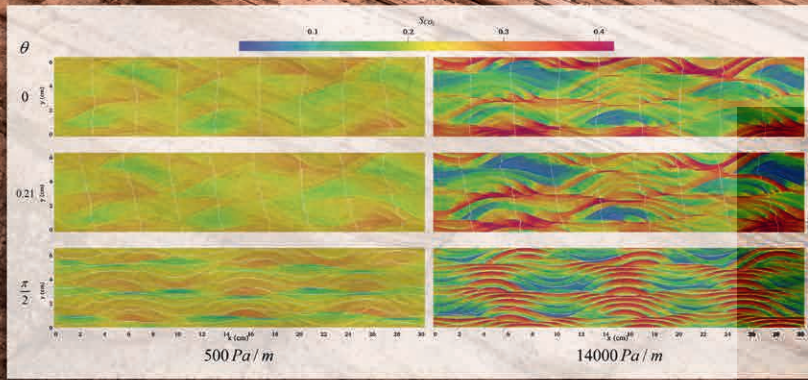
ECMOR | 2024

European Conference on the Mathematics of Geological Reservoirs

2-5 SEPTEMBER 2024 | OSLO, NORWAY

FIRST ANNOUNCEMENT

WWW.ECMOR.ORG



Bed-form heterogeneity of cross-bedded reservoir sandstone (frame) and simulated non-uniform distribution of supercritical CO₂ ensuing from it for different far-field fluid-pressure driving gradients (inset).

WELCOME TO ECMOR 2024!

MATHEMATICAL MODELLING AND SIMULATION FOR SUSTAINABLE SUBSURFACE ENERGY SYSTEMS

On behalf of EAGE and the ECMOR scientific committee, we are pleased to announce the European Conference for Mathematics of Geologic Reservoirs, ECMOR 2024. The conference will be held in Oslo, Norway as a 3-day event, preceded by a one-day workshop focusing on the modelling and simulation challenges associated with the implementation of carbon-geosequestration at scale. Save the dates September 2-5, 2024 for attending this twentieth edition of ECMOR.

The United Nations Sustainable Development Goal 7 “Affordable & Clean Energy” can only be achieved with mathematical modelling and simulation as an enabler, helping us to discover ways to manage the subsurface sustainably despite competing and intensifying interventions, such as energy extraction and storage, mining, water abstraction, waste disposal, and carbon geo-sequestration. Risking, uncertainty estimation, field-development planning, and optimisation of engineering measures all rely on mathematical modelling and simulation. The latter is indispensable also because it permits to investigate the emergent behaviour of subsurface systems including early detection of unwanted side effects of engineering measures. Its synergies with artificial intelligence applications have accelerated progress in this domain. However, major challenges such as the decarbonisation of the global economy lie ahead as captured by the Sustainable Development Goal 13 “Climate Action”. We believe that mathematical modelling and simulation of the subsurface play a vital role for finding the sustainable engineering solutions needed to achieve both SDG 7 and 13.

For more than 30 years, ECMOR has brought together applied mathematicians, engineers and geoscientists from academia, government, and industry, who share an interest in the numerical modelling of underground geologic systems.

ECMOR has a tradition of featuring significant scientific and engineering breakthroughs in its focus areas. In this coming ECMOR, we highlight the importance of CO₂ capture and geosequestration as a means to halving global emissions into the atmosphere. This quest motivates the one-day workshop on the fundamentals and state of the art of CO₂ geo-sequestration. As the number of such projects increases rapidly, international experts will help us understand emerging knowledge, practices, modelling and simulation needs. While this event will be of interest to scientists and engineers who already have some experience with CO₂-storage, it also aims to engage those unfamiliar with, but interested in, this topic, whether they have a background in mathematics, computer science, AI, geosciences or reservoir engineering.

In addition, ECMOR 2024 invites contributions to new topical sessions on machine learning, open software development, and hydrogen storage.

From the 2020 event organised online with around 200 participants from over 20 countries and 6 continents, to the hybrid 2022 event in The Hague with more than 100 participants from 22 countries, ECMOR 2024 returns to its original format of an in-person event attracting experts from all over the world for live discussions. We look forward to receiving your abstracts and to seeing you in Oslo!

Stephan Matthai & Arne Skorstad
Co-chairs, ECMOR 2024

ABOUT ECMOR

Every two years, the ECMOR conference gathers applied mathematicians and geoscience engineers from both academia and industry to focus on recent advances in geological and reservoir modelling. The ECMOR conferences started more than 30 years ago in a sequence of meetings across Europe and continue a tradition of combining high-quality mathematical and computational science with engineering applications. The ECMOR conference provides a forum for researchers and engineers from academia, governmental bodies and industry to meet in an informal atmosphere and to discuss key technical and mathematical challenges in modelling and predicting the behaviour of geologic reservoirs and subsurface energy systems.

SCIENTIFIC COMMITTEE

Ahmed Elsheikh	Heriot-Watt University
Alberto Cominelli	Eni
Arne Skorstad*	Landmark
Dominique Guérillot	Terra 3E SAS
Edel Reiso	Equinor
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Ralf Schulze-Riegert	SLB
Roland Masson	Université Côte d'Azur
Stephan Matthai*	The University of Melbourne
Taoufik Ait-Ettajer	Repsol

* Co-chairs

ABOUT OSLO

Oslo is a charming and vibrant city, capital of Norway, beautifully situated between fjords and forests. It's known for its harmonious blend of modernity and history and offers a unique experience that combines urban life with the tranquillity of nature. This modern city blends history with innovation, showcasing stunning architecture and a commitment to sustainability. Museums like the Viking Ship Museum reveal the country's rich past, while parks like Vigeland Park offer serene escapes. Oslo's culinary scene highlights fresh, local ingredients and diverse international flavours. With efficient public transport, a vibrant waterfront, and a touch of northern magic, Oslo captures the essence of Norway's unique charm.

CONFERENCE OVERVIEW

2 September 2024	Workshop & Networking Reception
3 September 2024	Technical Programme
4 September 2024	Technical Programme + Conference Dinner
5 September 2024	Technical Programme

TOPICS

We invite all applied mathematicians, engineers and geoscientists to contribute to the technical programme, to share results, experiences and new ideas during the ECMOR conference. The Call for Abstracts deadline is 1 February 2024. For more information on submitting your abstract, please refer to www.ecmor.org.

The technical programme of ECMOR 2024 consists of oral and poster presentations on a broad selection of topics.

1. PHYSICAL MODELLING

1. Fluid property and compositional modelling
2. Pore scale modelling
3. Flow and mechanics of fractured media
4. Geomechanics (incl. compaction, subsidence, and induced seismicity)
5. Geochemical and biochemical modelling (incl. fluid-rock interaction)
6. EOR
7. CO₂ sequestration
8. Energy storage and geothermal
9. Hydrogen storage

2. COMPUTATIONAL METHODS

1. Mesh generation and discretization schemes
2. Linear and nonlinear solvers
3. Upscaling and multiscale methods
4. Reduced order modelling
5. Statistical and stochastic methods
6. High-performance computing
7. Machine learning and data-driven/hybrid methods
8. Physics - informed AI methods
9. Sustainability assessment of geo-energy solutions



3. UNCERTAINTY QUANTIFICATION AND OPTIMIZATION

1. Geostatistics and reservoir characterization
2. Modelling of geological uncertainties
3. Data assimilation and history matching
4. Risk and uncertainty analysis
5. Optimization and planning
6. Closed-loop reservoir management, smart fields
7. Response surfaces and machine learning surrogate modelling
8. AI approaches to reservoir management and control
9. Optimisation of the sustainability of geo-energy solutions

4. ENGINEERING OF OPEN SIMULATION SOFTWARE

Since this is a new topic, we will base subdivisions on the contributions received.

All accepted paper contributions will be published on EAGE's EarthDoc database. Authors of selected papers will receive an opportunity to publish their contribution in a special issue of a scientific journal.

SUBMISSION GUIDELINES

The Call for Abstracts deadline is 1 February 2024. To submit a paper or for any additional information, please refer to the event website.

IMPORTANT DATES

Abstract Submission Deadline	1 February 2024
Early Registration Deadline	10 July 2024
Full Paper Submission Deadline	1 June 2024
Regular Registration Deadline	10 August 2024
ECMOR 2024	2-5 September 2024

WORKSHOP

ENABLING GIGATONNE DISPOSAL OF CARBONDIOXIDE IN THE SUBSURFACE

Monday 2 September | 9:00-17:30

PRESENTERS

Phil Ringrose (Equinor/NTNU)
Sarah Gasda (NORCE)
Stephan Matthai (UoM)
David Ponting (OpenGoSim)
Odd Andersen (SINTEF)
Lukas Mosser (Aker BP)

Carbon geo-sequestration is essential for global decarbonisation, and field-demonstration pilots like Sleipner, now operating for >20 years, demonstrate the potential of

this technology, but also that there are still many unknowns. New projects are now emerging every month. The challenge facing humanity now is to upscale these efforts from a few millions to gigatonnes sequestered per year. Only then, can CCS markedly impact atmospheric CO₂ concentration.

This one-day workshop moves from CO₂ geo-sequestration fundamentals to the state of the art, unpacking emerging knowledge, practices, geomodelling and simulation needs, and highlighting open research and engineering questions. It is tailor-made for a multi-disciplinary audience ranging from scientists to engineers with different levels of experience with carbon geo-sequestration, and it aims to engage those unfamiliar with, but interested in this subject, whether they have a background in mathematics, computer science, AI, geosciences or reservoir engineering.

The workshop is presented as a series of lectures interleaved with discussion sections and it will conclude with a panel discussion revisiting leading questions inviting contributions from the audience.

The workshop materials, including references to online resources will be made available to the participants prior to the workshop.

SOCIAL PROGRAMME

To complement the conference, a networking reception will be organised as well as a conference dinner at a special location. Keep a close eye on our website to check the most up-to-date information about the social programme of ECMOR 2024.

SPONSORING

Our sponsorship opportunities are designed to introduce attendees and businesses to your organisation while effectively highlighting your significance within the industry. For more information please refer to the [Sponsor Guide](#) available on the conference website.

REGISTRATION SPONSOR



CONTACT

Visit www.ecmor.org for the latest event updates. For questions, please contact the EAGE Europe Office via europe@eage.org or call us at +31 88 995 5055.