InterPore2024

16th ANNUAL MEETING

CONFERENCE PROGRAM

13 - 16 May 2024

Shangri– La Hotel Qingdao, China

中国石油大学（华东）
CHINA UNIVERSITY OF PETROLEUM

www.interpore.org/2024 | conference2024@interpore.org

InterPore

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WELCOME MESSAGES

WELCOME TO QINGDAO!

Jun Yao
LOC General Chair

Dear InterPore2024 participants,

On behalf of the Local Organizing Committee of InterPore2024, I would like to welcome you to Qingdao for the 16th Annual Meeting. This conference is the major annual event of our Society as it offers a unique opportunity to meet new colleagues, reminisce with old friends and collaborators, and most importantly, exchange information, share findings, and develop new ideas and concepts through interactions.

We are expecting over 700 participants, and have more than 10 sponsors and exhibitors. There will be plenty of opportunities for you to visit their stands and learn about the valuable services and products they are offering to the porous media community.

We have an impressive week ahead of us, full of scientific activities and cultural immersion. I invite you to partake in the Chinese Art Event on Tuesday, which will lead you to explore the intricate artistry of calligraphy and paper cutting. You'll not only witness the beauty of paper cutting and calligraphy, but you will be able to try it by yourself. The Laboratory Tours are also scheduled for your visit. Check the conference website for more details.

As a renowned international sailing capital, Qingdao boasts numerous attractions that invite further exploration. Join us for a walk along the seashore on Wednesday, where you will see famous attractions such as the May Fourth Square, the Olympic Sailing Center, Lover Dam, and Yeer Island. We will also be able to enjoy a spectacular light show. Of course, you cannot miss the delicious seafood and fresh Qingdao beer. There is the Qingdao Museum, a beer street where you can experience freshly brewed beer and a variety of delicious Chinese food, so please come and experience it!

The LOC has been preparing this meeting since 2020. We are ready! We sincerely invite you to come to Qingdao and enjoy this academic feast!

Yours Sincerely,
Jun Yao

WELCOME MESSAGES

Karsten Thompson
Louisiana State University, USA

Dear Colleagues,

On behalf of the Executive Committee, welcome to the 16th Annual Meeting of the International Society of Porous Media. InterPore is an international organization not only in name, but as evidenced by its global membership and participation, and we are proud to be hosting the annual conference in East Asia for the first time. It has been a long time in the making, postponed twice due to the pandemic.

Last year's highly successful conference in Edinburgh marked a return to programming centered around in-person oral and poster presentations, and it was clear from feedback how much attendees appreciated the engagement, discussion, and networking that this format creates.

We anticipate the same this year in Qingdao, as the program includes an outstanding slate of plenary and invited talks, oral presentations, and poster presentations. As we have come to expect from InterPore, the sessions are a rich mix of what we think of as "traditional" porous media subjects as well as specialized, emerging, unusual, and other thought-provoking topics. In other words – it offers the diverse and interdisciplinary blend of porous media research that is one of the main characteristics of InterPore.

I would like to express gratitude for the skill and persistence of the events committee, the local organizing committee, and the InterPore staff, who successfully re-negotiated contracts and adjusted events planning through the two postponements of the Qingdao event. These efforts have enabled us to host the 2024 conference on firm financial footing and with the great conference experience I know we will have this week.

Thank you for participating in InterPore 2024, and see you in the technical sessions, networking, and social events!

On behalf of the Executive Committee,
Karsten Thompson
President of InterPore

InterPore National Chapters

National chapters offer elevated visibility, improved local and global networking, platforms for joint workshops and many other benefits.

Existing Chapters


Australia


Benelux


Brazil


China


Columbia


France


Germany


Hellenic


India


Iran


Israel


Italy


Japan


Mexico


Norway


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Spain


United Kingdom


Southern US


NE-MW US


West Africa

Chapters Under Formation include:
Hong Kong, Maghreb, Egypt, Austria, GULF

InterPore National Chapter Committee Members:

Eduardo Abreu (Chair) University of Campinas, *Brazil*
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Michel Quintard, CNRS, IMFT, *France*
Nicolae Tomozeiu, Canon Production Printing, *the Netherlands*
Xiaofan Yang, Beijing Normal University, *China*
Maja Rucker, Eindhoven University of Technology, *the Netherlands*

Visit the InterPore website to learn more about joining or starting your local chapter!

InterPore
Student Affairs

The Student Affairs Committee (SAC), in collaboration with student representatives of LOC, is thrilled to announce an array of exciting activities organized for students and early-career researchers during InterPore2024. Immerse yourself in a transformative experience by marking your calendars and participating in our engaging events:

• **Career Development Event**: Whether you're a student, a Ph.D. candidate, or an early-career researcher (ERC), this event is designed to equip you with the skills needed to thrive in the era of energy transition and the green shift. Join us on Tuesday, 14 May from 14:00 - 15:30 for an enlightening panel discussion featuring accomplished academics and industry professionals. Gain invaluable guidance on the most sought-after skills, discover the secrets to building marketable competency, and learn how to showcase your expertise effectively.

• **Chinese Art**: Journey through the enchanting world of Chinese culture as you explore the intricate artistry of calligraphy and paper cutting on Tuesday, 14 May from 17:00 - 18:30. Step into the profound heritage of China and witness the beauty of these traditional art forms. Appreciate the skill and precision required to create stunning works of art while gaining a deeper understanding of Chinese artistic traditions.

• **Game Night and Networking**: Join us for an unforgettable evening of team building and excitement at our ECR Rendezvous Game Night taking place on Tuesday, 14 May from 19:00 - 21:00. This event is specially curated for those eager to turn academic networking into an adventurous experience. Connect with fellow researchers, engage in friendly competition through board games and trivia, and create lasting memories.

• **Grant Writing Workshop**: Embark on a funding journey with our exclusive workshop held on Thursday, 16 May from 13:00 - 15:00. Led by Professor Nima Shokri, Dean of Faculty and Head of Institute at Hamburg University of Technology, this workshop will empower you in securing funds for your research projects. Dive into the world of successful grant writing and transform confusion into confidence. Learn how to craft winning grant applications, create project budgets, and design impactful projects.

These events are open to all InterPore2024 participants, including undergraduates, PhDs, Postdocs, and early-career researchers. For more information on the SAC events, please refer to the detailed program or visit the InterPore2024 website. Get ready to enhance your conference experience and make the most out of these incredible opportunities!

On behalf of the Student Affairs Committee,
Mohammad Nooraiepour
SAC Chair

Would you like to join SAC and make InterPore2024 even better? Contact **sac@interpore.org**

InterPore SAC 2024 Board Members

Chair: Mohammad Nooraiepour, University of Oslo, *Norway*
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Mohammad Masoudi, University of Oslo, *Norway*

InterPore Foundation

In support of outreach activities, one goal of the Foundation is to facilitate the participation of promising **students** in **international scientific gatherings** and support outstanding young scientists from **countries with financial difficulties** in joining InterPore activities.

Since 2018, the InterPore Foundation has provided close to **100 conference grants** to students and young scientists. The Foundation aims to increase both the number and amount of these grants for the coming years.

Visit www.interpore.org/interpore-foundation/
to learn more about the Foundation and how your contributions count!

Make all this possible - DONATE NOW!

Promoting InterPore educational and training activities via:

- **Courses**
- **Webinars**
- **Thematic workshops**
- **Young Academy activities**

InterPore Academy Governance:

Director: Brian Berkowitz, Weizmann Institute of Science, *Israel*
Scientific Secretary: M. Sadegh Riasi, University of Cincinnati, *USA*
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Chair of Course Committee: Ilenia Battiato, Stanford University, *USA*
Co-Chairs of the Young Academy: Marcel Moura, University of Oslo, *Norway*
Catherine Spurin, Stanford University, *USA*
Mohammad Nooraiepour, University of Oslo, *Norway*

Young Academy Team

Porous Media Tea Time Talks past sessions are available on our YouTube Channel via the QR-Code

To learn more about upcoming events & suggest topics and lecturers, visit:

www.interpore.org/academy/

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Booth #8

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The company has a 30-year history of developing innovative electron microscopy, micro-computed tomography, and related software solutions for customers in research and industry worldwide. For example, TESCAN's TENSOR is the first 4D-scanning transmission electron microscope (4D-STEM) built from the ground up for a totally new level of performance and user experience.
As a result, TESCAN has earned a leading position in micro- and nanotechnology. TESCAN world-class technology delivers complete solutions for researchers in all branches of science. No matter what is the type and size of the sample, and what questions are being asked, there is always a dedicated solution available to solve all required tasks. Due to the high versatility and customisable design of all TESCAN systems, it is very easy to design and manufacture dedicated instruments suited exactly to the customer's needs.

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Understanding the porosity of a material, whether it is a defect or a feature, is critical for its continued quantification. For example, understanding the various types of porosity defects can guide adjustments in the manufacturing process to improve the material's properties. In a material that is porous by design, the expected level of porosity can be altered through conception changes. Imaging techniques such as microCT, FIB-SEM, SEM, and TEM allow for the analysis of porous materials to quantify micropores, sponge-type voids, large macro-voids, inclusions, and so forth.
At Thermo Fisher Scientific, we strive to provide innovative analytical solutions. For over 20 years, the Thermo Scientific Avizo Software and Thermo Scientific PerGeos Software have evolved closely with the scientific community. They provide a reliable, fully automatable, customizable, and easy-to-use software solution so you can innovate faster.

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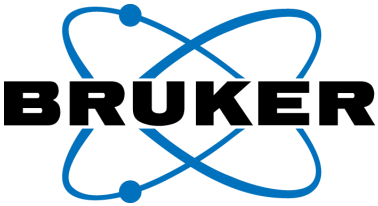

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Booth #14

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Booth #10

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Gumiho

Booth # 4

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Main products: microscope

http://www.gumiho.com.cn/

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Booth #1

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www.tckyyq.com

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Booth # 3

Jiangsu Kedi Scientific Research Instrument Co., Ltd. is a high-tech enterprise specializing in the design, development and production of petrochemical analysis, petroleum scientific research instruments, coal bed methane, shale gas equipment, supercritical extraction and other equipment. Products are widely used in petroleum, chemical industry, geology, metallurgy, pharmaceutical, food and universities and other scientific research and experimental institutions, the company has established core analysis and testing, oilfield exploration and development research, supercritical extraction laboratories.
Our company has strong technical force, advanced equipment, complete testing means and superior basic conditions. Pay attention to integrity management and technology development, and with perfect scientific research, excellent quality through the ISO9001:2000 international quality management system certification, and obtained the "Jiangsu Province measurement assurance confirmation unit" certificate, new technology utility patent certificate, special equipment (pressure vessel) manufacturing license.

http://www.jskdky.cn/

Capillarity in Porous Media at Different Scales
Sunday, May 12, 9:00 - 12:00
China University of Petroleum (UPC),
Instructor:
Majid Hassanizadeh, *Utrecht University*

Machine learning integration with pore-scale studies:
concepts and applications
Sunday May 12, 9:00 - 12:00
China University of Petroleum (UPC),
Instructor:
Saeid Sadeghnejad, *Applied Geology, Institute for Geosciences, Friedrich-Schiller-University Jena*

Microscale flow and multiphysical transport in porous media (In Chinese)
Sunday May 12, 9:00 - 17:00
China University of Petroleum (UPC),
Instructor:
Moran Wang, *Tsinghua University*

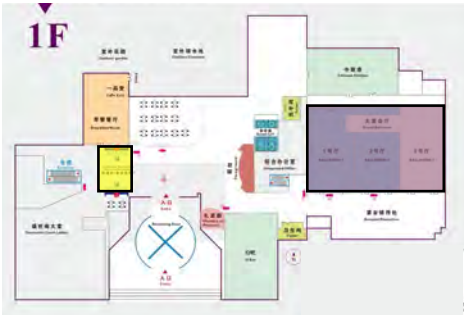
Multi-Scale Multi-Module Correlative Analysis including image Analysis (CT/FIB/Avizo - Hands On Tutorial)
Sunday May 12, 14:00 - 17:00
China University of Petroleum (UPC),
Instructor:
Eric Pui-Lam Ho, *Thermo Fisher Scientific*

Introduction to powder metallurgically manufactured porous materials
Friday May 17, 9:00 - 12:00
China University of Petroleum (UPC),
Instructor:
Olaf Andersen, *Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Branch Lab Dresden*

Advances in CO2 Sequestration in Reactive Basaltic Rocks through Mineral Carbonation
Friday May 17, 09:00 - 12:00
China University of Petroleum (UPC),
Instructors:
Helge Hellevang, *University of Oslo*
Mohammad Nooraiepour, *University of Oslo*
Mohammad Masoudi, *University of Oslo*

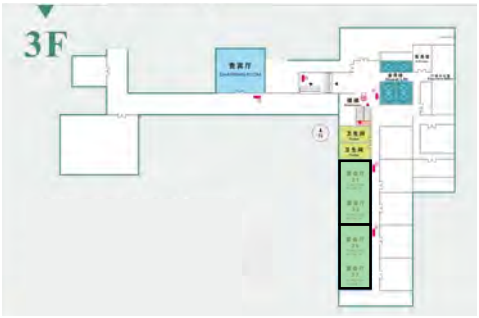
Multiphase Flow in Permeable Media: A Pore-Scale Perspective
Friday May 17, 09:00 - 17:00
China University of Petroleum (UPC),
Instructor:
Martin Blunt, *Imperial College London*

VENUE FLOORPLAN



Grand Ballrooms	Plenary Sessions Invited Sessions Parallel Sessions DEI Forum
Centurion Court Lobby	Registration

China Hall	Welcome Dinner Lunches EquiPore Happy Hour
Function Room 22	Parallel Sessions Chinese Art Event
Function Room 24/25	Parallel Sessions
Function Room	Parallel Sessions
China Hall Pre-Function	Posters & Exhibition Coffee Breaks



Function Room 31/33	Parallel Sessions
Function Room 35/37	Parallel Sessions Career Event Grant Writing Work-shop

LIST OF MINISYMPOSIA

(MS01) Porous Media for a Green World: Energy & Climate

Organizers: Maartje Boon, Adedapo Awolayo, Lauren Beckingham, Rainer Helmig, Anna Herring, Kai Li, Kamaljit Singh , Yuhang Wang

(MS02) Porous Media for a Green World: Water & Agriculture

Organizers: Milad Aminzadeh, Minsu Kim, Gang Wang, Nima Shokri

(MS03) Flow, transport and mechanics in fractured porous media

Organizers: Hamid Nick, Hang Deng, Tianran Ma, Catherine Peters

(MS04) Swelling and shrinking porous media

Organizers:: Yihuai Zhang, Muhammad Arif , Yang Yang, Yida Zhang

(MS05) Microbial Processes in Porous Media: Risks and Advances

Organizers: Na Liu, Chaojie Cheng, Jacquelin Elizabeth Cobos Mora, Seetha N, Yibin Qi, Eike Thaysen, Yuze Wang

(MS06-A) Physics of multiphase flow in diverse porous media

Organizers: Chao-Zhoong Qin, Saman Aryana, Li Chen, Ying Gao, Yu Jing, Hassan Mahani, Maša Prodanović, Rui Wu

(MS06-B) Interfacial phenomena in across scales

Organizers: Ran Holtzman, Oshri Borgman, Sidian Chen, Zuhao Kou, Hannah Menke , Ziqing Pan, Subhadeep Roy, Rui Wu, Zhibing Yang

(MS07) Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes

Organizers: Jakub Both, Eric Chung, Ben Mansour Dia, Cunqi Jia, Nadja Ray, Peng Xu

(MS08) Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media

Organizers: Marco Dentz, Branko Bijeljic, Mohammad Nooraiepour, Amir Raoof, Mozhdeh Sajjadi, Qingwang Yuan, Weiwei Zhu

(MS09) Pore-scale modelling

Organizers: Ke Xu, Bo Guo, Shaina Kelly, Yashar Mehmani, Saeid Sadeghnejad, Moran Wang, Chiyu Xie, Yongfei Yang**,** Stéphane Zaleski

(MS10) Advances in imaging porous media: techniques, software and case studies

Organizers: Lin Ma, Martin Blunt, Sidian Chen, Qinhong Hu, Maja Rucker, Liwei Zhang

(MS11) Microfluidics and nanofludics in porous systems

Organizers: Yaniv Edery, Shima Parsa, Nicolas Waisbord, Jiahui You, Junjie Zhong

(MS12) Advances in Computational and Experimental Poromechanics

Organizers: Jianchao Cai,, Sebastian Geiger, Amir Haghi,

(MS13) Fluids in Nanoporous Media

Organizers: Bin Pan, Elizabeth Barsotti, Qinhong Hu, Shaina Kelly, Jianchun Xu, Yun Yang

(MS14) Uncertainty Quantification in Porous Media

Organizers: Ben Mansour Dia, Valentina Ciriello, Mina Karimi, Rodrigo W. dos Santos, Huining Xu

(MS15) Machine Learning and Big Data in Porous Media

Organizers: Shuyu Sun, Bailian Chen, Yalchin Efendiev, He Liu, Pania Newell, Hongkyu Yoon, Chensong Zhang, Kai Zhang, Tao Zhang

(MS16) Fluid Interactions with Thin Porous Media

Organizers: Richmond Cohen, Dwayne Jackson, Satoru Katoh, Nicolae Tomozeiu Chaozhong Qin

(MS17) Complex Fluid and Fluid-Solid-Thermal coupled process in Porous Media: Modeling and Experiment

Organizers: Yingfang Zhou, Praveen Linga,, Shimin Liu, Moran Wang, Ruina Xu

(MS18) Innovative Methods for Characterization, Monitoring, and In-Situ Remediation of Contaminated Soils and Aquifers

Organizers: Christos Tsakiroglou**,** Xiaopu Wang, Tianyuan Zheng

(MS19) Elastic, electrical, and electrochemical processes and properties in porous media

Organizers: Pablo Garcia Salaberri, Yuqi Wu, Cunqi Jia

(MS20) Biophysics of living porous media: theory, experiment, modeling and characterization

Organizers: Dominik Obrist, Timo Koch, Fred Vermolen, Moran Wang

(MS21) Non-linear effects in flow and transport through porous media

Organizers: Mohaddeseh Mousavi Nezhad, Huaming Guo, Yves Méheust

(MS22) Manufactured Porous Materials for Industrial Applications

Organizers: Senyou An, Vahid Niasar, Mohammadjavad Shokriafra, Shuo Zhai

(MS23) Interfaces, interfaces everywhere… A special session in honor of Dorthe Wildenschild

Organizers: Maša Prodanović, Ryan Armstrong, Steffen Berg, Wenhui Song

SUNDAY, 12 MAY 2024

8:00 – 13:00	**AM Lab Tours**: *Meet in Centurion Court Lobby*
9:00 – 16:00	**Conference Courses:** *China University of Petroleum*
13:00 – 18:00	**PM Lab Tours**: Meet in Centurion Court Lobby

MONDAY, 13 MAY 2024

08:00	**Registration (Open every day):** *Centurion Court Lobby*							
	Plenary Session 1: *Grand Ballroom (Ballrooms 1, 2 & 3)*							
09:00 – 09:05	**Opening Ceremony**							
09:05 – 09:10	**Award Ceremony** InterPore Meritorious Service Medal: *Jun Yao*							
09:10 – 09:55	**Plenary Lecture:** Zhangxing (John) Chen							
09:55 – 11:25	**Poster Session I, Exhibition, Coffee Break:** *China Hall Pre-Function Area*							
11:25 – 12:25	**Session 1.1**							
	Ballroom 2	*Function Rm 24/25*	*Ballroom 3*	*Function Rm 26*	*Function Rm 22*	*Function Rm 31/33*	*Ballroom 1*	*Function Rm 35/37*
	MS13	MS06-B	MS09	MS07	MS05	MS08	MS04	MS15
12:25 – 13:25	**Diversity, Equality & Inclusiveness Lunch Forum:** *Ballroom 2*							
12:25 – 13:25	**Lunch Break:** *China Hall*							
13:25 – 14:55	**Session 1.2**							
	Ballroom 2	*Function Rm 24/25*	*Ballroom 3*	*Function Rm 26*	*Function Rm 22*	*Function Rm 31/33*	*Ballroom 1*	*Function Rm 35/37*
	MS13	MS06-B	MS09	MS21	MS05	MS08	MS04	MS15
14:55 – 16:25	**Poster Session II, Exhibition, Brew Break (Coffee, Beer & Refreshments):** *China Hall Pre-Function Area*							
	Ballroom 1				*Ballroom 2*			
16:25 – 16:55	**Invited Lecture 1:** Alex Hansen				**Invited Lecture 2:** Xiaofan Yang			
17:00 – 18:00	**Session 1.3**							
	Ballroom 2	*Function Rm 24/25*	*Ballroom 3*	*Function Rm 22*	*Function Rm 31/33*	*Ballroom 1*	*Function Rm 35/37*	
	MS13	MS06-B	MS09	MS01	MS08	MS03	MS15	
19:00 – 21:00	**Welcome Dinner:** *China Hall*							

TUESDAY, 14 MAY 2024

	Plenary Session 2: *Grand Ballroom (Ballrooms 1, 2 & 3)*						
08:30 – 08:40	Award Ceremony Honorary Lifetime Membership Award: *Sally Benson* Kimberly-Clark Distinguished Lectureship Award: *Rainer Helmig*						
08:40 – 09:25	**Plenary Lecture:** Susumu Kitagawa						
09:25 – 10:55	**Poster Session III, Exhibition, Coffee Break:** *China Hall Pre-Function Area*						
10:55 – 11:55	**Session 2.1**						
	Ballroom 2	*Ballroom 3*	*Function Rm 26*	*Function Rm 22*	*Function Rm 31/33*	*Ballroom 1*	*Function Rm 35/37*
	MS13	**MS09**	**MS19**	**MS01**	**MS08**	**MS03**	**MS15**
12:00 – 13:00	**Session 2.2**						
	Ballroom 2	*Function Rm 24/25*	*Ballroom 3*	*Function Rm 26*	*Function Rm 22*	*Function Rm 31/33*	*Ballroom 1*	*Function Rm 35/37*
	MS13	**MS10**	**MS17**	**MS07**	**MS01**	**MS06-A**	**MS03**	**MS15**
13:00 – 14:00	**Lunch Break:** *China Hall 2 & 3*						
14:00– 15:30	**Session 2.3**						
	Ballroom 2	*Function Rm 24/25*	*Ballroom 3*	*Function Rm 26*	*Function Rm 22*	*Function Rm 31/33*	*Ballroom 1*	*Function Rm 35/37*
	MS13	**MS22**	**MS09**	**MS06-A**	**MS01**	**MS20**	**MS03**	**Career Event**
	Ballroom 1				*Ballroom 2*			
15:35 – 16:05	**Invited Lecture 3:** Shuyu Sun				**Invited Lecture 4:** Catherine A. Peters			
16:05 – 17:35	**Poster Session IV, Exhibition, Brew Break (Coffee, Beer & Refreshments):** *China Hall Pre-Function Area*						
17:00 – 18:30	**Chinese Art Event:** *Function Room 22*						
19:00 – 21:00	**ECR (Early-Career Researcher) Rendezvous Game Night:** *Bar Constellation*						

WEDNESDAY, 15 MAY 2024

	Plenary Session 3: *Grand Ballroom (Ballrooms 1, 2 & 3)*							
08:30 – 08:40	Award Ceremony InterPore Medal for Porous Media Research: *Alberto Guadagnini* InterPore Award for Porous Media Research: *Ryan Armstrong*							
08:40 – 09:25	**Plenary Lecture:** Svetlana Mintova							
09:25 – 10:55	**Poster Session V, Exhibition, Coffee Break:** *China Hall Pre-Function Area*							
10:55 – 11:55	**Session 3.1**							
	Ballroom 2	*Function Rm 24/25*	*Ballroom 3*	*Function Rm 26*	*Function Rm 22*	*Ballroom 1*	*Function Rm 35/37*	
	MS13	**MS10**	**MS17**	**MS07**	**MS01**	**MS03**	**MS15**	
12:00 – 13:00	**Session 3.2**							
	Ballroom 2	*Function Rm 24/25*	*Ballroom 3*	*Function Rm 26*	*Function Rm 22*	*Function Rm 31/33*	*Ballroom 1*	*Function Rm 35/37*
	MS11	**MS10**	**MS17**	**MS07**	**MS01**	**MS06-A**	**MS03**	**MS23**
13:00 – 14:00	**Lunch Break:** *China Hall 2 & 3*							
14:00 – 15:30	**Session 3.3**							
	Ballroom 2	*Function Rm 24/25*	*Ballroom 3*	*Function Rm 26*	*Function Rm 22*	*Function Rm 31/33*	*Ballroom 1*	*Function Rm 35/37*
	MS11	**MS10**	**MS17**	**MS06-A**	**MS12**	**MS18**	**MS03**	**MS23**
	Ballroom 1				*Ballroom 2*			
15:35– 16:05	**Invited Lecture 5:** Ivan Lunati				**Invited Lecture 6:** Lucia Mancini			
16:05– 17:35	**Poster Session VI, Exhibition, Brew Break (Coffee, Beer & Refreshments):** *China Hall Pre-Function Area*							
17:30 – 19:00	**EquiPore Happy Hour:** *China Hall 2 & 3*							
19:00 –20:30	**Social Event: Seaside Walk and Light Show:** *Meet in Centurion Court Lobby*							

THURSDAY, 16 MAY 2024

	Ballroom 1				*Ballroom 2*			
08:30 – 09:00	Invited Lecture 7: Jan Nordbotten				Invited Lecture 8: TieJun (TJ) Zhang			
09:05 – 10:20	**Session 4.1**							
	Ballroom 2	*Function Rm 24/25*	*Ballroom 3*	*Function Rm 26*	*Function Rm 22*	*Function Rm 31/33*	*Ballroom 1*	*Function Rm 35/37*
	MS11	MS10	MS17	MS06-A	MS01	MS12	MS03	MS15
10:20 – 11:50	**Poster Session VII, Exhibition, Coffee Break:** *China Hall Pre-Function Area*							
11:50 – 12:50	**Session 4.2**							
	Ballroom 2	*Function Rm 24/25*	*Ballroom 3*	*Function Rm 26*	*Function Rm 22*	*Ballroom 1*	*Function Rm 35/37*	
	MS11	MS09	MS17	MS06-A	MS01	MS03	MS15	
12:50 – 13:50	**Lunch Break:** *China Hall*							**Grant Writing Workshop**
13:50 – 15:05	**Session 4.3**							
	Ballroom 2	*Function Rm 24/25*	*Ballroom 3*	*Function Rm 22*	*Function Rm 31/33*	*Ballroom 1*		
	MS11	MS09	MS17	MS01	MS16	MS03		
15:05 – 16:20	**Poster Session VIII, Exhibition, Brew Break (Coffee, Beer & Refreshments):** *China Hall Pre-Function Area*							
	Plenary Session 4: *Grand Ballroom (Ballrooms 1, 2 & 3)*							
16:20 – 17:05	**Plenary Lecture:** Changying Zhao							
17:05 – 17:25	**Award Ceremony** MDPI Student Poster Awards InterPore – PoreLab Award for Young Researchers: *Bauyrzhan Primkulov* Rien van Genuchten Early-Career Award of Porous Media for a Green World: *Serveh Kamrava* InterPore National Chapter Award InterPore Rosettes							
17:25 – 17:30	**Closing Ceremony**							

FRIDAY, 17 MAY 2024

8:00 – 13:00	**AM Lab Tours**: *Meet in Centurion Court Lobby*
9:00 – 16:00	**Conference Courses:** *China University of Petroleum*

Kimberly-Clark

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PROGRAM HIGHLIGHTS

Opening Ceremony

Monday, *Grand Ballroom (Ballrooms 1, 2 & 3), 9:00-9:05*

Award Ceremony: *InterPore Meritorious Service Medal*

Monday, *Grand Ballroom (Ballrooms 1, 2 & 3), 9:05-9:10*

Plenary Lecture: *Zhangxing (John) Chen*

Monday, *Grand Ballroom (Ballrooms 1, 2 & 3), 9:10-9:55*

Diversity, Equality & Inclusiveness Lunch Forum

Monday, *Ballroom 2, 12:25-13:25*

Invited Lectures: *Alex Hansen & Xiaofan Yang*

Monday, *Ballrooms 1 & 2, 14:55-16:25*

Welcome Dinner

Monday, *China Hall, 19:00-21:00*

Award Ceremony: *InterPore Honorary Lifetime Membership Award & Kimberly-Clark Distinguished Lectureship Award*

Tuesday, *Grand Ballroom (Ballrooms 1, 2 & 3) , 8:30-*8:40

Plenary Lecture: *Susumu Kitagawa*

Tuesday, *Grand Ballroom (Ballrooms 1, 2 & 3), 8:40-9:25*

SAC Career Development Event

Tuesday, *Function Room 35/37, 14:00-15:30*

Invited Lectures: *Shuyu Sun & Catherine A. Peters*

Tuesday, *Ballrooms 1 & 2, 15:35-16:05*

Chinese Art Event

Tuesday, *Function Room 22, 17:00-18:30*

ECR Rendez-Vous Game Night

Tuesday, *Bar Constellation, 19:00-22:00*

PROGRAM HIGHLIGHTS

Award Ceremony: *InterPore Medal for Porous Media Research & InterPore Award for Porous Media Research*

Wednesday, *Grand Ballroom (Ballrooms 1, 2 & 3)*, *8:30-8:40*

Plenary Lecture: *Svetlana Mintova*

Wednesday, *Grand Ballroom (Ballrooms 1, 2 & 3)*, *8:40-9:25*

Invited Lectures: *Ivan Lunati & Lucia Mancini*

Wednesday, *Ballrooms 1 & 2*, *15:35-16:05*

Equipore Happy Hour

Wednesday, *China Hall 2 & 3* , *17:30-19:00*

Seaside Walk and Lightshow

Wednesday, *meet in Centurion Court Lobby*, *19:00-20:30*

Invited Lectures: *Jan Nordbotten & Tiejun (TJ) Zhang*

Thursday, *Ballrooms 1 & 2*, *8:30-9:00*

Grant Writing Workshop

Thursday, *13:00 -15:00*

Plenary Lecture: *Changying Zhao*

Thursday, *Grand Ballroom (Ballrooms 1, 2 & 3)*, *16:20-17:05*

Award Ceremony*: MDPI Student Poster Awards, InterPore PoreLab Award for Young Researchers, Porous Media for a Green World Award, National Chapter Award & InterPore Rosettes*

Thursday, *Grand Ballroom (Ballrooms 1, 2 & 3), 17:05-17:25*

Closing Ceremony

Thursday, *Grand Ballroom (Ballrooms 1, 2 & 3)*, *17:25-17:30*

Plenary Session

Grand Ballroom (Ballrooms 1, 2 & 3) 9:10 - 09:55
Chair: *Karsten Thompson*

Opening Ceremony *9:00 - 9:05*

Award Ceremony 1 *9:05 - 9:10*

InterPore Meritorious Service Medal

Jun Yao
School of Petroleum Engineering, China

The InterPore Meritorious Service Medal recognizes individuals for exceptional, prolonged, impactful, and meaningful services to the Society. These individuals have exhibited such exceptional devotion of time, effort, thought, and action as to set them apart from other contributions.

Plenary Lecture *9:10 - 9:55*
Grand Ballroom (Ballrooms 1, 2 & 3)
Chair: *Gabriel Wittum*

Zhangxing (John) Chen
Eastern Institute of Technology, *Ningbo, China* / University of Calgary, *Canada*

Reservoir Simulator Development: The Past, Present and Future

Reservoir simulators have been developed in the past 70 years. They have been widely used to predict, understand, and optimize complex physical processes in modeling and simulation of multiphase fluid flow in petroleum reservoirs. These simulators are important for understanding the fate and transport of chemical species and heat and maximizing the economic and environmental performance of exploration and production of fossil fuel energy.

The development of reservoir simulators has been concentrated on conventional oil and gas reservoirs in the last century, and efficient black oil, compositional and thermal simulators have been successful in their application to the recovery of conventional oil and gas resources. As these conventional resources dwindle, the recovery of unconventional oil and gas (such as heavy oil, oil sands, tight and shale oil and gas, and coalbed methane) resources is now at the center stage. While the development of unconventional reservoir simulators has been focused on in this century, a lot of challenges still exist because of the significant differences between conventional and unconventional reservoirs in their multi-scale phenomena, fluid occurrence states, flow mechanisms, and production technologies.

The speaker has engaged in the development of reservoir simulators for over 30 years. His group has developed parallel and intelligent simulators that can efficiently simulate complex fluid flow problems with giga (billion) grid block cells and reduce simulation time from days to seconds. For over ten years, his group has also incorporated artificial intelligence (AI) and quantum computing algorithms into these reservoir simulators. Fast and accurate simulators can increase energy production due to full utilization of available data and better understanding of the chemical and physical mechanisms involved, process designs and uncertainty analyses. In this plenary presentation, the speaker will give an overview on the development of conventional and unconventional reservoir simulators, the incorporation of parallel and AI algorithms into these simulators, and the quantum computing potential to solve reservoir simulation problems. The present status, existing challenges, and future prospects on reservoir simulators will be emphasized in this plenary presentation.

Coffee Break & Exhibition

09:55 - 11:25

Refreshments are available in the China Hall Pre-Function area. Come grab a snack, network with other attendees, visit the exhibition booths and discuss the posters on display.

Did you know... Qingdao?

Photo credits: Yuezhong Cui

If you're looking for a place to walk around and relax during the conference, why not visit May Fourth Square? Located in the Shinan District, the square is one of Qingdao's iconic attractions. Built to commemorate the May Fourth Movement, May Fourth Square is of great historical and cultural significance and integrates culture, art, leisure and entertainment.

Poster Session I

China Hall Pre-Function Area, 09:55 - 11:25

Poster board	
1	[521] **Study on the Influence of Supercritical Carbon Dioxide Adsorption on the Phase Behavior of Shale Gas Condensate Reservoirs** *Fei Peng, Keliu Wu, Qingyuan Zhu, Shengting Zhang, Jianfei Bi*
3	[453] **Numerical simulation of coupling multiphase flow and micro-bio reactive transport in underground hydrogen storage** *Zhilei Han, Bicheng Yan, Olav Møyner, Knut-Andreas Lie, Shuyu Sun*
5	[585] **Two-dimensional geometric tortuosity model of MICP-treated sand considering particle arrangement** *Fusheng Zha, rulong ban, Runkai Wang, Chaozhong Qin, Bo Kang*
7	[763] **Unveiling Microbial Activity in Rock Pores: Tailored Sample Preparation and SEM-EDS Insights** *Joyce Schmatz, Eva Wellmann, Mingze Jiang*
9	[1002] **Archaea community in gas hydrate-bearing sediments in the South China Sea** *Siwei Liu*
11	[129] **Molecular Simulation of the Effect of Imidazolium-Based Ionic Liquids on the Water/Toluene Interface** *Salem Alshammari, Moataz Abu-Al-Saud, Safwat Abdel-Azeim*
13	[166] **Brinkman double-layer model for flow at a free-porous interface** *Jinliang Kang, Moran Wang*
15	[185] **Reversing capillary trapping of nonaqueous fluid from dead-end structures by nanoparticle suspension and their self-adaptive control in complex porous media** *Wenhai Lei, Xukang Lu, Guang Yang, Shervin Bagheri, Moran Wang*
17	[376] **Experimental and theoretical evidence for energy signal indicating flow regimes for two phase flow in porous media** *Shuangmei Zou, Dong Chen, Congjiao Xie*

MONDAY, 13 MAY 2024

Poster Session I, cont.

China Hall Pre-Function Area, 09:55 - 11:25

Poster board	
19	[615] **Physical origin of adsorption heat and its significance in the isotherm equation** *Chao Zhang, Lijun Li, Shaojie Hu, Lingyun Gou*
21	[52] **Ensemble Variational Bayesian Uncertainty Quantification for High Dimensional Nonlinear Parameter Inversion of Darcy Flows in Porous Media** *zhao zhang*
23	[147] **Bypass flow of trapped droplet under seismic stimulations through pore double model analysis** *Wen Deng, Shilin Yu*
25	[196] **Volatile Transport in Porous Lunar Regolith: Diffusion at Infinite Knudsen Number** *sunpeng zhou, Chuanxi Wang, Ke Xu, Zhenpeng Wang*
27	[277] **Direct Pore-Scale Simulation of the Effect of Wettability Alteration by Low-Salinity on Oil Mobilization in 3D Natural Sandstone** *Haoyun Li, Yongfei Yang*
29	[581] **Investigation of fault damage zones from direct shear tests and implications for hydraulic fracturing process** *Zifang Zhu, Shengwen Qi, Weiwei Zhu, Bowen Zheng*
31	[639] **A novel CO2-responsive microgel for in-depth conformance control in CO2 enhance oil recovery (EOR)** *Qihui Wu, Junjie Zhong*
33	[735] **Exploring the Relation Between Soil Salinity on Soil Organic Carbon Dynamics in Global Terrestrial Ecosystems** *Amirhossein Hassani, Pete Smith, Nima Shokri*
35	[898] **Molecular dynamics simulation of ionic diffusion and mixing phenomena in polymer-enhanced low-salinity waterflooding** *Abdolmaleki Abdolmaleki, Hassan Mahani, Shahab Ayatollahi, Nahid Pour Khiabani*

Poster Session I, cont.

China Hall Pre-Function Area, 09:55 - 11:25

Poster board	
37	[31] **Research on the development mechanism of core-scale fracturing-flooding** *Liyuan Dong, Jun Yao, Lei Zhang, Hai Sun, Zhaoqin Huang*
39	[118] **Experimental Validation of Pore-Scale Models for Gas Diffusion Layers in PEMFCs** *Liusheng Xiao, Miaoqi Bian, Yushuai Sun*
41	[311] **Mechanism simulation on low salinity water flooding in high temperature sandstone reservoirs based on molecular simulation method** *Renyuan SUN, HAFIZ MUHAMMAD AIMAN FAREED, Ernest Peter Maiki*
43	[457] **Numerical modelling of polymer support fluids permeating in sands** *Si Suo, Martin Blunt, Catherine O'Sullivan*
45	[470] **Influence of non-stationarity within porous media sample on its flow properties** *Marina Karsanina, Nickolay Evstigneev, Kirill Gerke*
47	[1000] **Pore-scale Modeling of Dynamic CO2 Dissolution in Natural Porous Media with different Wettability** *Jinlei Wang, Yongfei Yang*
49	[463] **Stability, deformation and rupture of Janus oligomer enabled self-emulsifying water-in-oil microemulsion droplets** *Yuequn Fu*
51	[195] **A molecular simulation study on adsorption and diffusion behaviors of hydrogen, methane and carbon dioxide** *Zhenxiao Shang, Yongfei Yang*
53	[232] **Theoretical Foundation for Klinkenberg-corrected Permeability of Microporous Media in Pulse Decay Method** *Tian Zhiguo, Moran Wang*

MONDAY, 13 MAY 2024

Poster Session I, cont.

China Hall Pre-Function Area, 09:55 - 11:25

Poster board	
55	[310] **The occurrence states of shale oil and its controlling factors in Yanchang Formation, Ordos Basin, China** *Chen Zhao, Min Wang, Congsheng Bian, Jinbu Li, Shangde Dong*
57	[382] **A Robust Vapor-liquid-liquid Equilibrium Calculation Algorithm Considering Capillary Pressure and Critical Shift in Nanopores** *Binyao Xiao, Hai Sun, Dongyan Fan, Lei Zhang, Shuaishi Fu, Jun Yao*
59	[409] **Pore structure variations of felsic shale oil reservoirs to injected fluids: with implications to fracturing** *Demiao Shang, Xiaofeng ZHOU, Jianguang WEI, Fahimeh Hadavimoghaddam*
61	[493] **Flow simulation of pore-scale deep shale gas under nano-confinement conditions** *Chaoyang Zhao, Yongfei Yang*
63	[160] **A Study on Stochastic Modeling of Channelized Reservoirs Based on Reinforcement Learning** *Jingzhe Li, Xiufan Zhang, Hanhan Yang, Zhongchuang Wang, Lingwen Xu, Dongxing Du*
65	[315] **Attenuation Patterns of Low-Frequency Hydraulic Pulse Waves in Porous Media with Different Permeability** *Kai Wang, Qiao Fan, Yunzhi Ge, Yuanjia Lv, Yuchi LI, Mingliang Luo*
67	[346] **Dynamic Effects on Solute Transport in an Unsaturated Soil** *Luwen Zhuang, Han Zhu, S. Majid Hassanizadeh*

Oral presentations: Parallel sessions 1.1
11:25 - 12:25

MS13: Fluids in Nanoporous Media- *Part 1*
Ballroom 2
Chairs: *Bin Pan & Shaina Kelly*

11:25	[149] **Anomalous phase transition behavior of dilute electrolyte solutions in nanoconfinement under cryogenic environment** *Shaoheng Wang, Michael Steiger*
11:40	[921] **Effect of partial saturation on acoustic properties of nano-porous media** *Gennady Gor, Boris Gurevich*
11:55	[230] **Slip correction theory and transient solution of the pressure oscillation method** *Mingbao Zhang, Moran Wang, Zhiguo Tian*
12:10	[792] **Nanoporosity controls on the carbon storage and mineralization potential of basalts: insights from hydrothermal alteration at Newberry Volcano** *Shaina Kelly, Zuhao Kou, Olivia Terry, Tianxiao Shen*

MS06-B: Interfacial phenomena across scales- *Part 1*
Function Rm 24/25
Chairs: *Rui Wu & Ziqing Pan*

11:25	[701] **Numerical modeling of the phase separation process driven by a porous membrane** *Mengyi Jiang, Guang Yang, Jingyi Wu*
11:40	[20] **Permeability Evaluation for Hydrate-Bearing Sediments Based on Spectral Induced Polarization** *Lanchang Xing, Shuo Wang, Liyun Lao, Xiaofei Wu*
11:55	[12] **The mathematical model and analysis of the nanoparticle-stabilized foam displacement** *Grigori Chapiro, Pavel Sejas Paz, Tatiana Danelon de Assis*
12:10	[359] **The Impact of System Softness on Haines Jumps in Porous Media** *Zhonghao Sun, Dianrun Yang*

Oral presentations: Parallel sessions 1.1, cont.
11:25 - 12:25

MS09: Pore-scale modelling- *Part 1*
Ballroom 3
Chairs: *Ke Xu & Saeid Sadeghnejad*

11:25	[755] **Direct pore-scale modeling of foam flow through 3D rough fractures** *Xuesong Ma, Bernard Chang, Masa Prodanovic*
11:40	[46] **Numerical simulation of two-phase flows in digital core samples with underresolved porosity** *Vadim Lisitsa, Tatiana Khachkova*
11:55	[782] **Volume of Fluid based study of the three phase dynamic contact line in wetting of the nanometric rough micro-channels** *Tianyang Han, Yash Kulkarni, Tomas Fullana, Stephane Zaleski, Stephane Popinet*
12:10	[397] **Spatial characterization of wetting in porous media using local lattice-Boltzmann simulations** *Hamidreza erfaniGahrooei, Reza Haghanihasanabadi, James McClure, Edo Boek, Carl Fredrik Berg*

Oral presentations: Parallel sessions 1.1, cont.

11:25 - 12:25

MS07: Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes - *Part 1*

Function Rm 26

Chairs: *Ben Mansour Dia & Eric Chung*

11:25	[157] **Simulation of density-driven flow in heterogenous and fractured porous media** *Gabriel Wittum*
11:40	[391] **Multilevel Monte Carlo Method for Simulation of Propagation of Uncertainties in Fractured Porous Media** *Dmitry Logashenko, Alexander Litvinenko, Gabriel Wittum, Raul Tempone*
11:55	[347] **A Hybrid-Dimensional Stokes--Brinkman--Darcy Model: Derivation, Analysis and Validation** *Linheng Ruan, Iryna Rybak*
12:10	[24] **Modeling of Dispersive Shear Thinning Polymer-Surfactant Flooding** *Prabir Daripa*

MS05: Microbial Processes in Porous Media: Risks and Advances *Part 1*

Function Rm 22

Chairs: *Na Liu, David Landa-Marban*

11:25	[37] **Microcalorimetric Evaluation of Microbial Activity and Reaction Rate in Sand-packed Porous Media During Microbial-Induced Carbonate Precipitation For CO2 Leakage Remediation** *Jacquelin Cobos, Erik Søgaard, Na LIU*
11:40	[81] **Predicting the tensile strength of sands treated via microbially induced carbonate precipitation (MICP)** *Gloria Castro, Mary Anderson, James Minto, Grainne El Mountassir, Rebecca Lunn*
11:55	[446] **Pore-scale hydrodynamics influence the spatial evolution of preferential flow paths in porous media bioclogging system** *Rui Peng, Ran Hu*
12:10	[729] **Exploiting induced carbonate precipitation to improve reservoir storage integrity and geothermal system efficiency** *Philip Salter, James Minto, Jay Warnett, Katherine Dobson*

MONDAY, 13 MAY 2024

Oral presentations: Parallel sessions 1.1, cont.

11:25 - 12:25

MS08: Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media- *Part 1*

Function Rm 31/33

Chairs: *Mohammad Nooraiepour & Branko Bijeljic*

11:25	[6] **Dispersion and Straining Behaviors of Non-Spherical Suspended Particles in Saturated Randomly Packed Beads: A Numerical and Theoretical Study** *Yaoming Chen, Dian Fan, Bin Yuan*
11:40	[7] **Dispersion Control in Fractured Multi-Layer Porous Media System** *Bowen Ling, Felipe P. J. de Barros, Runqing Shan*
11:55	[79] **Non-monotonic effect of compaction on dispersion coefficient of porous medium** *Yang Liu, Wenbo Gong, Han Xiao, Moran Wang*
12:10	[487] **Probing Transport in Geologic Porous Materials by Fast X-ray Micro-Computed Tomography** *Takeshi Kurotori, Ronny Pini*

MS04: Swelling and shrinking porous media- *Part 1*

Ballroom 1

Chairs: *Yang Yang & Yihuai Zhang*

11:25	[173] **Quantifying the Soil Swelling Potential by Soil Water Isotherm** *Yijie Wang, Liming HU, Ning Lu*
11:40	[301] **Pore-scale network modelling of CO2–shale interaction with swelling effect** *Amin Taghavinejad, Yihuai Zhang, Arash Rabbani*
11:55	[318] **Impact of Sand-Hydrogel Mixtures Swelling on Shearing Behaviour: An X-ray CT Study** *Mhlengi Masango, Budi Zhao*
12:10	[364] **Study on the injection-production characteristics of hydrogen storage in unconventional Wells** *Xu Chenghao, Junping Zhou, Yifan Peng*

Oral presentations: Parallel sessions 1.1, cont.
11:25 - 12:25

MS15: Machine Learning and Big Data in Porous Media- *Part 1*
Function Rm 35/37
Chairs: *Shuyu Sun & Tao Zhang*

11:25	[67] **Machine learning accelerated molecular simulation: Implications for oil and gas problems** *Jie Liu, Tao Zhang, Shuyu Sun*
11:40	[187] **CO2 Leakage Detection using Optimized Deep Learning** *Xupeng He, Yiteng Li, Xiang Rao, Jun Gao, Hyung Kwak*
11:55	[592] **Prediction of Upscaled Permeability of Digital Rock Cores Using Machine Learning Techniques** *Fei Jiang, Lionel Esteban, Mai Shimokawara, Marina Pervukhina, Maxim Lebedev, Mojtaba Seyyedi, Ryuta Kitamura, Takeshi Tsuji, Yaotian Guo, Yoshitake Kato*
12:10	[82] **Large Scale Efficient 3D Domain Transfer for Digital Images of Porous Materials using Pseudo-3D Architectures** *Kunning Tang, Peyman Mostaghimi, Yufu Niu, Ryan Armstrong, YingDa Wang*

Diversity, Equality & Inclusiveness Lunch Forum

Ballroom 2, 12:25 - 13:25

Chair: *Yuhang Wang*

Hang Deng

Peking University, *China*

Be Part of the Conversation

In this talk, Hang will share her experiences of developing a career as a woman scientist, how mentorship has been an important enabling force, and some thoughts about initiating and cultivating mentoring relationships. Hang will also share her experiences of being engaged in promoting diversity, equity and inclusion: how she was first exposed to this conversation, became part of it, and what she has observed and learned in the process.

Hang considers herself as 'ordinary' in terms of the level of engagement and contribution to DEI. Serving as an example, she hopes to take the pressure off all community members, especially ones at the early career stage, so that everyone feels comfortable to open up and encouraged to join the conversation. Afterall, DEI is for everyone.

Lunch Break

China Hall, 12:25 - 13:25

Oral presentations: Parallel sessions 1.2
13:25 - 14:55

MS13: Fluids in Nanoporous Media- *Part 2*
Ballroom 2
Chairs: *Qinhong Hu & Boxin Ding*

13:25	[261] **Pore aperture regulated surface adsorption and mass transfer of hydrocarbon and CO2 in organic nanopores** *mingshan zhang*
13:40	[861] **Molecular Simulation of Competitive Adsorption of H2S-Containing CO2 and CH4 in Organic and Inorganic Shale Nanopores** *Jingkai Cui, Junyao Bao, Shaofeng Ning, Shiyuan Zhan, Xiaoguang Wang*
13:55	[68] **Microscopic mechanism of CO2 huff-n-puff promoting shale oil mobilization in organic/inorganic nanopores** *Huaisen Song, Yongfei Yang, Jun Yao*
14:10	[222] **Investigation of Fluid Flow Mechanism Considering Multi-Component Fluids, Nanopore Roughness, and Nanopore Flexibility** *Tianhao Li, Hai Sun, Zheng Li, Dongyan Fan, Lei Zhang, Jun Yao*
14:25	[65] **Molecular dynamics investigation of water-gas two phase flow in rough clay nanopores** *Ying Bi, Youzhi Hao, Xiaotian Jia, Detang Lu*

Oral presentations: Parallel sessions 1.2, cont.
13:25 - 14:55

MS06-B: Interfacial phenomena across scales- *Part 2*
Function Rm 24/25
Chairs: *Zhibing Yang & Rui Wu*

13:25	[608] **A gel front liquid system with delayed properties for pore-type cracks** *Doudou Wang, Yuhuan Bu, Chang Lu, Huajie Liu, Shenglai Guo*
13:40	[13] **Experimental Investigation and Molecular Dynamics Analysis of the Fluid-Fluid Interactions between Binary Surfactant Systems for EOR** *Ayomikun Bello, Alexander Rodionov, Alexey Cheremisin, Alina Bazhanova, Anastasia Ivanova*
13:55	[290] **Wettability acoustic probing in granular porous media** *Yangpu Chen, Li-Yun Fu, Tobias Mueller*
14:10	[218] **Contact angle on rough curved surfaces and its implications in porous media** *Lei Liu, Liang Lei*
14:25	[448] **Enhanced CO2 Storage in Saline Aquifer by Electric Field Considering Formation Wettability** *Liangyu Zhao, Zheng Li, Jianlong Kou, Xiaoguang Wang*
14:40	[768] **Experimental Investigation of Illite Clay in Norwegian Quick Clay for Sustainable Ground Stabilization** *Rene Tammen, Astrid de Wijn, Erika Eiser, Ge Li, Ida-Marie Høyvik, Lu Xia*

Oral presentations: Parallel sessions 1.2, cont.
13:25 - 14:55

MS09: Pore-scale modelling- *Part 2*
Ballroom 3
Chairs: *Ke Xu & Chiyu Xie*

13:25	[36] **Invasion of Porous Layers for Electrochemical Processes: Experimental Studies and Lattice Boltzmann Simulations** *Supriya Bhaskaran, Nicole Vorhauer-Huget, Jasna Jankovic, Vikranth Kumar Surasani, Tanja Vidakovic-Koch, Evangelos Tsotsas*
13:40	[913] **Volume of Fluid based study of the three phase dynamic contact line on rough surfaces relevant for Underground Hydrogen Storage** *Willemijn van Rooijen, Hadi Hajibeygi, Stephane Zaleski*
13:55	[604] **Simulation of boundaries and parameters variations of natural gas hydrate in thermofluidic dissolution based on multi-field coupling under pore-scale modeling** *Zhengyi Li, Zhiyuan Wang, Chiyu Xie, Hongqing Song, Jianbo Zhang*
14:10	[291] **Identification and assessment of three-phase boundaries in porous electrodes of solid-oxide electrolysis cells based on a 3D microstructure model** *Yuzhu Chen, Meng Lin*
14:25	[704] **Digital Porous Material Analysis with Multiscale REV** *Julien Maes, Hannah Menke, Yong Wen-Pin, Dmytro Petrovskyy, Kamaljit Singh*
14:40	[117] **Digital rock reconstruction considering high stress** *Chunqi Wang, Zhaoqin Huang, Jun Yao*

Oral presentations: Parallel sessions 1.2, cont.
13:25 - 14:55

MS21: Non-linear effects in flow and transport through porous media
Function Rm 26
Chairs: *Mohaddeseh Mousavi Nezhad & Derek Ma*

13:25	[184] **Wave-mediated diffusion model for semi-sealed systems: effective diffusion coefficient and experimental validation** *Yan Jin, Shiming Wei, Kangping Chen*
13:40	[334] **Non-linear growth of fingers during two-phase flow in porous media** *Santanu Sinha, Yves Méheust, Alex Hansen*
13:55	[430] **Modeling Non-Newtonian Polymer Flooding in Heterogeneous Carbonate Rock: An Experimental and Simulation Investigation** *Chuangchuang Qi, Mohamed Haroun, Mohammed Al Kobaisi, Md Motiur Rahman*
14:10	[543] **Incorporating Pore Size Distribution into Dynamic Permeability Modelling for Porous Media** *Jimmy Xuekai Li, Mohammad Sarmadivaleh, Reza Rezaee, Tobias M. Müller*
14:25	[586] **Universal scaling law of bubble dissolution in porous media** *Yuehongjiang Yu, Ke Xu*
14:40	[432] **Non-linear seepage characteristics and synergistic displacement mechanisms of emulsion in heavy oil reservoir** *Kang Zhou, Mingkun Zhai, Jian Hou*

Oral presentations: Parallel sessions 1.2, cont.
13:25 - 14:55

MS05: Microbial Processes in Porous Media: Risks and Advances- *Part 2*
Function Rm 22
Chairs: *Jacquelin Cobos, Yibin Qi*

13:25	[158] **Co-transport of engineered nanoparticles and bacteria in soil** *Rima Manik, N Seetha*
13:40	[1006] **Pore-Scale Modeling MICP Process and Investigation of the Effect of Pore Structures on Calcite Distribution** *Dianlei Feng, yajie chu, Leiyu Feng, Lingxiang Wang*
13:55	[49] **Bioclogging during underground hydrogen storage: Assessing impact of biofilm formation on hydrogen injection and recovery.** *Na LIU, Martin Fernø, Nicole Dopffel*
14:10	[70] **Impacts of viscous fingering on bio-methanation risks during underground hydrogen storage** *Gang Wang, Eric Mackay, Kenneth Sorbie*
14:25	[637] **Field-scale mathematical modelling and simulations of biofilm effects in hydrogen storage** *David Landa-Marbán, Svenn Tveit, Tor Harald Sandve, Sarah Gasda*

Oral presentations: Parallel sessions 1.2, cont.
13:25 - 14:55

MS08: Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media- *Part 2*
Function Rm 31/33
Chairs: *Weiwei Zhu & Mohammad Nooraiepour*

13:25	[23] **Investigating the limits of averaging: a numerical case study employing diffusion-reaction in porous media** *David Rieder, Frank Peters, Hans Kuipers*
13:40	[255] **Reactive Solute Transport in Rough Fracture** *Mengzi Ren*
13:55	[354] **Fingering Instability During Mixing-Driven Precipitation Flow: Experiments and Simulations** *Benzhong Zhao, Negar Shahsavar, Xiaojing Fu*
14:10	[33] **Pore-scale digital twin of sorption thermal energy storage in packed bed reactor using a machine-learning assisted dual-network model** *Mingliang Qu, Sajjad Foroughi, Jie Luo, Jinping Yang, Qingyang Lin, Martin Blunt*
14:25	[106] **The impact of dispersion on porous media gravity current propagating over an interbed layer** *Saeed Sheikhi, Morris Flynn*
14:40	[95] **Quantification of crystal surface reactivity using positron emission tomography (PET) techniques** *Jann Schöngart, Cornelius Fischer*

Oral presentations: Parallel sessions 1.2, cont.
13:25 - 14:55

MS04: Swelling and shrinking porous media- *Part 2*
Ballroom 1
Chairs: *Yida Zhang & Yihuai Zhang*

13:25	[39] **Unified surface poromechanics theory capturing condensation-induced contraction of mesoporous materials** *Yida Zhang*
13:40	[225] **Role of Substrate Roughness in Soil Desiccation Cracking** *Yuhan Yang, Chao Zhang, Lingyun Gou, Renpeng Cheng, Yi Dong*
13:55	[764] **Molecular Dynamics Simulations of Porous Illite Clay Surfaces and Particles** *Ge Li, Astrid de Wijn, Erika Eiser, Ida-Marie Høyvik, Lu Xia, Rene Tammen*
14:10	[471] **Dynamic soil structure imaging experiments and their digital model representation** *Marina Karsanina, Kirill Tolstygin, Andrey Zubov, Dmitry Fomin, Anna Yudina, Konstantin Romanenko, Konstantin Abrosimov, Kirill Gerke*
14:25	[648] **Impact of dynamic pore structure on local macroscopic parameters** *Jing Chen, Xiang Lu, Rui Wu, Abdolreza Kharaghani*
14:40	[692] **Predictive modelling of liquid ingress into disintegrating pharmaceutical tablets** *Jongmin Lee, Daniel J. Goodwin, Ranjit M. Dhenge, Joelle Nassar, J. Axel Zeitler*

Oral presentations: Parallel sessions 1.2, cont.
13:25 - 14:55

MS15: Machine Learning and Big Data in Porous Media- *Part 2*
Function Rm 35/37
Chairs: *Xupeng He & Jie Liu*

13:25	[205] **Deep learning-assisted technology transition in natural hydrogen development** *Haoxiang Liang, tao zhang, Jie Liu, Shuyu Sun*
13:40	[313] **Multiparameter Inversion of Reservoirs Based on Deep Learning** *Daolun Li, Wenshu Zha, Yuxiang Hao, Qian Wang*
13:55	[450] **A Vision Transformer for Size-Agnostic Modelling of Two-Phase Drainage in Complex Porous Media Considering Wettability, Interfacial Tension, and Resolution** *Seyed Reza Asadolahpour, Zeyun Jiang, Helen Lewis, Chao Min, Ping Wu*
14:10	[674] **A neural network model with physics constraints for simulating CO2 storage in deep saline aquifers during and after injection** *Mengjie Zhao, Yuhang Wang, Marc Gerritsma, Hadi Hajibeygi*
14:25	[880] **2D to 3D deep learning reconstruction of CO2 electroconversion Gas Diffusion Electrode : a validation study** *Ana Stanovic Obradovic, Florian Euzenat, Georgy Borisochev, Isabelle-C Jovilet, Julie Guillemant, Mohamed Regaieg*
14:40	[98] **Deep Learning enhanced multiscale rock typing for digital core modeling** *Denis Orlov, Batyrkhan Gainitdinov, Dmitry Koroteev*

Brew Break & Exhibition

14:55 - 16:25

Refreshments are available in the China Hall Pre-Function Area. Come grab a snack, network with other attendees, visit the exhibition booths and discuss the posters on display.

Did you know... Qingdao?

Photo credits: Chenggeng Liu

Zhan Qiao Pier is located at the souterhn shore of Qingdao, It was built in 1891 and it was the city's first wharf.

Poster Session II

China Hall Pre-Function Area, 14:55 - 16:25

Poster board	
2	[126] **Consideration of the effect of interlayer spatial distribution on the mechanical behaviour of porous media** *Mingxin Liu, Yongfei Yang*
4	[546] **The impact of supercritical CO2 exposure time on the effective stress law for permeability in shale** *Yinming Chen, Junping Zhou, Shifeng Tian, Yuchen Zhong*
6	[578] **Effect of catalyst particle size distribution in the catalytic layer on the performance of water electrolysis in proton exchange membrane pore scale simulation** *Jiaxin He*
8	[849] **Numerical simulation of yttrium oxide grain sintering** *Dmitry Prokhorov, Eugene Malkovich, Vadim Lisitsa, Vladimir Derevshchikov, Yaroslav Bazaikin*
10	[860] **Covalent Organic Frameworks Supported Highly Active Fe-N-C Catalyst Boosting Oxygen Reduction in Direct Formate Fuel Cell** *Linghan Lan, Yaxing Zhu, Guangfu Liu, Juchao Liang, Ping Zhang*
12	[1049] **Adsorption Swelling and Anisotropic Characteristics of CO2 in Shale** *Shuangshuang Lin, Xin Chang*
14	[910] **Simulation study of hydrogen storage in a depleted gas reservoir: Microbiological influences in porous media** *Zanfu Xiong, Jian Hou, Qingjun Du*
16	[1047] **Numerical Simulation of the Microbial Induced Calcite Precipitation (MICP) Process in Darcy-scale and Pore-scale** *Dianlei Feng, Yajie Chu, Lingxiang Wang*
18	[14] **Rock-Fluid Interaction Mechanisms between Binary Surfactants Systems for Enhanced Oil Recovery in a Carbonate Formation** *Ayomikun Bello, Alexey Cheremisin, Anastasia Ivanova*

Poster Session II, cont.

China Hall Pre-Function Area, 14:55 - 16:25

Poster board	
20	[250] **Is it safe to continue relying on traditional porosity-permeability relationships?** *Mohammad Masoudi, Mohammad Nooraiepour, Hang Deng, Helge Hellevang*
22	[410] **Molecular Dynamics Simulation Insights into CO2 and N2 Wettability of Shales Organic Matters under wide range temperatures and pressures** *Kai Cheng, Bo Peng, Arif Muhammad, Yupeng Zhang, Ningjing Sun*
24	[594] **Efficient solution strategies for a generalized coupled fluid-porous problem** *Linheng Ruan, Iryna Rybak, Paula Strohbeck*
26	[613] **Coupling between soil matric potential and osmotic potential** *Shaojie Hu, Chao Zhang, Ning Lu*
28	[893] **Water Impact on Adsorbed Oil Detachment from Mineral Surfaces by Supercritical CO2** *Rui Gao, Yulong Yang, Wenyuan Sun, Leilei Yang, Jirui Hou*
30	[1029] **Droplet motion in flexible channels: Effects of opening angle and wettability** *Haiyi Zhong, Dongsheng Chen, Jiayin Zhao, Yixiang Gan, Zhongzheng Wang*
32	[130] **Remote hydraulic fracturing at weak interfaces** *Tao You, Keita Yoshioka*
34	[1001] **A fully implicit single-phase multi-component phase transition pore network model based on automatic differentiation and GPU acceleration** *Chaozhong Qin, Jianqi Rong*
36	[1028] **RepoTREND: Software Tools for Robust Safety Analysis of Radioactive Waste Repositories** *Tatiana Reiche*

Poster Session II, cont.

China Hall Pre-Function Area, 14:55 - 16:25

Poster board	
38	[189] **Shale Fracture Permeability Estimation: A Data-Driven Model Using Machine Learning** *Xupeng He, Yiteng Li*
40	[238] **Upscaled model for steady slip flow fluid structure coupling in shale system** *Yurou Sun, Hai Sun, Xia Yan, Dongyan Fan, Lei Zhang, Shuaishi Fu, Jun Yao*
42	[242] **Do capillary and film water have equal matric suction or not in simple geometries ?** *Zi Li*
44	[286] **Investigating Hydrogen Storage in Pore Media of Saline Aquifers: A Numerical Study on Wettability and Pore Structure Impact** *Jiawei Li, Yongfei Yang*
46	[332] **Extensive pore modelling (XPM) – a coherent framework for multiscale pore network modelling** *Dmytro Petrovskyy, Hannah Menke, Julien Maes, Kamaljit Singh, Tom Bultreys*
48	[416] **Simulation of the Microscopic Three-Phase Flow Process in CO2 Miscible Flooding at the Pore Scale** *Jing Li, Chuanzhi Cui*
50	[980] **InPore: Image-based and GPU-Accelerated Volumetric Lattice Boltzmann Method for Pore-Scale Porous-media Flows with Applications** *Huidan Yu*
52	[990] **A pore-scale lattice Boltzmann model for solute transport coupled with heterogeneous surface reactions and mineral dissolution** *Ju Long, Bicheng Yan, Shuyu Sun*
54	[43] **Nanomechanical properties of Janus nanoparticle-stabilized Pickering emulsion in confined nanochannels** *yuanhao chang, bo wang, fanhua zeng*

Poster Session II, cont.

China Hall Pre-Function Area, 14:55 - 16:25

Poster board	
56	[212] **A study on the CO2 displacement behavior at nanoscale considering rough surface** *Keli Ding, Hai Sun, Jun Yao, Junjie Zhong, Yongfei Yang, Zengding Wang*
58	[375] **The Mechanism and Quantification of Threshold Pressure for Oil Flow in Silica Nanochannel by Molecular Simulation** *Bingbing Liu, Jie Zhong, Youguo Yan, Jun Zhang, Xiao Wang*
60	[439] **Determination of the type of free gas transport in shale gas formations based on Knudsen number from molecular perspectives** *Xinyi Zhao, Qian Sang, Hai Sun, Jun Yao, Mingzhe Dong*
62	[137] **Optimizing Battery State Estimation: Overcoming Computational Challenges with Hybrid Models** *Hossein Mirzaee, Serveh Kamrava*
64	[198] **Relative permeability curve prediction directly from 3D digital rocks based on AI approaches** *Jingwei Zhu, Hongqing Song, Chiyu Xie*
66	[1020] **Machine-Learning-Based Robust Optimization of Brine Extraction Well Placement in CCS Projects Using Fast Marching Method** *Hyunjee Yoon, Hoonyoung Jeong, Yeongju Kim*
68	[323] **Changes in the acoustic signature of tight sandstone during spontaneous imbibition process** *Fangzhou Zhao, Jianchao Cai*
69	[498] **Assessing the Representativeness and Precision of Three-Dimensional Digital Rock Modeling: A Case Study on Tight Sandstone** *Fei Xian, Min Li, Zizeng Li, Jiamin Hu, Chenyu Li, Xuefeng Liu*

Poster Session II, cont.

China Hall Pre-Function Area, 14:55 - 16:25

Poster board	
70	[539] **Wave Velocity Dispersion and Attenuation in Partially Saturated Porous Media** *Jimmy Xuekai Li, Jinghao Hu, Seyederfan Saberhosseini, Tiancheng Zhang, Zhongwei Chen*
71	[553] **The Crushing Characters of Quartz Sand Based on a New Experimental Image Processing Methods** *liansong Wu, jianchun Guo, xiaopeng Chen, yutong Wu, yuxuan Liu, ziyi Peng*
72	[908] **Impacts of diagenesis events and pathways on petrophysical properties of sandstones** *Yuqi Wu, Keyu Liu, Chengyan Lin, Chunmei Dong*

Invited Parallel Lecture 1

Ballroom 1, 16:25 - 16:55
Chair: *Anna Herring*

Alex Hansen *16:25 - 16:55*

NTNU-UiO Porous Media Laboratory, *Norway*

A New Kind of Thermodynamics for Two-Phase Flow in Porous Media

Homogenization is the standard approach to up-scaling immiscible two-phase flow in porous media from the pore scale to the Darcy scale. The trouble with homogenization techniques is that they can only produce averages of existing variables and not new types of variables.

Statistical mechanics does produce new types of variables when scaling up thermal systems from the molecular scale to the continuum scale. Temperature is an example of such a variable. It connects the mechanistic description at the molecular level with a thermodynamic description at the continuum level. The trouble with statistical mechanics is that it demands equilibrium. Immiscible two-phase flow in porous media is not an equilibrium process.

It is, however, possible to map immiscible two-phase flow in porous media onto an equivalent equilibrium process through a trick. This makes it possible to formulate a version of statistical mechanics for this problem.

This leads to a thermodynamics-like description at the Darcy scale where the fluid velocities play the roles of internal energy and free energies. New variables such as the agiture – a temperature equivalent – emerge.

Another emergent variable at the Darcy scale is the co-moving velocity. This variable has no equivalent in ordinary thermodynamics. The co-moving velocity has many interesting properties, many of which remain mysterious. Perhaps the most surprising one is that it leads to a differential equation between the relative permeabilities. The simplest solution to this equation gives the Corey relative permeabilities.

Invited Parallel Lecture 2

Ballroom 2, 16:25 - 16:55
Chair: *Saman Aryana*

Xiaofan Yang *16:25 - 16:55*

Beijing Normal University, *China*

Simulating flow and solute transport in subsurface environments: From pore-scale to beyond

Research of the multi-scale, multi-phase, and multi-processes system is of great interest in understanding subsurface environments. However, the coupled flow and transport processes are complex yet challenging for model development and utilization. There have been numerous object-oriented and easy-to-use models/codes across scales to facilitate consistency, continuity, and reproducibility in subsurface research. In addition, pioneer efforts on upscaling also inspire the development of hybrid multi-scale models. It is then critical to intercompare codes and approaches for their evaluation or validation, and propel discussions for optimizing the codes and the development of the next-generation numerical approaches. In this talk, we present a suite of at-scale and multi-scale models that we developed and utilized in recent years for simulating flow and transport processes, with intercomparison and benchmarking cases, including: (1) pore-scale models for simulating flow, solute transport and biofilm growth in porous media; (2) Darcy-scale models for simulating thermo-hydrological processes in frozen soils; (3) regional-scale groundwater models for simulating groundwater-surface interactions; (4) hybrid multi-scale models (pore- to Darcy-scale) for numerical upscaling.

Oral presentations: Parallel sessions 1.3
17:00 - 18:00

MS13: Fluids in Nanoporous Media- *Part 3*
Ballroom 2
Chairs: *Jianchun Xu & Bin Pan*

17:00	[309] **Wetting behaviors and oil occurrence status of shale reservoirs** *Tao Zhang, Qinhong Hu, Shengyu Yang, Qiming Wang, Cuijian Zhang, Khawaja Hasnain Iltaf*
17:15	[905] **Experimental study of gas flow and relative permeability in low-porosity media using LF-NMR** *Aliya Mukhametdinova, Desmond Batsa, Timur Aminev, Denis Bakulin, Timur Unusov, Alexey Cheremisin*
17:30	[424] **A comprehensive study on shale pyrolysis dynamics by real-time in-situ imaging technology** *Xia Yin, Weiyi Pan, Jie Zhang, Zengmin Lun, Stefan Iglauer, Bin Pan*
17:45	[105] **Occurrence characteristics and quantitative evaluation of micro-nano pore shale oil: A case study of Lianggaoshan Formation shale strata in northeast Sichuan, China** *Xuefeng Bai, Shuangfang Lu, Xin Wang, Min Wang*

Oral presentations: Parallel sessions 1.3, cont.
17:00 - 18:00

MS06-B: Interfacial phenomena across scales- *Part 3*
Function Rm 24/25
Chairs: *Ziqing Pan & Zhibing Yan*

17:00	[814] **Interface Evolution During Pore Water Evaporation in Micromodels** *Yu Zhang, Yi Dong*
17:15	[519] **Evaporation in porous media with salt precipitation** *Rui Wu*
17:30	[491] **Interfacial tension reduction mechanism by nanoparticles at heavy oil-carbonized water interface from molecular dynamics approaches** *Xiaofei Sun, Guo Yu, Haoyu Ning, Zixiong Jia, Guanglei Xie, Yongbin Zhao, Xinyu Sun*
17:45	[141] **Thermodynamics and Morphology of Ganglia in 2D Heterogeneous Porous Media** *Chuanxi Wang, Ke Xu*

Oral presentations: Parallel sessions 1.3, cont.
17:00 - 18:00

MS09: Pore-scale modelling- *Part 3*
Ballroom 3
Chairs: *Ke Xu & Saeid Sadeghnejad*

17:00	[78] **Multiscale Generalized Network Modeling of Carbonates with Sub-Resolution Porosity** *Asli S. Gundogar, Sajjad Foroughi, Martin Blunt, Branko Bijeljic*
17:15	[681] **The interplay between temperature evolution, species distribution, and microstructure dynamic in a calcining porous particle** *Xiang Lu, Jing Chen, Abdolreza Kharaghani*
17:30	[34] **Quantification of geometric and flow characteristics for CO2 storage at pore-scale using a DC-GAN based digital experiment approach** *Yifan Zhang, Sajjad Foroughi, Mingliang Qu, Jinping Yang, Qingyang Lin, Martin Blunt*
17:45	[388] **The numerical simulation of two-phase flow in multi-mineral shale digital rock cores** *Guangyuan wei, Hai Sun, Lei Zhang, Dongyan Fan, Shuaishi Fu, Jun Yao, Yongfei Yang, Junjie Zhong*

Oral presentations: Parallel sessions 1.3, cont.
17:00 - 18:00

MS01: Porous Media for a Green World: Energy & Climate- *Part 1*
Function Rm 22
Chairs: *Yuhang Wang & Kamaljit Singh*

17:00	[458] **Solar energy storage in saline aquifers: Insights from coupled hydro-thermo-mechanical modeling** *Yanyong Wang, Kunpeng Zhong, Xiyi Peng*
17:15	[568] **Towards an open-source digital twin for subsurface geothermal systems: a proof-of-concept study for a doublet system** *Guofeng Song, Sebastian Geiger, Denis Voskov, Hemmo Abels, Philip Vardon*
17:30	[666] **Insight on the stability of gas hydrate in montmorillonite slits by molecular dynamics simulations** *Jie Chen, Jiafang Xu, Zhengcai Zhang, Gaowei Hu*
17:45	[727] **Microfluidic Study of Formation, Dissociation, and Dissolution Dynamics of Gas Hydrates in Porous Media** *Wei Yu*

Oral presentations: Parallel sessions 1.3, cont.
17:00 - 18:00

MS08: Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media- *Part 3*
Function Rm 31/33
Chairs: *Mozhdeh Sajjadi & Weiwei Zhu*

17:00	[437] **Dissolution patterns and permeability evolution in dissolving fracture under mechanical deformation** *Kai Li, Ran Hu, Zhibing Yang, Yi-Feng Chen*
17:15	[565] **A mechanistic investigation of oscillatory zoning using reactive transport modeling** *Hang Deng, Jenna Poonoosamy*
17:30	[789] **Quantifying dissolution dynamics in porous media using a spatial flow focusing profile** *Tomasz Szawełło, Jeffrey D. Hyman, Peter K. Kang, Piotr Szymczak*
17:45	[417] **Dynamics of contaminant flow through porous media containing biochar adsorbers** *Kaj Pettersson, Albin Nordlander, Angela Sasic Kalagasidis, Dario Jonsson Maggiolo, Oskar Modin*

MONDAY, 13 MAY 2024

Oral presentations: Parallel sessions 1.3, cont.

17:00 - 18:00

MS03: Flow, transport and mechanics in fractured porous media- *Part 1*

Ballroom 1

Chairs: *Catherine Peters & Hamid Nick*

17:00	[72] **An Efficient Numerical simulation of Reactive Flow in Fractured Vuggy Carbonate Reservoirs Considering Hydro-Mechanical coupling effects** *Kang Liu, Zhaoqin Huang*
17:15	[146] **Characteristics of CO2 Dissolution in Fractured Saline Aquifers** *Xiaocong Lyu, Junxi Xiao, Huiqing Liu, Jing Wang*
17:30	[559] **A new model for predicting conductivity under nonlinear fracture closure and proppant crushing grading curve evolution** *liansong Wu, jianchun Guo, simin He, yutong Wu, yuxuan Liu*
17:45	[420] **Impact of corner-bridge flow on capillary pressure curve** *Guan-Xiong Wang, Ran Hu, Tian Lan, Yi-Feng Chen, Zhibing Yang*

MS15: Machine Learning and Big Data in Porous Media- *Part 3*

Function Rm 35/37

Chairs: *Tao Zhang & Xupeng He*

17:00	[59] **Application of Diffusion Models to Generate Multiphase Fluid Pore-Scale Images** *Linqi Zhu, Branko Bijeljic, Martin Blunt*
17:15	[64] **Predicting ultimate hydrogen production and residual volume during cyclic underground hydrogen storage in porous media using machine learning** *Raymond Mushabe, Sandve Tor, Kane Birane, Donald Wendpanga, David Marban*
17:30	[259] **Efficient 3D Digital Rock Detail Reconstruction and Quality Enhancement with Super-Resolution Transformer** *Zhihao Xing, Jun Yao*
17:45	[1050] **Integrating deterministic geological model with multimodal machine learning to predict shale productivity** *Gang Hui, Muming Wang, Fuyu Yao, Hai Wang, Zhiyang Pi, Penghu Bao*

Gala Dinner

China Hall at the Shangri-La 19:00 - 21 :00

InterPore and the Local Organizing Committee welcome all in-person participants to the Gala Dinner. It will be a seated event, and beverages are included This is a great opportunity to socialize with your peers, visit the exhibitor booths, and kick-off the conference.
This event is included in the in-person conference registration fees.
Separate tickets to the event for accompanying guests are available for purchase.

Photo credits: property of Shangri-La Hotel

Plenary Session

Grand Ballroom (Ballrooms 1, 2 & 3) , 8:40 - 9:25
Chair: *Michel Quintard*

Award Ceremony 2 *8:30 - 8:40*

InterPore Honorary Lifetime Membership Award

Sally M. Benson
Stanford University, USA

The Honorary Lifetime Membership Award is reserved for individuals who have made extraordinary contributions to porous media science and technology, who are world renowned in the porous media community, and whose contributions are consistent with the aims and ideals of InterPore.

Kimberly-Clark Distinguished Lectureship Award

Rainer Helmig
University of Stuttgart, Germany

Each year, InterPore selects a porous media researcher with an esteemed international recognition and excellent presentation skills, who works on a broad range of porous media topics, as the "InterPore Kimberly-Clark Distinguished Lecturer on Porous Media Science & Technology". The awardee will share a topic relevant to the industrial porous media community through a series of lectures at various member and non-member organizations.

Secure your chance to host Prof. Helmig at your institute: Visit the InterPore booth for more information on how to apply.

A word of gratitude: This award has been made possible by a generous grant from Kimberly-Clark, home to some of the world's most iconic and trusted brands, including: Huggies, Scott, Kleenex, Cottonelle and Kotex. For more than a century Kimberly-Clark has been transforming insights and technologies into innovative products and services that improve the lives of nearly a quarter of the world's population.

TUESDAY, 14 MAY 2024

Plenary Session, cont.

Plenary Lecture *8:40 - 9:25*

Grand Ballroom (Ballrooms 1, 2 & 3)

Chair: *Maja Rücker*

Susumu Kitagawa

Institute for Integrated Cell-Material Sciences (iCeMS)
Kyoto University, *Japan*

Chemistry and Application of Soft Porous Crystals

With the Industrial Revolution in the 19th century, humans began to create technologies that consume huge amounts of energy. Initially, people used solid coal as an energy resource. In the 20th century, the focus changed to liquid petroleum. In the 21st century, where the depletion of petroleum has become a critical concern, gases (e.g., natural gas and biogas, and even air) should play important roles—an "age of gas" is dawning. However, a gas is a form that is difficult to handle because it is easily dispersed, creates mixtures, has a low concentration under normal conditions, and is invisible. In particular, new porous materials are indispensable for advancing science and technology to control gases at will. As the promising materials to address global issues of clean energy technologies and environmental sustainability, the emerging class of crystalline microporous materials, porous coordination polymers (PCPs) or metal-organic frameworks (MOFs), have been applied in fields of gas storage and separation, delivery vessel, sensors, catalysis, supercapacitors, FETs, batteries, proton conduction, and so on. We have found the 3rd generation (3G) PCPs/MOFs (Soft porous crystals, SPCs) that possess flexible or dynamic porous frameworks reversibly respond to external stimuli, not only chemical but also physical, unlike robust PCPs/MOFs (2G). In particular, by controlling the local motion of organic ligands that construct the framework, we discovered and developed an effective mechanism for separating gas mixtures with very similar properties, such as oxygen/argon, and light water/heavy water isotopologue mixtures. This talk provides an essential and accessible overview of the chemistry of SPCs, their current features, and the outlook of further developed materials as 4th generation PCPs/MOFs which exhibit multi-functions simultaneously or alternately in combination.

Coffee Break & Exhibition

09:25 - 10:55

Refreshments are available in the China Hall Pre-Function Area. Come grab a snack, network with other attendees, visit the exhibition booths and discuss the posters on display.

Did you know... Qingdao?

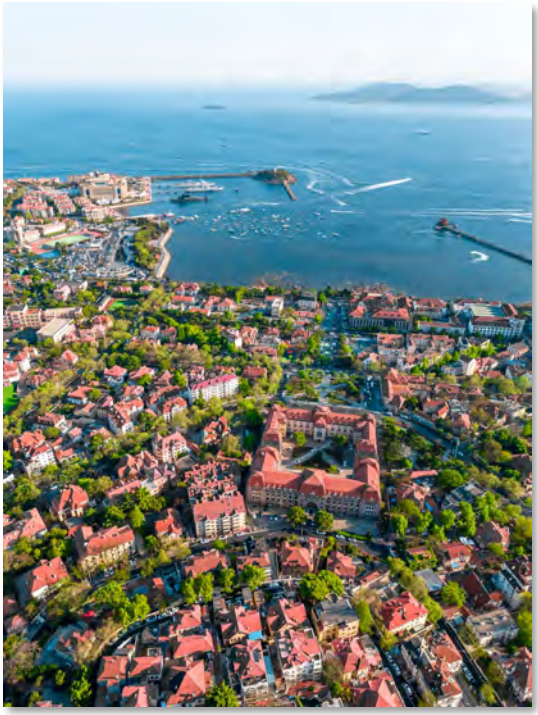


Photo credits: Yuezhong Cui

The skyline of Qingdao

TUESDAY, 14 MAY 2024

Poster Session III

China Hall Pre-Function Area, 09:25 - 10:55

Poster board	
1	[63] **Pore-scale and Reservoir-scale Investigations on H2 Trapping: Impact of Temperature and Salinity** *Haiyang Zhang, Yihuai Zhang, Mohammed Saad Al Kobaisi, Md Motiur Rahman, Muhammad Arif*
3	[154] **Unraveling Heat Transfer Routes in Unsaturated Soils** *Tairu Chen, Wenbin Fei, Guillermo Narsilio*
5	[179] **Advancing Underground Hydrogen Storage: Insights from Molecular Simulations of Wettability and Interfacial Tension** *Salem Alshammari, Safwat Abdel-Azeim,, Abdulaziz Alqasim, Moataz Abu-Al-Saud*
7	[18] **Experimental evaluation of dynamic seepage in tight/shale reservoirs under the coupling of matrix fractures based on NMR** *Meng Du, Shuyi Lu, Zhengming Yang, Weifeng Lyu, Xinliang Chen, Xiang Qi, Pengwei Fang, Zhuoying Dou*
9	[175] **IMPACT OF DUAL POROSITY SYSTEMS ON FLOW IN HEAP LEACHING USING MICRO COMPUTED TOMOGRAPHY IMAGING** *Quan Zheng, Kunning Tang, Peyman Mostaghimi, Ryan Armstrong, Samuel Jackson, Ying Da Wang*
11	[496] **Experimental and theoretical study of unsaturated flow in fractured media** *Zhibing Yang, song xue, Zexiong Zhou, Ran Hu, Yi-Feng Chen*
13	[269] **Microscopic damage rules of water flooding in ultra-low permeability reservoir: an experimental study based on the combination of microfluidic and low-field NMR technology** *Yiping Wen, Qi Li, Jingyi Zhu, Xinyu Tang*
15	[698] **Evaluating the performance of asphalt mixture with additives to withstand salt erosion and freeze-thaw cycles** *Huining Xu, Weidong Ji*

Poster Session III, cont.

China Hall Pre-Function Area, 09:25 - 10:55

Poster board	
17	[728] **Reactivity of porous media under continuous injection** *Dario Maggiolo, Angela Sasic Kalagasidis, Kaj Pettersson*
19	[926] **Multiphase Flow Through Rough Porous Layers in Proton-Exchange Membrane Fuel Cells (PEMFCs)** *Yixiang Gan*
21	[932] **Comparisons between a dual-pore-network model and a hybrid pore-network-continuum model for predicting permeability and formation factor of multiscale carbonate digital rocks** *Bowen Shi, Chao-Zhong Qin, Xingyuan Zhao*
23	[1040] **Development of multiphase flow simulation method in DEM under a movable-grain condition** *Quanwei Dai, Fiona CY Kwok, Kang Duan*
25	[557] **Microscopic mechanism investigation of counter-current imbibition in tight reservoirs using the Lattice Boltzmann method**
27	[600] **Dynamic X-ray computed microtomography imaging of multiphase flow in porous media using deep learning** *Eric Sonny Mathew, Dorthe Wildenschild, Samuel Jackson, Peyman Mostaghimi, Kunning Tang, Ryan Armstrong*
29	[537] **Oscillation Method for Measuring Gas Storage in MCM-41** *Muhammad Airlangga, John Sass, Nolan Kovach, Brian Trewyn, Xiaolong Yin*
31	[580] **Multi-scale Pore Structure Characteristics of Deep Marine Shale and Its Controlling on Gas Transport Mode: Silurian Longmaxi Formation in Southern Sichuan, China** *Shijie He, Pingping Li, Xianglu Tang, Zhenxue Jiang*
33	[738] **Direct numerical simulation of CH4 - CO2 mixture flow in nanoporous media** *Chenyue Xie, Jingwei Huang, Xiaolong Yin, Hui Zhao*

Poster Session III, cont.

China Hall Pre-Function Area, 09:25 - 10:55

Poster board	
35	[834] **Coupled studies of oil compositions and storage spaces in the Kongdian Shale Formation, Bohai Bay Basin, Eastern China** *Weixing Yan, Qiming Wang, Qinhong Hu, Shengyu Yang, Xuyang*
37	[349] **Pore-scale Modeling and Numerical Simulation for Viscoelastic Emulsion Flow** *Haoran Cheng, Rui Huang*
39	[385] **Inferring electrochemical performance and parameters of Li-ion batteries based on deep operator networks** *Qiang Zheng, Xiaoguang Yin, Dongxiao Zhang, Qiang Ye*
41	[977] **MODELING OF RESERVOIR OIL VISCOSITY DISTRIBUTION BASED ON MACHINE LEARNING TECHNOLOGY** *Elena Potekhina, Irina Poplygina, Natalya Kolycheva*
43	[1021] **Novel Learning-based Pattern-Data-Driven Forecast Approach for Predicting Future Well Responses** *Yeongju Kim, Bo Ren, Hoonyoung Jeong*
45	[21] **Acoustic Properties of Hydrate-Bearing Porous Media Based on Electrical-Mechanical-Acoustic Multi-physics-Field Coupling Model**
47	[165] **Integration of Digital Core and Molecular Simulation for Research on Reservoir Mechanical Properties** *Yifan Yin*
49	[499] **Constructing Three-Dimensional Digital Rock of Continental Shale with Multi-Mineral Components Using Machine Learning Segmentation Algorithms** *Min Li, Fei Xian, Zizeng Li, Jiamin Hu, Chenyu Li, Xuefeng Liu*

Poster Session III, cont.

China Hall Pre-Function Area, 09:25 - 10:55

Poster board	
51	[633] **Study on the Distribution Patterns and Resistivity Characteristics of THF Hydrates in Sandstone Sediments** *Zizeng Li, Qin Dai, Chenyu Li, Ming Chen, Min Li, Fei Xian, Jiamin Hu, Xuefeng Liu*
53	[781] **Neural Operator Predictions of Electrical Properties in Porous Media** *Bernard Chang, Masa Prodanovic, Rodolfo Araujo Victor*
54	[267] **A multiscale simulation method for aerosol transport in a mouth-to-lobar bronchi model** *Han Xiao, Moran Wang, Yang Liu*
55	[1022] **Assessment of CO2 Storage Capacities in Saline Aquifers Using Material Balance Equations** *Sangkeon Park, Hyunmin Oh, Hyunjee Yoon, Yeongju Kim, Byungin Choi, Wenyue Sun, Hoonyoung Jeong*
56	[426] **Effect of pore size of electrospun membrane on quality and ion separation of nanofiltration membrane** *zahra khezri, Masoud Riazi, Seyed Hamed Mousavi*
57	[930] **Reshaping the Imaging Landscape: AI-Supercharged Swin Transformer for Unprecedented Detail** *Yang Meng, Kunning Tang, Senyou An, Zhangxing Chen*

Oral presentations: Parallel sessions 2.1
10:55 - 11:55

MS13: Fluids in Nanoporous Media- *Part 4*
Ballroom 2
Chairs: *Shaina Kelly & Boxin Ding*

10:55	[465] **Bound water transport by diffusion in wood-revealed by Nuclear Magnetic Resonance** *Luoyi Yan, Rahima SIDI-BOULENOUAR, Benjamin MAILLET, Philippe COUSSOT*
11:10	[936] **Coarse-grained modeling of fluid transport in swelling porous media** *Jian Wu, Yixiang Gan, Pengyu Huang, Luming Shen*
11:25	[643] **Confinement-guided self-assembly of ionic superdiscs** *Zhuoqing Li, Aileen Raab, Mohanmed Kolmangadi, Mark Busch, Macro Grunwald, Felix Demel, Andriy Kityk, Andreas Schönhals, Sabine Laschat, Patrick Huber*
11:40	[836] **Fractal nanopore structure of anthracite and CO2 adsorption -induced alteration: A synchrotron radiation SAXS study** *Yixin Zhao, Xiaodong Guo*

Oral presentations: Parallel sessions 2.1, cont.
10:55 - 11:55

MS09: Pore-scale modelling- *Part 4*
Ballroom 3
Chairs: *Chiyu Xie & Ke Xu*

10:55	[45] **Micro-Continuum Modeling of Mineral Nucleation and Precipitation at Pore-Scale** *Fengchang Yang, Bowen Ling*
11:10	[17] **Investigate the effect of pore heterogeneity on elastic wave velocity evolution under mineral dissolution process** *Yutian Zhang, Yifan Wu, Fei Jiang, Xiaoguang Wang, Takeshi Tsuji*
11:25	[579] **A Benchmark Study of Pore-scale Multiphase Flow in Pore-doublet: The Impacts of Hydrodynamics on Mineral Dissolution Reaction Rate**
11:40	[826] **Pore-scale multiphase reactive transport and CO2 mineralization capacity in vesicular basalts** *Shaina Kelly, Tianxiao Shen*

Oral presentations: Parallel sessions 2.1, cont.
10:55 - 11:55

MS19: Elastic, electrical, and electrochemical processes and properties in porous media
Function Rm 26
Chairs: *Yuqi Wu & Ben Mansour Dia*

10:55	[58] **Electrical response during drying and imbibition of mesoporous materials.** *Mariia Liseanskaia, Patrick Funnemann, Michael Froeba, Andriy Yaroshchuk, Patrick Huber, Manuel Brinker*
11:10	[116] **Main controlling factors and pore structure of low resistivity shale** *Yijiang Leng, Hongming Tang*
11:25	[120] **Elastic indication of fluid patch clustering in partially saturated porous media: critical saturation model** *Qiang Liu, Tobias M. Müller, Reza Rezaee, Yanli Liu, Danping Cao*
11:40	[858] **Analyzing uncertainties of the instability of the anode /electrolyte interface in solid state batteries** *Ben Mansour Dia, Guy Olivier Ndjawa*

Oral presentations: Parallel sessions 2.1, cont.
10:55 - 11:55

MS01: Porous Media for a Green World: Energy & Climate- *Part 2*
Function Rm 22
Chairs: *Mengjie Zhao & Kamaljit Singh*

10:55	[790] **Evaluating the impact of Hysteresis and Heterogeneity on Hydrogen Storage Performance in Saline Aquifers** *Abdolali Mosallanezhad, Amir Jahanbakhsh, John M. Andresen, M. Mercedes Maroto-Valer*
11:10	[528] **Numerical simulation of depleted and cushion gases impacts on hydrogen storage in a depleted gas reservoir** *Yawen Yang, Hua Tian, Yongfei Yang, Kai Liu, WeiYao Zhu, Stefan Iglauer, Bin Pan*
11:25	[280] **Pore Storage for Green Hydrogen: A Sensitivity Analysis of Geological Parameters at Ketzin Anticline (Germany)** *Lea Döpp, Anna-Maria Eckel, Márton Pál Farkas, Cornelia Schmidt-Hattenberger, Ingo Sass*
11:40	[94] **Performance Study of Underground Hydrogen Storage in a Saline Aquifer for a Prospective Hydrogen Pore Storage Site in Northeast Germany** *Anna-Maria Eckel, Lea Döpp, Márton Pál Farkas, Maria Belén Febbo, Ben Norden, Tobias Björn Weisenberger, Cornelia Schmidt-Hattenberger, Ingo Sass*

Oral presentations: Parallel sessions 2.1, cont.
10:55 - 11:55

MS08: Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media- *Part 4*
Function Rm 31/33
Chairs: *Mozhdeh Sajjadi & Branko Bijeljic*

10:55	[192] **Salinity-induced melting of underlaying permafrost** *Yumin Wang, Ke Xu*
11:10	[299] **How does access to continuous brine sources in saline aquifers enhance salt precipitation dynamics during geological CO2 storage?** *Mohammad Nooraiepour, Mohammad Masoudi, Helge Hellevang*
11:25	[808] **Experimental and Numerical Study of Carbon Dioxide Geological Storage in Coal – A Comparative Analysis with the application of Positron Emission Tomography Imaging.** *Aaron Uthaia Kumaran, Kunning Tang, Peyman Mostaghimi, Ryan Armstrong, Ying Da Wang, YU JING*
11:40	[832] **Cotransport of clay and microplastics in saturated porous media** *Mahima Horta, Seetha N*

Oral presentations: Parallel sessions 2.1, cont.
10:55 - 11:55

MS03: Flow, transport and mechanics in fractured porous media- *Part 2*
Ballroom 1
Chairs: *Hang Deng & Hamid Nick*

10:55	[74] **Effects of cross-scale fracture surface roughness in crystalline host rocks on hydrodynamics** *Wenyu Zhou, Cornelius Fischer*
11:10	[128] **Numerical simulation of transport mechanisms for cyclic high-speed injection and production in fractured-vuggy underground gas storage** *Ye Tian, Yi Yang, Huiyan Zhao, Zehao Xie, Yulong Zhao, Liehui Zhang*
11:25	[209] **A numerical pad-well model for pressure transient analysis in fractured horizontal wells with complex fractures** *Zhiming Chen, Wei Yu*
11:40	[245] **Generalized framework for flow in fractured subsurface formations** *Daniel Stalder, Shangyi Cao, Daniel Meyer, Patrick Jenny*

Oral presentations: Parallel sessions 2.1, cont.
10:55 - 11:55

MS15: Machine Learning and Big Data in Porous Media- *Part 4*
Function Rm 35/37
Chairs: *Shuyu Sun & Kai Zhang*

10:55	[405] **Stable Diffusion in Digital Rock Analysis: Applications, Challenges, and Future Prospects** *Yutian Ma, Qinzhuo Liao, Zhengting Yan, Shaohua You, Gensheng Li*
11:10	[455] **Optimizing Underground Hydrogen Storage through Surrogate Modeling: A CNN-LSTM-Attention Network Approach** *Zhilei Han, Bicheng Yan, Zeeshan Tariq, Zhao Feng, Shuyu Sun*
11:25	[319] **Feasibility study of the inversion method for non-uniform hydrate saturation distribution based on ensemble Kalman filter algorithm** *Yongge Liu, Xu Zhang, Jian Hou, Guo Li, Hongzhi Xu, Ermeng Zhao, Litao Chen, Tiankui Guo, Evgeny Chuvilin*
11:40	[214] **A Comprehensive Approach to In-Situ Stress Estimation in Subsurface Energy Structures using Numerical Simulation and Machine Learning** *Aboozar Garavand, Fahimeh Hadavimoghaddam, Erfan Mohammadian, Masoud Mostajeran Gortani, WEI Jianguang, Xiaofeng Zhou*

Oral presentations: Parallel sessions 2.2

12:00 - 13:00

MS13: Fluids in Nanoporous Media- *Part 5*

Ballroom 2

Chairs: *Boxin Ding & Jianchun Xu*

12:00	[714] **Quantifying oil- and water-wettable pore networks of the lacustrine- and marine-sourced shale oil reservoirs** *Qinhong Hu, Yuxiang Zhang, Cunjian Zhang, Tao Zhang, Qiming Wang, Yubin Ke, He Cheng, Xiuhong Li*
12:15	[1010] **Theory of electrolyte solutions in a slit charged pore: Effects of structural interactions and specific adsorption of ions** *Victoria A. Vasileva, Daria Mazur, Yury A. Budkov*
12:30	[1017] **Using fractal theory to study the influence of movable oil on the pore structure of different types of shale: A case study of the Fengcheng Formation shale in Well X of Mahu Sag, Junggar Basin, China** *Hong Zhang, Kouqi Liu*

MS10: Advances in imaging porous media: techniques, software and case studies - *Part 1*

Function Rm 24/25

Chairs: *Martin Blunt & Lin Ma*

12:00	[77] **Pore structure evolution of low-permeability sandstone under acid treatment: a Micro-CT investigation** *Sinan Liu, Liwei Zhang, Yan WANG, Manguang Gan*
12:15	[462] **Void deformation and connecting visualization in asphalt mixture under dynamic water pressure** *Hao Shi, Maja Ruecker, Huining Xu*
12:30	[237] **Experimental study on optimization of acidizing acidizing fluid in heterogeneous oolitic limestone reservoir** *Yanying Qu, Dongjin Xu*
12:45	[164] **Flow field tomography identifies and quantifies pore opening and clogging in sandstones** *Cornelius Fischer, Jonas Schabernack, Johannes Kulenkampff*

Oral presentations: Parallel sessions 2.2, cont.
12:00 - 13:00

MS17: Fluids in Nanoporous Media- *Part 1*
Ballroom 3
Chairs: *Yingang Zhou & Moran Wang*

12:00	[351] **Advanced 4D Imaging of Shales at Micro- to Nano-scale: Investigating the time-lapse evolution Under Subsurface Thermal, Hydrological, Mechanical, and Chemical Conditions** *Lin Ma, Kevin Taylor*
12:15	[66] **Lattice Boltzmann simulation of water distribution and its effect on methane adsorption in nanoporous shale** *Tao Zhang, Yulong Zhao, Binrui Wang, Liehui Zhang, Thanh Hung Vo*
12:30	[89] **A Coupled THMC Model for Simulating In-situ Conversion process in Low-Medium Maturity Shale Oil Reservoir** *Zijie Wang, Jun Yao, Hai Sun, Xia Yan*
12:45	[696] **Application of Automated Mineralogy in Fluid-Solid chemical reactivity transmission on reservoirs** *Yi Du, Shijie Yan*

Oral presentations: Parallel sessions 2.2, cont.

12:00 - 13:00

MS07: Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes- *Part 2*

Function Rm 26

Chairs: *Peng Xu & Ben Mansour Dia*

12:00	[16] **A robust two-level overlapping preconditioner for Darcy flow in high-contrast porous media** *Eric Chung*
12:15	[915] **Exploration of robust and fast L-splitting schemes for nonlinear double degenerate equations** *Ayesha Javed, Koondanibha Mitra, Iuliu Sorin Pop*
12:30	[125] **Stable unfitted finite element method for poroelasticity with weak discontinuity** *Yimin Zhang, Yuxin Tong, Fanke Wu, Yongliang Wang, Zhijun Liu*
12:45	[859] **Multiscale Extended Finite Element Method for the Simulation of Fractured Geological Formations** *Fanxiang Xu, Bert Sluys, Hadi Hajibeygi*

Oral presentations: Parallel sessions 2.2, cont.
12:00 - 13:00

MS01: Porous Media for a Green World: Energy & Climate- *Part 3*
Function Rm 22
Chairs: *Yuhang Wang & Kai Li*

12:00	[42] **Realistic evaluation of prototypical porous materials for carbon capture** *Lisa Mingzhe Sun, Sean McIntyre, Meishan Guo, Majid Naderi, Daryl Williams, Paul Iacomi*
12:15	[877] **Effect of reactive impurities in CO2 gas storage in carbonate reservoirs** *Dmytro Mihrin, Karen Feilberg, Rasoul Mokhtari, Ali Talaei, Komeil Shojaei, Safa Khojamli*
12:30	[541] **Effect of dissolution and heterogeneity on supercritical CO2 invasion in porous media: an experimental study using X-ray micro-computed tomographic imaging** *Ruotong Huang, Anna Herring, Adrian Sheppard, Mohammad Saadatfar*
12:45	[744] **Pore-Scale Dynamics in Carbonate Reservoirs: Understanding Heterogeneity's Influence on CO2 Storage in Indiana Limestone** *Nihal Darraj, Catherine Spurin, Martin Blunt, Ronny Pini, Sam Krevor, Sojwal Manoorkar, Steffen Berg*

Oral presentations: Parallel sessions 2.2, cont.

12:00 - 13:00

MS06-A: Physics of multiphase flow in diverse porous media- *Part 1*

Function Rm 31/33

Chairs: *Li Chen & Yu Jing*

12:00	[80] **Aging of liquid foam in porous media** *Ali Salamé, Olivier PITOIS, Vincent Langlois*
12:15	[183] **Trapping criteria for three-dimensional periodic liquid particles in micropillar scaffolds** *Wenhai Lei, Shervin Bagheri, Wouter van der Wijngaart*
12:30	[262] **Spontaneous Symmetry Breaking during Dispersed Fluid Flow through Porous Media** *Jie Qi, Ke Xu*
12:45	[918] **A three-layer Hele-Shaw problem driven by a sink** *Meng Zhao, Amlan Barua, Shuwang Li*

MS03: Flow, transport and mechanics in fractured porous media- *Part 3*

Ballroom 1

Chairs: *Catherine Peters & Hang Deng*

12:00	[191] **Study on Foam Flow Behavior in Fractured-Vuggy Systems** *Zhengxiao Xu, Meng Li, Tong Yu, Lei Tao, Jiajia Bai, Wenyang Shi, Qingjie Zhu, Zhaomin Li, Zihan Gu*
12:15	[753] **Experimental study on the effect of supercritical CO2 and acid alternative injection mode on the acid-etching behavior and conductivity of fracture in carbonate rocks** *Bo Gou, Ke Xu, Jianchun Guo, Xiao Li, Mingwei Lei, Junshuo Zhang*
12:30	[326] **Study on Migration Mechanism of Gas Tracer in Carbonate Gas Reservoir** *Yihe Du, Yonggang Duan, Mingqiang Wei, Zhenglan Li, Le Luo*
12:45	[841] **Bubble growth and induced flow characteristics in porous media under heating conditions** *Zhi Feng, kailun Zhang, Jinqing Wang, Peng Xu, Rui Wu*

Oral presentations: Parallel sessions 2.2, cont.
12:00 - 13:00

MS15: Machine Learning and Big Data in Porous Media- *Part 5*
Function Rm 35/37
Chairs: *Tao Zhang & Jie Liu*

12:00	[5] **A deep learning enabled massive parallel simulator for porous media flow** *Chensong Zhang*
12:15	[57] **Application of Machine Learning and Deep Learning Methods in Reservoir Development** *Kai Zhang, Jinding Zhang, Qinyang Dai, Xinyan Wang, Guojing Xin, Liming Zhang, Xia Yan, Piyang Liu, Huaqing Zhang, Yang Wang, Wenjuan Zhang*
12:30	[434] **3D Pore Segmentation and Pore-Scale Simulation by Deep Learning** *Haotian Li, Bicheng Yan, Billal Aslam, Mahmoud Mowafi, Shuyu Sun*
12:45	[906] **A multi-well deep learning model considering geological and engineering parameters for the long-term forecasting of shale gas production** *Yilun Dong, Youzhi Hao, Detang Lu*

Lunch Break
China Hall 2 & 3, 13:00-14:00

Oral presentations: Parallel sessions 2.3
14:00 - 15:30

MS13: Fluids in Nanoporous Media- *Part 6*
Ballroom 2
Chairs: *Qinhong Hu & Jianchun Xu*

14:00	[741] **Multicomponent alkanes transport through nanoporous shale matrix** *Sen Wang, Yipu Liang, Qihong Feng*
14:15	[678] **A Modified Simplified Local-Density Model for Gas Adsorption Considering Cylindrical Pore Structures** *Jialin Shi, Zhuo Chen, Ke Hu*
14:30	[363] **Multicompotent image-based modeling of water flow in mixed wet shale nanopores** *Xiangjie Qin, Jianchao Cai*
14:45	[694] **Multiscale modeling of ion transport in water saturated nanostructures of clays** *Yuankai Yang, Yaoting Zhang, Jenna Poonoosamy, Dirk Bosbach, Guido Deissmann*
15:00	[29] **A Multi-Scale Approach for Assessing Shale Oil Accessibility: Digital Core, Molecular Simulation and Machine Learning Analysis** *Yifan Yin, Zhixue Sun*
15:15	[775] **Water effect on oil adsorption and configuration in nano mineral pore** *Hang Jiang, Jingsheng Ma*

Oral presentations: Parallel sessions 2.3, cont.
14:00 - 15:30

MS22: Manufactured Porous Materials for Industrial Applications
Function Rm 24/25
Chairs: *Senyou An & Vahid Niasar*

14:00	[270] **Nano Porous Particle: A Novel Additive for Gas Storage Technology Based on the Hydrate Method** *Pengfei Wang, Yinlong Li, Ying Teng, Hao Long, Meng Han*
14:15	[281] **Experimental Study and Process Modeling of Closed-loop LIB Recycling with Lithium Sulphate Electrodialysis** *Anahita Asadi, Dongxin Kang, Joey Chung-Yen Jung, Pang-Chieh Sui*
14:30	[1018] **Process modelling of selective laser melting: Effects of powder bed quality and surface tension model** *yuyao Zhang*
14:45	[584] **New insights in battery electrolyte behavior during cycling and heating of batteries using dynamic micro-CT** *Wesley De Boever, Jan Dewanckele, Ksenija Nikolic, Marijn Boone, Zachary Karmiol*
15:00	[668] **A combined ionic Lewis acid descriptor and machine-learning approach to prediction of efficient oxygen reduction electrodes for ceramic fuel cells** *Shuo Zhai*
15:15	[751] **Characterization and numerical investigation of 3D-printed porous organic cages for gas adsorption** *Bin Ling, Rishav Agrawal, Robert J. Poole, Donglin He, Andrew I. Cooper, Ming Liu, Esther García-Tuñón*

Oral presentations: Parallel sessions 2.3, cont.
14:00 - 15:30

MS09: Pore-scale modelling- *Part 5*
Ballroom 3
Chairs: *Shaina Kelly & Chiyu Xie*

14:00	[353] **The pinning dynamics of a non-wetting droplet penetrating a permeable substrate** *Chiyu Xie, Hongqing Song, Junming Lao, Bin Pan, Hongen Yang, Lin Liu*
14:15	[329] **A thermodynamically consistent and conservative diffuse-interface model for two-phase flows in complex geometries** *Chengjie Zhan, Xi Liu, Zhenhua Chai*
14:30	[467] **Combined effect of pore geometry and wettability characteristics on entry capillary pressure** *Tongke Zhou, Mehrdad Vasheghani Farahani, Senyou An, Vahid Niasar*
14:45	[481] **Permeability of pore-scale pre-Darcy flow on typical rock samples by pore network modelling** *Jingsheng Ma*
15:00	[739] **Effect of roughness in the fluid flow in porous media: based on random fields theory and 3D printing technology** *Yunlong Wu, Jean-Baptiste Colliat, Jean-Philippe Carlier, Nicolas Bur*
15:15	[148] **Theory of nonwetting fluid snap-off in porous media under vibration** *Jiajing Li, Wen Deng*

Oral presentations: Parallel sessions 2.3, cont.

14:00 - 15:30

MS06-A: Physics of multiphase flow in diverse porous media- *Part 2*

Function Rm 26

Chairs: *Masa Prodanovic & Rui Wu*

14:00	[300] **Pattern transition during immiscible displacement of non-Newtonian fluids in a rough fracture** *Zhibing Yang, Le Zhang, Yves Méheust, Insa Neuweiler, Ran Hu, Yi-Feng Chen*
14:15	[950] **Experimental study on hysteresis during cyclic injection in hierarchical porous media** *Shuo Yang, Si Suo, Johan Revstedt, Yixiang Gan, Lei Wang, Shervin Bagheri*
14:30	[475] **Impact of wetting films on stability diagrams of two-phase flow in porous media** *Cyprien Soulaine, Nathan Bernard, Sophie Roman*
14:45	[324] **A generic model for capillary imbibition in a liquid-liquid system: Non-Newtonian fluid as the wetting phase** *Pengyu Fu, Yuhang Wang, Huirong Guo, Wanjun Lu*
15:00	[715] **A comprehensive analysis on the wettability in shale oil rocks** *Xiao Wenlian, Yubin Yang, jitian Ren, Chu Huang, Hui Tang, Lingli Zheng, Qihong Lei, Suwei Ma, Wanfen Pu, Youan He*
15:15	[288] **Direct imaging of surfactant/polymer floods in sandstone cores utilising a combined PET/ X-ray CT approach** *Andrea Rovelli, Ronny Pini*

Oral presentations: Parallel sessions 2.3, cont.
14:00 - 15:30

MS01: Porous Media for a Green World: Energy & Climate- ***Part 4***
Function Rm 22
Chairs: *Anna Herring & Yuhang Wang*

14:00	[833] **Investigation of the effect of capillary number, working pressure and hysteresis on hydrogen storage and recovery efficiency using a CFD approach** *Matin Bagheri, Hassan Mahani, Shahab Ayatollahi*
14:15	[251] **The Impact of Water Saturation on Hydrogen Adsorption in Clay-rich Caprocks** *Mohammad Masoudi, Mohammad Nooraiepour, Helge Hellevang*
14:30	[780] **Ostwald Ripening Leads to Less Hysteresis during Hydrogen Injection and Withdrawal: A Pore-Scale Imaging Study** *Sepideh Goodarzi, Branko Bijeljic, Martin Blunt*
14:45	[284] **Investigating multiphase flow dynamics in rock fractures via XCT imaging for hydrogen storage optimization** *Sojwal Manoorkar, Soetkin Barbaix, Hamdi Omar, Dominique Ceursters, Steven Colpin, Maxime Lathinis, Tom Bultreys*
15:00	[296] **Microstructural heterogeneity and alteration of reservoir sandstones with experimental exposure to hydrogen** *Heather Braid, Christopher Rochelle, Edward Hough, Kevin Taylor, Lin Ma*
15:15	[123] **Pore-scale Diffusive Mixing Between Hydrogen and Carbon Dioxide: Implications for Underground Hydrogen Storage** *Zhe Wang, Yuhang Wang, Huirong Guo, Wanjun Lu*

Oral presentations: Parallel sessions 2.3, cont.
14:00 - 15:30

MS20: Biophysics of living porous media: theory, experiment, modeling and characterization
Function Rm 31/33
Chairs: *Dominik Obrist & Moran Wang*

14:00	[305] **Preliminary results for a novel in vitro MRI-based approach to quantify blood clot permeability** *Cody Kubicki, Thomas Neuberger, Keefe Manning*
14:15	[307] **Investigating charged nanoparticles diffusion in brain tumour microstructures at pore-scale** *Yi Yang, Tian Yuan, Rui Li, Dubravka Pokrajac, Yingfang Zhou, Wenbo Zhan*
14:30	[402] **Reconstruction of Multiscale Structures of Cerebral Vasculature** *Yuedi Wang, Han Xiao, Moran Wang, Yang Liu*
14:45	[547] **Cardiac Microvascular Obstruction: microvascular drug transport and lysis of microthrombi in a multi-scale model of the myocardial microcirculation** *Yannick Rösch, Anastasia Milusev, Petra Wolint, Miriam Weisskopf, Nikola Cesarovic, Dominik Obrist*
15:00	[830] **Geometry of the porcine myocardial microcirculation with and without cardiac microvascular obstruction: preliminary results from an ex vivo study with propagation-based phase contrast tomographic microscopy** *Ross Straughan, Eric Schreiber, Anne Bonnin, Nikola Cesarovic, Dominik Obrist*
15:15	[599] **Efficient mixed-dimensional models for root water uptake** *Timo Koch*

Oral presentations: Parallel sessions 2.3, cont.
14:00 - 15:30

MS03: Flow, transport and mechanics in fractured porous media- *Part 4*
Ballroom 1
Chairs: *Catherine Peters & Hamid Nick*

14:00	[131] **A Novel Method to Optimize the Study of Deep Shale Shut-in Time** *Shiying Di, Yuhua Wei, Shiqing Cheng, Shou Ma, Linan Miao*
14:15	[316] **Research on Fracture Propagation Law of Shale Hydraulic Fracturing Based on Mineral Interface Effect** *Mengru Hou, Bing Liang, Jianfeng Hao, Weiji Sun, Qi Liu*
14:30	[384] **Prior ensemble based on geomechanical proxy model for data assimilation in naturally fractured reservoirs** *Michael Liem, Giulia Conti, Stephan Matthai, Patrick Jenny*
14:45	[582] **Rigorous Derivation of Discrete Fracture Models for Darcy Flow in the Limit of Vanishing Aperture** *Christian Rohde, Maximilian Hörl*
15:00	[914] **Study of fluid filtration in fractured rocks based on field observations** *Vladimir Poplygin, Irina Poplygina, Evgenii Kozhevnikov, evgenii riabokon, Mikhail Turbakov*
15:15	[60] **A tensorial representation of the hydraulic aperture of rough fractures under compressive and shearing stresses** *Carlos A. S. Ferreira, Hamid M. Nick*

TUESDAY, 14 MAY 2024

SAC Career Development Event

Function Room 35/37, 14:00 - 15:30
***Convener**: Mohammad Nooraiepour*

Mastering In-Demand Skills and Expertise Spotlight!

Gear up for an extraordinary Career Development Event at InterPore2024, brought to you by the Students Affairs Committee (SAC). Brace yourself for an illuminating panel featuring accomplished academics and industry professionals sharing their expert insights into thriving in the ever-evolving landscape of porous media science careers.

Whether you're a student, a Ph.D. candidate, or a seasoned professional, deciding on the right career path post-graduation can be a puzzle. Join us to gain priceless guidance and perspectives on the most sought-after skills in this era of energy transition and the green shift. Uncover the secrets to building competency that resonates in the job market and learn the art of showcasing your expertise effectively.

In this not-to-be-missed event, our esteemed speakers will delve into the critical choices that shaped their successful careers. Discover the pros and cons of different paths, whether it's academia, industry, or governmental agencies, and grasp the key to securing satisfying and secure employment after graduation.

This exclusive event is your ticket to unlocking a world of career possibilities. Open to all InterPore2024 participants, join us on this transformative journey at Career Development Event 2024 – where we illuminate the path to mastering in-demand skills and putting your expertise in the spotlight!

This free event is open to all InterPore2024 participants.

Prof. Alex Hansen
Norwegian University of Science and Technology, *Norway*

Dr. Marijn Boone
Tescan, *Belgium*

Assistant Prof. Lin Ma
University of Manchester, *UK*

Invited Parallel Lecture 3

Ballroom 1, 15:35 - 16:05
Chair: *Moataz Abu-Al-Saud*

Shuyu Sun *15:35 - 16:05*

KAUST, *Saudi Arabia*

Property-Preserving Schemes for Porous Media Flow: Phase-Wise Conservation, Bound Preservation, and Energy Stability

Single-phase and multi-phase flow and transport in porous media are central to a wide range of natural and industrial processes, including geologic CO2 sequestration, enhanced oil recovery, and water infiltration into soil. Petroleum engineers use reservoir simulation models to manage existing petroleum fields and to develop new oil and gas reservoirs, while environmental scientists use subsurface flow and transport models to investigate and compare for example various schemes to inject and store CO2 in subsurface geological formations, such as depleted reservoirs and deep saline aquifers. One basic requirement for accurate modeling and simulation of multiphase flow is to have the predicted physical quantities sit within a physically meaningful range. For example, the predicated saturation should sit between 0 and 1 while the predicated molar concentration should sit between 0 and the maximum value allowed by the equation of state. Unfortunately, popular simulation methods used in petroleum industries do not preserve physical bounds. A commonly used fix to this problem is to simply apply a cut-off operator. However, this cut-off practice does not only destroy the local mass conservation but it also damages the global mass conservation, which seriously ruins the numerical accuracy and physical interpretability of the simulation results. Another major issue with common algorithms for two-phase flow, especially common semi-implicit algorithms, is that they are (locally) conservative to just one phase only, not all phases. Moreover, stability of the algorithms has been shown to be crucial to certain multiphase flow scenarios.

Invited Parallel Lecture 4

Ballroom 2, 15:35 - 16:05
Chair: *Hang Deng*

Catherine A. Peters *15:35 - 16:05*

Princeton University, *USA*

Orthogonally different mineral reactions, same outcome of permeability reduction: How can this be?

Sustainable energy technologies that involve subsurface gas storage require reliable containment of buoyant fluids. An example is geologic carbon sequestration in which large volumes of CO2 are injected deep underground into porous formations with overlying caprocks. Storage security could be jeopardized if fractures exist, so strategies are needed to seal permeable flow paths. In our work, two orthogonally different mineral reaction scenarios were explored. In one case minerals precipitated and in the other case minerals dissolved, but both cases had the same outcome of reduced fracture permeability. How can this be? In the first case, vein minerals from a mudrock sample of the Wolfcamp formation provided insights about syntaxial mineral growth in a fracture. Dolomite and other carbonate minerals had precipitated in the fracture, closing it off to fluid flow. In the second case, a carbonate-rich shale was reacted leading to calcite dissolution along fracture surfaces. Subsequent compression from normal stress collapsed the altered layer, sealing the fracture and reducing permeability. These studies show that multiple mineral reaction mechanisms can achieve fracture sealing and permeability reduction, a favorable outcome in subsurface applications where the goal is to reduce leakage risks.

Brew Break & Exhibition

16:05 - 17:35

Refreshments are available in China Hall Pre-Function Area. Come grab a snack, network with other attendees, visit the exhibition booths and discuss the posters on display.

Did you know... Qingdao?

Photo credits: Shield

Chuozirou is a distinctive barbecue delicacy from Qingdao. Its uniqueness liesin the use of a small iron box with a handle, known as "Chuozi," which resembles a mini iron pot that can be placed over charcoal fire.

TUESDAY, 14 MAY 2024

Poster Session IV

China Hall Pre-Function Area, 16:05 - 17:35

Poster board	
2	[44] **Investigation of pore-scale evaporative drying, salt precipitation and crystallization migration in CO2 injection process by a lab-on-a-chip system** *BO WANG, Yuanhao Chang, Hongyang Wang, Qiushi Zhang, Fanhua Zeng*
4	[122] **Visualization study on the growth and occurrence patterns of CO2-SO2 mixed hydrates in porous media** *Lifu Zhang, Zhe Wang, Wanjun Lu*
6	[155] **Effect of co-injection of acidic impurity gas and seawater on geological sequestration of CO2 in basalt** *Zhe Wang, Lifu Zhang, Wanjun Lu*
8	[10] **Fractal characteristics of natural fractures in continental shale reservoir and their effects on permeability** *Xiaoming Wang, Junbin Chen*
10	[113] **Mechanical analysis of gas diffusion layers for PEMFCs based on orthogonal design method** *liusheng xiao, miaoqi bian, yushuai sun*
12	[213] **Experimental study on microscopic pore-scales crude oil production characteristics and influencing factors during dynamic imbibition of shale reservoir with online NMR** *Meng Du, Shuyi Lu, Zhengming Yang, Lanlan Yao, Weifeng Lv, Pengwei Fang, Qainhua Xiao*
14	[220] **Prediction model of permeability in porous media with different arrangements** *Yang Zhang, Bei Wei, Jian Hou*
16	[725] **Comparative verification of hydro-mechanical fracture behavior: Task G of international research project DECOVALEX–2023** *Mostafa Mollaali, Wenqing Wang, Keita Yoshioka, Olaf Kolditz*
18	[171] **Pore-scale Study of the Influence of Pore Heterogeneity on Non-miscible CO2 Displacing Oil** *Minfeng Li, Shuyang Liu, Yingshuo Wan, Hangyu Li*

Poster Session IV, cont.

China Hall Pre-Function Area, 16:05 - 17:35

Poster board	
20	[235] **Stages of change in the permeability of the chalk core during the injection of produced water and seawater** *Maksim Kurbasov, Karen Feilberg*
22	[282] **Analyzing Impacts of Gas Evolution within a Batch-Mode Electrodialysis of Lithium Sulfate using Two-Phase Flow CFD Simulation** *Anahita Asadi, Hesam Bazargan Harandi, Joey Chung-Yen Jung, Liwei Zhang, Pang-Chieh Sui, Samaneh Shahgaldi*
24	[344] **A Semi-Analytical Method for Predicting Three-Phase Flow Production in Condensate Gas Reservoirs** *Yaxian Wang*
26	[169] **Finite-size scaling for the connectivity, permeability, and dispersion of discrete fracture networks** *Tingchang Yin, Teng Man, Pei Zhang, Sergio Andres Galindo Torres*
28	[436] **Effect of flow rate and fluid chemistry on Precipitation Patterns in acidified shales** *qiurong Jiang, Ran Hu, Hang Deng, Bowen Ling, Chenxing Zhou, Zhibing Yang, Yi-Feng Chen*
30	[742] **Simulation of multiphase porous media flow in acid stimulation formations with an adaptive mesh refinement strategy** *Longlong Li, Cunqi Jia*
32	[991] **Diffusion Hysteresis in Unsaturated Water Flow: A Microfluic study** *Yajuan Zhuang*
34	[1016] **Pore-Scale Insights into Freshwater Displacement Dynamics in Brine-Saturated Berea Sandstone Using 4D Microtomography** *Rail Kadyrov, Evgeny Statsenko, Thanh Hung Nguyen*
36	[641] **Transport and Detachment Characterization of Nanoparticle-Laden Oil Droplet in Pore-Throat Channel** *Yue Li, Bin Yuan, Can Ke, Wei Zhang*

TUESDAY, 14 MAY 2024

Poster Session IV, cont.

China Hall Pre-Function Area, 16:05 - 17:35

Poster board	
38	[577] **The Competitive Adsorption Behavior of CH4/CO2/H2S Mixtures in Kerogen Nanopores from the Perspective of Molecular Simulation** *Junyao Bao, Shaofeng Ning, Jingkai Cui, Shiyuan Zhan, Xiaoguang Wang*
40	[682] **Characterization of Fluid Mobility and Determination of Movable Pore Throat Lower Limit in Deep Tight Sandstone Reservoirs Based on Nuclear Magnetic Resonance** *Yuchao Wang, DongXia Chen, Fuwei Wang*
42	[857] **Unlocking the secrets of unconventional shale: A multi-scale approach to understanding fluid transport and resource recovery** *Yeping Ji, Andrzej P. Radlinski, Chen Xiao, Claudio Delle Piane, Klaus Regenauer-Lieb, Mihaela Grigore, Phung Vu, Tomasz Blach*
44	[248] **Controllable generation of porous media hybrid multiple-point statistics and sliced Wasserstein metric** *Zhenchuan Ma, Qizhi Teng, Xiaohai He, Xiaohong Wu, Juan Li*
46	[386] **Criss-Cross Physics-Informed Convolutional NeuraNetworks for Prediction of Fluid Flow in Porous Media with Spatial Heterogeneity** *JiangXia Han, Liang Xue*
48	[447] **A novel evolutionary optimization approach via surrogate model and autoencoder for reservoir development scheme design** *Qinyang Dai, Liming Zhang, Kai Zhang, Guodong Chen, Guoyu Qin, Dawei Wu, Jun Yao*
50	[653] **Preparation of municipal solid waste incineration (MSWI) fly ash-based self-foaming materials and feasibility study on goaf filling** *Guosheng Fu*
52	[758] **Multi-scale flow, permeability, and heat transport in building materials** *Hannah Menke, Julien Maes, Kamaljit Singh, Katherine Hood*

Chinese Art: Journey through Calligraphy and Paper Cutting

Function Room 22, 17:00 - 18 :30

Step into the enchanting world of Chinese culture as we invite you to explore the intricate artistry of calligraphy and paper cutting at InterPore2024. Immerse yourself in the profound heritage of China.

Witness the elegance of Chinese paper cutting, a folk art dating back to the Northern Dynasties, where each delicate pattern tells a story steeped in historical and cultural significance. Recognized by UNESCO in 2009, this captivating art form captures the essence of social awareness, moral concepts, and aesthetic tastes.

With more than 3,000 years of artistic evolution, Chinese calligraphy is more than just writing—it's a visual masterpiece. Unveiling its beauty acknowledged by UNESCO, Chinese calligraphy showcases a rich tapestry of diverse styles, distinctive features, and exquisite beauty. Immerse yourself in the rhythmic strokes, witness the creation of Chinese characters, and explore the captivating artistic history they embody.

Join us for an immersive cultural journey, where you'll not only witness the beauty of paper cutting and calligraphy but actively participate in their creation. Experience the infinite charm of Chinese culture and art by trying your hand at the intricate techniques of paper cutting and calligraphy. Feel the rich cultural heritage of one of the world's oldest civilizations come to life in your own creations!

TUESDAY, 14 MAY 2024

Game Night and Networking

Bar Constellation, 19:00 - 21 :00
***Convener**: Mohammad Nooraiepour*

ECR Rendezvous: Brewing Connections and Gaming Brilliance in Qingdao!

Elevate your conference experience with the ultimate soirée for early-career researchers (ECRs) – a night of Team Building and Game Night extravaganza in Qingdao!

If you're a student, PhD, Postdoc, or an early-career researcher looking to turn your academic networking into a legendary adventure, look no further! Join us for an evening filled with excitement, where connections are made, laughter is abundant, and memories become part of your academic journey. Imagine you, your peers, and an array of board games and trivia that will have your brain doing somersaults of joy! This isn't just any networking event; it's a fusion of camaraderie and competition.

Worried about meeting new faces? Fear not! Our curated games will break the ice, and before you know it, you'll be sharing laughs, strategies, and epic tales of academic triumphs.

Bar Constellation

Plenary Session

Grand Ballroom (Ballrooms 1, 2 & 3), 8:30 - 9:20
Chair: *Azita Ahmadi-Senichault*

Award Ceremony 3 *8:30 - 8:40*

InterPore Medal for Porous Media Research
Alberto Guadagnini
Politectinco de Milano, I*taly*

The InterPore Medal for Porous Media Research (formerly InterPore Award for Excellence in Porous Media Research) is given to scientists with an established career, in recognition of excellent research in general porous media, with emphasis on research conducted over the past 10 years. Awardees are senior scientists who have an excellent research record that has contributed to the theoretical, experimental and/or modelling advances in understanding of problems involving natural and/or industrial porous media.

InterPore Award for Porous Media Research
Ryan Armstrong
University of New South Wales, *Australia*

The InterPore Award for Porous Media Research (formerly Procter & Gamble Award for Thin and Swelling Porous Media Research) is given to mid-career researchers in recognition of outstanding research in general porous media, with emphasis on research conducted over the past 5 years.

Plenary Lecture *8:40 - 9:25*

Grand Ballroom (Ballrooms 1, 2 & 3)

Chair: *Boris Gurevich*

Svetlana Mintova

CNRS, Laboratory of Catalysis and Spectrochemistry (LCS), ENSICAEN, Normandy University, *France*

Nanosized Zeolites with Exceptional Adsorption Properties

The transition of the global energy system from traditional fossil fuels to renewable and sustainable energy sources and processes necessitates the development of new materials and the reinvention of existing ones. Zeolites will play a key role in facilitating this transition due to their exceptional qualities, which make them valuable in essential catalytic and adsorption processes, such as carbon capture and storage. The zeolites used in these processes consist of micrometer-scale particles. Consequently, small molecules must diffuse a distance approximately tens of thousands of times their own size through the particles. This results in a relatively large mass transfer zone within a fixed bed configuration, limiting the usable capacity in separation processes.

Nanozeolites offer several key advantages over their conventional micron-sized counterparts, such as high surface-to-volume ratios that provide greater access to more active sites, rapid diffusion properties, and rich chemistry. Furthermore, the direct synthesis using inorganic structure-directing agents ensures the formation of nanozeolites with uniform elemental composition and desirable adsorption properties, eliminating the need for post-synthetic calcination treatment.

In this presentation, I will discuss the synthesis of nanosized zeolites with various sizes, morphologies, and framework structures by tailoring the crystallization process. The diffusion properties of the nanosized zeolites were studied through breakthrough curve analysis, revealing exceptionally sharp curves indicative of rapid diffusion due to the nanosized crystals and desired morphology. The unique adsorption properties of nanozeolites make them interesting candidates for gas separation applications in humid streams.

Coffee Break & Exhibition

09:25 - 10:55

Refreshments are available in China Hall Pre-Function Area. Come grab a snack, network with other attendees, visit the exhibition booths and discuss the posters on display.

Did you know... Qingdao?

Photo credits: Zhuocheng

Zhanshan Temple is a Buddhist temple situated in the downtown area of Qingdao, recognized as scenic spot and acclaimed as the "Northern Jungle Pearl".

Poster Session V

China Hall Pre-Function Area, 09:25 - 10:55

Poster board	
1	[395] **Production dynamic prediction and injection production efficiency optimization simulation of depleted gas storage reservoirs** *Hao Feng*
3	[338] **Integrated Workflow of Fracturing-Flowback-Production in Tight Oil Reservoirs with a Focus on Fracturing Fluid Leak-off.** *Wensheng Wu, Xiukun Wang, Yanjie Guo, Wenlong Wu*
5	[392] **Application of gel particles in the regulation of oil-water permeability curve** *Quanling Qin, Jian Hou, Kang Zhou*
7	[423] **Study on enhanced WAG expanding swept volume technology based on carbon dioxide thickener** *Pengwei Fang, Qun Zhang, Zhengming Yang, Zemin Ji, Hongwei Yu, Meng DU, Xinliang Cheng, Yuan Gao*
9	[612] **Time-dependent deformation of porous sandstones during pore pressure fluctuations and its effect on porous sandstone properties: Implications for subsurface hydrogen storage.** *Ming Wen, Nick Harpers, Jim Buckman, Kamaljit Singh, Andreas Busch*
11	[687] **Assessment of Fluid/Fluid Displacement in Mixed-wet Systems Using Microfluidic Devices** *Abdullah AlOmier, Qi Liu, Dongkyu Cha, Subhash Ayirala, Ali Al-Yousif, Hussein Hoteit*
13	[997] **Pore-scale experimental investigation of low-salinity waterflooding for enhanced oil recovery** *Chunyu Tong, Jun Yao, Yongfei Yang*
15	[611] **DuMux -- an open-source simulator for solving flow and transport problems in porous media with a focus on model coupling** *Timo Koch, Dennis Gläser, Martin Schneider, Bernd Flemisch*

Poster Session V, cont.

China Hall Pre-Function Area, 09:25 - 10:55

Poster board	
17	[907] **Production prediction of fractured horizontal wells in shale gas reservoirs based on multi-scale flow** *Hongsha Xiao, Man Chen, Ruihan Zhang, Yulong Zhao, Zhongming Wu*
19	[731] **The emulsification phenomenon of heavy oil in porous media studied by nuclear magnetic resonance method.** *Jiajing Chang, Zhaojie Song, Bingyu Ji, Yongqang Tang, Zengmin Lun*
21	[766] **Pore-Type-Dependent microstructures of Shales and Implications on Permeability** *Qian Zhang, Yanhui Dong*
23	[846] **Petrophysical Properties Estimation Based on Digital Rock Modeling for Sandstone** *Lyudmila Khakimova, Andrey Morkovkin, Alexander Burukhin, Alexey Cheremisin*
25	[92] **Mechanism Research on Rapid Expansion of Steam Chamber Based on Nitrogen Inducing** *Haojun Xie, Ben-Hua Zhang, Guang-Huan Wu, Shi-Ming Zhang*
27	[115] **Numerical simulation and completion design optimization of sand production in depressurization exploitation of natural gas hydrate in South China Sea** *Yu Qin, Yiqun Zhang, Xiaoya Wu, Youkeren An*
29	[161] **Optimization of Water Control and Oil Stabilization Scheme for Edge and Bottom Water Heavy Oil Reservoir** *lilong Xu, Lei Tao, Junjie Zhong*
31	[342] **Two-phase seepage behaviour of hydrate-bearing sediments at pore-scale studied using a CFD approach** *Zhenyuan Yin, Xiaohui Liu, Jidong Zhang*

Poster Session V, cont.

China Hall Pre-Function Area, 09:25 - 10:55

Poster board	
33	[421] **Relationship between Pore Structure and Reaction Characteristics in Supercritical Water Gasification of Chunk Coa** *Xuanhao Zhang*
35	[320] **Investigation on pore structure and imbibition characteristic of tight sandstone by nuclear magnetic resonance** *Xuanzhe Xia, Jianchao Cai*
37	[396] **Direct numerical simulation of the two-phase flow in a pore network and comparative analysis with drainage/imbibition tests on glass micromodels** *Nadia Bali, Anastasia Strekla, Christina Ntente, Maria Theodoropoulou, Jeff Gostick, Christos Tsakiroglou*
39	[274] **Simulation and Prediction of Natural Restoration for Arsenic-Contaminated Site** *ZOU Shengzhang, Changsong ZHOU*
41	[276] **Pore scale characteristics of CO2 trapping and oil recovery in heterogeneous layered sandstone** *Yingwen Li, Yongfei Yang*
43	[438] **Microscopic Simulation Methods for the Movement and Effects of Nanoparticles at the Oil-Water Interface** *Can Ke, Bin Yuan, Wei Zhang, Yue Li*
45	[480] **Computational and Topological Methods for In-situ Characterisation of Hetrogeneous Surface Wettability in Porous Media** *Ying Da Wang, Chenhao Sun, Kunning Tang, Luke Kearney, Martin Blunt, Peyman Mostaghimi, Ryan Armstrong*

WEDNESDAY, 15 MAY 2024

Oral presentations: Parallel sessions 3.1

10:55 - 11:55

MS13: Fluids in Nanoporous Media- *Part 7*

Ballroom 2

Chairs: *Bin Pan & Boxin Ding*

10:55	[1052] **Molecular simulations of Cavitation Bubbles dynamics** *Yuequn Fu*
11:10	[252] **Coupled mass and heat transfer model in porous media under high Knudsen number** *Shalong Xiong, Nicole Vorhauer, Petra Foerst, Rui Wu*
11:25	[327] **Modelling the Effect of Porewall Heterogeneity on the Phase Equilibria of Fluids in Shale Nanopores** *Xiaohu Dong, Zhan Xiao*
11:40	[211] **Calculation of CO2-oil minimum miscibility pressure for tight reservoirs considering adsorption effect** *Zengding Wang, Keli Ding, Jun Yao, Tengyu Liu, Hai Sun, Yongfei Yang, Lei Zhang, Mojdeh Delshad, Kamy Sepehrnoori, Junjie Zhong*

MS10: Advances in imaging porous media: techniques, software and case studies - *Part 2*

Function Rm 24/25

Chairs: *Maja Ruecker & Qinhong Hu*

10:55	[226] **SEM image segmentation based on deep learning** *Ziyun Zhang, Chuanzhi Cui*
11:10	[610] **An AI-based method to measure pores in imaging data with Avizo Software** *Eric Pui Lam Ho*
11:25	[253] **Quantitative analysis of the geometry and topology of microstructure based on pore-corner network extraction** *Ninghua Zhan, Abdolreza Kharaghani, Evangelos Tsotsas, Rui Wu*
11:40	[287] **Inverse gas chromatography, a new technique for correlating surface energy porous media to saturation** *Mohammad Hossein Khoeini, Azahara Luna-Triguero, Maja Ruecker*

Oral presentations: Parallel sessions 3.1, cont.
10:55 - 11:55

MS17: Fluids in Nanoporous Media- *Part 2*
Ballroom 3
Chairs: *Zhaoqin Huang & Yingfang Zhou*

10:55	[345] **Domain decomposition physics-data combined neural network for parametric reduced order modelling of fluids** *Xinyu Pan, Dunhui Xiao*
11:10	[1036] **Thermo-hydro-mechanical coupled zero-thickness interface finite elements: benchmarking and application** *wen luo, Joaquin Liaudat, Josselin Ouf, Anne-Catherine Dieudonné, Florian Amann, Philip J. Vardon*
11:25	[492] **Coupled Thermal-Hydraulic-Mechanical-Chemical Simulation for Underground Coal Gasification** *Zhuocheng Hu, Jun Yao, Hai Sun*
11:40	[96] **The HiPerBorea project: permafrost modeling from the pore scale to the headwater catchment scale with open source, high performance computing tools** *Laurent Orgogozo, Thibault Xavier, Simon Cazaurang, Oleg Pokrovsky, Sergey Loiko, Anatoly Prokushkin, Manuel MARCOUX, Michel Quintard*

Oral presentations: Parallel sessions 3.1, cont.

10:55 - 11:55

MS07: Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes - *Part 3*

Function Rm 26

Chairs: *Eric Chung & Peng Xu*

10:55	[532] **Thermodynamically consistent modeling and simulation of two -phase flow and multicomponent flow in porous media with rock compressibility** *Huangxin Chen*
11:10	[734] **Multiscale modeling of multiphase compressible non-isothermal fluid flow in deformable porous media** *Xiaojin Zheng, Ian Bourg*
11:25	[461] **A Lagrangian Simulation Framework for Multiphase Flow and Transport in Fractured Porous Media** *Ranit Monga, Daniel Meyer, Patrick Jenny*
11:40	[778] **Quantifying Uncertainty in the Predictive Power of Multi-Scale Pore-Scale Modeling of Complex Microporous Media** *Sajjad Foroughi, Branko Bijeljic, Martin Blunt*

MS01: Porous Media for a Green World: Energy & Climate- *Part 5*

Function Rm 22

Chairs: *Anna Herring & Kamaljit Singh*

10:55	[32] **CO2-enhanced shale gas recovery – Monotonic and cyclic injection** *JOSE LUIZ DAVALOS MONTEIRO, Qi Liu, J. Carlos Santamarina*
11:10	[231] **Molecular investigation of pore size redistribution and formation deformation during the CH4 displacement accompany with CCUS in shale under various influencing factors** *Jiawei Li, Yubo Lan, Tianjiao Guo, Min Yuan*
11:25	[788] **Quantifying the multiphase CO2-brine transport in basaltic rocks** *Jianwei Tian, Yuechao Zhao, Bohyun Hwang, Adedapo Awolayo, Benjamin M. Tutolo*
11:40	[26] **Visualisation of [11C]CO2 storage in coal with positron emission tomography imaging** *YU JING*

Oral presentations: Parallel sessions 3.1, cont.

10:55 - 11:55

MS03: Flow, transport and mechanics in fractured porous media- *Part 5*

Ballroom 1

Chairs: *Hang Deng & Hamid Nick*

10:55	[150] **Phase-field modeling of hydraulic fracture with discrete crack topology** *Yue Xu, Tao You, Qizhi Zhu*
11:10	[419] **Elementary Slip Solutions for Efficient Geomechanical Simulation of Fractured Rock** *Giulia Conti, Stephan Matthai, Patrick Jenny*
11:25	[903] **Non-Isothermal Variational Phase-Field Modeling in Hydraulic Fracturing** *xiaoqiang wang, Detang Lu*
11:40	[632] **Interaction forces caused by relative movement in a continuum mechanical model for suffusion** *Solveig Buscher, Eugen Perau*

Oral presentations: Parallel sessions 3.1, cont.
10:55 - 11:55

MS15: Machine Learning and Big Data in Porous Media- *Part 6*
Function Rm 35/37
Chairs: *Kai Zhang & Tao Zhang*

10:55	[87] **Unsupervised resolution boosting of µCT scans integrated into a supervised convolutional network to predict 3D rock properties** *Saeid Sadeghnejad, Frieder Enzmann, Michael Kersten, Thorsten Schäfer*
11:10	[103] **Deep learning for microstructure analysis of porous media from image augmentation, and multiscale fusion to image auto-segmentation** *Fugui Liu, Yongfei Yang, Jun Yao*
11:25	[298] **Machine Learning Assisted Numerical simulation of Propylene Glycol-mixed Steam Enhanced Extraction in Unsaturated soils** *Zhixin Chen, Yue Wang, Holger Class, Rainer Helmig, Liming Hu*
11:40	[785] **Data Quality Assurance Metrics for Federated Machine Learning** *Bernard Chang, Cinar Turhan, Ali Mohamed, Maria Esteva, Masa Prodanovic*

Did you know... Qingdao?

Photo credits: Shuai Li

Laoshan Mountain is a national scenic spot, famous for its beautiful natural scenery, profound cultural heritage, and unique Taoist culture.

WEDNESDAY, 15 MAY 2024

Oral presentations: Parallel sessions 3.2

12:00 - 13:00

MS11: Microfluidics and nanofluidics in porous systems - *Part 1*

Ballroom 2

Chairs: *Zhongzheng Wang & William Rossen*

12:00	[508] **Probing into nanoparticles adsorption mechanisms through direct experimental characterization of nanoparticle-pore surface interaction forces** *Mingliang Han, Bin Yuan, Dongming Li, Wei Zhang*
12:15	[569] **Pore-scale morphologies of CO2 hydrate formation in microfluidics with in-situ Raman spectroscopy for CO2 sequestration** *Qian Ouyang, Jyoti Shanker Pandey, Nicolas von Solms*
12:30	[356] **Effectiveness of CO2 microbubble method for enhanced oil recovery in fractured reservoirs** *Baocai Tong, Donglei Liu, Lanlan Jiang, Yongchen Song*
12:45	[719] **Pore-scale investigation on the migration and distribution characteristics of gel particle systems in heterogeneous porous media** *Yiran Zhou, Chuanjin Yao, Jia Zhao, Jiawei Zhu, Yuyuan Song, Cuifang Li*

MS10: Advances in imaging porous media: techniques, software and case studies - *Part 3*

Function Rm 24/25

Chairs: *Liwei Zhang & Maja Ruecker*

12:00	[293] **Darcy-Scale Image Analysis for laboratory CO2 storage and fracture flow** *Jakub Both, Martin Ferno, Jan Martin Nordbotten, Erlend Storvik*
12:15	[322] **Understanding heterogeneous and anisotropic porous media based on geometric properties extracted from three-dimensional images** *Liang Lei, Rongrong Tian*
12:30	[365] **Real-world image super-resolution for digital rock analysis** *Shaohua You, Qinzhuo Liao, Zhengting Yan, Yutian Ma, Gensheng Li*
12:45	[371] **Gas Invasion Behaviors and Deformation Patterns within Layered Porous Systems: A Case Study Using X-ray CT** *Zhenqi Guo, Huanyu Wu, Lei Liu, Liang Lei, Xiangbo Gao*

Oral presentations: Parallel sessions 3.2, cont.
12:00 - 13:00

MS17: Complex fluid and Fluid-Solid-Thermal coupled process in porous media: Modeling and Experiment - *Part 3*
Ballroom 3
Chairs: *Zhaoqin Huang & Yingfang Zhou*

12:00	[922] **A vectorial finite element method for the pore-scale calculation of the high temperature thermal behaviour of periodic porous 3D architectures.** *Benoit Rousseau, Franck Enguehard, Jérôme Vicente, Yann Favennec*
12:15	[110] **Pore network modelling of hydro-chemo-mechanical performance of clay materials** *qingrong Xiong, yongxiao qu*
12:30	[476] **Pore-scale modelling of non-linear rock deformation under low- stress ranges** *Rui Li, Yi Yang, Yuxuan Zhang, Wenbo Zhan, Jianhui Yang, Yingfang Zhou*
12:45	[716] **Study on the evolution of mechanical properties of organic-rich shale under high temperature steam** *Dong Yang, Jingzhe Cao, Lei Wang, Lihong Feng, Xudong Huang*

Oral presentations: Parallel sessions 3.2, cont.

12:00 - 13:00

MS07: Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes - *Part 4*

Function Rm 26

Chairs: *Ben Mansour Dia & Eric Chung*

12:00	[102] **Bridging Microscale Physics to Macroscale Models in Confined Porous Media** *Nijat Rustamov, Saman Aryana*
12:15	[536] **Lattice Boltzmann modeling of pore-scale fluid flow during wettability alteration-based enhanced oil recovery in marine porous carbonate reservoirs** *Daigang Wang, Fangzhou Liu, Yong Li, Zhe Hu, Kaoping Song*
12:30	[373] **A lattice Boltzmann based Darcy-Brinkman-Stokes method for micro-continuous two-phase flow** *Yang Liu, JingSen Feng, JingChun Min*
12:45	[925] **Fully coupled implicit discretization for large-scale simulation of miscible multiphase flow in heterogenous porous media** *Shuai Lu, Dmitry Logashenko, Gabriel Wittum*

Oral presentations: Parallel sessions 3.2, cont.
12:00 - 13:00

MS01: Porous Media for a Green World: Energy & Climate- *Part 6*
Function Rm 22
Chairs: *Kai Li & Mengjie Zhao*

12:00	[890] **CO2 storage capacity in saline aquifers and uncertainty sensitivity analysis** *Lishijia Han, Yuan Zhang*
12:15	[452] **Parallel numerical simulation analysis of the stress evolution within the full synthetic field model during CO2 geological storage** *Enyi Yu, Yuan Di, Hui Wu, Shilong Liu*
12:30	[720] **Feasibility of injecting CO2 into low-permeability gas reservoirs to enhance gas recovery** *Ermeng Zhao*
12:45	[923] **Evaluating the Material, Energy, Environmental, and Economic Aspects of Pan-European CCS Infrastructure** *Ali Eftekhari*

Oral presentations: Parallel sessions 3.2, cont.

12:00 - 13:00

MS06-A: Physics of multiphase flow in diverse porous media - *Part 3*

Function Rm 31/33

Chairs: *Chaozhong Qin & Hassan Mahani*

12:00	[619] **Interpreting Pore-Scale Fluctuations: Predicting Transport Coefficients in Multiphase Flow through Porous Media Using the Green Kubo Formulation - An Experimental Investigation** *Umar Alfazazi, DIck Bedeaux, Signe Kjelstrup, Marcel Moura, Mohammad Ebadi, Peyman Mostaghimi, James McClure, Ryan T. Armstrong*
12:15	[673] **Pore-scale modeling of multiphase flow in porous media with particle migration** *Yuanping Li, Hui Zhao, Jingwei Huang, Xiaolong Yin*
12:30	[314] **A microfluidics investigation of the impact of microfractures on flow patterns in porous media during imbibition** *Bowen Zhang, Zhonghao Sun*
12:45	[369] **Experimental and numerical studies of spontaneous imbibition in sandstones** *Chaozhong Qin, Xin Wang, Bo Guo*

Oral presentations: Parallel sessions 3.2, cont.
12:00 - 13:00

MS03: Flow, transport and mechanics in fractured porous media- *Part 6*
Ballroom 1
Chairs: *Catherine Peters & Hamid Nick*

12:00	[207] **Non-Local Flow Description for Non-Space-Stationary Fractured Formations** *Shangyi Cao, Daniel Stalder, Daniel Meyer, Patrick Jenny*
12:15	[348] **Modeling of micro-particle transport in supercritical CO2 over rough fractures** *Qianqian ZHOU, Bin Wang, Haizhu Wang, Mengmeng Zhou, Zhichao Yang, Yong Zheng*
12:30	[368] **Visualization and Quantification of micro-particle transport in rough fractures** *Yaochen Zhang, Yunpeng Zhang, Bin Wang, Haizhu Wang, Mengmeng Zhou, Qianqian ZHOU*
12:45	[394] **Homogenization of flow and solute transport in fractured media using hybrid upscaling method** *Bowen Ling, Yujie Wang*

Oral presentations: Parallel sessions 3.2, cont.
12:00 - 13:00

MS23: Interfaces, interfaces everywhere...a special session in honor of Dorthe Wildenschild - *Part 1*
Function Rm 35/37
Chairs: *Masa Prodanovic & Wenhui Song*

12:00	[767] **The Effect of Film Flow on Capillary Pressure Equilibration in Multi-Phase Flow With Disconnected Phase** *Tianyi Li, Dorthe Wildenschild*
12:15	[247] **Spontaneous fragmentation of dissolving ganglia in porous media** *Kangdi Xu, Chuanxi Wang, Ke Xu*
12:30	[464] **Imaged-based Study of Fluid Droplet Deformation During Immiscible Ferrofluid Flooding** *Luming Cha, Masa Prodanovic, Matthew Balhoff, Ningyu Wang, Yifei Liu*
12:45	[769] **Visualizing Mass Transfer Across Fluid-Fluid Interfaces** *Anna Herring, Haochen Li*

Lunch Break
China Hall 2 & 3, 12:55 - 13:25

Oral presentations: Parallel sessions 3.3
14:00 - 15:30

MS11: Microfluidics and nanofluidics in porous systems - *Part 1*
Ballroom 2
Chairs: *Zhongzheng Wang & Evgeny Shilov*

14:00	[759] **Validation of methodology for MMP measurements on microfluidic slim-tube analogue** *Evgeny Shilov, Dmitrii Pereponov, Michael Tarkhov, Vitaly Kazaku, Ivan Filippov, Alexander Rykov, Andrey Betekhtin, Ivan Promzelev, Vladislav Krutko, Alexey Cheremisin*
14:15	[791] **3D microfluidic investigation of crystallization behavior in porous media for carbon storage application** *Rosalie Krasnoff, Shaina Kelly, Tianxiao Shen*
14:30	[473] **Assessing pH Impact on Miscible Phase Displacement and Mixing within Porous Structures** *Tongzhou GAN, Ludmila Abezgauz, yaniv edery*
14:45	[919] **Microscopic Percolation Patterns in Multiphase Flow of CO2 Enhanced Oil Recovery and Mineralization** *Qingxuan Wang, Xiaopu Wang*
15:00	[71] **PoroFluidics: Deterministic fluid control in porous microfluidics** *Zhongzheng Wang, Louis Ong, Yixiang Gan, Jean-Michel Pereira, Jun Zhang, Emilie Sauret, Yi-Chin Toh*

Oral presentations: Parallel sessions 3.3, cont.

14:00 - 15:30

MS10: Advances in imaging porous media: techniques, software and case studies- *Part 4*

Function Rm 24/25

Chairs: *Lin Ma & Martin Blunt*

14:00	[378] **X-ray microtomography imaging of two-phase fluid flow in water-wet and mixed-wet Bentheimer sandstone** *Shuangmei Zou, Dong Chen, Congjiao Xie*
14:15	[413] **Pore fluid identification with innovative non-electrical methodology for Ultradeep tight reservoirs** *Liang Cai, Shengquan Ge, Shichen Shuai, Wei Zhang*
14:30	[540] **Quantifying the effective porosity of reservoir and source rocks: Multi-scale and multi-approach studies** *Qinhong Hu, Qiming Wang, Tao Zhang, Shengyu Yang, Chen Zhao*
14:45	[623] **Spectral micro-CT imaging of soil: retrieving atomic information and density maps** *Marijn Boone, Bert Masschaele, Denis Van Loo, Jan Dewanckele, Wesley De Boever*

Oral presentations: Parallel sessions 3.3, cont.
14:00 - 15:30

MS17: Complex fluid and Fluid-Solid-Thermal coupled process in porous media: Modeling and Experiment- *Part 4*
Ballroom 3
Chairs: *Yingfang Zhou & Zhenyuan Yin*

14:00	[197] **The evolution of water ice reservoir in lunar polar regions** *Zhenpeng Wang, sunpeng zhou, Ke Xu*
14:15	[343] **Pore-scale study of CH4 hydrate morphology and kinetic behavior by high-pressure microfluidics** *Jidong Zhang, Xiaohui Liu, Zhenyuan Yin*
14:30	[472] **Pore-scale Simulations On The Impacts Of Hydrate Production Approaches On Gas And Water Transport In Hydrate-bearing Sediments** *Zhuoran Li, Guan Qin*
14:45	[485] **Mineral composition and concrete gradation of sandy clay on CO2 hydrates formation** *Jianzhong Zhao, Chi Zhang, Qiang Gao, Yue Ma*
15:00	[549] **Clathrate Hydrates in Porous Media: Application to Low-carbon Fuels in Clean Energy Transition** *Junjie Zheng, Praveen Linga*
15:15	[657] **Fluid solid coupling simulation of deep carbonate gas reservoirs based on digital cores** *Ruihan Zhang, Tingting Wu, Yulong Zhao, Deliang Zhang*

Oral presentations: Parallel sessions 3.3, cont.
14:00 - 15:30

MS06-A: Physics of multiphase flow in diverse porous media - *Part 4*
Function Rm 26
Chairs: *Hassan Mahani & Chaozhong Qin*

14:00	[750] **Mechanism of oil absorption in surface engineered sponges for wastewater treatment** *Gijs Wensink, Pavani Cherukupally, Laurenz Schröer, Kobus van Kempen, Job ten Hacken, Veerle Cnudde, Maja Rücker*
14:15	[664] **Minimal Surfaces in Mixed-Wet Bead Packs: Insights from 3D X-Ray Imaging** *Min Li, Sepideh Goodarzi, Jiafei Zhao, Branko Bijeljic, Martin Blunt*
14:30	[602] **Seepage Model of Conglomerate Based on Deep Neural Network and Finite Element-Discrete Element Coupling** *Kang Yan, Denglin Han, Chenchen Wang, Binyu Ma, Miaomiao Su, Chaobin Zhu*
14:45	[558] **Upscaling of Relative Permeability on a Laminated Sandstone after Pore-scale Rock-typing Using Minkowski Functionals** *Han Jiang, Chaozhong Qin, Christoph Arns, bowen shi*
15:00	[190] **Spontaneous imbibition in dual permeable media using dynamic pore network model** *Wenbo Gong, Zhiqiang Chen, Moran Wang*

Oral presentations: Parallel sessions 3.3, cont.

14:00 - 15:30

MS12: Advances in Computational and Experimental Poromechanics - *Part 1*

Function Rm 22

Chairs: *Pejman Tahmasebi & Jianchao Cai*

14:00	[333] **Time-Resolved Schlieren Imaging of Pulsatile Flow in Sinuous-Shaped Constricted Pores** *Weitao Sun, Diyao Wang*
14:15	[340] **A New Method for Dynamic Analysis and Predicting Production of Multi - Fractured Horizontal Tight/Shale Oil Wells** *Yanjie Guo, Xiukun Wang, WenSheng Wu, WenLong Wu*
14:30	[358] **Hydro-mechanical coupling analysis method for dynamic response of coral reef island airport foundation under aircraft load** *Ning Zhang, Kai Zhao*
14:45	[645] **Interaction Mechanism Between Hydrate Phase Transition and Deformable Sediment Structure under Cold Seep System** *Xuan Kou, Xiao-Sen Li, Yi Wang*

Oral presentations: Parallel sessions 3.3, cont.

14:00 - 15:30

MS18: Innovative Methods for Characterization, Monitoring, and In-Situ Remediation of Contaminated Soils and Aquifers

Function Rm 31/33

Chairs: *Christos Tsakiroglou & Xiaopu Wang*

14:00	[139] **Microscale study on green remediation of non-aqueous phase liquid contamination in heterogeneous groundwater systems** *Xiaopu Wang, Hailong Zhao, Yan Li, Tao Long, Hangyu Li*
14:15	[444] **4D Study of Groundwater Remediation Techniques at Pore-scale** *Meezanul Islam, Nathaly Lopes Archilha, Pavel Kazakovtsev, Tannaz Pak*
14:30	[842] **Assessment of colloidal gas aphrons stability for soil remediation: experiments and molecular dynamics simulations** *Ayaulym Amankeldiyeva, Samal Kaumbekova, Yerlan Amanbek, Stéfan Colombano, Yanwei WANG, Sagyn Omirbekov*
14:45	[644] **A trend prediction model of natural attenuation in groundwater based on machine learning and microbial community** *Xiaodong Zhang, Ran Yu, Tao Long, Xin Zhu*
15:00	[743] **Numerical modeling of the PFAS Fate in a Former Firefighting Training Site in Korsør, Denmark** *Nadia Bali, Anastasios Melitsiotis, Maria Theodoropoulou, Ofer Dahan, Knud Erik Strøyberg Klint, Christos Tsakiroglou*
15:15	[617] **Conducting Monitored Natural Attenuation: Microbial communities hold the answers** *Lu Yang, Shaopo Deng, Qiang Chen, Jing Wei, Tingting Fan, Lingya Kong, Tao Long, Shengtian Zhang*

WEDNESDAY, 15 MAY 2024

Oral presentations: Parallel sessions 3.3, cont.

14:00 - 15:30

MS03: Flow, transport and mechanics in fractured porous media - Part 7

Ballroom 1

Chairs: *Catherine Peters & Hang Deng*

14:00	[1025] **Thermo-hydraulic-Mechanical Modeling Studies of Cryogenic Effects in the Near-wellbore Region of Geothermal Formations** *Philip H. Winterfeld, Bowen Yao, Yu-Shu Wu*
14:15	[583] **Experimental and molecular simulation studies of methane adsorption on deep shales** *Weijun Shen, Xu Yang, Zhen Shen*
14:30	[566] **Investigating interface coupled mineral dissolution and precipitation processes using advanced analytical and modelling tools** *Jenna Poonoosamy, Alexander Kaspor, Yuankai Yang, Hang Deng*
14:45	[677] **Wettability Impact on Immiscible Fluids Flow in Rough Fracture** *dongsheng wu, Han-Xing Deng, Xiao-Guang Wang, Dong-Po Wang*
15:00	[700] **Quantifying the effect of matrix diffusion on tracer transport in fractured reservoirs** *Hui Wu, Yuanyuan Wei*
15:15	[713] **Fracture-matrix interaction, fluid flow and chemical movement in low-permeability fractured media** *Qinhong Hu*

Oral presentations: Parallel sessions 3.3, cont.

14:00 - 15:30

MS23: Interfaces, interfaces everywhere...a special session in honor of Dorthe Wildenschild- Part 2

Function Rm 35/37

Chairs: *Ryan Armstrong & Masa Prodanovic*

14:00	[366] **Pore-scale investigation of forced imbibition in natural rocks through interface curvature and pore topology analysis** *Jianchao Cai, Xiangjie Qin*
14:15	[168] **Pore scale insights on multi-component multi-phase fluid transport phenomena in multi-scale shale pore-fracture system** *wenhui song, Masa Prodanovic, Jun Yao*
14:30	[684] **Competition between main meniscus flow and corner film flow in strongly wetting porous media: a pore network study** *Jianlin Zhao, Dominique Derome, Guangqing Zhang, Jan Carmeliet*
14:45	[651] **Bridging the Gap: Connecting Pore-Scale and Continuum-Scale Simulations for Immiscible Multiphase Flow in Porous Media** *Mohammad Ebadi, James McClure, Peyman Mostaghimi, Ryan Armstrong*
15:00	[819] **Multiscale Simulation Study on Residual Trapping in Subsurface Rocks with Clay Minerals: Implications for Geological Carbon Storage** *Sheng Li, Yunfeng Liang, Fei Jiang, Takeshi Tsuji, Haihu Liu, Keishi Usui, Tomohiro Taniguchi, Gyuhwan Jo*
15:15	[783] **Harnessing the power of microstructure imaging through open data, software and education: past, present and future of Digital Rocks Portal** *Masa Prodanovic, Bernard Chang, Cinar Turhan, Ali Mohamed, Maria Esteva, Richard Ketcham, James McClure*

Invited Parallel Lecture 5

Ballroom 1, 15:35 - 16:05
Chair: *Moran Wang*

Ivan Lunati *15:35 - 16:05*

Empa, *Switzerland*

Inertia, non-equilibrium, and momentum conservation in porous media

Theoretical and computational models of flow through porous media typically ignore inertial effects and use Darcy's law (and extensions thereof) to approximate momentum balance. This contrasts with experimental observations of rapid fluid movement in the pore space, such as Haines jumps that occur in presence of multiple flowing phases. Also, neglecting acceleration may lead to contradictions analogous to those encountered when Fourier's law is used as constitutive equation in the heat equation.

We review the role of local inertial effects in shaping the morphology of invading fluid fronts, paying particular attention to the effects of surface energy instabilities, spontaneous reconfiguration of the interface, collective pore filling, and hysteresis. Then, we discuss how a macroscopic momentum-balance equation can be introduced to model multiphase flow in porous media and describe salient flow features that are observed in the experiments but cannot be captured if Darcy's law is used.

Invited Parallel Lecture 5

Ballroom 2, 15:35 - 16:05
Chair: *Masoud Riazi*

Lucia Mancini *15:35 - 16:05*

ZAG - Slovenian National Building and Civil Engineering Institute, *Slovenia*

Advanced multi-scale and multi-modal 3D imaging and modelling of porous anode microarchitecture and shape changes in rechargeable zinc-based batteries

The increasing need of reliable and sustainable energy supply, storage and portability, combined with global industrial competition, imposes a stringent schedule for battery research and development. Among the different technologies available nowadays, rechargeable zinc-based batteries are promising candidates owing to their comparatively high specific energy, abundant and distributed raw-material resources, moderate cost, environmental friendless and safety. The successful applications of rechargeable Zn batteries are still hindered by various technical pitfalls, a crucial one being their limited cycle life due to uncontrolled morphological changes of the anode upon applying discharge/charge cycles. The textural and geometrical properties of the pore network, including pore size distribution, shape, connectivity and tortuosity, as well as the anode shape changes brought about by cycling, play a crucial role in ionic transport in batteries and electrolyte flow in particulate-anodes, controlling their final electrochemical properties. These properties depend on the anode microstructure, electrolyte composition, use of chemical additives and are a function of the power applied to the battery, representing significant challenges for battery characterization and energy storage applications. An accurate estimation of the percolating networks of ionic conductors and fluid transport properties in the porous electrode material is essential to decipher the battery performance in terms of capacity loss when cycling and can be derived through the integration of optimized anode manufacturing processes, electrochemical characterization and morpho-textural analyses of the battery components and assembled cells. The recent advances in X-ray and neutron 3D imaging techniques, in static and dynamic conditions, through a multi-scale approach coupled with computational modelling simulating the cycling behaviour of batteries, can offer a deeper understanding of how the pore network properties influence fluid transport and their impact on the battery operation. In this talk the result of investigation of Zn-based batteries cycling for traditional and innovative electrolyte chemistries and electrode configurations, at current densities and depths of discharge of practical interest, will be presented.

Brew Break & Exhibition

16:05 - 17:35

Refreshments are available in the China Hall Pre-Function Area. Come grab a snack, network with other attendees, visit the exhibition booths and discuss the posters on display.

WEDNESDAY, 15 MAY 2024

Poster Session VI

China Hall Pre-Function Area, 16:05 - 17:35

Poster board	
2	[352] **OpenWorkFlow - Development of an open-source synthesis-platform for safety investigations in the site selection process** *Olaf Kolditz, Christoph Lehmann, Thomas Nagel*
4	[387] **Physical characteristics analysis of Carboniferous-Jurassic reservoir in the piedmont southwest Tarim Basin** *Boyu Wang, Jie Yin, Lin Ye, Zhenqi Wang*
6	[411] **Numerical study on the enhanced oil recovery by CO2 injection and CO2 storage in shale oil formations** *Rupeng Zhang, Hai Sun, Xinyi Zhao, Dongyan Fan, Lei Zhang, Jun Yao*
8	[505] **Evolution characteristics and quantitative model of shale porosity for Wufeng-Longmaxi Formation in southern Sichuan Basin, China** *Guangshun Xiao*
10	[525] **Modelling liquid-gas interface movement under imbibition conditions considering solubility effects** *Xingfu Li, Shitao Liu, Igor Shikhov, Christoph Arns*
12	[683] **Establishment and analysis of characterization model of oil-water flow energy consumption in porous media** *Yajie Bai, Jian Hou, Yongge Liu*
14	[1030] **Improving CO2 Sweep Efficiency in Carbonate Rock by Injecting Water-Saturated CO2** *Hang Yin, Furqan Le-Hussain, Jiachao Ge, Patrick Tung, YAMIN WANG, Saira Saira*
16	[1034] **Estimating sub-core permeability using multiple coreflooding experiments** *Yanjing Wei, Avinoam Rabinovich*

Poster Session VI, cont.

China Hall Pre-Function Area, 16:05 - 17:35

Poster board	
18	[330] **Study on Injection-Production Characteristics of CO2 Flooding in Fractured Extra/Ultra-low Permeability Reservoirs** *Xinliang Chen, Hongwei Yu, Zhengming Yang, Ming Gao, Zhongkun Niu, Yilin Chang, Meng Du, Pengwei Fang, Zhuoying Dou, Yuan Gao*
20	[440] **Buoyancy-driven dissolution instability in a horizontal Hele-Shaw cell** *Kai Li, Ran Hu, Yi-Feng Chen, Zhibing Yang, Ting Wang*
22	[484] **An efficient numerical simulation of coupled thermo-hydro-mechanical processes in deep tight gas reservoirs** *Yongliang Tang, Yu-Shu Wu, Zhaoqin Huang, Jun Yao*
24	[616] **Visualized investigation of transport behaviors during CO2-EOR in multiscale porous medium** *Jiawei Shi, Linyang Tao, Bo Bao, Junjie Zhong, Liyuan Zhang*
26	[652] **Determination of gas content in shale by adsorption and desorption experiment** *Jian Guan, Songyan Li, Xiaobing Wang*
28	[399] **Numerical simulation for the reactive multiphase flow in porous media during the Carbon Capture and Storage process** *Wenxin Yang, Hai Sun, Lei Zhang, Dongyan Fan, Shuaishi Fu, Junjie Zhong, Jun Yao*
30	[449] **Modeling of CO2-Foam Rheology for Improved Injectivity Prediction in CCUS Processes** *Jinyu Tang, William R. Rossen*
32	[523] **Study on Reservoir Time-Varying Patterns and Remaining Oil Distribution in Sandstone Reservoirs during Long-Term Water Flooding Process** *Tonghui Liu, Yongfei Yang*

Poster Session VI, cont.

China Hall Pre-Function Area, 16:05 - 17:35

Poster board	
34	[630] **Pore-Scale Exploration of Wettability Impact on Fluid Flow: Micro-CT Imaging and Relative Permeability Analysis in a Sandstone Core** *Tingting Wang, Kunning Tang, Peyman Mostaghimi, Ryan Armstrong, Ying Da Wang*
36	[661] **Sub-core scale investigation of heterogeneity effect on CO2 transport in natural conglomerate cores** *Xueqing Zhou, Linqi Zhu, Yuan Chen*
38	[784] **Model formulation of fluid flow in phase domain for fracturing -shut in-flowback-production process in tight oil reservoirs** *Zhixue Zheng*
40	[762] **Integrated Microstructural Analysis of Rock Samples: Quantifying Porosity and Mineralogy with SEM and Machine Learning** *Mingze Jiang, Eva Wellmann, Joyce Schmatz*
42	[829] **Image domain metal artifact correction of rock CT based on deep learning** *Xintao Mu, Liguo Niu, yingqi zhang, yanxia liu, Xin WANG, Jingsheng Ma*
44	[979] **Connectivity of multiscale porous structures of shale rocks based on multiscale imaging analysis** *Bowen Shi, Chaozhong Qin, Han Jiang, Zhiwei Wang*
46	[143] **Wettability-alteration and Its Impact on Immiscible Two-phase Relative Permeability Induced by Nanoparticles Non-uniform Adsorption in Heterogeneous Porous Media** *Can Ke, Bin Yuan, Caili Dai, Wei Zhang, Yue Li*
47	[244] **Microfluidic study on the gas-water flow behaviors at pore-scale in tight sandstone rocks** *Jian Tian, Chaozhong Qin*

Poster Session VI, cont.

China Hall Pre-Function Area, 16:05 - 17:35

Poster board	
48	[331] **Pore Scale Study on Transport Plugging and Displacement Performance Evaluation of a Novel Microencapsulated Polymer Delivery System** *Yongsheng Liu, Jian Hou, Bei Wei*
49	[372] **Plugging rules, macro-micro matching relationship and EOR mechanism of elastic particle: A microfluidic study** *Xin Chen, Shun Liu, Jianbin Liu*
50	[136] **Numerical simulation CO2 sequestration in deep saline aquifers coupled with enhanced reservoir water and geothermal energy system recovery** *Zehao Xie, Yulong Zhao, Cheng Cao, Ruike Luo, Shaomu Wen, Yong Hu, Xian Peng, Zihan Zhao, Liehui Zhang*
51	[181] **Testing a Thermal-Dispersion Upscaling Method for Geothermal Reservoir Simulation in Heterogeneous Reservoirs** *Jinyu Tang, Pelle van Nieuwkerk, William Rossen*
52	[306] **Pore-scale analysis of fluid transport in different grades of brain tumours considering the effect of extracellular matrix** *Yi Yang, Tian Yuan, Rui Li, Yingfang Zhou, Dubravka Pokrajac, Wenbo Zhan*
53	[398] **Mathematical model and numerical simulation of multi-scale coupled flow in ultra-deep fractured tight sandstone gas reservoirs** *Yongliang Tang, Xianzhe LI, Hao Wang, Zhaoqin Huang*
54	[418] **Microscopic visualization experimental study of salt precipitation during supercritical CO2 injection into saline aquifers** *Yongchao Wang, Yulong Zhao, Shaomu Wen, Liehui Zhang, Yuqiang Zha, Zihan Zhao, Tao Zhang, Cheng Cao*
55	[69] **Stress Sensitivity of Fracture Permeability in Shale Oil Reservoirs under Fluid-Solid Coupling** *Saipeng Huang*

Poster Session VI, cont.

China Hall Pre-Function Area, 16:05 - 17:35

Poster board	
56	[302] **How does surface salt crystallization influence saline water evaporation from porous media in the presence of a water table?** *Sahar Jannesarahmadi, Milad Aminzadeh, Muhammad Sahimi, Rainer Helmig, Nima Shokri*
57	[994] **The role of biopolymer on the stability of Colloidal Gas Aphrons** *Ayaulym Amankeldiyeva, Aigerim Khalidulliyeva, Zhanat Salimova, Yanwei WANG, Sagyn Omirbekov*
58	[236] **Remobilization mechanism of microscopic residual oil in heterogeneous sandstones during water flooding process** *Qi Zhang, Yongfei Yang*
59	[379] **Pore network modelling to study dynamic permeability evolution of hydrate-bearing sediments considering media deformation** *Mingqiang Chen, Qingping Li, Weixin Pang, Qiang Fu, Chaohui Lyu, Yang Ge, Huiyun Wen, Bo Yang, Xiaohan Zhang*
60	[454] **Impact of wettability on supercritical CO2 transport and local capillary trapping in deep saline aquifers** *Xiyi Peng, Yanyong Wang, Yongming He*
61	[1043] **Monitoring nano-scale fluid films in porous rock with AFM** *Maja Ruecker, Gijs Wensink, Mehrbod Keshavarzi, GEORGE CLADUIU SAVULESCU, Paul Luckham*

EQUIPORE HAPPY HOUR

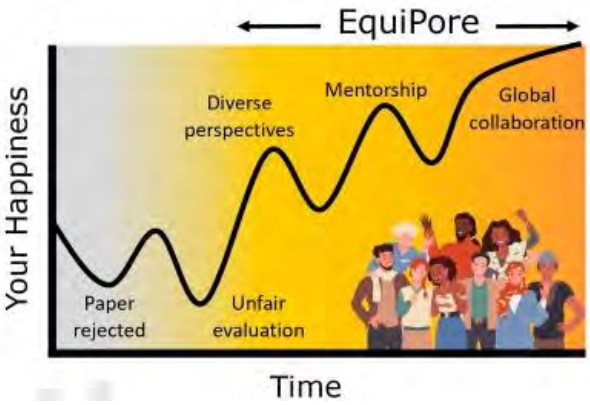
China Hall 2&3, 17:30 - 19:00

Furthering Diversity and Inclusion in Porous Media Research through Connections and Events

Join us for drinks and discussion at the 1st EquiPore Happy Hour.

- Leadership roles available!
- Suggest flagship initiatives!
- Meet new colleagues!
-

This event is open to all participants at InterPore2024"



SEASIDE WALK & LIGHT SHOW

Wednesday, 19:00

Meet in Centurion Court Lobby

Join us for a walk to the Qingdao seashore where we will see famous attractions such as the May Fourth Square, the Olympic Sailing Center, Lover Dam and Yeer Island. The one-hour oceanside stroll will culminate with a spectacular light show.

Photo credits: Zhiqiang Zhou

The night in Qingdao is very beautiful, especially by the sea. When walking along the beach, one can enjoy the beautiful night view and see the light-house in the distance, as well as the high-rise buildings on the coast, which will have light show performances, making it a very spectacular sight. The lighting show is a visual feast featuring the latest lighting technology and the integration of multimedia elements. The show lasts for about 15 minutes and features a variety of elements such as multimedia lighting, music, and even fireworks, creating a stunning visual experience for the audience. Additionally, the lighting show also incorporates elements of Qingdao's history and culture, allowing visitors to enjoy the beauty of the lighting while also learning about the city's past.

Invited Parallel Lecture 7

Ballroom 1, 8:30 - 9:00
Chair: *Hannah Menke*

Jan Nordbotten *8:30 - 9:00*

University of Bergen, *Norway*

Validating computational models for carbon storage

As is common for subsurface applications, the planning and operation of geological carbon storage relies heavily on computational models. Arguably, several decades of experience from the extraction of subsurface resources support the validity of these tools, in particular during the active carbon dioxide injection and early post-injection phase. However, validation of long-term carbon storage performance, on the time-scales of hundreds of years after injection, cannot directly be justified by either existing engineering practice nor natural analogues.

The FluidFlower validation and forecasting study was specifically designed to provide validation data for carbon storage. Moreover, by conducting a multi-institutional and multidisciplinary double-blind study, we were able to address the forecasting skill of the carbon storage simulation community. In this talk we give an overview of the results of the study, both from the perspective of model validation and assessment of forecasting skill.

Invited Parallel Lecture 8

Ballroom 2, 8:30 - 9:00

Chair: *Sergio Fontoura*

TieJun (TJ) Zhang *8:30 - 9:00*
Khalifa University, *UAE*

Physical Insights into Phase Transition and Capillary Transport in Porous Media with In-situ NMR-MRI Characterization

Interfacial transport and phase transition are essential for a large variety of energy and sustainability applications, while in-situ characterization provides instrumental ways of probing and enhancing thermal-fluid transport in porous media. In this talk, I will share our recent progresses on water evaporation and ice melting in homogeneous and heterogeneous opaque porous media, by utilizing non-destructive nuclear magnetic resonance (NMR) and magnetic resonance imaging (MRI). By characterizing the amplitude variation of NMR transverse relaxation time T2, we find that cavitation occurs across the entire porous media along with the water evaporation from open surface. Disconnected void clusters at different depths in the porous medium are also observed from MRI scanning and optical images. These evidences confirm the occurrence of cavitation in porous media because the water is stretched to metastable state by large capillary pressure from the evaporating meniscus. Moreover, transient T2 distributions from NMR enable us to reveal the substantial role of inherent throat and pore confinements in ice melting among various porous media. The increase in minimum T2 offers new findings on how the confinement between ice crystal and particle surface evolves inside the pores of mushy zone. The evolution of melting front and 3D spatial distribution of water content are directly visualized by a stack of temporal cross-section images from MRI, in consistency with the associated NMR results. For heterogeneous porous media like lunar regolith simulant, the T2 curves show two distinct pore size distributions with different pore-scale melting dynamics, and the maximum T2 keeps increasing throughout the whole ice melting process instead of reaching steady for homogeneous porous media. These transport and phase change physics opens up new avenues to develop novel solutions for water-energy-food nexus and in-situ

Oral presentations: Parallel sessions 4.1
9:05 - 10:20

MS11: Microfluidics and nanofluidics in porous systems - *Part 3*
Ballroom 2
Chairs: *Yaofa Li & Zhongzheng Wang*

09:05	[241] **Robust determination of viscosity of surfactant-polymer solution for enhanced oil recovery using microfluidics approach** *Wenbin Gao, Debin Kong, Qi Li, Yiping Wen, Yiqiang Li*
09:20	[456] **Study on Oil Displacement Mechanism of Polymer Microspheres Based on Microfluidic Technology** *Mengqi Ma, Junjian Li, Hanqiao Jiang, Shuai Yuan, Fuwei Yu, Hang Su*
09:35	[433] **Study on the percolation mechanism and oil displacement mechanism of a mixed solution of polymer and silica nanoparticles** *Yu Xue, Jian Hou, Bei Wei*
09:50	[658] **Influence of fluids properties and pore-throat structure on snap-off: microfluidic experiments and theoretical analysis** *Bei Wei, Yongsheng Liu, Jian Hou*
10:05	[180] **Conditions Allowing Steady Multiphase Flow in Microfluidic Devices** *William Rossen, Ewald Jacques Maximiliaan Obbens, Simon Cox*

Oral presentations: Parallel sessions 4.1, cont.
9:05 - 10:20

MS10: Advances in imaging porous media: techniques, software and case studies - *Part 5*
Function Rm 24/25
Chairs: *Qinhong Hu & Liwei Zhang*

09:05	[746] **A Novel GPU-accelerated NMR T2 Simulator Resolving Surface Roughness Effect** *Yiteng Li, Xupeng He, Hyung Kwak, Hussein Hoteit*
09:20	[1041] **Pore- and Nano-scale Imaging of Pore Changes During CO2 Injection in Sandstone** *Rukuan CHAI, Sepideh Goodarzi, Aninditya Patmonoaji, Martin J Blunt, Branko Bijeljic, Anfal Al Zarafi*
09:35	[848] **Non-invasive imaging of solute redistribution below evaporating surfaces using 23Na-MRI** *Mohammad Ali Chaudhry, Andreas Pohlmeier, Johan Alexander Huisman, Rainer Helmig, Stefanie Kiemle*
09:50	[882] **Assessing the Efficacy of Thermal-Sensitive Polymer Gels for Temporary Wellbore Sealing: An X-Ray Computed Tomography Analysis** *Hamed Movahedi, Adrian Alexander Schiefler, Nicolas Bovet, Henning Friis Poulsen*

Oral presentations: Parallel sessions 4.1, cont.
9:05 - 10:20

MS17: Complex fluid and Fluid-Solid-Thermal coupled process in porous media: Modeling and Experiment- *Part 5*
Ballroom 3
Chairs: *Yingfang Zhou & Moran Wang*

09:05	[710] **Effect of pH on the Competitive Adsorption Behavior of CO2/CH4 in Shale Inorganic Nanopores from the Molecular Simulations** *Shaofeng Ning, Jingkai Cui, Junyao Bao, Shiyuan Zhan, Xiaoguang Wang*
09:20	[1014] **Simulation study on the distribution of water - gas domains and two-phase seepage characteristics of coal based on the cavity throat network model** *Dong Zhou*
09:35	[628] **Investigating the effects of temperature and moisture on CH4 recovery after CO2 injection: flow simulation based on coal pore network model** *Qiaoyun Cheng, Sandong Zhou (Corresponding Author), Zhejun Pan, Dameng Liu, Detian Yan*
09:50	[736] **Elastic properties evolution of carbonate rocks during reaction induced by carbon dioxide injection** *Rui Li, Yi Yang, Yingfang Zhou, Yuxuan Zhang, Zaibin Lin*
10:05	[317] **Study on pore-fracture morphology and mineral-induced acid-heat-flow-solid simulation of coal under supercritical CO2** *Saipeng Huang*

Oral presentations: Parallel sessions 4.1, cont.
9:05 - 10:20

MS06-A: Physics of multiphase flow in diverse porous media- *Part 5*
Function Rm 26
Chairs: *Yu Jing & Saman Aryana*

09:05	[177] **CT Gas Tracer Study of Gas Trapping and Diffusion in Foam in Porous Media** *JIAKUN GONG, William Rossen, Wuis Glerum*
09:20	[119] **An advanced approach for upscaling hydrogen migration in diverse saline aquifers** *yueyang yu, Liehui Zhang, Shaomu Wen, Yuanshuang Tang, Yulong Zhao*
09:35	[200] **Microfluidic experimental study of CO2-water-oil three-phase flow in porous media** *Shuxuan Zhang, Li Chen, Hangkai Wei, Wenquan Tao, Xin Sha*
09:50	[845] **Modeling of Gas Chimney Formation During Geological Storage** *Lyudmila Khakimova, Yury Alkhimenkov, Yury Podladchikov*
10:05	[474] **Experimental investigation of capillary effects on solid-liquid interactions in porous media at the decimetric column scale** *Meysam Golmohammadi, Lionel Mercury, Stéphane Gaboreau*

Oral presentations: Parallel sessions 4.1, cont.
9:05 - 10:20

MS01: Porous Media for a Green World: Energy & Climate - *Part 7*
Function Rm 22
Chairs: *Kai Li & Yuhan Wang*

09:05	[124] **Pore-scale simulation of H2-brine system relevant for underground hydrogen storage: A lattice Boltzmann Investigation** *Yuhang Wang, Thejas Chakrapani, Zhang Wen, Hadi Hajibeygi*
09:20	[772] **Methods for Hydrogen Storage Characterization in Porous Substrates** *Vladimir Alvarado, Erik Smith, Alexander Goroncy, Teresa Lehmann*
09:35	[144] **Pore-Scale Modeling of Hydrogen and Cushion Gas Relative Permeability to Brine in geological hydrogen storage** *Desmond Dorhjie, Alexey Cheremisin*
09:50	[598] **H2 flow and displacement in sandstone rocks: evaluating experimental results against pore-network model** *Zaid Jangda, Tom Bultreys, Zeyun Jiang, Andreas Busch, Sebastian Geiger, Kamaljit Singh*

Oral presentations: Parallel sessions 4.1, cont.
9:05 - 10:20

MS12: Advances in Computational and Experimental Poromechanics - *Part 2*
Function Rm 31/33
Chairs: *Jianchao Cai & Pejman Tahmasebi*

09:05	[752] **Micromechanical Coupling of Irregular Particles and Fluid** *Pejman Tahmasebi*
09:20	[85] **Adsorption induced Effective Stress in Porous Media** *Chao Zhang, Shaojie Hu, Ning Lu*
09:35	[400] **Evaluation of Relative Diffusivity of Hydrogen-Methane System for Underground Hydrogen Storage in a Depleted Gas Reservoir Using a Novel Pore-Scale Reactive Transport Model** *Qiuyue Zhang, Renyi Cao, Zhihao Jia*
09:50	[47] **Prediction of CO2 Injectivity into Low-temperature Water Zones below Natural Gas Hydrate Reservoirs for Non-Leaking Storage** *Boyun Guo, Peng Zhang, MD NAHIN MAHMOOD*

Oral presentations: Parallel sessions 4.1, cont.
9:05 - 10:20

MS03: Flow, transport and mechanics in fractured porous media- *Part 8*
Ballroom 1
Chairs: *Catherine Peters & Hamid Nick*

09:05	[234] **Experimental Study of Liquid Cohesion Impact on Particle Clogging in Rock Fractures** *Renjun Zhang, Zhibing Yang, Russ Detwiler, Dongqi Li, Gang Ma, Ran Hu, Yi-Feng Chen*
09:20	[793] **Dynamics of two-phase flow in coal using X-ray micro-computed tomography imaging and positron emission tomography** *Joan Esterle, Peyman Mostaghimi, Ryan Armstrong, Wen Xi, YU JING*
09:35	[820] **Effect of non-acid-soluble minerals on acid-etched hydraulic fracture morphology and conductivity for acid-fracturing in carbonate rock** *Bo Gou, Zihao Liu, Jianchun Guo, Bin Xiao, Kun Pu*
09:50	[823] **Dynamics of fluid flow in natural fracture networks** *Cuong Bui, Stephan Matthai*
10:05	[840] **A new multi-level discrete fracture model for multiphase flow in complex multi-scale fractured systems** *Longlong Li, Luting Wang, Denis Voskov*

Oral presentations: Parallel sessions 4.1, cont.
9:05 - 10:20

MS15: Machine Learning and Big Data in Porous Media- *Part 7*
Function Rm 35/37
Chairs: *Xupeng He & Jie Liu*

09:05	[479] **Multi-scale, multi-instrument, 3D to 3D super resolution of carbonate rocks from nano-CT to micro-CT sources** *Kunning Tang, Ying Da Wang, Francesco Iacoviello, Paul Shearing, Branko Bijeljic, Martin Blunt, Peyman Mostaghimi, Ryan Armstrong*
09:20	[227] **Solving seepage equation using physics-informed residual network without labeled data** *Shuaijun Lv, Daolun Li, Wenshu Zha, Luhang Shen, Yan Xing*
09:35	[574] **Efficient Surrogate Modeling of Subsurface Flow in Porous Media Using Transfer Learning with Multifidelity Data** *Jiawei Cui, Wenyue Sun, Hangyu Li*

Coffee Break & Exhibition
10:20 - 11:50

Refreshments are available in the China Hall Pre-Function Area. Come grab a snack, network with other attendees, visit the exhibition booths and discuss the posters on display.

Submit your best work to InterPore Journal

We would like to invite all scientists in the field to consider submitting their best work to InterPore Journal. By supporting this new journal, you join many scientists in playing a vital role in shaping the discourse and pushing the boundaries of knowledge in porous media science and technology and building a dynamic hub for groundbreaking porous media research. It goes without saying that your participation and support are key to the success of InterPore Journal, and we look forward to welcoming your contributions.

THURSDAY, 16 MAY 2024

Poster Session VII

China Hall Pre-Function Area, 10:20 - 11:50

Poster board	
1	[931] **The implications of subsurface CO2 geological storage for mineralogy and geomechanical behavior: Triassic Sherwood Sandstone, East Irish Sea, UK** *Krishna Milani, Stuart Jones, Andrew Aplin, Nicola de Paola*
3	[987] **The wettability of surfactant solutions on particles in simulated reservoirs** *Wang Zheng*
5	[843] **Research on productivity prediction of fractured horizontal wells considering fracture closure** *Wenrui Sun, Huiying Zhong, Hongli Tang*
7	[1003] **A variational hydraulic fracturing model for simulating the hydraulic fracture propagation in fracture-caved porous media** *Jie Jin, Detang Lu*
9	[730] **The effect of fractures and heterogeneity on the effective growth kinetics of microorganisms in large scale modelling of porous media** *Ali Mahmoodi, Hamid M. Nick*
11	[1045] **Thermo-hydro-mechanical coupled zero-thickness interface finite elements: benchmarking and application** *wen luo, Joaquin Liaudat, Josselin Ouf, Anne-Catherine Dieudonné, Florian Amann, Philip J. Vardon*
13	[679] **TH2M modelling: Extended analysis of gas phase appearance in low-permeable porous media** *Norbert Grunwald, Olaf Kolditz, Michael Pitz, Thomas Nagel*
15	[917] **Evaluation of the void space structure and flow channels in low -permeability reservoir rocks** *Aliya Mukhametdinova, Natalia Bogdanovich, Alexander Burukhin, Alexander Borisov, Pavel Grishin, Alexey Cheremisin*

Poster Session VII, cont.

China Hall Pre-Function Area, 10:20 - 11:50

Poster board	
17	[121] **Elastic anisotropy and influencing factors of shale in the Wufeng-Longmaxi Formation** *Feng yutian, Hongming Tang*
19	[219] **Mechanism and Control Factors of Particle Migration in Loose Sandstone Reservoirs** *Bowei Liu, Chunsheng Jia, Hongming Tang, Yawei Hou, haoxuan tang, zhao wang*
21	[511] **Feature alignment Generative Adversarial Network for Multi-scale fusion reconstruction of Core Images** *Pengcheng Yan, Qizhi Teng, Juan Li, Xiaohong Wu, Xiaohai He*
23	[757] **Coupling Deep Learning with Progressive Growing Generative Adversarial Networks and Data Assimilation for Inverse Modeling in Complex Aquifers** *Liangping Li, Michael Tetteh*
25	[1011] **The Future of Core Analysis: Estimating of Effective Porosity via µCT & Transfer Learning** *Rail Kadyrov, Evgeny Statsenko, Thanh Hung Nguyen*
27	[1053] **Super-resolution imaging of multiphase fluid distributions in porous media using deep learning** *Zhuangzhuang Ma*
29	[708] **Optical Properties versus Compositional & Structural Features of Dried Ink Thin Films** *Hamid Mansouri, Helder Marques Salvador, Nicolae Tomozeiu*
31	[649] **Digital-rock simulation of stress-dependent porosity and permeability for carbonate rocks** *Ziyi Pu, Ye Tian, Yangyang Lei, Yi Yang, Ying Li, Yulong Zhao*

Poster Session VII, cont.

China Hall Pre-Function Area, 10:20 - 11:50

Poster board	
33	[649] **Digital-rock simulation of stress-dependent porosity and permeability for carbonate rocks** *Ziyi Pu, Ye Tian, Yangyang Lei, Yi Yang, Ying Li, Yulong Zhao*
35	[837] **Numerical simulation on the four-dimensional in-situ stress evolution in shale gas reservoirs under water injection** *Qi Ruan, huiying tang, shangui luo, yulong zhao, zehao xie*
37	[798] **Reclaiming Pharmaceuticals: Innovations in Wastewater Treatment** *Stefano Seccia, Mohaddeseh Mousavi Nezhad*
38	[1048] **Multi-scale characterization for pore systems of hydrate-bearing reservoir ——Kerishna-Godavari Basin, India** *Wen Guan*

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Oral presentations: Parallel sessions 4.2
11:50 - 12:50

MS11: Microfluidics and nanofluidics in porous systems - *Part 4*
Ballroom 2
Chairs: *Evgeny Shilov & Yaofa Li*

11:50	[249] **Investigation of transport and deposition of micro-nano-bubbles in porous media using column test and microfluidics** *Yazhou Cao, Liming Hu, Zhen-yu YIN*
12:05	[412] **Microfluidic platform studying transport dynamics in weathering crust soil** *Bowen Ling, Enhao Liu, Gaofeng Wang, Hongping He, Jianxi Zhu, Wei Tan, Xiaoliang Liang*
12:20	[770] **Approach for void space reconstruction on a microchip based on the lithological and mineralogical data** *Margarita Latypova,Alexey Cheremisin, Dmitrii Pereponov, Eduard Batyrshin, Evgeny Shilov, Igor Maryasev, Michael Tarkhov, Roman Mukhin, Timur Nigmatullin, Vitaly Kazaku, Vladimir Kosorukov, Vladimir Shtinov, Igor Samsonov*
12:35	[442] **Novel Microfluidic Experiments Of Investigating Permeability Impairment due to Clogging in Rough Fractures** *Xusheng Chen, Ran Hu, Yi-Feng Chen, Zhibing Yang*

Oral presentations: Parallel sessions 4.2, cont.

11:50 - 12:50

MS09: Pore-scale modelling- *Part 6*

Function Rm 24/25

Chairs: *Moran Wang & Saeid Sadeghnejad*

11:50	[41] **Pore scale characterization of dissolution process during CO2 injection in sandstones: an simulation study** *Jinlei Wang, Yongfei Yang*
12:05	[239] **Role of micro-fractures on displacement of immiscible fluids in fractured porous media: a pore-scale perspective** *Zhennan He, Yinglong Zhang, Pei Zhao, Yan Zhou, Ning Qin*
12:20	[973] **Motion of a viscous slug on heterogeneous surfaces** *Bauyrzhan Primkulov, Amir Pahlavan, Luis Cueto-Felgueroso, Ruben Juanes*
12:35	[468] **Measuring (non)stationarity in porous media images and what it means for pore-scale simulations** *Kirill Gerke, Efim Lavrukhin, Andrey Zubov, Marina Karsanina*

MS17: Complex fluid and Fluid-Solid-Thermal coupled process in porous media: Modeling and Experiment- *Part 6*

Ballroom 3

Chairs: *Yingfang Zhou & Kejian Wu*

11:50	[854] **Investigation of the Effect of Thermal Stresses on Hydraulic Fracturing in Geothermal Reservoirs** *Abolfazl Ghadimi, Mozhdeh Sajjadi, Mohammad Emami Niri, Milad Dastangoo*
12:05	[717] **A three-dimensional reservoir-scale Thermal-Hydrological-Mechanical model of enhanced geothermal systems** *Tingting Liu, Hang Deng*
12:20	[665] **Temperature evolution law of mining coal seam in gas desorption process** *Wenlu Zhang, Weiji Sun, Bing Liang, Jianfeng Hao*

Oral presentations: Parallel sessions 4.2, cont.
11:50 - 12:50

MS06-A: Physics of multiphase flow in diverse porous media - *Part 6*
Function Rm 26
Chairs: *Longlong Li & Li Chen*

11:50	[108] **Multiphase Flow Behavior and Numerical Simulation in Fractured-vuggy Porous Media** *Heng Zhou, Zhaoqin Huang, Lei Yang*
12:05	[111] **A Robust three-phase equilibrium calculation framework for dimethyl ether (DME)-H2O-CO2-Hydrocarbon systems** *Zhengbao Fang, Hongbin Jing, Huanquan Pan, Jianqiao Liu*
12:20	[428] **Effect of Porous media on Minimum Miscibility Pressure** *Ali Safaee, Masoud Riazi*
12:35	[1026] **Effects of particle density and pore fluid on granular flow in a rotating drum** *Yu Chen, Si Suo, Yixiang Gan*

Oral presentations: Parallel sessions 4.2, cont.
11:50 - 12:50

MS01: Porous Media for a Green World: Energy & Climate - *Part 8*
Function Rm 22
Chairs: *Anna Herring & Mengjie Zhao*

11:50	[8] **Design of viscosified CO2 for carbon storage in saline aquifers by continuum-scale imaging and modeling** *Abbas Firoozabadi, Boxin Ding, Apostolos Kantzas*
12:05	[445] **Critical Thresholds for CO2 Foam Generation in Homogeneous Porous Media** *Jinyu Tang, Bing Wei, Mengke Yang, William R. Rossen*
12:20	[28] **Effects of Thermal Cycling on Sealing Ability of Sealant Surrounding Steel Pipe for CCS Applications** *Kai Li, Anne Pluymakers*
12:35	[303] **Water Thin Films on Kaolinite Gibbsite and Edge Surfaces and Their Effects on Surface Wettability in Relation to Geological Carbon Sequestration** *Zhehui Jin, Minjunshi Xie*

Oral presentations: Parallel sessions 4.2, cont.
11:50 - 12:50

MS03: Flow, transport and mechanics in fractured porous media - *Part 9*
Ballroom 1
Chairs: *Hamid Nick & Hang Deng*

11:50	[201] **Countercurrent imbibition in shale with parallel dense fractures: analytical model and anisotropic relative permeability** *Fei Yu, Ke Xu*
12:05	[383] **Relative Permeability Cyclic Hysteresis and its Application in Improving the History Matching Quality and Evaluating Deliverability Capacity in a Fractured Carbonate Gas Reservoir Storage Field** *Junchang SUN, Chun LI, Jieming WANG, Lei SHI, QingJie ZHANG, Runya SHEN, Ruotong CHEN, Xiaohu GUO*
12:20	[597] **Differential Mechanisms of Acidic Fluid-induced Dissolution in Jurassic Ahe Formation Reservoirs across Various Locations within the Northern Structural Zone of the Kuqa Depression** *chaobin Zhu, Denglin Han, Rui Yuan, Hao Du, Kang Yan, Miaomiao Su, Yipeng Li*
12:35	[1046] **Effect of mineral on mechanical behavior of granite after high-temperature treatment by particle flow simulation** *Yahua Wang, Jiafang Xu, Yongqiang Chen, Bowen Wang, Jian Wang, Jie Chen*

Oral presentations: Parallel sessions 4.2, cont.
11:50 - 12:50

MS15: Machine Learning and Big Data in Porous Media - *Part 8*
Function Rm 35/37
Chairs: *Tao Zhang & Jie Lin*

11:50	[425] **Anchored Physics-Informed Neural Network for Fluid Flow Simulation in Heterogeneous Porous Media** *Jingqi Lin, Xia Yan, Sheng Wang, Kai Zhang, Jun Yao*
12:05	[631] **A Transformer-based framework for brine-gas interfacial tension prediction: Implications for H2, CH4 and CO2 geo-storage** *Tianru Song, Ming Yue, Hussein Hoteit, Hassan Mahani, Stefan Iglauer, Bin Pan*
12:20	[901] **Machine learning algorithms for predicting breakthrough curves for pore scale reactive flow in porous media and application to parameter identification** *Oleg Iliev, Ivan Oseledets, Daria Fokina, Pavel Toktaliev, Vasiliy Grigoriev*

Lunch Break
China Hall, 12:50 - 13:55

Grant Writing Workshop

Function Room 35/37, 13:00- 15:00
***Convener**: Mohammad Nooraiepour*

Professor Nima Shokri

Dean of Faculty and Head of Institute,
Hamburg University of Technology, *Germany*

Ever felt lost in the maze of grant writing? Overwhelmed by where to start or which grants are the right fit for your career stage? Ready to turn confusion into confidence? Dive into the world of successful grant writing with SAC's exclusive workshop!

InterPore's Students Affairs Committee (SAC) presents an exclusive Grant Writing Workshop at InterPore2024 – a transformative experience designed to empower you in securing funds for your research projects.

About the Workshop:
"Persuasive Grant Writing" is your guide to using narrative tools that resonate with your funders. Elevate the quality of your grant applications, align your proposals with funder objectives, and apply narrative tools to make your applications more informative and persuasive.

Key Learning Points:
• Craft winning grant applications
• Create effective project budgets
• Design impactful projects
• Uncover the secrets of successful grant revisions

Who Should Attend:
Anyone eager to master the art of finding and applying for grants! Whether you're a student, a Ph.D. or postdoc, or an early-career researcher, this workshop is tailored just for you.

This workshop is your all-in-one ticket to navigating the grant writing sphere with confidence! Ready to embark on your funding journey? Join us in Qingdao to make InterPore2024 an unforgettable experience!

Oral presentations: Parallel sessions 4.3
13:50 - 15:05

MS11: Microfluidics and nanofluidics in porous systems - *Part 5*
Ballroom 2
Chairs: *William Rossen & Yaofa Li*

13:50	[217] **A Novel Microfluidic Approach to Quantify Pore-Scale Mineral Dissolution in Porous Media** *Rafid Musabbir Rahman, Colin Shaw, Yaofa Li*
14:05	[233] **Self-organized colloidal streamers in porous media: Emergence, development and clogging consequence** *Xukang Lu, Han Xiao, Junlin Luo, Wenbo Gong, Moran Wang*
14:20	[415] **Pore-scale investigation into the effects of fluid perturbation during hydrate formation** *Rui Xu, Jian-Wu Liu, Xiao-Sen Li, Yi Wang, Yu Deng, Zhao-Yang Chen*
14:35	[370] **Microfluidic Visualization and Modeling of Polymer Induced End-Point Relative Permeability Damage** *Shaken Kenzhekhanov, Xiaolong Yin*
14:50	[441] **Experimental Study of Dissolution Regimes in a Multiphase Flow Environment with Real-Rock Microfluidics** *Chen-Xing Zhou, Bowen Ling, Hang Deng, Ran Hu, Yi-Feng Chen, Zhibing Yang*

Oral presentations: Parallel sessions 4.3, cont.
13:50 - 15:05

MS09: Pore-scale modelling- *Part 7*
Function Rm 24/25
Chairs: *Moran Wang & Yongfei Yang*

13:50	[162] **Pore-scale Flow Simulation of CO2 Sequestration in Deep Shale Based on Thermal-hydro-mechanical Coupled Model** *Ziwei Liu, Yongfei Yang, Jun Yao*
14:05	[246] **Regularization strategies to improve the numerical efficiency of a fully-implicit pore-network model** *Hanchuan WU, Martin Schneider, Maziar Veyskarami, Rainer Helmig*
14:20	[272] **An Improved MCMP Pseudopotential Model for Immiscible Fluids Flow in Porous Media** *jingsen feng, Ke Xu, Moran Wang*
14:35	[140] **Pore-scale prediction of CH4-CO2 competitive adsorption in nanoporous media coupling molecular simulation and machine learning acceleration** *Han Wang, Jianchao Cai*

Oral presentations: Parallel sessions 4.3, cont.
13:50 - 15:05

MS17: Complex fluid and Fluid-Solid-Thermal coupled process in porous media: Modeling and Experiment - *Part 7*
Ballroom 3
Chairs: *Yingfang Zhou & Guan Qin*

13:50	[672] **Study the fluid flow interaction with fracture and matrix in the porous media.** *Kejian Wu, Guan Qin, Ciprian Panaitescu*
14:05	[526] **A pore-scale perspective on the hydraulic fracturing of heterogeneous glutenites** *yanying chen, Hongqing Song, Chiyu Xie*
14:20	[104] **Evaluating and enhancing the fracture conductivity by an optimised carrier fluid and proppant design** *Duo Wang, Jiayuan Zhang, Yunong Wu, Jun Feng, Xiaofang Jiang, Zhejun Pan*
14:35	[170] **Advancements in Hydraulic Fracturing Simulation Considering Complex Natural Fracture Distributions** *Weiwei Zhu, Zhiqiang Chen, Shengwen Qi, Moran Wang*

Oral presentations: Parallel sessions 4.3, cont.
13:50 - 15:05

MS01: Porous Media for a Green World: Energy & Climate - *Part 9*
Function Rm 22
Chairs: *Anna Herring & Kai Li*

13:50	[662] **Minimum miscibility pressure determination in confined nanopores considering the presence of the second liquid phase** *Zhuo Chen, Ruixue Li, Jialin Shi*
14:05	[509] **A Bayesian deep-learning approach to characterize CO2-brine saturation functions from experimental data** *Nikolai Andrianov, Behzad Rostami, Samira Mohammadkhani*
14:20	[50] **Optimization of porous structures via machine learning for solar thermochemical fuel production** *Da Xu, Meng Lin*
14:35	[88] **Structure and Properties of 316L Sinter Paper for Use as Gas Diffusion Layer in PEM Fuel Cell Applications** *Olaf Andersen*
14:50	[97] **Dynamic separation of CO2 from N2 using alkali-metal forms of nanosized chabazite** *Sajjad Ghojavand, Svetlana Mintova, Benoit Coasne, Edwin Clatworthy, Parveen Kumar-Gandhi, Rémy Guillet-Nicolas, Veronique Pugnet*

Oral presentations: Parallel sessions 4.3, cont.
13:50 - 15:05

MS16: Fluid Interactions with Thin Porous Media
Function Rm 31/33
Chairs: *Chaozhong Qin & Nicolae Tomozeiu*

13:50	[885] **Membrane fouling and filtercake formation during static microfiltration harvesting of microalgae using thin glass fibre filters** *Jincheng Wu, Edo Boek, Gerald Meeten, Neil Cagney, Tim Jones*
14:05	[705] **Color Properties and Porous Ink Layer – a study via Optical Spectroscopy** *Nicolae Tomozeiu*
14:20	[748] **Evaporation and absorption of surfactant-laden droplets on unsaturated porous media** *Xiaoxing Li, Hans Kuerten*
14:35	[278] **Unveiling moisture transport mechanisms (vapor vs. bound water) in cellulosic materials: application to droplet absorption** *Yuliang ZOU, Luoyi Yan, Benjamin Maillet, Laurent Brochard, Philippe Coussot*
14:50	[986] **The effect of graphene and porous coatings on flow boiling in flat microchannels under intense localized heating** *Dmitry Zaitsev, Andrey Semenov, Maxim Pukhovoy*

Oral presentations: Parallel sessions 4.3, cont.
13:50 - 15:05

MS03: Flow, transport and mechanics in fractured porous media - Part 10
Ballroom 1
Chairs: *Hamid Nick & Hang Deng*

13:50	[406] **A Darcy-Brinkman-Stokes Approach to Modeling Microbially Induced Calcium Carbonate Precipitation in Porous and Fractured Media** *Xueying Li, Xiaofan Yang*
14:05	[524] **A pore-scale investigation of dispersion in two-phase flow with varied viscosity contrast in porous media** *Zijing LI, TETSUYA SUEKANE, Chunwei Zhang*
14:20	[1013] **Effective Characterization of Fractured Media with PEDL: A Deep Learning-Based Data Assimilation Approach** *Tongchao Nan, Chunhui Lu, Jiangjiang Zhang, Jichun Wu, Yifan Xie*
14:35	[695] **Pore-scale Modeling of Two-Phase Fluid Flow in the Fracturing-Shut In-Flowback Process of Tight Oil Reservoirs** *Fangzhou Liu, Daigang Wang, Zhe Hu, Kaoping Song, Jin Chen*

Brew Break & Exhibition
15:05 - 16:20

Refreshments are available in the China Hall Pre-Function Area. Come grab a snack, network with other attendees, visit the exhibition booths and discuss the posters on display.

Did you know... Qingdao?

Photo credit: 刘润馨.

Chinese seal carving is a traditional art form that combines calligraphy and carving, primarily used for creating decorative and authentication seals. Seal carving utilizes various materials, such as stone and wood, intricately carved with exquisite ancient script. This art form not only showcases craftsmanship but also carries profound cultural significance and aesthetic values. In Chinese culture, seal carving is regarded as a symbol of refined art, widely cherished by scholars and literati.

Poster Session VIII

China Hall Pre-Function Area, 15:05- 16:20

Poster board	
2	[867] **AI assisted prediction of Sweep Efficiency of Hydrogen – Water Displacements in Porous Media** *Amirsalar Manouchehri, Mozhdeh Sajjadi*
4	[912] **Pore-scale investigation of the influence of gas mixing on He/brine and CO2/brine wettability using Microfluidics: Implications for CO2 and H2 geo-storage** *Amer Alanazi, Hussein Hoteit, Saleh Bawazer*
6	[756] **Reactive Transport Modeling of CO2 Saturated Brine in Fractured Cement** *Hamid M. Nick, Saeid Barzegar*
8	[831] **Gas mass transfer in deep coal cleats: coupling multiple flow mechanisms and poromechanics with creep** *Tao Zhang, Jianchun Guo, Jie Zeng, Zhihong Zhao*
10	[740] **Effect of Porous Media Properties on Pressure Drop and Coolability in Nuclear Debris Beds** *Aimad Bouloudenine, Liangxing Li, Zutao Xiang, Shang Shi, Muhammad Abu Bakar*
12	[891] **Quantitative characterization method for residual oil distribution in heavy oil after multi-cycle steam huff and puff based on CT scanning** *Haoyu Zheng, Jian Hou*
14	[512] **Organic matter–oil adhesion force and ultimate flow distance of adsorbed oil in shale reservoirs** *Rui Shen, Lei Xu, Hang Yang, Shengchun Xiong*

THURSDAY, 16 MAY 2024

Poster Session VIII, cont.

China Hall Pre-Function Area, 15:05- 16:20

Poster board	
16	[777] **Microfluidic visualization of asphaltene deposition under high temperature** *Dmitrii Pereponov, Evgeny Shilov, Michael Tarkhov, Tagir Karamov, Alexander Rykov, Ivan Filippov, Natalya Lesina, Evgeny Popov, Pavel Grishin, Alexey Cheremisin*
18	[940] **Machine-learning-based forecasting model for nanoparticles controlling oil-water interface performance** *Dongming Li, Bin Yuan, Mingliang Han, Wei Zhang*
20	[1031] **Experimental and Model Studies of Fluids in Micro-Nano Scales** *Fuquan Song, Heying Ding, Xiao Hu, Jinbiao Yu, Fei Gao*
22	[132] **Study on the Influencing Factors of N2-Water Alternating Huff and Puff Oil Recovery in Tight Oil Reservoir** *Qiao Fan, Mingliang Luo, Kai Wang, Yuanjia Lv, Shuanghuan Zhang*
24	[224] **Study on the pore-scale multiphase seepage characteristics of clayey-silt sediments** *Yuxuan Xia, Jianchao Cai*
26	[795] **Retention Mechanism of Residual Oil in Different Pore-Throat Structures Under High-Flux Water Displacement Using Pore-Scale Two-Phase Flow Simulation Considering Dynamic Contact Angle** *Gaofei Yan, Baobiao Pu, Renyi Cao, Zhihao Jia*
28	[466] **Integrating LUCAS data with AI-driven models for predicting soil Salinization across the EU** *Mohammad Aziz Zarif, Amirhossein Hassani, Panos Panagos, Inma Lebron, David A. Robinson, Nima Shokri*
30	[942] **An Autonomous Adaptive Meta Model (AAMM) for Real-Time Oil Rate Prediction and Optimization in Dynamic Environments** *Fatna Said Adinani, Kai Zhang, Huaqing Zhang, Johnson Joachim Kasali*

Poster Session VIII, cont.

China Hall Pre-Function Area, 15:05- 16:20

Poster board	
32	[620] **The Wettability Evolution Process and Mechanism of Deep Tight Sandstones Controlled by Diagenesis: A Case Study from the Dongying Sag, Bohai Bay Basin** *Xin Wang, Jianhui Zeng*
34	[562] **The influence of matrix lower limit on structure and flow characteristics in tight oil reservoir** *Chenchen Wang, Denglin Han, Rongrong Hu, Hao Du, Miaomiao Su*
36	[815] **Numerical study of the gas-liquid separation of cryogenic fluids with porous structures** *Tianhao Yi, Ran Xu, Chengcheng Chen, Guang Yang, Jingyi Wu*

Plenary Lecture

Grand Ballroom (Ballrooms 1, 2 & 3), 16:20 - 17:05
Chair: *Olaf Kolditz*

Changying Zhao
Shanghai Jiao Tong University, *China*

Multiscale Considerations on Porous Media Heat Transfer

Heat transfer in porous media is ubiquitous in many industrial applications, such as heat exchangers, heat pipes, heat storage system, and porous coatings for thermal radiation. Thus, it is of great importance to understand in depth the heat transfer in porous media. This, however, is still a huge challenge, mainly attributed to the following fact. First, heat transfer in porous media is a process involving multi scales. The pores in porous media can be multi scales, ranging from nano to milli meters; and the heat transfer in each pore of porous media controls the continuum- (macro) scale heat transfer in porous media. Second, heat transfer in porous media include multiple interactions, e.g., the interaction at the interfaces between fluids and solid matrix of porous media in single phase convection, interaction at the interface between fluids of different phases in phage change heat transfer, and heat transfer between solid matrix in thermal radiation. Thus, a multi scale exploration, from interface- to pore- and continuum-scale, is needed so as to disclose in detail the mechanisms of heat transfer in porous media. In this talk, we will introduce our recent multi-scale studies on the sing-phase convection, phase change heat transfer, and thermal radiation in porous media. As for the single-phase convection, the thermal non-equilibrium effects in forced and natural convection in porous media are clarified from the pore- and continuum-scale perspectives; and the permeability for natural convection is discussed. As for the gas-liquid and liquid-solid phase change heat transfer in porous media, the movement of phase interfaces in the nano- and micro-pores of porous media is disclosed, and its effects on the continuum-scale heat transfer is revealed. As for the thermal radiation heat transfer in porous media, a multiscale framework is established, which can account for the dependent scattering effects at microscale and the coherent effects of multiple scattering at mesoscale; based on this framework, an accurate prediction of macroscale radiative properties of various densely packed porous media is achieved. Furthermore, the role of far-field and near-field interferences in the wave aspects of thermal radiation transfer is quantitatively revealed.

Plenary Session

Grand Ballroom (Ballrooms 1, 2 & 3), 17:40 - 18:05
Chair: *S. Majid Hassanizadeh*

Award Ceremony 4

Grand Ballroom (Ballrooms 1, 2 & 3), 17:05 - 17:25

MDPI Student Poster Award

The MDPI Energies Student Poster Award is given in recognition of outstanding student poster presentations at the annual InterPore conference. Each year, at the annual InterPore conference, the Honors and Awards Committee will choose the best student poster presentations to win the MDPI Student Poster Award.

A word of gratitude: This award has been made possible by a generous grant from MDPI Energies and MDPI Computation.

InterPore PoreLab Award for Young Researchers

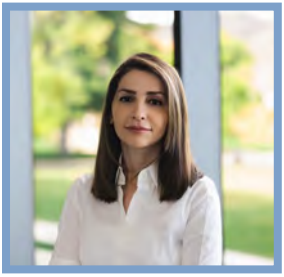
Dr. Bauyrzhan K. Primkulov
Massachusetts Institute of Technology, USA

This award is given to a young researcher in recognition of outstanding contributions in the field of porous media from a fundamental point of view. The research may be theoretical, computational, or experimental.

A word of gratitude: This award has been made possible by a generous grant from PoreLab (a research center of excellence jointly formed by Norwegian University of Science and Technology (NTNU)) in Trondheim and the University of Oslo (UiO). PoreLab focuses on the physics of porous media using experimental, theoretical and computational methods.

Award Ceremony 4, cont.

Grand Ballroom (Ballrooms 1, 2 & 3), 17:05 - 17:25



Rien van Genuchten Early-Career Award of Porous Media for a Green World

Serveh Kamrava
Colorado School of Mines, USA

The Rien van Genuchten Early Career Award is given to an early-career researcher whose focus is the general topic of "porous media research for a green world". This may involve significant theoretical, experimental and/or modeling advances addressing major soil, hydrologic and/or environmental problems facing our planet.

A word of gratitude: This award has been made possible by a generous donation from Dr. Betty-May Pontedeiro to the InterPore Foundation and is created in honor of the eminent soil and groundwater scientist Marthinus (Rien) Th. van Genuchten. Rien van Genuchten is world renown for his enormous achievements in the area of fluids flow and solutes transport in partially-saturated porous media. He has made highly impactful contributions to the understanding and modeling of subsurface processes, in such widely varying fields as soil physics, hydrology, geology, the environmental sciences, and civil engineering.

InterPore National Chapter Awards

Saudi Arabia InterPore Chapter

The National Chapter Awards are given in recognition of remarkable activities over the past year.

Award Ceremony 4, cont.

Grand Ballroom (Ballrooms 1, 2 & 3), 17:05 - 17:25

InterPore Rosettes

InterPore activities are carried out mainly by volunteers. It takes many voluntary working hours to make an international platform like InterPore a success. Recognizing and honoring volunteers sets a standard for service, encourages a sustained commitment to participation, and inspires others to commit themselves as well.

Each year, InterPore honors selected individuals who have made very significant contributions to InterPore activities; they receive the InterPore Rosette.

Recipients:
Wendong Wang
Shuaishi Fu
Zhuocheng Hu
Mohammad Nooraiepour
Hamid Nick
Branko Bijeljic
Gabriel Wittum
Mozhdeh Sajjadi

Closing Ceremony

Grand Ballroom (Ballrooms 1, 2 & 3), 17:25 - 17:30

A brief video of Albuquerque, USA, the InterPore2025 location, will be shown.

InterPore2025

17th Annual Meeting & Conference Courses

19 - 22 May 2025 | Conference Courses 18 & 23 May

Albuquerque, New Mexico, USA

The **scientific program** ranges from **pore-scale modeling** & **imaging**, to **experimental and numerical methods on larger scales**, to **sensitivity and uncertainty analysis**. Stay abreast of the latest porous media research on trending topics such as **energy transition**, **biotechnics** and **nature-based agriculture**. Presentations will be given on a wide variety of porous media processes in highly diverse applications, including: **carbon storage and clean energy recovery, oil and gas reservoirs, soil and groundwater, fuel cells, filters, foams, membranes and more.** InterPore2025 also offers opportunities to find collaborative **industrial and application-oriented institutional partners. Satellite conference courses** will be offered before and after the conference.

Topics and Applications

- Mass and heat transport
- Multiphysics-multiphase flow
- Reservoir engineering, CO_2 sequestration, geothermal energy and energy storage
- Colloids and nanoparticle transport
- Soil mechanics and engineering
- Swelling porous media
- Wave propagation
- Biotechnology and biofilms
- Thin and nanoscale porous media
- Fuel cells and batteries
- Food, wood, composites
- Fibers and textiles

Local Organizing Committee

Chair: Hongkyu Yoon - *Sandia National Laboratories*

Focus Theme: Water

When considering the topic of water and porous media, groundwater and hydrogeology come to mind first. We want to look at water in a broader context at this conference, covering topics like water supply, desalination, purification, biochars, sanitation, filtration, evaporation, constructed wetlands, biofilters, wastewater treatment, drip irrigation, hydroponics, permeable pavements, water-resistant outdoor gear, and any other natural or man-made situations where water interacts with porous materials.

Program Committee

Chair: Jaime Gómez-Hernández - *Universitat Politècnica de València*

Vice-Chair: Eleonora Secchi - *ETH Zurich*

The Perfect Venue

Albuquerque offers a unique blend of culture, history, and natural beauty, making it an ideal destination. With its vibrant arts scene, rich Native American heritage, and proximity to stunning landscapes like the Sandia Mountains, attendees can immerse themselves in diverse experiences. The landmark luxury **Hotel Albuquerque** is conveniently located in the heart of Old Town and the Sawmill District. In addition to serving as the conference venue, the hotel is the perfect base for exploring the historic Old Town, enjoying Southwestern cuisine, and engaging in the activities Albuquerque has to offer.

www.interpore.org/2025