InterPore

INTERNATIONAL SOCIETY FOR POROUS MEDIA

InterPore2020
12th ANNUAL MEETING

Photo courtesy: Pixabay

CONFERENCE PROGRAM
31 August - 3 September 2020

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ORGANIZING COMMITTEE

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We are so glad to welcome you!

WELCOME MESSAGES

Dear Colleagues,

On behalf of the Executive Committee, I welcome you to the 12th International Conference on Porous Media and Annual Meeting of the International Society for Porous Media (InterPore). This multidisciplinary international annual meeting is the focal event for the diverse porous media community, bringing together professionals and students to learn about new and exciting advances in porous media studies that cut across disciplines with participants from across the globe. Presentations at the Conference encompass all aspects of porous media from the nano-scale to the scale of reservoirs and address many of societies pressing concerns such as global water quality and scarcity, geothermal energy, CO2 sequestration and fuel cells, as well as fundamental studies related to transport and deformation of biological tissue, topological insight into geometric evolution of fluids, and scale-dependent behavior.

Laura J. Pyrak-Nolte
Purdue University

We appreciate your support and participation in InterPore's first virtual Annual Meeting. With the current unknowns related to the COVID-19 pandemic, it is important for the community and the Society to respond and develop appropriate methods to maintain communication and the exchange of ideas under restricted travel conditions.

The Symposium could not have happened without the effort and dedication of many people who worked tirelessly on short notice. I am very grateful for their assistance, commitment, and dedication. This year the co-organizers of minisymposia and session moderators had an extensive task and a crucial role in the success of the Conference. The hard work of moderators, the Program Committee, the Organizing Committee, Communication Committee, and InterPore's executive staff is greatly appreciated.

Thank you for participating in the Conference. Please enjoy the Conference, learn as much as you can, virtually meet and make friends, and take advantage of the clear view of the presentations from the comfort of your office or home.

"Learn from yesterday, live for today, hope for tomorrow. The important thing is not to stop questioning." (Albert Einstein).

On behalf of the executive committee,
Laura J. Pyrak-Nolte
President of InterPore

WELCOME MESSAGES

As a Chair of the Organizing Committee, and on behalf of the highly efficient team which worked on the organization, I wish to give you a warm welcome to this edition of the InterPore Annual Meeting. For the first time, the Annual Meeting this year has been organized in an online format due to the Corona outbreak. I hope very much that you, your relatives and friends did not suffer from the disease, and wish good health to all of you. Despite the new format, this major event of the InterPore Society offers the full spectrum of conference features. We expect over 700 participants from all over the world. You can present your results to a competent audience, have fruitful discussions on your and on other presentations, meet old friends and make new ones. Although this year's conference will be virtual, new software communication tools enable intensive and productive discussions. The scientific program is customized to the different time zones, which are most suitable for the presenters.

It has been an intensive effort organizing the event in the new format, and the involved team has done the best to enable it runs smoothly and to make it memorable for you. Welcome to InterPore 2020.
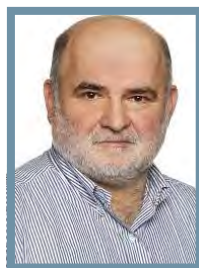
Oleg Iliev
Fraunhofer Institute

Oleg Iliev,
Chair of the Organizing Committee
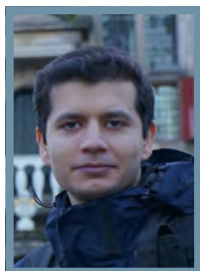
Hadi Hajibeygi
Delft University of Technology

Rainer Helmig
Stuttgart University

On behalf of the Program Committee, it is my pleasure to welcome you to the InterPore2020 online conference. We had originally prepared the program for the conference to take place in China. Block program, MS chairs, etc., were all arranged. However, due to the COVID-19 outbreak, the committee worked closely with the Executive and Organizing Committee to redesign the program for an online conference in a relatively short period of time. This is a new chapter in InterPore's history, a combination of live and recorded scientific events around porous media science. This allows anyone from anywhere on this beautiful planet Earth to connect, enjoy, learn, and present, with minimum registration fee. We are proud of being part of this open science program! We hope you all enjoy this conference, and help us to improve for the future by providing your feedback.

The Program Committee welcomes its new members and says goodbye to those who have finished their service period. Rainer Helmig and I will step down as chairs of the Program Committee effective 1/Jan/2021. New chairs will bring new ideas and framework for sharing science and making network and friendship. We would like to thank all the scientific program committee members for their contributions in allowing us reach major milestones, including the development of coherent structured mini-symposia and subject-expert invited chairs for them.

The most valuable asset of InterPore is the network among all of us, which makes us stand strong in difficult times and share our happiness in joyful moments.

To our proud InterPore family, enjoy the best scientific event on porous media!

Hadi Hajibeygi
Co-Chair of the Program Committee

InterPore Foundation for Porous Media Science and Technology

The InterPore Foundation is a Non-profit, non-governmental, independent organization founded by the International Society for Porous Media in 2016. Our mission is to promote and support innovative research, support educational activities of Interpore society and finance awards for excellence and diversity in the broad field of porous media and for honoring distinguished talented researchers and lecturers.

The foundation also facilitates the participation of promising young scientists in international scientific gatherings hosted by InterPore, and supports outstanding young scientists from countries with financial difficulties to join InterPore activities.

During the past year, the newly-formed InterPore Foundation continued the expansion of its activities and securing funds for InterPore awards, prizes, and grants. This has been made possible by generous grants from Proctor & Gamble, Kimberly-Clark Inc., and PoreLab (Norway), as well as some individuals (where a notable donation was made by Rien van Genuchten). This year, InterPore Foundation provided 25 conference grants to students and young scientists. The Foundation aims to increase both the number and amount of these grants for the coming years. This will be possible with your help only.

Support our actions by making a donation to the Interpore Foundation through: https://www.interpore.org/foundation/foundation-donate

Your small contributions will have a huge impact on science!

PLATINUM

THANKS TO OUR SPONSORS

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InterPore 2019 supporters:

VISIT OUR ONLINE EXHIBITORS

LIST OF MINI SYMPOSIA

(MS 1) Porous Media for a Green World: Energy & Climate
Organizers: Sarah Gasda, Sebastian Geiger, Bo Guo, Hadi Hajibeygi, Rainer Helmig

(MS 2) Porous Media for a Green World: Water & Agriculture
Organizers: Joaquin Jimenez-Martinez, Jun Yin, Jan Vanderborght, Pejman Tahmasebi, Salvatore Calabrese

(MS 3) Flow, transport and mechanics in fractured porous media
Organizers: Holger Steeb, Hamid Nick, Benoit Noetinger, Liu Jianjun

(MS 4) Swelling and shrinking porous media
Organizers: Jacques Huyghe, Abdolreza Kharaghani, Yihuai Zhang, Muhammad Sahimi, Jianchao Cai

(MS 5) Biochemical processes and biofilms in porous media
Organizers: Al Cunningham, Adie Phillips, Leon Van Paassen, Eleonora Secchi, Anozie Ebigbo

(MS 6-A) Physics of multi-phase flow in diverse porous media
Organizers: Aimy Bazylak, Steffen Berg, Yaniv Edery, Ryan Armstrong, Holger Ott

(MS 6-B) Interfacial phenomena in multiphase systems
Organizers: Grigori Chapiro, Yashar Mehmani, Hai Sun, Ke Xu, Bo Guo, Pacelli Zitha

(MS 7) Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes
Organizers: Sorin Pop, Ivan Yotov, Peng Xu

(MS 8) Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media
Organizers: Marco Dentz, Branko Bijeljic, Hossein Hejazi, Amir Raoof

(MS 9) Pore-scale modelling
Organizers: Martin Blunt, Stephane Zaleski, James McClure, Yongfei Yang

(MS 10) Advances in imaging porous media: techniques, software and case studies
Organizers: Liwei Zhang , Adrian Sheppard Matthis de Winter , Nikolaos K. Karadimitriou

(MS 11) Microfluidics in porous systems
Organizers: Florian Doster, Hassan Mahani, Afshin Goharzadeh, Yves Méheust

LIST OF MINI SYMPOSIA

(MS 12) Advances in modeling and simulation of poromechanics

Organizers: Martin Vohralik, Daigang Wang

(MS 13) Fluids in Nanoporous Media

Organizers: Gennady Gor, Patrick Huber, Renyuan Sun

(MS 14) Uncertainty Quantification in Porous Media

Organizers: Shuyu Sun, Denis Voskov, Zhiwen Zhang, Liang Xue

(MS 15) Machine Learning and Big Data in Porous Media

Organizers: Kai Zhang, Bailian Chen, Jianchun Xu, Yalchin Efendiev

(MS 16) Fluid Interactions with Thin Porous Media

Organizers: Rui Wu, Hamed Aslannejad, Chaozhong Qin

(MS 17) Thermal Processes, Thermal Coupling and Thermal Properties of Porous Media: modeling and experiments at different scales

Organizers: Moran Wang, Bernhard Krooss, Yingfang Zhou, Ruina Xu

(MS 18) Innovative Methods for Characterization, Monitoring, and In-Situ Remediation of Contaminated Soils and Aquifers

Organizers: Christos Tsakiroglou, Marios Valavanides, Olga Vizika, Qi Li

(MS 19) Electrochemical processes in porous media

Organizers: Ezequiel Medicil, Pablo A. García-Salaberri, Jeff Gostick, Iryna V. Zenyuk

(MS 20) Biophysics of living porous media: theory, experiment, modeling and characterization

Organizers: Fred Vermolen, Chi Zhang

(MS 21) Effective elastic, thermal, electrical and optical properties of porous materials, cellular materials, foams and metamaterials

Organizer:

(MS 22) Catalysis and adsorption/absorption processes in porous media

Organizer: Oleg Oliev, Satoru Katoh, Huijin Xu

(MS 23) Special Session for Professor Rainer Helmig

Organizer: Wolfgang Ehlers, Bernd Flemisch

MONDAY, 31 AUGUST 2020

Block A (CET)	09:00 – 09:30	**Invited lecture 1:** Moran Wang **Chair:** Insa Neuweiler				**Invited lecture 2:** Stephane Zaleski **Chair:** Bernhard Krooss			
	09:30 – 09:35	**Break**							
	09:35 – 10:35	Q&A 1	MS 3	MS 7	MS 8				
	10:35 – 10:40	**Break**							
	10:40 – 11:40	Q&A 2	MS 3	MS 7	MS 8				
	11:40 – 12:00	**Break**							
Block B (CET)	13:30 – 13:40	**Plenary Session 1 [Chair:** Oleg Illiev**]** **Opening Ceremony:** Laura Pyrak-Nolte							
	13:40 – 13:50	**Award Ceremony 1:** *Harry Vereecken*, Honorary Lifetime Membership Award							
	13:50 – 14:35	**Keynote Lecture 1:** Aimy Bazylak							
	14:35 – 14:40	**Plenary Pitch 1:** Branko Bijeljic							
	14:40 – 15:00	**Break**							
	15:00 – 15:55	Q&A 3	MS 3	MS 7	MS 8				
	15:55 – 16:00	**Break**							
	16:00 – 16:55	Q&A 4	MS 3	MS 7	MS 11				
Block C (CET)	18:00 – 18:30	**Invited lecture 3**: Olga Vizika **Chair:** Debasmita Misra				**Invited lecture 4:** Muhammad Sahimi **Chair:** Masa Prodanovic			
	18:30 – 18:45	**Break**							
	18:45 – 19:40	Q&A 5	MS 3	MS 7	MS 8				
	19:40 – 19:45	**Break**							
	19:45 – 20:40	Q&A 6	MS 3	MS 6-A	MS 11				

TUESDAY, 1 SEPTEMBER 2020

<table>
<tr><td rowspan="8">Block A (CET)</td><td>09:00 – 09:10</td><td colspan="8">Plenary Session 2 [Chair: Nima Shokri]
Award Ceremony 2: Amir Raoof, Procter & Gamble Award for Thin and Swelling Porous Media Research
Tanguy le Borgne, InterPore Award for Excellence in Porous Media Research</td></tr>
<tr><td>09:10 – 09:55</td><td colspan="8">Keynote Lecture 2: Signe Kjelstrup</td></tr>
<tr><td>09: 55 – 10:00</td><td colspan="8">Plenary Pitch 2: Sebastian Geiger</td></tr>
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<tr><td>10:05 – 11:00</td><td>Q&A 7</td><td>MS 1</td><td>MS 13</td><td>MS 17</td><td></td><td></td><td></td><td></td></tr>
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<tr><td rowspan="7">Block B (CET)</td><td>14:00 – 14:30</td><td colspan="4">Invited lecture 5: Bernd Flemisch
Chair: Matteo Icardio</td><td colspan="4">Invited lecture 6: Lilit Yeghiazarian
Chair: Sebastian Geiger</td></tr>
<tr><td>14:30 – 14:35</td><td colspan="8">Break</td></tr>
<tr><td>14:35 – 15:30</td><td>Q&A 9</td><td>MS 1</td><td>MS 13</td><td>MS 14</td><td></td><td></td><td></td><td></td></tr>
<tr><td>15:30 – 15:35</td><td colspan="8">Break</td></tr>
<tr><td>15:35 – 16:30</td><td>Q&A 10</td><td>MS 1</td><td>MS 13</td><td>MS 18</td><td></td><td></td><td></td><td></td></tr>
<tr><td>16:30 – 17:00</td><td colspan="8">Break</td></tr>
<tr><td>17:00 – 18:00</td><td colspan="8">Career Development Event (Student Affairs Committee activity)</td></tr>
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<tr><td rowspan="5">Block C (CET)</td><td>18:00 – 18:55</td><td>Q&A 11</td><td>MS 1</td><td>MS 13</td><td>MS 18</td><td rowspan="2">Scientific Writing Seminar</td><td></td><td></td><td></td></tr>
<tr><td>18:55 – 19:00</td><td>Break</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>19:00 – 19:55</td><td>Q&A 12</td><td>MS 1</td><td>MS 4</td><td>MS 17</td><td></td><td></td><td></td><td></td></tr>
<tr><td>19:55 – 20:00</td><td>Break</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>20:00 – 20:55</td><td>Q&A 13</td><td>MS 6-A</td><td>MS 23</td><td>MS 14</td><td></td><td></td><td></td><td></td></tr>
</table>

WEDNESDAY, 2 SEPTEMBER 2020

Block A (CET)	09:00 – 09:30	**Invited lecture 7:** Fred Vermolen **Chair:** Olaf Kolditz				**Invited lecture 8:** Martin Vohralik **Chair:** William Rossen			
	09:30 – 09:35	**Break**							
	09:35 – 10:30	Q&A 14	MS 6-A	MS 2	MS 12				
	10:30 – 10:35	**Break**				**Scientific Writing Seminar**			
	10:35 – 11:30	Q&A 15	MS 6-A	MS 15	MS 10				
Block B (CET)	14:00 – 14:30	**Invited lecture 9:** James McClure **Chair:** Cyprien Soulaine				**Invited lecture 10:** Guang Yang **Chair:** Samuel Jackson			
	14:30 – 14:35	**Break**							
	14:35 – 15:30	Q&A 16	MS 6-A	MS 5	MS 10				
	15:30 – 15:35	**Break**							
	15:35 – 16:30	Q&A 17	MS 6-A	MS 15	MS 23				
	16:30 – 16:35	**Break**							
	16:35 – 17:00	**Company Representatives Available for Interactions & Pitch** • Hiden Isochema • COMSOL, INC • Energies • Math2Martket • Nuimag – Low Field NMP • Thermo Fisher Scientific Electron Microscopy Solutions • Thermo Fisher Scientific Software Solutions • Zeiss							
Block C (CET)	18:00 – 18:10	**Plenary Session 3 [Chair:** Alberto Guadagnini**] Award Ceremony 3:** *Muhammad Sahimi*, Kimberly-Clark Distinguished Lectureship Award							
	18:10 – 18:55	**Keynote lecture 3:** Qinjun Kang							
	19: 00 – 19:05	**Break**							
	19:05 – 20:00	Q&A 18	MS 9	MS 6-B	MS 12				
	20:00 – 20:05	**Break**							
	20:05 – 21:00	Q&A 19	MS 9	MS 15	MS 10				

THURSDAY, 3 SEPTEMBER 2020

Block A (CET)	09:00 – 09:55	**Q&A 20**	MS 9	MS 6-B	MS 10				
	09:55 – 10:00	**Break**							
	10:00 – 10:55	**Q&A 21**	MS 9	MS 20					
	10:55 – 11:00	**Break**							
	11:00 – 11:55	**Q&A 22**	MS 9		MS 19				
Block B (CET)	14:00 – 14:55	**Q&A 23**	MS 9	MS 21 & MS 16	MS 19				
	14:55 – 15:00	**Break**							
	15:00 – 15:55	**Q&A 24**	MS 9	MS 6-B	MS 22				
	15:55 – 16:00	**Break**							
	16:00 – 16:55	**Q&A 25**	MS 9						
	17:30 – 17:55	**Social Event:** Jaime's Interactive Magic Show							
Block C (CET)	18:00 – 18:10	**Plenary Session 4 [Chair:** Laura Pyrak-Nolte**]** **Award Ceremony 4:** _Hamad Aslannejad,_ InterPore – PoreLab Award for Young Researchers _Basant Yadav_, _Rien van Genuchten_ Early-Career Award of Porous Media for a Green World InterPore Rosette Awardees							
	18:10 –18:55	**Keynote lecture 4:** Dominik Obrist							
	18:55 – 19:10	**Closing Ceremony:** LOC Chair							

PROGRAM HIGHLIGHTS

Invited Lectures

Monday, Time Block A - *09:00 - 09:30 CET*

Opening Ceremony

Monday, Time Block B - *13:30 - 13:40 CET*

Award Ceremony: *Honorary Lifetime Membership Award*

Monday, Time Block B - *13:40 - 13:50 CET*

Keynote Lecture: *Aimy Bazylak*

Monday, Time Block B - *13:50 - 14:35 CET*

Plenary Pitch

Monday, Time Block B - 14:35 - 14:40 CET

Invited Lecturers

Monday, Time Block C - 18:00 - 18:30 CET

Award Ceremony: *Procter & Gamble Award for Thin and Swelling Porous Media Research and InterPore Award for Excellence in Porous Media Research*

Tuesday, Time Block A - 9:00 - 9:10 CET

Keynote Lecture: *Signe Kjelstrup*

Tuesday, Time Block A - 9:10 - 9:55 CET

Plenary Pitch

Tuesday, Time Block A - 9:55 - 10:00 CET

Invited Lectures

Tuesday, Time Block B - 14:00 - 14:30 CET

Career Development Event

Tuesday, Time Block B -17:00 - 18:00 CET

Scientific Writing Seminar

Tuesday, Time Block C - 18:00 - 19:00 CET

Invited Lectures

Wednesday, Time Block A - 9:00 - 9:30 CET

Scientific Writing Seminar

Wednesday, Time Block A - 10:30 - 11:30 CET

PROGRAM HIGHLIGHTS

Invited Lectures

Wednesday, Time Block B - 14:00 - 14:30 CET

Company Pitches

Wednesday, Time Block B - 16:35 - 17:00 CET

Award Ceremony: *Kimberly-Clark Distinguished Lectureship Award*

Wednesday, Time Block C - 18:00 - 18:10 CET

Keynote Lecture: *Qinjun Kang*

Wednesday, Time Block C - 18:10 - 18:55 CET

Interactive magic show: What you did not know about the porosity of cards

Thursday, Time Block C - 17:30 - 17:55 CET

Award Ceremony: *InterPore-PoreLab Award for Young Researchers and Rien van Genuchten Early-Career Award of Porous Media for a Green World*

Thursday, Time Block C - 18:00 - 18:10 CET

Keynote Lecture: *Dominik Obrist*

Thursday, Time Block C - 18:10 - 18:55 CET

Closing Ceremony

Thursday, Time Block C - 18:55 - 19:10 CET

InterPore
Student Affairs

In response to the excellent participation in the previous years, the Student Affairs Committee (SAC) will organize a set of activities during the 2020 InterPore virtual meeting. The SAC activities are **free and open to participants from all career stages,** from the early student to the experienced researcher/professor. They form the perfect setting for you to get to know the international porous media community better and expand your professional and personal network. Come along!

More information on both of these events can be found in the detailed program.

InterPore SAC 2020 Board Members

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Marcel Moura
University of Oslo, Norway
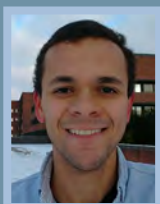
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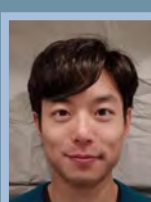
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Would you like to join SAC and make InterPore 2020 even better? Contact sac@interpore.org

STUDENT AFFAIRS EVENTS

Career Development Event
Tuesday, Time Block B - 17:00 - 18:00 CET

One of the most common struggles for a PhD student is to decide which career path to follow after graduate school. There are numerous opportunities that are potentially open to us as PhDs, which can take us on very different career paths. There are likely many questions you have about picking a direction (industry/academia/government) and the pros and cons of the various possibilities. A good approach to making an informed decision is listening to experiences and personal views of established professionals. The SAC's career event will have speakers from varied backgrounds, sharing their professional journeys and the important choices they had to make along the way. You will also have the chance to ask the speakers any questions you have!

Scientific Writing Seminar
Tuesday, Time Block C - 18:00 - 19:00 CET <u>or</u>
Wednesday, Time Block A - 10:30 - 11:30 CET

How to write a successful research paper: The 10 mistakes to avoid

Jaime Gómez-Hernández will be offering this writing workshop, which is free and open to all participants of InterPore2020. Through a number of real cases, the attendants will learn the common mistakes made when submitting a manuscript for consideration to a specialized journal.

Jaime has served in the Editorial Boards of Journal of Hydrology, Journal of Hydrogeology and Mathematical Geology for many years, and currently, he is still a member of the boards of Advances in Water Resources, Mathematical Geosciences, Water, and Springer Nature Applied Science. He has rejected too many manuscripts in the last 20 years and can tell you what to do to avoid rejection. He will also discuss how to deal with non-scientific reviews, and what to do when you know that the review is incorrect.

Everything will be presented using examples based on actual submissions in a very casual and lively way. Many previous attendants to this seminar have been able to overcome the hurdle of the dreaded rejection letter.

This event will be held twice for your convenience!

MONDAY, 31 AUGUST 2020
Time Block A

Invited Speakers: Parallel Session 1
9:00 - 9:30 CET

Moran Wang
Tsinghua University

Electrokinetic and ion transport in micro/nanoporous media

Ion transport is ubiquitous in aqueous environments in biological, geological, chemical and environmental systems. Electrokinetics plays a very important and key role in some special cases where pore size is comparable to the screening length of electrical double layer. The applications include tight oil/gas exploration and development, radiative waste disposal, high-quality water purification, and even ion channels in cells. This talk will present (1) electrokinetic and interface theories for ion transport in micro/nanoporous media; (2) a mesoscopic numerical framework for predictions and the validations by comparisons with theories and experimental data; (3) multiscale analysis in both spacial and temporal scales for special applications.

Invited Speakers: Parallel Session 1 *(cont.)*
9:00 - 9:30 CET

Stéphane Zaleski
Sorbonne Université

Contact line motion using the Volume of Fluid method

Wettability, contact line dynamics and surface tension are essential in the pore scale motion of interfaces. Since it is difficult to resolve numerically the small interface thickness a sharp interface model seems the only practical solution. However in the context of this sharp interface model Huh and Scriven wrote "not even Herakles could sink a solid if the physical model were entirely valid". The resolution of this paradox has occupied a large number of investigators, however a popular fix is to assume a Navier boundary condition for the tangential fluid velocity on the solid surface, which introduces a slip length l. We discuss the performance of such slip length models in various regimes. The sharp interface model is implemented using a Volume Of Fluid (VOF) method in the context of several free codes developed at d'Alembert Institute of Sorbonne Université and the FLOW lab at KTH. The results are compared to experiments and molecular dynamic simulations.

Timing of Q&A sessions on Monday				
Time Block (CET)	Q&A No.	Parallel sessions 1	Parallel sessions 2	Parallel sessions 3
A (09:35 – 10:35)	Q&A 1	MS3, part1	MS7, part1	MS8, part1
A (10:40 – 11:40)	Q&A 2	MS3, part2	MS7, part2	MS8, part2
B (15:00 – 15:55)	Q&A 3	MS3, part3	MS7, part3	MS8, part3
B (16:00 – 16:55)	Q&A 4	MS3, part4	MS7, part4	MS11, part1
C (18:45 – 19:40)	Q&A 5	MS3, part5	MS7, part5	MS8, part4
C (19:45 – 20:40)	Q&A 6	MS3, part6	MS6-A, part1	MS11, part2

Question and answer: Parallel sessions 1

(MS 3) Flow, transport and mechanics in fractured porous media – Part 1
Q&A 1 09:35 - 10:35 - Chairs: Holger Steeb, Hamid Nick, Benoit Noetinger

[614] Study on water injection mechanism of tight reservoir based on large-scale outcrop physical simulation experiment
Yutian Luo; Xuewei Liu

[286] Oxidative dissolution during spontaneous imbibition in organic-rich shale: implication for the matrix stimulation
Qiuyang Cheng; Lijun You; Yili Kang; Yang Zhou; Nan Zhang

[515] The Influence of Fractures on the Enrichment of Tight Sandstone Gas
Ping Wang; Quanyou Song; Baogang Li; Wenqing Tang Jin Wang

[84] Flow Law of Foam in Fractured Vuggy Reservoir
Zhengxiao Xu; Zhaomin Li; Binfei Li; Longkun Chen; Danqi Chen; Zihan Gu

[741] Analysis of Factors Affecting Fracturing and Absorbing Parameters in Tight Reservoir
Zhu Jiamin; Wu Minglu; Chen Xianchao

[756] Analysis of Hydrate Seafloor Subsidence Induced by Depressurization in Nankai Trough, Japan
Shuyue Ding; Shuxia Li; Didi Wu; Shaung Li

[363] The influence of microfractures on hydrocarbon migration
Wenqing Tang; Taixun Liu; Xiangying Wang Jin Wang; Ping Wang

[252] A physics based model of gas flow in shales predicts enhanced gas production
Syed Haider; Tadeusz Patzek

Question and answer: Parallel sessions 1 (cont.)

(MS 3) Flow, transport and mechanics in fractured porous media – Part 2

Q&A 2 10:40 – 11:40 - ***Chairs:*** *Holger Steeb, Hamid Nick, Benoit Noetinger*

[360] Combined effects of network topology, hydraulic conditions and in-situ stress variations on solute propagation in natural fracture networks
Chuanyin Jiang; Xiaoguang Wang; Delphine Roubinet; Zhixue Sun

[50] Pipe Network Modelling for Fractured Rock Cores with Micro-computed Tomography Imaging
YU JING; Ryan Armstrong; Peyman Mostaghimi

[1307] The hydraulic conductivity of shaped fractures with permeable walls
Daihui Lu; Federico Municchi; Ivan Christov

[120] A systematic investigation of the intrinsic flow properties of fractures using a combined 3D printing and micro-computed tomography approach
Tomos Phillips; Tom Bultreys; Arjen Mascini; Nathaniel Forbes Inskip; Sabine den Hartog; Niko Kampman; Kevin Bisdom; Veerle Cnudde; Andreas Busch

[48] Identification of Fracture Properties in Shale Oil Reservoirs by a Well Testing Model with"Fracturing-shutting" : A Case Study
Lumin Shi; Zhiming Chen; Xiaoliang Zhao

[63] Sensitivity Analysis on Different Parameters Affecting the Gas-Oil Gravity Drainage Mechanism in Naturally Fractured Reservoirs
Mohammad Madani; Amin Daryasafar

[927] Capillarity vs. Saturation in Fracture-Matrix Systems
Qi Liu; Alejandro Cardona; Juan Carlos Santamarina

[625] A multilayer model for reactive flow in fractured porous media
Alessio Fumagalli; Anna Scotti; Luca Formaggia

(MS 3) Flow, transport and mechanics in fractured porous media – Part 3

Q&A 3 15:00 – 15:55 - ***Chairs:*** *Holger Steeb, Hamid Nick, Benoit Noetinger*

[326] Adaptive Virtual Element Method for simulations of flow in fractured media
Andrea Borio; Stefano Berrone; Alessandro D'Auria

[1323] Multiscale model reduction of unsaturated flow problem
Denis Spiridonov; Maria Vasilyeva; Eric T. Chung; Yalchin Efendiev

[674] Implicit multiscale modelling for stress-dependent permeability in a poroelastic dual-continuum setting
Mark Ashworth; Florian Doster; Christine Maier

[683] The impact of fracture surface roughness on stress dependent permeability
Amanzhol Kubeyev; Christine Maier; Niko Kampman; Kevin Bisdom; Rafael March Castaneda Neto; Florian Doster

[443] Topological analysis of 3D Discrete Fracture Networks: a graph approach to connectivity and percolation in fractured rocks
Tawfik Rajeh; Israel Canamon; Rachid Ababou; Manuel Marcoux

[313] Measuring the deformation of porous media in response to hydraulic pressure
Martin Stolar; Yaniv Edery; Tajudeen M. Iwalewa; James R. Rice

MONDAY, 31 AUGUST 2020

Question and answer: Parallel sessions 1 (cont.)

(MS 3) Flow, transport and mechanics in fractured porous media – Part 3 (cont.)
Q&A 3 15:00 – 15:55 - **Chairs:** *Holger Steeb, Hamid Nick, Benoit Noetinger*

[1149] **Bandwidth re-fracturing technique optimization and design consideration in naturally-fractured tight reservoirs --- Case study on Ansai oil field, Ordos basin**
Xia Du, Mr YuLiang Su; Wendong Wang; Ning Zhao Dongsheng Li

[420] **Estimating Flow Characteristics of 3D Fracture Network based on Persistent Homology**
Anna Suzuki; Miyuki Miyazawa; Takatoshi Ito; Peter Kang

(MS 3) Flow, transport and mechanics in fractured porous media – Part 4
Q&A 4 16:00 – 16:55 - **Chairs:** *Holger Steeb, Hamid Nick, Benoit Noetinger*

[919] **Understanding Hydraulic Fracturing Dynamic Stimulation: Dynamic Characterization and Design Considerations for Tight Porous Media**
Abhijith Suboyin; MD Motiur Rahman; Mohammed Haroun

[320] **Fracture pore network model: efficient pore scale modelling of fluid flow in fractured porous media**
Chenhui Wang; Kejian Wu; Gilbert Scott

[461] **A comparative study of Lattice Boltzmann models for complex fractal geometry**
Dong Zhang; Xiaoli Liu; Enzhi Wang

[256] **Laser-Induced Fluorescence (LIF) study of solute transport in 3D-printed fractured porous media**
*Mehrdad Ahkami; Xiang-Zhao Kong; Martin O. Saar*

[354] **An investigation into the controls of fracture tortuosity in rock sequences and its impact on fluid flow in the upper crust**
Nathaniel Forbes Inskip; Tomos Phillips; Kevin Bisdom; Georgy Borisochev; Andreas Busch; Sabine den Hartog

[1032] **Experimental study of contaminant transport in coupled fracture-porous medium systems**
Monika S. Walczak; Hamidreza Erfani Gahrooei; Nikolaos Karadimitriou; Ioannis Zarikos; S. Majid Hassanizadeh; Vahid.J Niasar

[1274] **Gas-Oil Displacement Mechanisms in Fractured Vuggy Carbonates at Immiscible and Miscible Conditions**
Xiongyu Chen; Kishore Mohanty

[1249] **Effect of Fracture on Reactive-Density-Driven Convection of Injected CO2 in Porous Reservoir**
Paiman Shafabakhsh; Behzad Ataie-Ashtiani; Craig T. Simmons; Marwan Fahs

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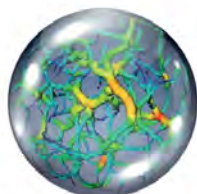
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Question and answer: Parallel sessions 1 (cont.)

(MS 3) Flow, transport and mechanics in fractured porous media – Part 5
*Q&A 5 18:45 – 19:40 - **Chairs:** Holger Steeb, Hamid Nick, Benoit Noetinger*

[198] A three-field approach for flow simulations in networks of fractures on non conforming meshes
Stefano Berrone; Sandra Pieraccini; Stefano Scialò; Denise Grappein

[667] Extended finite element analysis of a coupled fracture-reservoir model
Elisa Bergkamp; Clemens Verhoosel; Joris Remmers; David Smeulders

[90] Dynamic Multilevel Simulation of Coupled Flow-Heat Transport in Fractured Porous Media
Mousa HosseiniMehr; Cornelis Vuik; Hadi Hajibeygi

[1290] Recent advances in Mixed Virtual Elements for DFM simulations
Matias Benedetto; Andrea Borio; Franco Dassi; Alessio Fumagalli; Davide Losapio; Anna Scotti; Stefano Scialò; Giuseppe Vacca

[232] Fluid flow through anisotropic and deformable double porosity media with ultra-low matrix permeability: An efficient continuum framework
Qi Zhang; Ronaldo Borja

[165] Fracture-matrix interactions implicated by matrix pore connectivity: From waste repository to shale hydrocarbon production
Qinhong Hu

[278] Numerical Simulation of Fault Slip in Shale Gas Reservoirs Based on Discrete Fracture Network Model
Hao Liu; Zhaoqin Huang; Qinghua Lei

[566] Fracture propagation in porous media during fluid injection
Srutarshi Pradhan

(MS 3) Flow, transport and mechanics in fractured porous media – Part 6
*Q&A 6 19:45 – 20:40 - **Chairs:** Holger Steeb, Hamid Nick, Benoit Noetinger*

[71] Investigations of pore connectivities and permeabilities of fractured vuggy carbonates based on digital rock techniques
Weichao Yan; Sun Jianmeng

[630] Experimental Study on Two-phase Miscible Displacement Pattern of Porous Media
Wei Guo; Ran Hu

[238] Study on Water Quality Sensitivity and Characterization of Permeability in Water Flooding Sandstone Reservoirs
Xiankun Song; Jianzhong Wang

[1033] Experimental investigation of low salinity water flooding efficiency in tight carbonate fractured oil reservoirs; a case study
Rasoul Mokhtari; Mohammad Sadegh Mousapour; Pourya Malmir; Amin Alinejad ; Shahab Ayatollahi

[196] Impact of fracture sealing on the percolation state of orthogonal fracture networks
Weiwei Zhu; Siarhei Khirevich; Tadeusz Patzek

Question and answer: Parallel sessions 1 (cont.)

(MS 3) Flow, transport and mechanics in fractured porous media – Part 6 (cont.)

Q&A 6 19:45 – 20:40 - **Chairs:** *Holger Steeb, Hamid Nick, Benoit Noetinger*

[145] Pore structure characteristics of the Paleogene Shahejie Shale Oil Formation in Dongying Sag, Bohai Bay Basin, China
Xiuchuan Zhu; Qinhong Hu; Mianmo Meng; Na Yin; Binyu Ma; Yushan Du; Jing Chao

[1252] Role of mineralogy in controlling fracture formation.
Olivia Brunhoeber; Lauren Beckingham

[379] A Novel Correction Method of Ergun Equation for Application in a Rectangular Channel Partially Filled with Porous Media.
Tianwang Lai; Xiangyang Liu; Sa Xue; Maogang He; Jiming Xu

Question and answer: Parallel sessions 2

(MS 7) Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes– Part 1

Q&A 1 09:35 – 10:35 - **Chairs:** *Sorin Pop, Peng Xu, Carina Bringedal*

[1306] A Numerical Study on Multiphysics Fluid Flow in a Shale Gas Reservoir with Non-Uniform Fractures
Abhishek Kumar; Suresh Kumar Govindarajan

[1207] Spectral time-dependent solutions for natural convection in porous enclosure
Amin Fahs; Ali Zakeri; Adrien Wanko

[30] Research and Application of Numerical Method of Evaluation of Fracturing Effects in Large Scale Volume Reform of Vertical Wells
Debin Xia; Zhengming Yang; Xinlin Zhao Wei Lin; Ting Chen; Luo Yapu Zhang; Anshun Zhang

[658] An Embedded Discrete Fracture Method Based Well-Test Model for Pressure Transient Analysis in Fractured Wells with Complex Fracture Networks
Hui Liu; Xinwei Liao; Xiaoliang Zhao; Lijia Yuan; Juan Zhao

[716] A Discrete Fracture-Matrix   Model for Pressure Transient Analysis in Multistage Fractured Horizontal Wells with Arbitrarily Distributed Natural Fractures
Hui Liu; Xinwei Liao; Xuefeng Tang; Xiaoliang Zhao; Lijia Yuan; Juan Zhao

[1297] A multi-scale nonlinear finite element modelling of subsurface energy storage under cyclic loading
Kishan Ramesh Kumar; Hadi Hajibeygi

[918] A new parallel framework for general purpose reservoir simulation with advanced discretization and linearization schemes
Longlong Li; Ahmad Abushaikha

[1161] Simulation of two-phase flow in fractured media with discontinuous capillary pressure
Luat Khoa Tran; Stephan Matthai

Question and answer: Parallel sessions 2 (cont.)

(MS 7) Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes– Part 2

Q&A 2 *10:40 – 11:40 -* **Chairs:** *Jaime Gomez-Hernandez, Carina Bringedal, Sorin Pop*

[530] **A feasible method for the construction of fixed-tortuosity capillary medium with self-similarity behavior**
Wei Wei; Jianchao Cai; Yuxuan Xia Dr Haitao Tian; Zhenhua Tian

[241] **A revisited compositional 2-phase flow model for gas transport at various scales in heterogeneous porous structures in a deep geological radioactive waste disposal facility**
Zakaria Saadi; Abdellah Amir; Rachid Ababou

[102] **A (real) multi-scale solver for two-phase flow: a micro-continuum approach**
Cyprien Soulaine; Francisco Carrillo; Ian Bourg

[1291] **Coupling conditions for Stokes-Darcy problems with arbitrary flow directions**
Elissa Eggenweiler; Iryna Rybak

[1192] **Generation of a micro-earthquake clouds induced by the arrival of nonlinear fronts of pressure and temperature**
Arrigo Caserta; Roman Kanivetsky; Ettore Salust

[1268] **Upscaling of a Cahn–Hilliard Navier–Stokes Model with Precipiation in a Thin Strip**
Lars von Wolff; Iuliu Sorin Pop

[641] **Study on the coupling mathematical model of gas-water two-phase seepage and wellbore pipe flow in fractured horizontal Wells in volcanic gas reservoirs**
Cheng Fu; Abdellah Amir; Rachid Ababou

[695] **Gravity Segregation in Foam Mobility Control in Heterogeneous Reservoir**
Xiaocong Lyu; Denis Voskov; William Rossen

(MS 7) Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes– Part 3

Q&A 3 *15:00 – 15:55 -* **Chairs:** *Sorin Pop, Peng Xu, Carina Bringedal*

[1190] **Production Enhanced Potential Evaluation and Integrated Design for Horizontal Wells Energized Fracturing --- Case Study on Chang 7 Tight Reservoir, Ordos Basin**
Guanqun Li; Yuliang Su; Wendong Wang; Xia Du

[1333] **Residual-driven online Generalized Multiscale Finite Element Method for the poroelasticity problem in fractured and heterogeneous media**
Aleksei Tyrylgin; Maria Vasilyeva; Eric T. Chung; Yalchin Efendiev

[439] **Multiscale Pore Network Integration Using the Poreflow Software**
Elizabeth May Pontedeiro; William Godoy; Marianna Dantas; Fernanda Hoerlle; Martinus Th. van Genuchten; Amir Raoof; Paulo Couto

[1319] **Nonlocal nonlinear upscaling for problems in heterogeneous and fracture media using machine learning technique**
Maria Vasilyeva; Eric Chung; Yalchin Efendiev; Tat Leung Wing

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Question and answer: Parallel sessions 2 (cont.)

(MS 7) Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes– Part 3 (cont.)

Q&A 3 15:00 – 15:55 - Chairs: Sorin Pop, Peng Xu, Carina Bringedal

[661] **Coupling Staggered-Grid and vertex-centered Finite Volume Methods for Free Flow/Porous-Medium Flow Problems**
Martin Schneider; Edward Coltman; Kilian Weishaupt; Rainer Helmig

[1280] **Multiphase mixture models with phase change and filtration in OpenFOAM®**
Federico Municchi; Matteo Icardi

[665] **A Bundle of Capillary Tubes (BOCT) Model for Carbonated Water Flooding (CWF); a Promising Technique for Simultaneous CO2 Storage and Enhanced Oil Recovery Purposes**
Puyan Bakhshi; M. Mercedes Maroto-Valer; Mohammad Amani

[287] **Equivalent Conductivity Tensor in 3D Anisotropic Heterogeneous Formations**
Qinzhuo Liao; Gang Lei; Dongxiao Zhang; Shirish Patil

(MS 7) Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes– Part 4

Q&A 4 16:00 – 16:55- Chairs: Sorin Pop, Peng Xu, Carina Bringedal

[1316] **A multi-step Dirichlet-Neumann domain decomposition method applied to the polymer injection in porous media**
Renatha Batista dos Santos; Rodrigo Silva Tavares; Sidarta Araújo Lima; Adriano Santos

[908] **Physics-Preserving Algorithms for Flow and Transport in Porous Media**
Shuyu Sun; Huangxin Chen

[1269] **Efficiency and Accuracy of Micro-Macro Models for Dissolution/Precipitation in Two-Mineral Systems**
Stephan Gärttner; Peter Frolkovic; Peter Knabner; Nadja Ray

[324] **Incremental petrophysical characterization of carbonate rocks using μCT box counting fractal analysis for upscaling purposes**
Tatiana Lipovetsky; Luca Moriconi; Behzad Ghanbarian

[1320] **Modeling and design optimization for pleated membrane filter**
Yixuan Sun; Pejman Sanaei; Lou Kondic; Linda Cummings

[1324] **Stochastic Modelling of Adsorption and Sieving in a Pore Network**
Binan Gu; Pejman Sanaei; Linda Cummings; Lou Kondic

[352] **A pore-network model approach for coupling free flow with porous medium flow applied to evaporation**
Kilian Weishaupt; Rainer Helmig

[33] **Multi-scale iterative scheme for a phase-field model for reactive transport problems**
Manuela Bastidas; Carina Bringedal Iuliu; Sorin Pop

Question and answer: Parallel sessions 2 (cont.)

(MS 7) Mathematical and numerical methods for multi-scale multi-physics, nonlinear coupled processes– Part 5

Q&A 5 18:45 – 19:40 - Chairs: Sorin Pop, Peng Xu, Carina Bringedal

[1178] **An accelerated staggered solution scheme to phase-field modeling of brittle fracture**
Erlend Storvik; Jakub Both; Juan Michael Sargado; Jan Martin Nordbotten; Florin Adrian Radu

[1144] **Proactive Optimization of CO2 Sequestration under Geomechanical Constraints**
Mohammad Salehian; Aliakabar Hassanpouryouzband

[585] **Computational Multiscale Methods for Linear Poroelasticity using CEM-GMsFEM**
Eric Chung; Sai-Mang Pun; Shubin Fu; Robert Altmann; Roland Maier; Daniel Peterseim

[513] **Application of Laplace Equation to Derive Hydraulic Conductivity from Velocity Measurements in Porous Media.**
Michael Mont-Eton; David Mays

[1180] **Multiscale computation of pore-scale geomechanics**
Yashar Mehmani; Nicola Castelletto; Hamdi Tchelepi

[460] **Stochastic and upscaled analytical modeling of fines migration in porous media induced by low-salinity water injection**
Yulong Yang; Weifeng Yuan; Jirui Hou; Zhenjiang You; Jun Li

[1328] **Integration Pulse Decay Experimental Data into A Novel Continuum-Scale Multi-Physics Model to Study Gas Transport in Shale Formations**
Zihao Li; Yuntian Teng Ming Fan; Cheng Chen;

[253] **Automatic three-phase segmentation of 3D micro-CT image using deep learning.**
Johan Phan; Leo Ruspini; Paal Eric Oeren; Frank Lindseth

(MS 6-A) Physics of multi-phase flow in diverse porous media– Part 1

Q&A 6 19:45 – 20:40 - Chairs: Aimy Bazylak, Saman Aryana

[1331] **Nanoscale contact angle characterization of a water/oil/calcite system using atomic force microscopy.**
George Savulescu; Maja Ruecker; Alessio Scanziani; Apostolos Georgiadis; Paul F Luckham

[865] **Pore scale simulations of two-phase flow in porous media with high permeability.**
Maxime Cochennec; Hossein Davarzani; Yohan Davit; Stéfan Colombano; Ioannis Ignatiadis; Michel Quintard

[987] **LBM simulations of graded Gas Diffusion Layer for PEMFC applications**
Graham Danny Koyeerath; Yann Favennec; Christophe Josset; Bruno Auvity

[1265] **Assessment of end-effects during two-phase flow in micro-fluidic model pore networks – is it possible?**
Marios Valavanides; Nikolaos Karadimitriou; Holger Steeb

Question and answer: Parallel sessions 2 (cont.)

(MS 6-A) Physics of multi-phase flow in diverse porous media– Part 1

Q&A 6 19:45 – 20:40 - *Chairs:* Aimy Bazylak, Saman Aryana

[1255] In-situ Capillary Pressure Measurements for Gaining Insight into Foam Flow in Porous Media
Eric Vavra; Maura Puerto; George Hirasaki; Sibani Lisa Biswal

[966] Core flood-on-a-chip: a study of viscoelasticity's effects on oil recovery using a foot-long micromodel
Yujing Du; Matthew Balhoff

[1237] Quantification of non-linear multiphase flow in porous media
Yihuai Zhang; Branko Bijeljic; Ying Gao; Qingyang Lin; Martin Blunt

[464] Study of the residual saturation in NAPL in soils polluted by petroleum hydrocarbons in the groundwater runoff zone.
Elhadji Malick Niang; Manuel Marcoux

Question and answer: Parallel sessions 3

(MS 8) Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media – Part 1

Q&A 1 09:35 – 10:35 - *Chairs:* Marco Dentz, Branko Bijeljic

[195] Permeability of salt crusts from evaporation of sand columns.
Joseph Piotrowski; Johan Alexander (Sander) Huisman; Andreas Pohlmeier; Uri Nachshon; Harry Vereecken

[49] Quantitative Tortuosity Measurements of Carbonate Rocks using Pulsed Field Gradient NMR.
Kaishuo Yang; Ming Li; Nicholas N. A. Ling; Eric F. May; Paul R. J. Connolly; Lionel Esteban; Michael B. Clennell; Mohamed Mahmoud; Ammar El-Hussein; Abdulrauf R. Adebayo; Mahmoud Mohamed Elsayed; Michael L. Johns

[66] Experimental analysis of plumes transport and dilution processes under highly transient boundary conditions.
Mónica Basilio Hazas; Francesca Ziliotto; Massimo Rolle; Gabriele Chiogna

[647] Multi-Scale Benchmarking of a Coupled Geochemical Transport Solver.
Saideep Pavuluri; Christophe Tournassat; Francis Claret; Cyprien Soulaine

[740] The Peclet number and viscous ratios impact on the fingering evolution during miscible displacement in rough fractures.
Xusheng Chen; Ran Hu; Yang Zhibing; Chen Yi-Feng

[874] Turbulent mixing in the hyporheic zone.
Elisa Baioni; Giovanni Michele Porta; Mohaddeseh Mousavi Nezhad; Alberto Guadagnini

[1223] Hydrodynamic Dispersion in Simple Pore Geometries: Combining Experimental and Simulated Results at Individual Pore Scales.
Matthijs de Winter; Kilian Weishaupt; Stefan Scheller; Stefan Frey; Amir Raoof; S. Majid Hassanizadeh; Rainer Helmig

[763] A novel upscaling procedure for characterising heterogeneous shale porosity from nm- to mm-scale in 3D and 4D images.
Lin Ma; Patrick Dowey; Ernest Rutter; Kevin Taylor; Peter Lee

Question and answer: Parallel sessions 3 (cont.)

(MS 8) Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media – Part 2

Q&A 2 10:40 –11:40 - **Chairs:** *Branko Bijeljic, Marco Dentz*

[578] **Efficient Simulation of Reactive Flow in Reservoirs Rocks at the Pore Scale.**
Christian Hinz; Jens-Oliver Schwarz; Andreas Weber; Andreas Wiegmann

[123] **Scaling Analysis of Immiscible Two-Phase Flow in Porous Media with Fractal Permeability Fields.**
Saman Aryana; Yuhang Wang; Jesse McKinzie; Frederico Furtado

[718] **Experimental Study on Influence of Peclet number on the Dissolution patterns in rough fractures.**
Ting Wang; Ran Hu; Zhibing Yang; Yifeng Chen

[769] **Flow behavior of CO2/ N2/ CH4 huff and puff process for enhanced heavy oil recovery.**
Wu Mingxuan; Zhaomin Li; Songyan Li; Chen Lu; Zhengxiao Xu

[341] **Plume deformation, mixing and reaction kinetics in 3-D heterogeneous anisotropic porous media.**
Yu Ye; Gabriele Chiogna; Chunhui Lu; Massimo Rolle

[203] **Upscaling Diffusive Transport in Terms of Porosity Statisitcs.**
Alraune Zech; Matthijs de Winter

[433] **Multiscale flow simulation of shale oil considering hydro-thermal process.**
Zijie Wang; Jun Yao

(MS 8) Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media – Part 3

Q&A 3 15:00 – 15:55 - **Chairs:** *Hossein Hejazi, Amir Raoof*

[1012] **Numerical simulation of convective mixing in geologic carbon sequestration applications.**
Anna-Maria Eckel; Ronny Pini

[1304] **Chemical Component Transport in Heterogeneous Porous Medium during Low Salinity Water Flooding.**
Hasan Al-Ibadi; Karl D. Stephen; Eric Mackay

[521] **Fractal analysis of shape factor for matrix-fracture transfer function in fractured reservoirs.**
Lan Mei; Jianchao Cai; Qingbang Meng; Qiuying Sun; Shuang Li

[930] **Investigation of carbonation and degradation of well cement under geologic carbon sequestration using X-ray imaging and numerical modeling.**
Xiuxiu Miao; Liwei Zhang; Yan Wang; Manguang Gan

[1279] **Multi-rate mass transfer models and reactive transport in heterogeneous porous media.**
Federico Municchi; Matteo Icardi; Federico Municchi

Question and answer: Parallel sessions 3 (cont.)

(MS 8) Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media – Part 3 (cont.)

Q&A 3 15:00 – 15:55 - **Chairs:** Hossein Hejazi, Amir Raoof

[675] Studying the effects of heterogeneity on karstification and wormholing phenomena using Operator Based Linearization and High-Resolution LiDAR data.
Stephan de Hoop; Denis Voskov; Giovanni Bertotti

[160] The topological origin of anomalous transport: Persistence of β in the face of varying correlation length.
Yaniv Edery

[812] Volumetric response of crushed dunite during carbonation reaction under controlled σ-P-T conditions.
Jinfeng Liu; Timotheus Wolterbeek; Christopher Spiers

(MS 11) Microfluidics in porous systems– Part 1

Q&A 4 16:00 – 16:55 - **Chairs:** Hassan Mahani, Afshin Goharzadeh

[264] Experimental study of corner flow using 2.5-D microfluidic porous media.
Guanju Wei; Ran Hu; Zhen Liao; Yifeng Chen

[272] Foam Trapping and Foam Mobility in a Model Fracture.
Kai Li; William Rossen; Karl-Heinz Wolf

[386] Visualization of Polymer Retention Mechanisms in Porous Media using Microfluidics.
Antonia Sugar; Serag F. Maged; Victor A. Torrealba; Ulrich Buttner; Satoshi Habuchi; Hussein Hoteit

[296] An image recognition method for gas/liquid saturations and investigation of air-liquid threshold displacement pressure with dispersed bubbles in the planar pore network.
Menggang Wen; Yun Li

[784] A Microfluidic Investigation of In-Situ Water-in-Oil Emulsion Formation during Waterflooding of Heavy Oil Reservoirs.
Mohammad Salehpour; Zahra Sakhaei; Hassan Mahani; Masoud Riazi;

[245] 3D printing micro-model and deep learning method application for micro displacement experiment and remaining oil analysis.
Yimin Zhang; Chengyan Lin; Lihua Ren; Yuqi Wu

[403] Fabrication of "sandwich-like" microfluidic chips by ceramic 3D printing for flow visualization experiments.
Shidong Li ; Sibani Lisa Biswal; Ole Torsæter; Hon Chung Lau; Ludger Paul Stubbs

[292] Effect of Oil Polarity on the Time-Scale of Mixing during Low Salinity Waterflooding: A microfluidic Investigation.
Saheb Mohammadi; Hassan Mahani; Shahab Ayatollahi; Vahid.J Niasar

[129] Dynamics of liquid bridge on moving porous substrates.
Si Suo; Yixiang Gan

Question and answer: Parallel sessions 3 (cont.)

(MS 8) Mixing, dispersion and reaction processes across scales in heterogeneous and fractured media – Part 4

Q&A 5 18:45 – 19:40 - **Chairs:** *Amir Raoof, Hossein Hejazi*

[1148] **Numerical Studies on Reactive Flow in Porous Media: An Example of Carbonate Matrix Acdizing.**
Cunqi Jia; Jun Yao

[1200] **In Operando synchrotron microfluidics experiment and reactive transport modeling of acid erosion of carbonate fractures.**
Hang Deng; Jeff Fitts; Ryan Tappero; Julie Kim; Catherine Peters; Qian Zhang

[1235] **Transport and deposition of suspended particles in the context of permafrost thaw: An experimental and numerical modelling study.**
Madiha Khadhraoui; John Molson; Najat Bhiry

[1294] **Permeability irregularity/hysteresis from micro-channels opening/closing during dissolution/precipitation cycle.**
Martin Lesueur; Thomas Poulet; Manolis Veveakis

[1233] **The effect of buoyant convection on the buoyancy-driven spreading and draining that arises within a layered porous media with a permeability jump.**
Md Imran Khan; K. S. Bharath; M. R. Flynn

[1202] **Buoyant convection in porous media: Multiple layers separated by an inclined permeability jump.**
K. S. Bharath; Morris Flynn

[484] **Radionuclide transport and retention at the core scale identified by GeoPET analysis and reactive transport modeling.s**
Tao Yuan; Johannes Kulenkampff; Till Bollermann; Cornelius Fischer

[694] **Absolute Adsorption of Methane in Kerogen Nanoporous Media: Simulation, Characterization and Modeling.**
Wanying Pang; Zhehui Jin

(MS 11) Microfluidics in porous systems– Part 2

Q&A 6 19:45 – 20:40 - **Chairs:** *Florian Doster, Yves Méheust*

[1275] **Capillary flow mediated drop formation in a yarn-based microfluidic system.**
Bhaskarjyoti Sarma; Amaresh Dalal; Dipankar Narayan Basu

[1043] **Role of Connate Water in Immiscible Viscous Fingering.**
Lucas Mejia; Matthew Balhoff; Kishore Mohanty

[273] **Ferrofluid-Enhanced Mobilization of Trapped Oil: Microfluidic And Numerical Investigation.**
Ningyu Wang; Yifei Liu; Matthew Balhoff; Masa Prodanovic

[146] **An analytical fractal model for water transport in shale reservoirs.**
Yu Zhang; Jianchun Guo; Fanhui Zeng; Yu Zhang; Wenxi Ren; Jianhua Xiang

Question and answer: Parallel sessions 3 (cont.)

(MS 11) Microfluidics in porous systems– Part 2 (cont.)

Q&A 6 *19:45 – 20:40 -* **Chairs:** *Florian Doster, Yves Méheust*

[81] **Visualization of CH4 Hydrate Dissociation Under Permafrost Temperature Conditions Using High-Pressure Micromodel.**
Jyoti Shanker Pandey; Stian Almenningen; Nicolas von Solms; Geir Ersland

[41] **How Nanoscale Surface Heterogeneity Impacts Transport of Nano- & Micro-Particles in Granular Media under Environmental Conditions.**
William Johnson

[1321] **Experimental Investigations of Oil Transport in 2D Porous Media.**
Jiwei Wu; Thomas Cochard; Lizhi Xiao; David A. Weitz

[463] **Microfluidic Observations and Pore-Scale Simulations of Fluid Displacement and Capillary Trapping Under Intermediate-Wet Conditions.**
Rumbidzai. A. E Nhunduru

[299] **Conditions Allowing Steady Two-Phase Flow in Microfluidic Devices.**
Afsjin Davarpanah; Holstvoogd Jorijn; Simon Cox; William Rossen

MONDAY, 31 AUGUST 2020
Time Block B

Opening Ceremony
13:30 - 13:40 CET

Award Ceremony
13:40 - 13:50 CET

InterPore Honorary Lifetime Membership Award
Harry Vereecken
Forschungszentrum Jülich, Germany

Keynote Lecture
13:50 - 14:35 CET

Aimy Bazylak
University of Toronto

Designing porous materials for improved fuel cell and electrolyzer performance

The polymer electrolyte membrane (PEM) fuel cell and electrolyzer are composed of multiple porous materials, including the catalyst layer, microporous layer, and substrate. Commercial materials, whether by design or not, typically exhibit highly heterogeneous material and chemical properties. In order to reach cost targets for widespread commercial adoption, we must realize materials that enable more effective multiphase flow phenomena than what currently exists. Mass transport losses in PEM fuel cells and electrolyzers are both prohibitively significant. However, designing these materials requires the a priori knowledge of how the heterogeneous properties of the porous materials and their interfacial contacts influence electrochemical performance. In this work, I will discuss these critical design factors

Keynote Lecture *(cont.)*
13:50 - 14:35 CET

(heterogeneous porous materials and nature of interfacial contacts) and how they influence the flow and mass transport behaviour in PEM fuel cells and electrolyzers. I will also discuss the new materials we have designed and fabricated, informed by in-house numerical modelling and tested through a combination of in operando and ex situ X-ray and neutron beam characterization approaches.

Plenary Pitch
14:35 - 14:40 CET
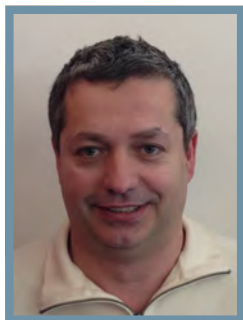
Branko Bijeljic
Imperial College London

Scale-dependence of Reaction Rates in Porous Media & Physical and Chemical Heterogeneity

Reactive transport of solutes in porous media is encountered in many applications, such as contaminant transport and remediation in subsurface, acidization to enhance permeability in oil recovery, and packed bed reactors in chemical engineering. A principal outstanding problem in subsurface reactive transport is to determine the effective reaction rates from the pore-scale upwards. This is of key importance in highly heterogeneous natural porous media such as carbonate rock. Carbonates are known to have a significant portion of their pore space as micro-porosity, which may lead to a very wide distribution of local velocities, increasing transport heterogeneity that affects mixing and ultimately reaction. Hence, there is a need for a systematic methodology that can identify and quantify the impact of physical and chemical heterogeneity on the reaction rates. Moreover, in many problems additional complexities arising from coupling of multispecies transport and reaction reversibility need to be accurately addressed.

We develop a new methodology termed Screening Pore-Scale Imaging and Modelling (SPIM) that can be used to predict the fluid/solid reaction rates based

Plenary Pitch *(cont.)*
14:35 - 14:40 CET

on the systematic characterization of both physical and chemical heterogeneity in multi-mineral systems [1-3]. Physical heterogeneity of the rocks is classified in accordance with the velocity distributions obtained by numerical flow simulation on dry micro-CT images. Spatial distribution of chemical heterogeneity is also provided from the images. Performing and analyzing coreflooding CO_2/brine/carbonate experiments, we show that mineral reaction rates are an order of magnitude lower than the corresponding batch rates due to mass transfer limitations. We introduce a new metrics quantifying coupled reactive transport behaviour, which describes proximity of reacted minerals to the fast channels and slow regions. Overall, a higher degree of physical (initial pore structure and associated velocity field) and/or chemical (intrinsic reaction rates and mineral distribution) heterogeneity promotes the preferential channelling effect, as opposed to uniform dissolution.

Furthermore, we simulate 3D multispecies fluid/fluid reversible reactive transport [4] in a micro-CT image of carbonate rock that entails spatially resolved information on connected micro-porosity. Direct numerical simulation of Darcy-Brinkman [5] and advection-diffusion transport equations are coupled to a general geochemical model [6]. We demonstrate salient features of mixing and reaction arising as a result of intricate pore space heterogeneity. We show that evolution of rates of formation and consumption is species-dependent, and highly distinct in macro- and micro-porosity. Well-mixed regions result in asymptotic reaction rates. In contrast, incomplete mixing leads to transient and, for some species, even non-monotonic reaction rate behaviour.

Overall, we conclude that reactive behaviour is simultaneously influenced by pore space heterogeneity, multispecies reactive transport, and reaction reversibility. This means that for complex reversible reactions in heterogeneous porous media, species-specific behaviour needs to be examined for an accurate determination of reaction rates.

Invited Speakers: Parallel Session 2
18:00 - 18:30 CET
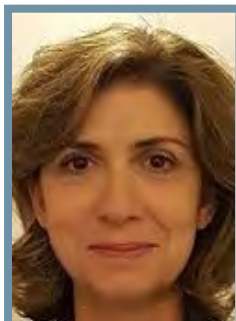
Olga Vizika
IFPEN

Multi-scale in-situ fluid monitoring to understand and model multiphase flow in porous media

Transport phenomena in porous media are encountered in many situations of practical and scientific interest, where determination of transport properties remains a challenging issue. They may concern natural porous media, such as soils, aquifers or hydrocarbon reservoirs, or artificial ones, such as filters, fuel cells, catalysts and concrete.

Multiphase flow in natural porous media is essential in a wide range of phenomena and applications in geosciences, including hydrocarbon formation and migration, oil and gas production, enhanced oil recovery, underground energy or CO_2 storage, water resources management or soil remediation. Understanding and predicting fluid displacement mechanisms at the relevant scale is one of the big challenges in basin and reservoir modeling.

The description of the transport of fluids in geological formations relies upon advances on the characterization and modeling of natural systems in a large spectrum of time and length scales. The complexity of transport processes in these systems is due to the natural complexity and heterogeneity of geological structures as well as to the dynamics of the multiphase fluid displacement and its coupling with mechanical, thermal, chemical and biological processes.

Information on the pore space geometry and topology and on fluid displacement is essential to understanding of mechanisms and modeling. In 2D, micromodel experiments and advances in microfluidics bring qualitative and quantitative information on the motion of fluid/fluid interfaces in model systems down to the micron scale. In 3D, X-Ray 3D-imaging has proved to be a key technology to study multiphase flow in porous media with a continuous quest for space and time resolution.

Experimental observation has to be intimately linked to pertinent theoretical modeling taking into account the relevant physics of the studied phenomena at the right scale. Advances in molecular dynamics, lattice-Boltzmann or pore-network modeling methods combined to upscaling considerations permit to simulate complex flow regimes and to run laboratory and numerical experiments on comparable sample volumes.

Through selected examples, on the combination of experimental observation and theoretical analysis at different scales, we demonstrate the necessity of adapting space and time scale to the studied phenomenon, and the complementarity of different methods to investigate multiphase flow in porous media.

Invited Speakers: Parallel Session 2 *(cont.)*
18:00 - 18:30 CET
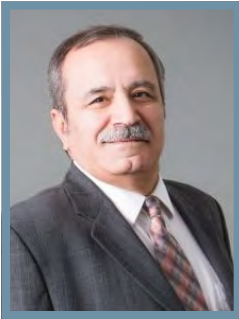
Muhammad Sahimi
University of Southern California

Porous Media, Small and Large: From Atomistic Modeling of Nano-Porous Membranes to Modeling of Flow and Transport in Geological Formations

Flow, transport, reaction, adsorption and deformation (FTRAD) constitute a fascinating set of phenomena that occur in a wide variety of porous media and materials over widely disparate length scales, from molecular, to pore, core, and field scales.

In this presentation four classes of fundamental problems are described and the approaches to their modeling are discussed. We first describe a process-based modeling of fabrication of a nano-porous membrane based on quantum mechanical calculations and molecular dynamics simulations. We then outline a general approach to modeling of adsorption and swelling of several types of core-scale porous materials. Next, the problem of reconstruction of porous materials and media based on limited data, such as their two- or three-dimensional images is described, and a new method based on curvelet transforms for speeding up simulation of the FTRAD in such images is discussed. Finally, the problem of upscaling from core to field scale is described and a multiresolution approach to the problem based on wavelet transformations is discussed.

TUESDAY, 1 SEPTEMBER 2020
Time Block A

Award Ceremony
9:00 - 9:10 CET

Procter & Gamble Award for Thin and Swelling Porous Media Research
Amir Raoof
Utrecht University, The Netherlands

A word of gratitude:
This award has been made possible by a generous grant from Procter and Gamble. Two billion times a day, P&G brands touch the lives of people around the world. Their products have made a name for themselves by combining "what's needed" with "what's possible"—making laundry rooms, living rooms, bedrooms, kitchens, nurseries, and bathrooms a little more enjoyable for over 181 years.

InterPore Award for Excellence in Porous Media Research
Tanguy Le Borgne
University of Rennes, France

Keynote Lecture
9:10 - 9:55 CET

Signe Kjelstrup
Norwegian University of Science and Technology

Addressing the water scarcity problem with thermal osmosis

To describe flow in porous media Darcy's law has been central, and rightly so. The pressure difference, or more generally the chemical potential difference, is a major driving force of flow. Other driving forces for transport, electric and gravitational fields for instance, have more particular applications. Less is known on thermal driving forces for transport in porous media. On the other hand, not only industry, also nature provide large amounts of waste heat. The use of this heat to do useful work, is therefore of interest, theoretically as well as practically. In this lecture, I will examine the theoretical and practical conditions for a particularly important case of two-phase flow in porous media; namely the flow of water using vapor-gap membranes and a waste heat source to provide a driving force. The phenomenon is called thermal osmosis. In thermal osmosis, heat can be used to clean water and drive a turbine, as well. In nature, the phenomenon can be related to frost heave.

There is a world - wide scarcity of clean water, and the United Nations have declared that the decade 2018-2028 be used to "Avert a global water crisis". In this contribution to help avert the problem, we shall see that the theoretical basis of non-equilibrium thermodynamics can help understand the mechanism of thermal osmosis. An exact description can then follow and lend itself to experimental control and optimization. Other applications are close at hand.

TUESDAY, 1 SEPTEMBER 2020
Time Block A

Plenary Pitch
9:55 - 10:00 CET

Sebastian Geiger
Heriot-Watt University

Flow diagnostics for fractured reservoirs: An innovative way to account for geological and geomechanical uncertainty in modern reservoir modelling and simulation workflows
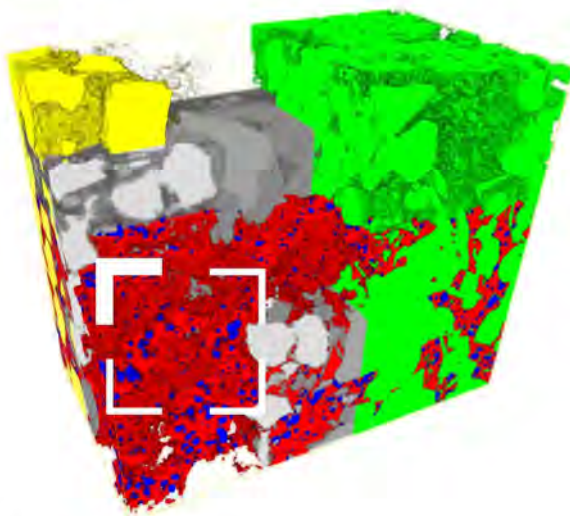
Fractured reservoirs are abundant in the subsurface and crucial to the provision of energy (e.g. oil, gas, geothermal) and groundwater, as well as for the storage of CO_2. Yet, these reservoirs are very difficult to characterise, develop, and manage due to their complex and uncertain geology. Fractures can also open or close as the stress state in the reservoir changes during production, adding further complexities to the reservoir management. Modern reservoir simulation and uncertainty quantification workflows allow us to support the design of field development and management plans that account for geological uncertainties. However, simulating these reservoirs is not trivial and the time spent running full-physics reservoir simulations is valuable; it should be used for studying models that explore a realistic range of (geological) uncertainties and hence provide the most insight.

We have developed new flow diagnostics tools for naturally fractured reservoirs which sacrifice some physical detail in exchange for speed but still allow us to compute some of the essential dynamic behaviours in the reservoir, e.g. how effectively wells communicate with each other or which wells are at risk of early breakthrough. A particular innovative addition to our flow diagnostics is that we can also account for geomechanical effects in the reservoir; we can therefore quickly evaluate if and where fractures are likely to open or close, and how reservoir dynamics evolve as a consequence, due to production-induced stress changes.

Our new technology enables us to screen large numbers of geological models based on their approximate dynamic and geomechanical behaviours in a matter of minutes prior to commencing more time-consuming full-physics reservoir simulations. Using intuitive metrics we quantify the reservoir dynamics to cluster models and reduce the number of full-physics simulations required for robust reservoir forecasting without affecting the original range of geological and geomechanical uncertainties. Flow diagnostics hence offer a natural pre-processing step that complements modern coupled hydro-mechanical reservoir simulation, uncertainty quantification, and optimisation workflows, allowing us to spend valuable simulation time on the cases that yield a greatly improved understanding of reservoir performance and related uncertainties.

Timing of Q&A sessions on Tuesday				
Time Block (CET)	Q&A No.	Parallel sessions 1	Parallel sessions 2	Parallel sessions 3
A (10:05 – 11:00)	Q&A 7	MS1, part1	MS13, part1	MS17, part1
A (11:05 – 12:00)	Q&A 8	MS1, part2	MS13, part2	MS6-A, part2
B (14:35 – 15:30)	Q&A 9	MS1, part3	MS13, part3	MS14, part1
B (15:35 – 16:30)	Q&A 10	MS1, part4	MS13, part4	MS18, part1
C (18:00 – 18:55)	Q&A 11	MS1, part5	MS13, part5	MS18, part2
C (19:00 – 19:55)	Q&A 12	MS1, part6	MS4	MS17, part2
C (20:00 – 20:55)	Q&A 13	MS6-A, part3	MS23, part1	MS14, part2

Question and answer: Parallel sessions 1

(MS1) Porous Media for a Green World: Energy & Climate – Part 1

Q&A 7 *10:05 – 11:00 -* **Chairs:** *William Rossen, Rainer Helmig*

[1273] **Introducing the concept of Paradise Island for quantifying the role of subsurface porous media in the green transition.**
Ali Akbar Eftekhari

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[828] **CO_2 Transport and Mineralization in Reactive Magnesium Cement-Based Concrete.**
Anna Herring; Penny King; Fatin Mahdini; Afiq Muzhafar Kemis Yahyah; Mohammad Saadatfar

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[432] **Assessment of Conglomerate Reservoir for CO_2 Sequestration using X-ray CT image Analysis.**
Gidon Han; Weon Shik Han; Kue-young Kim Kim; Jize Piao

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[890] **Carbon Dioxide Sequestration of Fuel Combustion Exhaust Using Metal-Organic Frameworks (MOFs): A Molecular Simulation Study.**
Jie Li; Jiaxiang Liu; Wenquan Tao; Zhuo Li

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[246] **Upscaling capillary pressure functions for modeling vertical migration of CO_2 in brine aquifers.**
Kan Bun Cheng; Avinoam Rabinovich

[1182] **Multiple-method pore structure characterization of Upper Cretaceous lacustrine shale from Songliao Basin in Northeast China.**
Mianmo Meng; Hongkui Ge; Yinghao Shen; Qinhong Hu

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[92] **Quantitative evaluation of mobile shale oil at different pore sizes.**
Ning Qi; Mingyue Lu; Haitao Xue; Jinxiu Yang; Bojie Zhang; Dongquan Sun; Xueping Liu; Jiafan Tang

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[1049] **Integrating geological data and upscaling static and dynamic properties for a CCS project.**
Mark Knackstedt; Mohammad Saadatfar; Robert Sok; Paal Eric Oeren; Lachlan Deakin

TUESDAY, 1 SEPTEMBER 2020

Question and answer: Parallel sessions 1 (cont.)

(MS1) Porous Media for a Green World: Energy & Climate – Part 2

Q&A 8 11:05 – 12:00 - **Chairs:** *Rainer Helmig, William Rossen*

[1199] valuation criteria of shale gas reservoir classification-- taking Longmaxi formation in Pengshui area as an example.
Ning Qi; Mingyue Lu

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[105] Experimental Studies on Carbonated Smart Water-flooding Mechanisms in Tight Reservoir.
Rukuan Chai; Yuetian Liu; Liang Xue; Jing Xin

[1071] CO2 Mobility Control by Foam at the Pore Level.
Tore Føyen; Malin Haugen; Benyamine Benali; Martin A Fernø

[1037] Dynamic Pore-Scale Dissolution by CO2-Saturated Brine in Carbonates: Impact of Homogeneous versus Fractured versus Vuggy Pore Structure.
Yingwen Li; Yongfei Yang

[1212] Study on Mechanism of Nitrogen Stimulation Production Aided by Viscosity Reducer in common heavy oil.
Yunong Zang; Binfei Li

[1193] Capillary heterogeneity trapping within the Captain Sandstone - a core to field scale study.
Catrin Harris; Sam Krevor; Samuel Jackson; Ann Muggeridge; Alistair Jones

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[1143] Development of multi-physics models accounting for reversible flow at various subsurface energy storage sites.
Beatrix Becker; Bernd Flemisch; Rainer Helmig; Bo Guo; Karl Bandilla; Mike Celia

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[1165] Research on geological modeling of porosity and permeability in CO2 gas reservoirs——Taking Surennuor area as an example.
Ning Qi; Mingyue Lu

(MS1) Porous Media for a Green World: Energy & Climate – Part 3

Q&A 9 14:35 – 15:30 - **Chairs:** *Julien Maes, William Rossen*

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[679] Modelling of long-term along-fault flow of CO2 from a natural reservoir.
Jeroen Snippe; Niko Kampman; Kevin Bisdom; Tim Tambach; Rafael March; Tomos Phillips; Nathaniel Forbes Inskip; Florian Doster; Andreas Busch

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[990] Ripening of Residual Bubbles in Porous Media: Thermodynamic Stability and Implications in CO2 Sequestration.
Ke Xu; Yashar Mehmani

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[785] Implementation of ePc-SAFT Equation of State into MRST Compositional for Modelling of Salt Precipitation during CO2 Storage in Saline Aquifers.
Mohammad Masoudi; Saeed Parvin; Rohaldin Miri; Helge Hellevang

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[770] Geothermal Simulation Using MRST.
Øystein Klemetsdal; Marine Collignon; Olav Møyner; Halvor Nilsen; Odd Andersen; Knut-Andreas Lie

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Question and answer: Parallel sessions 1 (cont.)

(MS1) Porous Media for a Green World: Energy & Climate – Part 3 (cont.)

Q&A 9 14:35 – 15:30 - *Chairs:* Julien Maes, William Rossen

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[983] Low Salinity Water-flooding in Chalk Core Samples from a Danish North Sea Reservoir.
Rasoul Mokhtari; Benaiah Anabaraonye; Karen Louise Feilberg

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[970] Effect of aging method on wettability and oil recovery from danish north sea carbonate reservoirs.
Samira Mohammadkhani; Jonas Folke Sundberg; Ming Li; Karen Louise Feilberg

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[1164] Pore and Permeability Modeling Research of the CO_2-bearing Strata in Wuerxun Depression.
mingyue lu; Ning Qi

[1141] Optimizing carbon dioxide storage in oilfields at the pore-scale.
Abdulla Alhosani; Qingyang Lin; Alessio Scanziani; Branko Bijeljic; Martin Blunt

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(MS1) Porous Media for a Green World: Energy & Climate – Part 4

Q&A 10 15:35 – 16:30 - *Chairs:* Dima Petrovskyy, Rainer Helmig

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[465] An investigation of caprock-cement integrity for CO_2 storage.
Amir Jahanbakhsh; Jonaid Hasan Bajwa; Nazia Mubeen Farooqui; M. Mercedes Maroto-Valer; Mojgan Hadi Mosleh; Harshit Agrawal; Anna Korre; Sevket Durucan

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[447] A novel approach towards understanding pore attributes of shale.
Debanjan Chandra; Vikram Vishal

[1227] Carbon Dioxide Plume in Bespoke 2D Porous Micromodels.
Niloy De; Patrice Meunier; Yves Méheust; François Nadal;

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[992] Experimental Investigation on the Effects of Ion Type/Valency and Ionic Strength of Formation Water on Rock-Fluid Interactions during CO_2 Geological Storage.
Shima Ghanaatian; Omid Shahrokhi; Susana Garcia; M. Mercedes Maroto-Valer

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[1246] Numerical Simulation of CO_2 enhanced gas recovery (CO_2-EGR) for the optimal CO_2 injection perforation position and injection rate.
Liu Shuyang; Sun Baojiang

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[315] Evaluation of CO_2 enhanced recovery potential as pre-pad in tight reservoir compared with slickwater.
Liyao Fan; Yuliang Su; Lei Li; Mingyu Cai; Zheng Chen; Chengwei Wang; Xiaogang Gao

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[946] CO_2 Storage Potential in Naturally Fractured Reservoirs.
Rafael March; Florian Doster; Sebastian Geiger

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[751] Application of GIS and Remote Sensing in Landuse Land Cover Change Detection: A Study of District Malakand, Pakistan.
Muhammad Yasir; Hui Sheng; Sami Ur Rehman; Atif Zafar; Muhammad Ilyas; Asif Mehmood

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TUESDAY, 1 SEPTEMBER 2020

Question and answer: Parallel sessions 1 (cont.)

(MS1) Porous Media for a Green World: Energy & Climate – Part 5

Q&A 11 18:00 – 18:55 - *Chairs:* Christine Maier, Bo Guo

[1226] Assessment of Geochemical Reactions in Porous Formation Compressed Energy Storage Systems.
Chidera Iloejesi; Lauren Beckingham

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[568] Chemo-Hydro-Poromechanics of Enhanced Cracking in Geo-Energy Engineering.
ManMan Hu

[1240] Buoyant convection from a discrete source in closed vs. leaky porous media.
Morris Flynn; Chunendra K. Sahu; Mark Roes

[1013] Redistribution of residually trapped CO_2 by Ostwald ripening due to capillary heterogeneity.
Yaxin Li; Charlotte Garing; Sally M Benson

[1019] Parametric study on the residual CO_2 trapping in Deccan Volcanic Basalt.
Pradeep Reddy Punnam; Shakti Raj Singh Bawal; Himavarsha Pakala; Vikranth Kumar Surasani

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[68] A vertically integrated approach to field-scale modelling of mineral trapping in reactive rocks.
Tom Postma; Karl Bandilla; Mike Celia

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[104] Pore connectivity of shale oil reservoirs from small angle neutron scattering, mercury intrusion porosimetry and spontaneous imbibition experiments.
Xiaohui Sun; QinHong Hu; Binyu Ma; Tao Zhang; Mianmo Meng; Shengyu Yang; Xiugang Pu; Wenzhong Han

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[39] The grading evaluation and sweet spot prediction of shale reservoirs based on high-pressure mercury intrusion technology and fractal theory.
Yu Zhang; Rixin Zhao

(MS1) Porous Media for a Green World: Energy & Climate – Part 6

Q&A 12 19:00 – 19:55 - *Chairs:* Bo Guo, Christine Maier

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[399] Flue Gas Hydrate Storage, Self-Preservation and Dissociation in Unconsolidated Porous Medium in the Presence of Environment-Friendly Promoters.
Jyoti Shanker Pandey; Nicolas von Solms

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[827] Use of limited deep formation monitoring data with shallow aquifer observations for leakage monitoring in geologic carbon storage.
Tissa Illangasekare; Ahmad Askar; Jakub Solovský; Radek Fucik; Ye Zhang; Jiangyin Jiao; Andrew Trautz

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[563] The Seebeck effect in membrane systems of ions abundant in seawater.
Peder Holmqvist; Signe Kjelstrup; Kim Kristiansen

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[776] Hydrophobicity/Hydrophilicity Driven CO_2 Solubility in Kaolinite Nanopores in Relation to Carbon Sequestration.
Wenhui Li; Zhehui Jin

TUESDAY, 1 SEPTEMBER 2020

Question and answer: Parallel sessions 1 (cont.)

(MS1) Porous Media for a Green World: Energy & Climate – Part 6 (cont.)

Q&A 12 19:00 – 19:55 - *Chairs:* Bo Guo, Christine Maier

[696] Using 2D seismic line data to estimate the possible impact of large-scale and sub-scale structural trapping in the Gassum Formation on the Norwegian Continental Shelf.
Odd Andersen; Anja Sundal; Halvor Nilsen

[373] Utilization of microporous materials as multi-functional proppant for enhanced shale gas and recovery and CO_2 sequestration.
Kaiyi Zhang; Guan Qin

[1243] Sedimentary Sedimentary Study and Application of the Lower Fourth Member of Shahejie Formation in Chenguanzhuang Area.
Zongwei Zhang

[142] Study on tight oil seepage characteristics based on digital cores.
Yixin Cao; Ning Qi; Xinlei Yuan

(MS 6-A) Physics of multi-phase flow in diverse porous media– Part 3

Q&A 13 20:00 – 20:55 - *Chairs:* Saman Aryana, Majid Hassanizadeh

[972] Impact of pair interactions on frictional fluid dynamics
Louison Thorens; Knut Jorgen Maloy; Mickaël Bourgoin; Stéphane Santucci

[1187] Thin film flow: fluid transport via thin liquid films in slow porous media flows
Marcel Moura; Knut Jørgen Måløy; Eirik Grude Flekkøy; Gerhard Schäfer; Renaud Toussaint

[1301] Physical origin of pressure-saturation curves during drainage: modelling based on gravitational and capillary effects, and recipe for upscaling by correcting finite-size effects
Renaud Toussaint; Monem Ayaz; Gerhard Schäfer; Marcel Moura; Knut Jorgen Maloy

[846] Benchmarking root and soil interaction models exemplified with CRootBox and Dumux.
Daniel Leitner; Andrea Schnepf

[1154] Bistability in the unstable flow of polymer solutions through porous media
Christopher Browne; Audrey Shih; Sujit Datta

[1009] Pore system evaluation of a bi-modal carbonate rock using a suite of low field NMR and microCT techniques.
Jun Gao; Ahmad AlHarbi; Hyung Kwak

[602] Study on Fluid Extraction Considering Reservoir Microstructure.
Zhou Fang; Jifeng Qu; Caiqi Zhang; Lei Zhang; Guangming Pan

[1105] Liquid-gas penetration through the complex three-dimensional porous media.
Yu Shi; Xiao-na Yang

TUESDAY, 1 SEPTEMBER 2020

Question and answer: Parallel sessions 2

(MS 13) Fluids in Nanoporous Media – Part 1

Q&A 7 10:05 – 11:00 - *Chairs:* Gennady Gor, Patrick Huber

[1160] Molecular Simulation Study of Inorganic and Organic Porous Materials
Arun Kumar Narayanan Nair; Shuyu Sun

[646] Nondestructive high-throughput screening of nanopore geometry in porous membranes by imbibition: Laser-Interferometry and Dilatometry Experiments
Juan Sanchez Calzado; Zhuoqing Li; Luisa G. Cencha; Michael Kappl; Floudas George ; Claudio L.A. Berli; Steinhart Martin; Michael Fröba; Raul Urteaga; Patrick Huber

[334] Distribution of oil in shale formations and its effects on kerogen nano-structural properties
Qian Sang; Xinyi Zhao; Mingzhe Dong

[250] Adsorption Evaluations of Shale Gas in Nanometer Pores Based on Molecular Simulation Method
Sun Renyuan; Sun Ying; Tang Guiyun; Gong Dajian; Cao Haipeng

[1132] The effects of oxidation on the capacity of shale gas desorption and diffusion in nanoscale pores
Yang Zhou; Lijun You; Yili Kang; Qiuyang Cheng; Yang Chen

[528] Fractal analysis of real gas transport in 3D shale matrix
Zhenhua Tian; Jianchao Cai; Yihua Xiong; Haitao Tian; Kai Xu

[297] Imbibition-Induced Deformation Dynamics in Nanoporous Media: The Interplay of Bangham and Laplace Pressure Effects
Zhuoqing Li; Juan Sanchez Calzado; Michael Fröba; Patrick Huber

[1103] Study on the micro pore structure characteristics of low permeability porous carbonate reservoir.
Yapu Zhang; Zhengming Yang; Yanzhang Hhuang; Xingwang Shi; Haitao Hou

(MS 13) Fluids in Nanoporous Media – Part 2

Q&A 8 11:05 – 12:00 - *Chairs:* Gennady Gor, Patrick Huber

[1157] Evaporation and condensation of water in nanopores with salt
Olivier Vincent; Piyush Jain; Marine Poizat; Léo Martin; Abraham Stroock

[779] Viscosity of hydrocarbons in slit pores by molecular dynamics
Vasily Pisarev; Nikolay Kondratyuk

[596] Study on the distribution of micro remaining oil in different sedimentary microfacies by using glass etching displacement experiments
Xianbo Luo

[1325] The effects of oxidation on the capacity of shale gas desorption and diffusion in nanoscale pores
Yang Zhou; Lijun You; Yili Kang; Qiuyang Cheng; Yang Chen

[559] Adsorption and Flow Behaviors of Shale Oil in Organic Slit by Molecular Simulation
Jie Liu; Yongfei Yang; Jun Yao

Question and answer: Parallel sessions 2 (cont.)

(MS 13) Fluids in Nanoporous Media – Part 2 (cont.)

Q&A 8 11:05 – 12:00 - *Chairs:* Gennady Gor, Patrick Huber

[1285] Extension and Limits of Cryoscopy for Nanoconfined Solutions
Benjamin Malfait; Alban Pouessel; Aicha Jani; Denis Morineau

[489] Giant Piezoelectrolytic Actuation in Nanoporous Silicon-Polypyrrole Membranes
Manuel Brinker; Guido Dittrich; Thelen Marc; Lakner Pirmin; Claudia Richert; Tobias Krekeler; Thomas F Keller; Norbert Huber; Patrick Huber

[493] Ionic liquid dynamics in nanoporous carbon: A pore-size- and temperature-dependent neutron spectroscopy study on supercapacitor materials.
Mark Busch; Tommy Hofmann; Bernhard Frick; Jan Embs; Boris Dyatkin; Patrick Huber

(MS 13) Fluids in Nanoporous Media – Part 3

Q&A 9 14:35 – 15:30 - *Chairs:* Gennady Gor, Patrick Huber

[1267] Water Dynamics in Nanoporous Confinement: A Quasielastic Neutron Scattering Study
Aicha Jani; Benedikt Mietner; Mark Busch; Jacques Olliver; Bernhard Frick; Markus Apple; Jean-Marc Zanotti; Patrick Huber; Michael Fröba; Denis Morineau

[267] Small Angle Neutron Scattering to determine the Interplay between Fluids and Pores in Mudrocks
Amirsaman Rezaeyan; Timo Seemann; Pieter Bertier; Vitaliy Pipich; Lester Barnsley; Andreas Busch

[1302] Dynamic Heterogeneities in Liquid Mixtures Confined in Nanopores
Aicha Jani; Ramona Mhanna; Benedikt Mietner ; Mark Busch; Jean-Marc Zanotti; Bernhard Frick; aziz ghoufi; Patrick Huber; Michael Fröba; Denis Morineau

[117] A serially-connected pore model (SCPM) for characterising disordered mesoporous materials
Henry Enninful; Daniel Schneider; Richard Kohns; Dirk Enke; Rustem Valiullin

[116] Characterisation of strongly disordered mesoporous solids with the serially-connected pore model (SCPM)
Henry R. N. B. Enninful; Daniel Schneider; Antonia Hoppe; Dirk Enke; Rustem Valiullin

[457] Physically-based combined model for water retention of cementitious materials
Walaa Issa; Jean-Philippe Carlier; Nicolas Burlion

[898] Stochastic apparent permeability model considering pore-throat structures and fluid-solid molecular interactions for shale oil reservoir
Jilong Xu; Yuliang Su; Wendong Wang; Han Wang

[635] Permeation and separation of CH4/CO2, N2/O2 mixtures through single-layer nanoporous graphene membranes : theory and molecular simulations
Juncheng Guo; Romain Vermorel; Guillaume Galliero

TUESDAY, 1 SEPTEMBER 2020

Question and answer: Parallel sessions 2 (cont.)

(MS 13) Fluids in Nanoporous Media – Part 4

Q&A 10 15:35 – 16:30 - Chairs: Gennady Gor, Patrick Huber

[859] Mechanism of shale gas occurrence: Insights from comparative study on pore structures of marine and lacustrine shales
Lei Chen; Keyu Liu

[1166] Direct pore scale simulation of water in nanoporous shale and prediction of apparent liquid permeability
Tao Zhang; Ying Yin; Xiangfang Li

[10] Pore-scale Investigation of Effects of Organic-matter Pores on Shale Properties Based on Multicomponent and Multiscale Digital Rocks
Yuqi Wu; Pejman Tahmasebi; Chengyan Lin

[308] A variation free approach for free energy minimization in density functional theory
Yuriy Kanygin; Irina Nesterova; Pavel Lomovitskiy; Aleksey Khlyupin

[511] Density Functional Theory Model for Adsorption-Induced Deformation of Materials with Convex Pore Walls
Andrei Kolesnikov; Gennady Gor

[1266] Experimental Evaluation of the Saturation Vapor Pressure above Supercooled Nanoconfined Liquids
Klaus Schappert; Rolf Pelster

[1286] Pore size distribution in nanoporous materials using NMR cryoporometry
Marc Fleury

[268] Coupling between the dynamic capillary pressure and deformation in porous materials.
Yuliang Zou

(MS 13) Fluids in Nanoporous Media – Part 5

Q&A 11 18:00 – 18:55 - Chairs: Gennady Gor, Patrick Huber

[1238] Pore connectivity characterization of Woodford Shale using liquid imbibition and tracer gas diffusion methods
Chen Zhao; Qinhong Hu; Qiming Wang; Jing Zhang; Roger Slatt

[328] A fractal model for shale gas apparent permeability
Fanhui Zeng; Chao Wen; Jianchun Guo; Qiang Zhang; Jianhua Xiang

[1228] Permeability and Adsorption of Light Gas Through Mature Shale Kerogen by Molecular Simulations
Fouad Oulebsir; Romain Vermorel; Guillaume Galliero

[164] Nanopore Connectivity and Fluid Migration in Shales
Qinhong Hu

[1188] CO2-Regulated Octane Flow in Calcite Nanopores from Molecular Perspectives
Wei Zhang; Zhehui Jin; Qihong Feng

THE FUTURE.
YOURS TO MAKE.

"I want to
be able to
look back

And say
I played
my part"

Ryan
Engineer at Shell

Read my letter to the future at
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TUESDAY, 1 SEPTEMBER 2020

Question and answer: Parallel sessions 2 (cont.)

(MS 13) Fluids in Nanoporous Media – Part 5 (cont.)

Q&A 11 18:00 – 18:55 - *Chairs:* Gennady Gor, Patrick Huber

[332] Evaluation of Gas Adsorption Behavior in Nanoporous Shale Using Simplified Local-Density Model Integrated With Cylindrical and Slit Pore Structures and Pore Size Distribution
Yu Pang; Sen Wang; Shengnan Chen

[997] Wetting dynamics of nanoliter water droplets in nanoporous media
Bin Pan; Christopher Clarkson; Marwa Atwa; Chris DeBuhr; Amin Ghanizadeh; Viola Birss

[103] Impact of solvent extraction on the petrophysical analysis of lacustrine shale
Hongguo Qiao; Qinhong Hu; Shengyu Yang; Binyu Ma; Wenzhong Han; Xiaohui Sun; Xiuchuan Zhu; Xiugang Pu

(MS 4) Swelling and shrinking porous media

Q&A 12 19:00 – 19:55 - *Chairs:* Jacques Huyghe, Sridhar Ranganathan, Muhammad Sahimi

[1303] The coupling between compaction and pressurization in cyclically sheared drained granular layers: implications for soil liquefaction.
Shahar Ben Zeev; Renaud Toussaint; Liran Goren; Stanislav Parez; Einat Aharonov

[1206] Swelling properties in reinforced polymeric ion-exchange membranes.
Íñigo Lara; Sagrario Muñoz; V. María Barragán García

[1107] Reservoir Parameter Changes of Weakly-Volatile Oil Reservoir Developed by Natural Energy and The Potential Analysis of Water Injection: A Case Study of Offshore X Oilfield.
Jianting Huang; Jintao Wu; Guangming Pan; Hao Li; Zhenpeng Li

[1062] Extremely large deformation and fracture of hydrogels.
Jacques Huyghe; Eanna Fennell

[335] Deformation of kerogen and its effects on oil flow in shale.
Xinyi Zhao; Qian Sang; Yajun Li; Houjian Gong; Mingzhe Dong

[1327] Role of Temperature on Threshold Gradient and Permeability of non-Darcian Flow in Sand and Clay Mixtures.
Yuntian Teng; Zihao Li; Weiyu Zheng; Cheng Chen

[323] Modelling the drying shrinkage of porous materials incorporating capillary and adsorption effects.
Ginger El Tabbal; Patrick Dangla; Matthieu Vandamme; Marina Bottoni; Sylvie Granet

[1334] Modeling wood shrinkage during pyrolysis : a major challenge for second generation biofuels.
Jean Lachaud; Michael Meyer; Cyrille Metayer; Marin Virey; Wahbi Jomaa; Jérémy Meurisse

TUESDAY, 1 SEPTEMBER 2020

Question and answer: Parallel sessions 2 (cont.)

(MS 23) Special Session for Professor Rainer Helmig – Part 1

Q&A 13 20:00 – 20:55 - **Chairs:** *Bernd Flemisch, Martin Schneider*

[971] **The Geography of CCUS and its Implication for CO2 Emissions.**
Michael Celia

[1158] **Equilibria, kinetics, constraints, and multiple scales.**
Malgorzata Peszynska; Choah Shin

[1074] **Effects of Quasi-Saturation on Water Table Dynamics, Estimated Recharge Rates, and Groundwater Modeling.**
Roger Gonçalves; Hung K. Chang; Martinus van Genuchten

[957] **From open source to open workflows?**
Lars Bilke ; Jörg Buchwald; Thomas Fischer; Thomas Kalbacher; Olaf Kolditz; Thomas Nagel; Dmitri Naumov; Erik Nixdorf; Karsten Rink; Haibing Shao; Wenqing Wang

[680] **Research collaboration Highlights: A tribute to Rainer Helmig.**
Al Cunningham

Question and answer: Parallel sessions 3

(MS 17) Thermal Processes, Thermal Coupling and Thermal Properties of Porous Media: modeling and experiments at different scales – Part 1

Q&A 7 10:05 – 11:00 - **Chairs:** *Ruina Xu, Moran Wang*

[456] **Numerical Analysis of Interaction between a Reacting Fluid and a Moving Bed with Spatially and Temporally Fluctuating Porosity**
Alban Rousset; Abdoul Wahid Mainassara Chekaraou; Xavier Besseron; Bernhard Peters; Chiara Galletti

[1196] **Influence of the porous network on the conductive-radiative behavior of SiC-based cellular ceramics up to very high temperature**
Benoit Rousseau; Jerome Vicente; Afeef Badri; Yann Favennec

[724] **Thermal Conduction Simulation Based on Reconstructed Digital Rocks with Respect to Fractures**
Haiyuan Yang; Yongfei Yang; Jun Yao

[857] **Buoyancy-induced flow and heat transfer through and around a porous cylinder in a cavity**
Shimin Yu; Tingting Tang; Jianhui Li; Peng Yu

[872] **Unsteady mixed convection flow through and around an array of cylinders**
Tingting Tang; Shimin Yu; Jianhui Li; Peng Yu

[1116] **Analysis of Viscous Fingering for Steam Flooding Heavy Oil Reservoirs**
Xue Liu; Jing Huang; Xiangyun Qu; Ming Li; Ming Jiang; Xianming Kou; Enshun Ouyang

Question and answer: Parallel sessions 3 (cont.)

(MS 17) Thermal Processes, Thermal Coupling and Thermal Properties of Porous Media: modeling and experiments at different scales – Part 1 (cont.)

Q&A 7 10:05 – 11:00 - Chairs: Ruina Xu, Moran Wang

[311] Joint influence of in-situ stress and fracture network geometry on heat transfer in fractured geothermal reservoirs.
Xiaoguang Wang; Chuanyin Jiang; Qinghua Lei; Zhixue Sun

[61] Dynamic of ice lens formation in frozen soil.
Signe Kjelstrup; Seyed Ali Ghoreishian Amiri; Hao Gao; Gustav Grimstad; Benoit Loranger

(MS 6-A) Physics of multi-phase flow in diverse porous media– Part 2

Q&A 8 11:05 – 12:00 - Chairs: Ryan Armstrong, Nima Shokri

[1231] Pore-Scale Imaging of Controlled-Salinity Waterflooding in a Heterogeneous Carbonate Rock at Reservoir Conditions
Ahmed Selem; Nicolas Agenet; Ying Gao; Qingyang Lin; Ali Qaseminejad Raeini; Martin Blunt; Branko Bijeljic

[540] Insights into Laws of Topology in Wetting
Chenhao Sun; James McClure; Peyman Mostaghimi; Anna Herring; Steffen Berg; Ryan Armstrong

[1311] Pore scale observations of wetting alteration during low salinity water flooding
Edward Andrews; Sam Krevor; Ann Muggeridge

[885] Quantifying Wettability Alteration Effects on Fluid Flow Properties of Heterogeneous Porous Media
Omar Al-Farisi; Kamel Zahaf; Djamel Ouzzane; Mohamed Sassi

[406] Upscaling of capillary force in simultaneous infiltration of two immiscible fluids through porous media: pore scale LBM modelling
Zi Li; Sergio Galindo-Torres; Ling Li

[1236] Heterogeneity and mixed wetting states imaged during two-phase flow in carbonate rocks using X-ray tomography at high resolution and large fields of view
Salome M.S. Shokri-Kuehni

[1335] Transition from micro-scale to macro-scale modeling of solute transport in drying porous media
Faeez Ahmad; Rahimi Arman; Evangelos Tsotsas ; Marc Prat; Abdolreza Kharaghani

[1210] Pore-by-pore wettability characterization in sandstone and carbonate rocks
Gaetano Garfi; Sam Krevor

Question and answer: Parallel sessions 3 (cont.)

(MS 14) Physics of multi-phase flow in diverse porous media– Part 1

Q&A 9 *14:35 – 15:30 -* **Chairs:** *Shuyu Sun, Hui Zhao*

[126] Optimal Dispatch Techniques for Natural Gas Industry - Reservoir Simulation and Data Simulation.
Tao Zhang; Yiteng Li; Shuyu Sun; Hua Bai

[901] Accelerated generalized multi-scale approximation of mixed finite elements method in subsurface porous media.
Tao Zhang; Jie Chen; Shuyu Sun;

[279] The Implementation of Ensemble Kalman Filter in Automatic History Matching for a Marine Reservoir and a Fluvial Reservoir.
Zelong Wang

[226] An efficient stochastic simulation of shale gas development based on deep learning algorithm.
Liang Xue; Junru Zhang

[896] A multilevel quasi-Monte Carlo method for subsurface compressible single-phase flow with uncertainty in permeability.
Yahong Xiang; Xianbing Luo

[1145] Quantifying Uncertainty Reduction in Geologic CO2 Sequestration Risk Assessment.
Bailian Chen; Dylan Harp; Rajesh Pawar

[900] Numerical treatment of uncertainty for incompressible single-phase flow in porous media using multi-index Monte Carlo methods.
Xianbing Luo; Meng Li

[1015] DoE*-based history matching as a method for uncertainty quantification in THM(C) models of clay.
Jörg Buchwald; Olaf Kolditz; Sabine Attinger; Thomas Nagel

(MS 18) Innovative Methods for Characterization, Monitoring, and In-Situ Remediation of Contaminated Soils and Aquifers– Part 1

Q&A 10 *15:35 – 16:30 -* **Chairs:** *Christos Tsakiroglou, Olga Vizika*

[1081] A True-to-Mechanism Model for Plasma and Transport Phenomena inside a DBD reactor
Nadia Bali; Christos Aggelopoulos; Eugenios Skouras; Christos Tsakiroglou; Vasilios Burganos

[1295] Simulating microscale zero-valent iron injection in field-like conditions: large-scale radial laboratory experiments and numerical modeling
Federico Mondino; Amelia Piscitello; Carlo Bianco; Andrea Gallo; Tiziana Tosco; Rajandrea Sethi

[577] Remediation of solid wastes by nanosecond pulsed dielectric barrier discharge plasma
Christos Aggelopoulos; Christos Tsakiroglou

TUESDAY, 1 SEPTEMBER 2020

Question and answer: Parallel sessions 3 (cont.)

(MS 18) Innovative Methods for Characterization, Monitoring, and In-Situ Remediation of Contaminated Soils and Aquifers– Part 1 (cont.)

Q&A 10 15:35 – 16:30 - *Chairs:* Christos Tsakiroglou, Olga Vizika

[613] Wastewater treatment in continuous-flow fixed-bed photoreactors packed with ZnO nanoparticles-coated beads
Mihalis Karavasilis;Christos Tsakiroglou

[1313] Numerical predictive modelling for groundwater remediation using nanotechnology
Daphne Silva Pino; Tannaz Pak; Alexander Wood; Masoud Babaei; Reginaldo Bertolo

[656] Evaluation and comparison of various numerical porosimetry methods: Yield Stress fluids Method, Mercury Intrusion Porosimetry and pore Network Modelling approaches.
Antonio Rodríguez de Castro; Mehrez Agnaou; Azita Ahmadi; Abdelaziz Omari

[789] Experimental study of non-Newtonian behavior of foam flow in very high permeability porous media.
Sagyn Omirbekov; Hossein Davarzani; Stéfan Colombano; Azita Ahmadi-Sénichault

132] Experimental studies on gas dissipation during the coring process of shale
Ying Sun

(MS 18) Innovative Methods for Characterization, Monitoring, and In-Situ Remediation of Contaminated Soils and Aquifers– Part 2

Q&A 11 18:00 – 18:55 - *Chairs:* Marios Valavanides, Qi Li

[1310] The first nanoremediation pilot-test in Brazil: site selection criteria and nZVI mobility studies
Daphne Silva Pino; Reginaldo Bertolo; Petr Kvapil; Carlo Bianco; John Etim; Tannaz Pak

[1283] Method of Moments to Characterize a Reservoir Using a Single Non-Ideal Tracer Test
Deepshikha Singh; Jyoti Phirani

[1282] Quantifying wetted area of sediments during multiphase flow in geological porous media
Deepshikha Singh; Jyoti Phirani

[1170] EUTROFICATION CONTROL TREATMENTS AND CARBON GAS EMISSIONS
DAngelo A. Sandoval; Anne M. Hansen; Armando González-Sánchez; Rodolfo Sosa-Echeverría

[1271] Mathematical modeling of the fate and transport of per- and polyfluoroalkyl substances (PFAS) in the vadose zone
Bo Guo; Jicai Zeng; Mark Brusseau

[113] Micro-Scale Mechanism Analysis of NAPL Contamination Remediation in Heterogeneous Porous Media
Xiaopu Wang; Xu Wang; Yan Li

TUESDAY, 1 SEPTEMBER 2020

Question and answer: Parallel sessions 3 (cont.)

(MS 17) Thermal Processes, Thermal Coupling and Thermal Properties of Porous Media: modeling and experiments at different scales – Part 1

Q&A 12 19:00 – 19:55 - **Chairs:** Bernhard Krooss, Yingfang Zhou

[1287] **Temperature Distribution (2D and 3D) of Culex Basin-Yellowstone, WY: A comparison of Dirichlet and Neumann nonlinear solutions from field measurements.**
Anthony Sorensen II; Peter B. Larson; Sergey Lapin; Jarred Zimmerman

[1208] **Experimental Study on the Performance of a Hybrid Evaporator Wick with Bionic Topological Substrate**
Xin Cheng; Jingyi Wu; Guang Yang

[310] **Evaporative cooling in fuel cells: Estimating effective conductivity in gas diffusion layers**
Sarah van Rooij; Mirco Magnini; Sophia Haussener

[80] **Numerical and semi-analytical investigation on forced convection in tubes fully/partially filled with metal foams**
Farshid Jamshidi; Anastasia August; Andreas Reiter; Aron Kneer; Michael Selzer; Britta Nestler

[202] **Numerical modeling of coupled heat and water transport for the study of permafrost dynamics: High Performance Computing simulations for watershed scale analysis**
Laurent Orgogozo; Oleg S. Pokrovsky; Christophe Grenier; Emmanuel Mouche; Manuel Marcoux; Michel Quintard

[787] **Flow of sub- and supercritical CO2 in nano-porous ceramics: direct comparison of laboratory experiments and numerical simulation**
Steffen Nolte; Yue Wang; Reinhard Fink; Bernhard M. Krooss; Moran Wang; Alexandra Amann-Hildenbrand

[959] **Impact of moisture transfer in the context of borehole thermal energy storage application.**
Haibing Shao; Boyan Meng; Bo Wang; Sebastian Bauer; Olaf Kolditz

[1134] **Non-classical hygrothermoelastic response of a hollow cylinder.**
Zhangna Xue

(MS 14) Physics of multi-phase flow in diverse porous media– Part 2

Q&A 13 20:00 – 20:55 - **Chairs:** Shuyu Sun, Morris Flynn

[223] **Dealing with Model Uncertainty and Deficiencies in Thermal Breakthrough Models.**
Elvar K. Bjarkason; Anna Suzuki

[1173] **Local and global sensitivity analysis of THM consolidation around a point heat source.**
Aqeel Afzal Chaudhry; Jörg Buchwald; Thomas Nagel

Question and answer: Parallel sessions 3 (cont.)

(MS 14) Physics of multi-phase flow in diverse porous media– Part 2 (cont.)

Q&A 13 20:00 – 20:55 - **Chairs:** *Shuyu Sun, Morris Flynn*

[1308] **A novel molecular communication paradigm for porous media applications.**
Matteo Icardi; John Couch

[1195] **Quality assessment and parameter estimation of post-laminar flow models.**
Mohaddeseh Mousavi Nezhad; Alberto Guadagnini

[1284] **Quantifying uncertainty using Monte Carlo method in methane hydrate reservoir simulations.**
Neelam Choudhary; Jyoti Phirani

[1229] **Application of Discrete Fracture Network Modeling using Sequential Gaussian Simulation.**
*Timur Merembayev; Yerlan Amanbek; Sanjay Srinivasan*

[739] **Evaluating influence factors on phase equilibria calculation of CO2/H2O mixture using the CPA equation of state.**
Yiteng Li; Tao Zhang; Shuyu Sun

[663] **Reduced-Physics Multilevel Monte Carlo Methods for Uncertainty Quantification in Complex Reservoirs.**
Øystein Klemetsdal; Stein Krogstad; Knut-Andreas Lie
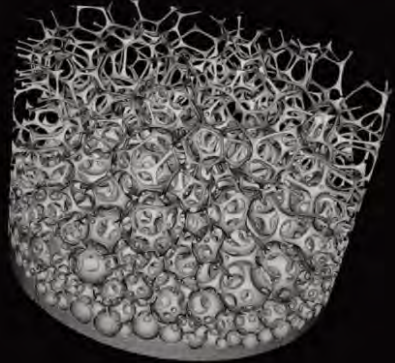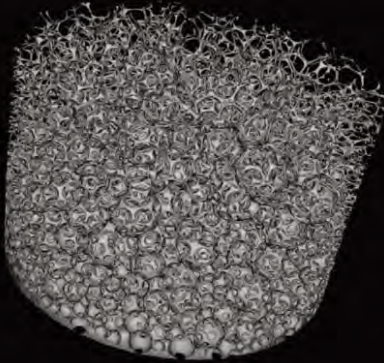
TUESDAY, 1 SEPTEMBER 2020
Time Block B

Invited Speakers: Parallel Session 3
14:00 - 14:30 CET

Bernd Flemisch
University of Stuttgart

Facilitating the Reproduction of Simulation Results

Guaranteeing the reproducibility of simulation results faces many technical challenges, mostly originating from complex software stacks and hardware architectures. In this talk, we present our measures for facilitating the reproduction of simulation results obtained with the open-source porous-media simulator Dumux. In particular, we would like to automate the steps from a local executable to a distributable web application with which the results can be reproduced and visualized. This includes the containerization of the underlying software stack, access to the required input data, selection and provision of a suitable backend, as well as the generation of the browser frontend. The current state of our efforts is illustrated by means of a recently performed benchmark study for flow and transport in fractured porous media.

Invited Speakers: Parallel Session 3 *(cont.)*
14:00 - 14:30 CET

Lilit Yeghiazarian
University of Cincinnati

HydroGrid: Emerging Technologies for Global Water Quality and Sustainability

Water problems cannot be solved piece-meal, one issue at a time. Rather, a holistic, systems-based approach is needed to manage the global water system sustainably. This talk will introduce the concept of the HydroGrid as a framework to describe connected water systems that encompass surface water and groundwater, the natural environment and built infrastructure. Drawing upon the knowledge and engineering experience employed in electrical grid operations, we outline mirroring concepts in the HydroGrid, with a particular focus on monitoring, analysis, and control of water quality.

We will discuss emerging technologies in advanced materials, porous media design and modeling, signal transduction and wireless communications that enable development of autonomous mobile devices for dynamic water quality monitoring. As this technology matures, the devices will have the capability to stream real-time or near-real-time data for analysis with stochastic models of contaminant fate and transport. Modeling results, combined with controllability analysis of water systems, can then be used to determine system-wide prevention and mitigation strategies. Progress is measured with probability-based metrics of HydroGrid sustainability such as reliability, vulnerability, and resilience.

TUESDAY, 1 SEPTEMBER 2020
## Time Block B

Career Development Event
17:00 - 18:00 CET

One of the most common struggles for a PhD student is to decide which career path to follow after graduate school. There are numerous opportunities that are potentially open to us as PhDs, which can take us on very different career paths. There are likely many questions you have about picking a direction (industry/academia/government) and the pros and cons of the various possibilities. A good approach to making an informed decision is listening to experiences and personal views of established professionals. The SAC's career event will have speakers from varied backgrounds, sharing their professional journeys and the important choices they had to make along the way. You will also have the chance to ask the speakers any questions you have!

This event is free and open to all participants of InterPore2020!

Tiina Roose
Professor
University of
Southampton.
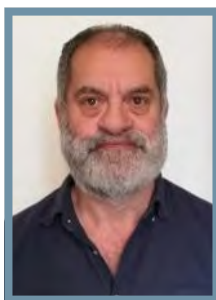
Benoit Noetinger
OGST Editor
FP Energies Nouvelles

Veerle Cnudde
Professor
Ghent University

Scientific Writing Seminar
18:00 - 19:00 CET

How to write a successful research paper: The 10 mistakes to avoid

Jaime Gómez-Hernández will be offering this writing workshop, which is free and open to all participants of InterPore2020. Through a number of real cases, the attendants will learn the common mistakes made when submitting a manuscript for consideration to a specialized journal.

Jaime has served in the Editorial Boards of Journal of Hydrology, Journal of Hydrogeology and Mathematical Geology for many years, and currently, he is still a member of the boards of Advances in Water Resources, Mathematical Geosciences, Water, and Springer Nature Applied Science. He has rejected too many manuscripts in the last 20 years and can tell you what to do to avoid rejection. He will also discuss how to deal with non-scientific reviews, and what to do when you know that the review is incorrect.

Everything will be presented using examples based on actual submissions in a very casual and lively way. Many previous attendants to this seminar have been able to overcome the hurdle of the dreaded rejection letter.

*This seminar will also be held live during Time Block A on Wednesday.

WEDNESDAY, 2 SEPTEMBER 2020
Time Block A

Invited Speakers: Parallel Session 4
9:00 - 9:30 CET

Fred Vermolen
University of Hasselt and TU Delft

Modelling the behaviour of skin after deep tissue injury using poro- and morpho-elastic models

More than 12 million people per year get seriously injured as a result of burn accidents. About one million people per year die as a result of the consequences. Serious skin trauma is often accompanied with heavy scar formation and with the formation of contractures, which refer to skin contractions that are so severe that the patient is faced with disability.

In order to improve the quality of life of patients, it is important to investigate the biological mechanisms behind the evolution of skin. Investigation of skin is done by clinical and in-vitro experiments, and by the formulation of hypotheses. To match theory to experiments, which come in as patterns and numbers, quantification of the developed theory is crucially important. Therefore, mathematical models help develop insight into the behaviour of skin after skin trauma.

Skin mechanics is an important aspect of the formation of contraction. One of the important features is that deformations are plastic. In this talk, a morpho-elastic model will be presented, as well as the underlying mathematical and numerical issues to simulate skin mechanics. Furthermore, some results from poro-elasticity will be discussed.

Since there are large patient-to-patient variations, uncertainty is an important aspect. In the talk, uncertainty aspects will also be dealt with using stochastic (partial) differential equations and stochastic processes.

Invited Speakers: Parallel Session 4 *(cont.)*
9:00 - 9:30 CET

Martin Vohralík
Inria Paris

A posteriori error estimates and adaptive solvers for porous media flows

Numerical simulation of porous media flows is a domain of permanently increasing importance. But can we assess how large is the error between the predicted numerical result and the unknown solution? And could the same precision be achieved faster? I will present some answers to these questions for several model porous media flow problems, starting from the steady linear single-phase Darcy flow, passing through problems involving reaction, advection, nonlinearities, degeneracies, or thermal effects, and ending with multi-phase multi-compositional flows with phase change. Guaranteed and fully computable bounds are obtained for the simpler problems, both for error in some energy norm or for error in a quantity of interest. A unified framework covering common discretization schemes (finite elements, finite volumes, discontinuous Galerkin) is presented, general polygonal/polyhedral meshes are discussed, and cheap implementations of the estimates are addressed. For all models, different error components are distinguished such as space discretization, time discretization, linearization, or algebraic. Then adaptive stopping and balancing criteria are designed which allow to invest the computational effort where needed and considerably speed-up simulations for the given relative precision target.

WEDNESDAY, 2 SEPTEMBER 2020
Time Block A

Scientific Writing Seminar
10:30 - 11:30 CET

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*This seminar will also be held live during Time Block C on Tuesday.

Timing of Q&A sessions on Wednesday				
Time Block (CET)	Q&A No.	Parallel sessions 1	Parallel sessions 2	Parallel sessions 3
A (09:35 – 10:30)	Q&A 14	MS6-A, part 4	MS2	MS12, part 1
A (10:35 – 11:30)	Q&A 15	MS6-A, part 5	MS15, part 1	MS10, part 1
B (14:35 – 15:30)	Q&A 16	MS6-A, part 6	MS5	MS10, part 2
B (15:35 – 16:30)	Q&A 17	MS6-A, part 7	MS15, part 2	MS23, part 2
C (19:05 – 20:00)	Q&A 18	MS9, part 1	MS6-B, part 1	MS12, part 2
C (20:05 – 21:00)	Q&A 19	MS9, part 2	MS15, part 3	MS10, part 3

Question and answer: Parallel sessions 1

(MS 6-A) Physics of multi-phase flow in diverse porous media– Part 4

Q&A 14 09:35 – 10:30 - **Chairs:** *Ryan Armstrong, Tannaz Pak*

[801] **Gas Slippage in Partially Saturated Tight Rocks**
Steffen Nolte; Mohammadebrahim Shabani; Reinhard Fink; Bernhard M. Krooss; Alexandra Amann-Hildenbrand

[766] **Oil Recovery Characteristics of Supercritical CO_2 Huff-n-Puff Process in Ultra-Low Permeable Porous Media**
Dongxing Du; Yinjie Shen ; Di Zhao; Weifeng Lv; Ninghong Jia; Tong Li; Yingge Li

[1230] **Study on multi-phase seepage of complex pore network in strongly heterogeneous carbonate reservoir based on various methods：A case study in Upper Cretaceous Khasib of the E Oilfield in the Middle East**
Hao Lu; Hongming Tang; Yijun Wang

[199] **Study on micro seepage model of nanopore in shale gas reservoir considering diffusion and slippage effect.**
Lijuan Jiang; Hongguang Sun

[1214] **Mechanism study on water plugging and EOR by nitrogen foam injection in bottom-water reservoirs**
Danqi Chen; Binfei Li; Zhengxiao Xu; Kun Liu; Huiyu Yang; Zheyang Liao

[700] **Experimental study on enhanced oil recovery of offshore heavy oil reservoirs by activated water flooding**
Xin Chen; Yiqiang Li; MingYue Sui; Jian Zhang; Han Zhang

[589] **Measurement and Research of Two-phase Micro-force of Foam Fluid and Heavy Oil**
Zihan Gu; Zhaomin Li; Teng Lu; Zhengxiao Xu; Sheng Li; Xinru Zhao

Question and answer: Parallel sessions 1 (cont.)

(MS 6-A) Physics of multi-phase flow in diverse porous media– Part 5 (cont.)

Q&A 15 *10:35 – 11:30 -* **Chairs:** *Ryan Armstrong, Holger Ott*

[1250] **Effect of the deformation and variability of biosourced reinforcement mats on their permeability**
Tarek Abdul Ghafour; Chiara Balbinot; Nils Audry; Florian Martoïa; Laurent Orgéas; Pierre J.J. Dumont

[358] **Electrolyte Transport through the Porous Electrode in Vanadium Redox Flow Batteries**
Nico Bevilacqua; László Eifert; Kerstin Köble; Rupak Banerjee; Tomas Farago; Marcus Zuber; Aimy Bazylak; Roswitha Zeis

[1299] **Insights on transition from capillary toward viscous flow in porous media**
Mahdi Mansouri-Boroujeni; Mohamed Azaroual; Sophie Roman

[1245] **Modeling the effect of microscale heterogeneities on soil bacterial dynamics and the impact on soil functions.**
Simon Zech; Alexander Prechtel; Nadja Ray

[572] **Control of immiscible displacement patterns in disordered porous media**
Xinlei Qi; Zhengyuan Luo; Bofeng Bai

[628] **Pore Scale Mechanisms of Chemical Injection into Heterogeneous Micromodel**
Dongqing Cao; Ming Han; Jinxun Wang; Abdulkareem AlSofi

[300] **Experimental study of CO2/CH4 diffusion coefficient in oil-saturated cores under reservoir conditions**
Zerong Li; Yi Zhang

[1281] **Meter-scale core floods and 3D numerical modelling to study the interplay between immiscible viscous fingering and geological heterogeneity**
Samuel Jackson; Mojtaba Seyyedi; Michael Clennell

(MS 6-A) Physics of multi-phase flow in diverse porous media– Part 6

Q&A 16 *14:35 – 15:30 -* **Chairs:** *Yaniv Edery, Tannaz Pak*

[122] **Pore-scale imaging of multiphase flow in porous media: wettability, minimal surfaces, displacement efficiency**
Qingyang Lin; Branko Bijeljic; Sam Krevor; Steffen Berg; Martin Blunt

[214] **Effect of Wetting Transition during Multiphase Displacement in Porous Media**
Zhongzheng Wang; Jean-Michel Pereira; Yixiang Gan

[1159] **Real-time imaging reveals distinct pore scale dynamics during transient and equilibrium subsurface multiphase flow**
Catherine Spurin; Sam Krevor; Martin Blunt; Steffen Berg; Gaetano Garfi; Maja Ruecker; Tom Bultreys; Vladimir Novak; Christian Schleputz

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Question and answer: Parallel sessions 1 (cont.)

(MS 6-A) Physics of multi-phase flow in diverse porous media– Part 6 (cont.)

Q&A 16 14:35 – 15:30 - Chairs: Yaniv Edery, Tannaz Pak

[1217] Characterization and 3D numerical modelling of multiphase flow in Carbonate rocks
Nele Wenck; Sam Krevor; Samuel Jackson; Ann Muggeridge; Sojwal Manoorkar; Alistair Jones

[1242] The Impact of Entrapped Air on Satiated Hydraulic Conductivity of Coarse Sands Interpreted by X-ray Microtomography
Tomas Princ; Helena M.R. Fideles; Johannes Koestel; Michal Snehota

[520] Pore-scale study of spontaneous imbibition in digital rock by using a color-gradient lattice Boltzmann model
Yang Liu; Jianchao Cai; Qingbang Meng; Xuan Qin; Shanshan Jiang

[876] Gravity-driven fluid slug splitting at T-junctions: visual experiments and a novel model
Zhibing Yang; Song Xue; Yi-Feng Chen

[319] Direct pore-scale numerical simulation of two-phase flow and reactive transport using the Volume-Of-Fluid method.
Julien Maes; Cyprien Soulaine; Sebastian Geiger

(MS 6-A) Physics of multi-phase flow in diverse porous media– Part 7

Q&A 17 15:35 – 16:30 - Chairs: Yaniv Edery, Saman Aryana

[565] Compositional pore network model for gas condensate flow
Paula Reis; Marcio Carvalho

[1179] Upscaled equations for two-phase flow in highly heterogeneous porous media
Tufan Ghosh; Carina Bringedal; Rainer Helmig; G. P. Raja Sekhar

[965] Relative magnitude of capillary over bulk viscosity resistances for NWP blobs flowing within periodic capillary tubes
Marios Valavanides; Santanu Sinha; Alex Hansen

[355] Pore-scale wettability characterization in mixed-wet sandstones using dynamic laboratory micro X-ray tomography
Arjen Mascini; Marijn Boone; Veerle Cnudde; Tom Bultreys

[1288] The effect of solution gas liberation on oil flow in the porous medium
Wael Al-Masri; Alexander Shapiro

[1051] Study on formation water mobility and its determination method in tight sandstone gas reservoirs
Dongsheng Li; Yuliang Su; lei li; Xiaogang Gao; Jingang Fu

[1175] Investigating the effect of SIO2 nano particles on interfacial tension as EOR indicator.
Ali Alsaffar; Abbas Abubakar

[1341] Asymptotic analysis of immiscible two-phase flow with moving contact line in a thin strip.
Carina Bringedal; Stephan Lunowa; Iuliu Sorin Pop

Question and answer: Parallel sessions 1 (cont.)

(MS 9) Pore-scale modelling – Part 1 (cont.)

Q&A 18 19:05 – 20:00 - **Chairs:** *Martin Blunt, James McClure*

[1258] **Improving physics of residual trapping of CO2 in pore-network flow models using direct numerical simulation.**
Amir Kohanpur; Albert Valocchi

[1254] **Pore-network modeling of mineral dissolution and reactive transport in porous media.**
Barbara Esteves; Paulo L.C. Lage; Paulo Couto; Anthony Kovscek

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[274] **Validating pore-scale modeling of fluid flow and mass transport in multi-scale porous media with microporosity**
Bin Wang; Karsten Thompson; Richard Hughes; Lin Mu

[1234] **Scale-effect in the simulation of two-phase flow in porous media**
Brandon Yokeley; Behzad Ghanbarian; Muhammad Sahimi

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[765] **Lattice Boltzmann Modeling of the Apparent Viscosity of Thinning-Elastic Fluids in Porous Media**
Chiyu Xie; Matthew Balhoff

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[413] **An analysis model for hydraulic fracturing liquid imbibition into shale matrix: coupling molecular interactions and dynamic contact angle**
Han Wang; Yuliang Su; Wendong Wang

[1296] **Unfitted boundary method to improve mesh convergence of high-resolution CT-scan permeability**
Martin Lesueur; Hadrien Rattez; Oriol Colomés

[1329] **Pore-scale CFD based estimation of permeability decline in porous media due to fines migration**
Pramod Bhuvankar; Abdullah Cihan; Jens Birkholzer

(MS 9) Pore-scale modelling – Part 2

Q&A 19 20:05 – 21:00 - **Chairs:** *Martin Blunt, James McClure*

[1185] **Effect of metal foam geometric characteristics on its permeability in non-Darcy flow regime: A Pore-scale direct numerical simulation study.**
Hamid Moghimi; Majid Siavashi

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[186] **Analysis of capillary imbibition for fluid through confined Nano pores**
Fanhui Zeng; Qiang Zhang; Jianchun Guo; Yu Zhang

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[688] **Evaluation of Equivalent Permeability in 3D Vuggy Porous Media using Brinkman Model and Digital Image Analysis**
Rafael Cruz; Marcio Carvalho; Frederico Carvalho

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[975] **Expanding the role of pore-scale models to capture the multi-scale evolution of porous media**
Sergi Molins; Hang Deng; David Trebotich; Carl Steefel

[1239] **Fully-implicit dynamic pore-network modeling of two-phase flow in porous media**
Sidian Chen; Chaozhong Qin; Bo Guo

Question and answer: Parallel sessions 1 (cont.)

(MS 9) Pore-scale modelling – Part 2 (cont.)

Q&A 19 20:05 – 21:00 - *Chairs:* Martin Blunt, James McClure

[1312] A new generation of lattice Boltzmann code for pore-scale simulation of scCO2-brine displacement in complex geometries
Yu Chen; Qinjun Kang; Albert Valocchi; Hari Viswanathan

[1201] Numerical Analysis of a Model of Biofilm Growth at the Pore-Scale
Azhar Alhammali; Malgorzata Peszynska

[1163] Modeling the droplet occurrence, growth and detachment at the interface between the porous layers in a PEM fuel cell coupling a pore-network model with Stokes flow
Cynthia Michalkowski; Maziar Veyskarami; Carina Bringedal; Rainer Helmig

Question and answer: Parallel sessions 2

(MS 2) Porous Media for a Green World: Water & Agriculture

Q&A 14 09:35 – 10:30 - *Chairs:* Joqauin Jimenez-Martinez, Jan Vanderborght, Jun Yin

[960] Structured Mini-Dunes (SMDs) as Self-Irrigation Units: A Lesson from the Sand Dunes of Arid Regions.
Afrah Al-Shukaili; Ali Al-Maktoumi; Anvar Kacimov

[333] Smart Capillary Barrier-Wick: A Self Irrigating Technique Inspired by Nature for Home Gardens in Arid Zones.
Ahmed Al-Mayahi; Said Al-Ismaily; Ali Al-Maktoumi; Hamed Al-Busaidi; Anvar Kacimov; Rhonda Janke; Johan Bouma; Jirka Šimůnek;

[1336] Global scale prediction of long-term variations of soil salinity and sodicity.
Amirhossein Hassani; Adisa Azapagic; Nima Shokri

[83] Tracing back the source of contamination.
J. Jaime Gómez-Hernández; Zi Chen; Andrea Zanini

[1305] Reducing herbicide spreading in the environment using an eco-compatible nano-formulation.
Monica Granetto; Lucia Re; Carlo Bianco; Aurora Audino; Luca Serpella; Francesco Vidotto; Silvia Fogliatto; Tiziana Tosco

[964] Nanoporous carbon scaffolds for membrane filtration and capacitive deionization applications.
Arlene (Chengying) Ai; Xiaoan Li; Robert Mayall; Sathish Ponnurangam; Viola Birss

[136] Hydraulic behaviour of sand-biochar mixtures: Particle size effects on permeability.
Ziheng Wang; Majid Sedighi; Amanda Lea-Langton

[208] The effect of salinity on fecal bacteria transport through porous media.
Dong Zhang; Valentina Prigiobbe

Question and answer: Parallel sessions 2 (cont.)

(MS 2) Porous Media for a Green World: Water & Agriculture (cont.)

Q&A 14 09:35 – 10:30 - **Chairs:** *Joqauin Jimenez-Martinez, Jan Vanderborght, Jun Yin*

[1224] **Performance Evaluation and Mechanism Analysis of Organic Clay Inhibitors with Low Molecular Weight.**
Jingwen Wang; Weian Huang; Yu Fan; Bo Zeng; Haoyong Huang

(MS 15) Machine Learning and Big Data in Porous Media – Part 1

Q&A 15 10:35 – 11:30 - **Chairs:** *Denis Voskov, Kai Zhang*

[236] **Evaluation of machine learning methods for predicting the oil-water relative permeability: a comparison of tuning processes and model performances**
Baosheng Jiang; Zhixue Sun

[668] **Data-driven models based on flow diagnostic and machine learning techniques**
Manuel Borregales; Stein Krogstad; Knut-Andreas Lie

[1098] **Predicting Performance of Offshore Oilfield in High Water Cut Period Based on Big Data and Artificial Intelligence**
Cunliang Chen; Hongyou Zhang; Shaopeng Wang; Yu Wang; Qiongyuan Wu; Xue Liu

[1168] **Optimization of fracturing parameters in shale gas reservoir by a modified variable-length particle swarm optimization algorithm**
Zhihao Li; Jun Yao

[298] **Flux Regression Neural Networks for Backbone Identification in Discrete Fracture Networks**
Stefano Berrone; Francesco Della Santa; Antonio Mastropietro; Sandra Pieraccini; Francesco Vaccarino

[764] **Analysis of Neural Networks Performances for Flux Regression in Discrete Fracture Networks**
Stefano Berrone; Francesco Della Santa; Sandra Pieraccini; Francesco Vaccarino

[514] **Predicting the effective thermal conductivities of sands using machine learning and a thermal conductance network model**
Wenbin Fei; Guillermo Narsilio

[188] **Automatic well test interpretation based on convolutional neural network for infinite reservoir.**
Xuliang Liu; Daolun Li; Jinghai Yang; Wenshu Zha

Question and answer: Parallel sessions 2 (cont.)

(MS 5) Biochemical processes and biofilms in porous media

Q&A 16 *14:35 – 15:30 -* **Chairs:** *Anozie Ebigbo, Secchi Eleonora*

[621] **Experimental Methods and Imaging for Enzymatically Induced Calcite Precipitation in micro-fluidic devices.**
Felix Weinhardt; Johannes Hommel; Robin Gerlach; Nikolaos Karadimitriou; Holger Steeb; Holger Class Dongwon Lee; Samaneh Vahid Dastjerdi

[967] **Pore-scale simulations of hydraulic properties during biomass accumulation.**
Holger Ott; Neda Hassannayebi; Frieder Enzmann; Johanna Schritter; Martin Ferno; Andreas Paul Loibner

[620] **A Numerical Model for Enzymatically Induced Calcite Precipitation.**
Johannes Hommel; Arda Akyel; Adrienne Phillips; Robin Gerlach; Al Cunningham; Holger Class

[562] **Numerical simulations of biofilms in core samples: MEOR and MICP.**
David Landa Marbán; Gunhild Bødtker; Bartek Florcsyk Vik; Per Pettersson; Iuliu Sorin Pop; Kundan Kumar; Florin Adrian Radu; Svenn Tveit; Sarah Gasda

[989] **Field trials on Microbially Induced Desaturation and Precipitation for liquefaction mitigation.**
Leon van Paassen; Chen Zeng; Caitlyn Hall; Elizabeth Stallings Young; Diane Moug; Arash Khosravifar

[1152] **Life in a tight spot: Bacterial motility in porous media.**
Tapomoy Bhattacharjee; Daniel Amchin; Jenna Ott; Felix Kratz; Sujit Datta

[835] **Transport of chemotactic bacteria in granular media with randomly distributed NAPL ganglia: Modeling and simulation.**
Beibei Gao; Ehsan Taghizadeh; Brian Wood; Roseanne Ford

[1298] **How does microbial calcite precipitation alter soil water retention characteristics?**
Ehsan Nikooee; Rahim Saffari; Ghassem Habibagahi; Martinus van Genuchten

[1248] **Modelling biofilm formation in porous media flow.**
Christoph Lohrmann; Kartik Jain; Christian Holm

(MS 15) Machine Learning and Big Data in Porous Media – Part 2

Q&A 17 *15:35 – 16:30 -* **Chairs:** *Bailian Chen, Jianchun Xu*

[730] **A Physics-based Data-driven Model for Waterflooding Profile Control and Water Plugging Performance**
Hui Zhao; Wei Liu; Shuoliang Wang; Lin Cao; Yuhui Zhou

[359] **An Efficient Parameterization for History Matching of Reservoir Models by Using Deep Variational Autoencoder with The Intrinsic Dimension Estimation Method**
Xiaopeng Ma; Kai Zhang

Question and answer: Parallel sessions 2 (cont.)

(MS 15) Machine Learning and Big Data in Porous Media – Part 2 (cont.)

Q&A 17 *15:35 – 16:30 -* **Chairs:** *Bailian Chen, Jianchun Xu*

[682] Equivalent Permeability Prediction of Karst Core Samples Using Deep Learning
Monique Dali; Sergio Ribeiro; Frederico Gomes; Marcio Carvalho

[868] Properties Quantification of Heterogeneous Media with 3D Vision informed Machine Learning
Omar Al-Farisi; Aikifa Raza; Hongtao Zhang; Djamel Ouzzane; Mohamed Sassi; Tiejun Zhang

[916] The Images Detection of Granular Fibers and Composite Materials through Multi-Windows Object Detection Method
Qiaonan Li; Weifeng Liu

[611] Research on Prediction of Remaining Oil Distribution Based on SVM and LSTM
Gujian Wei; Yanlong Ren

[1215] Shale gas productivity prediction and parameter optimization based on machine learning.
Lu Qiao; Shuangfang Lu; Huijun Wang; Zheng Fu; Taohua He

[1263] Lithology classification on rock samples microtomographic images using artificial intelligence.
Adna Grazielly Paz de Vasconcelos; Manuel Ramon; Vargas Avila

(MS 6-B) Interfacial phenomena in multiphase systems – Part 1

Q&A 18 *19:05 – 20:00 -* **Chairs:** *Pacelli Zitha, Yashar Mehmani*

[673] Mathematical analysis of foam flow in porous media.
Grigori Chapiro; Luis Fernando Lozano; Rosmery Zavala; Pacelli Zitha

[1044] Uncertainty quantification in a model for foam flooding in porous media.
Rodrigo Weber dos Santos; Andrés R. Valdez; Bernardo Martins Rocha; Grigori Chapiro

[684] Applications of the electromagnetic heating in EOR.
Samuel Almeida; Grigori Chapiro; Pacelli Zitha

[995] Bubble Deformation by Pore-Throats Modifies Dissolution in Porous Media.
Yu Qiu; Ke Xu

[690] Polymer Screening Using Microfluidics.
Mohammad Zargartalebi; Anne Benneker

[777] Effects of Salinity and N-, S-, and O-Bearing Polar Components on Light Oil-Brine Interfacial Properties from Molecular Perspectives.
Wenhui Li; Zhehui Jin

[44] Mechanistic Modelling and Laboratory Evaluation of Immiscible Water-Alternating-Gas Injection and Foam-Assisted Chemical Flooding.
Fabian Torres Mendez; Martijn Janssen

Question and answer: Parallel sessions 2 (cont.)

(MS 6-B) Interfacial phenomena in multiphase systems – Part 1(cont.)

Q&A 18 19:05 – 20:00 - Chairs: Pacelli Zitha, Yashar Mehmani

[567] Probing Chemical Interactions of Asphaltenes with Silica and Calcium Carbonate Surfaces.
Saleh Hassan; Maxim Yutkin; Sirisha Kamireddy; Xiaozhen Hu; Clayton Radke; Tadeusz Patzek

(MS 15) Machine Learning and Big Data in Porous Media – Part 3

Q&A 19 20:05 – 21:00 - Chairs: Bailian Chen, Bo Guo

[1189] A novel approach to identify hydraulic conductivity fields that best approximate geological uncertainties via unsupervised learning techniques and Wellhead Protection Area Analysis
Abelardo Rodríguez-Pretelín; Wolfgang Nowak

[1314] Estimating Oil Recovery Factor from Reservoir Characteristics using the XGBoost Algorithm
Alireza Roustazadeh; Behzad Ghanbarian; Mohammad Shadmand; Vahid Taslimitehrani; Larry Lake;

 [73] Estimation of Subsurface Hydraulic Conductivities using Geophysical Signatures
Debasmita Misra; Peter Calvin

[697] Physics-informed machine learning of permeability prediction and upscaling of reactive transport in porous media
Hongkyu Yoon

[1003] Automation of flow simulation in porous media
Masa Prodanovic; Javier Santos ; Honggeun Jo; Michael Pyrcz

[1272] Bayesian inference of poroelastic properties from induced seismicity data using an energy-based poromechanics model
Mina Karimi; Elizabeth S Cochran; Mehrdad Massoudi; Matteo Pozzi; Kaushik Dayal

[1221] A Hybrid-driven method to improve dynamical reservoir characterization
Vanessa Simoes; Horrara Diógenes; Marianna Dantas; Patrick Machado

[1262] Petrophysical properties predictions using computerized tomographic images.
Adna Grazielly Paz de Vasconcelos; Carlos Eduardo Menezes dos Anjos

Question and answer: Parallel sessions 3

(MS 12) Advances in modeling and simulation of poromechanics – Part 1

_Q&A 14_ 09:35 – 10:30 - _Chairs:_ Alessio Fumagalli, Jianchao Cai

[508] Multi-scale Extended Finite Element Method For Fractured Geological Formations.
Fanxiang Xu; Hadi Hajibeygi; Bert Sluys

[282] Influence of reservoir heterogeneity on fracture propagation of true triaxial hydraulic fracturing.
Jin Wang; Jianwei Feng; Rongtao Jiang; Wenqing Tang Ping Wang

[237] The influence of porosity and gas hydrate on tortuosity in porous media based on CT scanning - lattice Boltzmann method.
Lei Liu; Zhixue Sun

[284] Stress Field Change of Multi well and Multi period Fracturing and its Influence on Reservoir Development.
Rongtao Jiang; Jianwei Feng; Jin Wang

[1209] A generalized finite volume method for density driven flows in porous media.
Yueyuan Gao; Danielle Hilhorst; Huy Cuong Vu Do

[550] The change of reservoir physical properties with formation pressure decreasing and its influence on remaining oil.
Jintao Wu; Yong Hu; Guangming Pan; Jianting Huang; Hao Li

[867] Poroelastic effects of CO_2 adsorption capacity in coal seams under subsurface boundary conditions.
Yuxun Zhu; Jinfeng Liu; Peter Fokker

[797] The impact of surface roughens on contact angle hysteresis studied by molecular dynamics simulation.
Wei Yong; Yingfang Zhou; Jos J. Derksen

(MS 10) Advances in imaging porous media: techniques, software and case studies – Part 1

_Q&A 15_ 10:35 – 11:30 - _Chairs:_ Liwei Zhang, Nima Shokri

[1292] Measuring contact angles in a two-phase flow experiment using home-laboratory micro-computed tomography.
Kim Robert Tekseth; Dag Werner Breiby

[796] _Facilitating visualization and analysis of time-resolved X-ray micro-CT data using sliding widow reconstruction and flip point detection._
Marijn Boone; Jan Dewanckele; Arno Merkle; Tom Bultreys; Tim De Kock

[555] SEM, Raman and Micro-CT characterization of CO_2–Induced Wellbore Cement degradation.
Yan Wang; Liwei Zhang; Xiuxiu Miao; Manguang Gan

Question and answer: Parallel sessions 3 (cont.)

(MS 10) Advances in imaging porous media: techniques, software and case studies – Part 1 (con.t)

Q&A 15 10:35 – 11:30 - Chairs: Liwei Zhang, Nima Shokri

[391] The influence of confining pressure and flow process on the corrosion of wellbore cement under geological storage environment.
Manguang Gan; Liwei Zhang; Xiuxiu Miao; Yan Wang; Xiaochun Li

[1260] Relaxing the Capillary Equilibrium Constraint for Automated Contact Angle Measurement of Time-Resolved X-ray Micro-Tomography Images in Porous Media.
Omid Shahrokhi; Amir Jahanbakhsh; M. Mercedes Maroto-Valer

[551] Distribution and Quantitively Evaluation of Micro Residual Oil after Polymer Flooding based on CT Scanning.
Liu Tao; Yongfei Yang; Jun Yao; Lei Zhang; Hai Sun

[875] Experimental Study on Phase Transition Characteristics of CO_2 in Porous Media of Low Permeability Reservoirs.
Huo hongbo; Li jinman; Ma kuiqian; Hu yong; Li Hongyuan

[405] A fractal analysis of stress sensitivity of a porous medium based on the thick-walled Cylinder Model.
Xin Su; Zhaoqin Huang; Jun Yao

(MS 10) Advances in imaging porous media: techniques, software and case studies – Part 2

Q&A 16 14:35 – 15:30 - Chairs: Sadaf Sobhani, Andreas Busch

[759] Multi-scale 3D/4D imaging of the pore network in shales and its evolution under subsurface conditions.
Lin Ma; Kevin Taylor; Patrick Dowey; Michael Chandler; Peter Lee

[1293] Dynamic in situ computed tomography study of strain evolution in Draupne shales under triaxial loading.
Aldritt Scaria Madathiparambil; Basab Chattopadhyay; Nicolaine Agofack; Pierre Cerasi; Jessica Ann McBeck; Francois Renard; Alain Gibaud; Dag Werner Brieby

[435] Pore-scale imaging with measurement of relative permeability and capillary pressure on the same reservoir sandstone under water-wet and mixed-wet conditions.
Ying Gao; Ali Q. Raeini; Ahmed Selem; Igor Bondino; Martin J. Blunt; Branko Bijeljic

[1089] Porous system characterization of a heterogeneous carbonate rock bed using x-ray microtomography.
Fernanda Hoerlle; William Godoy; Elizabeth May Pontedeiro; Paulo Couto

[1225] Contrast enhanced X-ray micro-tomography of tomato fruit tissues for microscale gas transport simulation.
Hui Xiao; Pieter Verboven; Agnese Piovesan; Bayu Nugraha; Bart Nicolai

[112] An experimental study of the interplay between viscous, capillary and gravitational forces in two-phase flow in a three-dimensional porous medium.
Joachim Falck Brodin; Per Arne Rikvold; Marcel Moura; Knut Jorgen Maloy

Question and answer: Parallel sessions 3 (cont.)

(MS 10) Advances in imaging porous media: techniques, software and case studies – Part 2

Q&A 16 14:35 – 15:30 - **Chairs:** Sadaf Sobhani, Andreas Busch

[1022] **2D to 3D Transform: Material Properties from 2D Images.**
Juan Pablo Daza; Amos Nur; Tapan Mukerji

[712] **Comparative Study of Pore Structure Parameters for Various Rock Samples.**
Yixin Zhang; Rouzbeh Ghanbarnezhad Moghanloo; Davud Davudov

(MS 23) Special Session for Professor Rainer Helmig – Part 2

Q&A 17 15:35 – 16:30 - **Chairs:** Bernd Flemisch, Martin Schneider

[1300] **Component transport at the soil – atmosphere interface.**
Lisa Bahlmann; Insa Neuweiler

[1184] **Micro-macro Models: The Next Generation Models for Reactive Flow and Transport Problems in Porous Media?**
Peter Knabner; Carina Bringedal; Florin Adrian Radu; Iuliu Sorin Pop; Lars von Wolff; Manuela Bastidas

[1174] **Precipitation and dissolution in complex media: modelling, upscaling and simulation.**
Manuela Bastidas; Carina Bringedal; Iuliu Sorin Pop; Florin Adrian Radu; Lars von Wolff

[1181] **Robust and efficient solvers for flow in deformable porous media.**
Florin Adrian Radu

[719] **3D modelling of subsurface methane leakage through unconsolidated sedimentary aquifers; implications for environmental monitoring.**
Gilian Schout; S. Majid Hassanizadeh; Jasper Griffioen; Niels Hartog; Rainer Helmig

(MS 12) Advances in modeling and simulation of poromechanics – Part 2

Q&A 18 19:05 – 20:00 - **Chairs:** Alessio Fumagalli, Florian Doster

[54] **Dynamic hydraulic fracturing in naturally fractured reservoirs.**
Mohammad Vahab; Mohammadreza Hirmand; Nasser Khalili

[387] **Preliminary Study on Mechanical Model of Reef Limestone Porous Media.**
Ning Zhang; Cijia Wang; Thomas Nagel

[1232] **A deformation-dependent permeability model for polycrystalline rocks.**
Florian Zill; Olaf Kolditz; Thomas Nagel

[1332] **Effect of soil saturation on the stability of soil slopes during rainfall infiltration.**
Paiman Shafabakhsh; Marwan Fahs; Renaud Toussaint

[390] **A fully coupled Thermo-Hydro-Chemo-Mechanical model for the evaluation of gas production characteristic in hydrate-bearing sediment.**
Didi Wu; Shuxia Li

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Question and answer: Parallel sessions 3 (cont.)

(MS 12) Advances in modeling and simulation of poromechanics – Part 2

Q&A 18 19:05 – 20:00 - **Chairs:** *Alessio Fumagalli, Florian Doster*

[1101] **Mathematical Model of Thermo-Gel Flooding and Its Application in Thermal Recovery of Offshore Heavy Oil.**
Jintao Wu; Lei Zhang; Jianting Huang; Hao Li; Guangming Pan

[1005] **A fully coupled Thermo-Hydro-Chemo-Mechanical model for the evaluation of gas production characteristic in hydrate-bearing sediment.**
Matthew Andrew

(MS 10) Advances in imaging porous media: techniques, software and case studies – Part 3

Q&A 19 20:05 – 21:00 - **Chairs:** *Nikolaos K. Karadimitrio, Maja Rucker*

[782] **A New Approach to 3D Imaging of Multi-scale Pore Systems in Carbonates using Confocal Microscopy.**
Ahmed Hassan; Viswasanthi Chandra; Maxim Yutkin; Tadeusz Patzek

[1205] **Time-lapse imaging of fines migration within subsurface reservoirs.**
Chenzi Shi; Kevin G. Taylor; Lin Ma

[1218] **A quantitative method to compare Invasion Percolation models to high-resolution gas-injection experiments in sand.**
Ishani Banerjee; Anneli Guthke; Cole Van de Ven; Kevin. G. Mumford; Wolfgang Nowak

[1197] **Impact of image resolution on quantification of mineral properties and simulated mineral reactions and reaction rates.**
Fanqi Qin; Lauren Beckingham

[1256] **Study on the effect of pore structure in thermal conductivity and permeability of volcanic rocks.**
Sandra Vega; Jonathan De la Rosa; Irving Reyna-Bustos

[212] **Three-dimensional characterization of pore space architecture in granular materials.**
Nimisha Roy; David Frost

[686] **3D Visualization of Oil Displacement by a Suspension of Microcapsules**.
Raphael Chalhub Oliveira Spinelli Ribeiro; Marcio Carvalho

[937] **Velocity Distribution Inside the Trapping Phase at Low Capillary Number: Direct Pore-Scale Modeling** .
Amir Hossein Mohammadi Alamooti; Qumars Azizi; Hossein Davarzani

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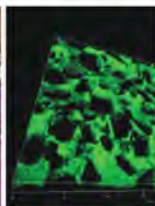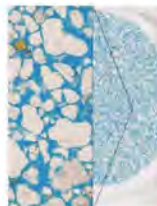
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Seeing beyond

Time Block B

Invited Speakers: Parallel Session 5
14:00 - 14:30 CET

James McClure
Virginia Polythechnic Institute and State University

Topology and its effects on fluid flow

Geometric structure plays an essential role in many transport processes. Within this context, topology provides a way to measure how material is connected within a system. In a multiphase flow, topological changes occur due to coalescence and snap-off events that fundamentally alter the fluid structure and behavior. These changes can be understood quantitatively based on geometric invariants, which include the Euler characteristic as a topological measure. This talk will consider topological changes in the context of geometric evolution. Geometric laws that constrain the possible shapes that an object can attain will be used to infer the relationship between geometric invariants. Noting that changes to the toplogy of an object occur as discrete events, the fundamental mechanisms that drive these changes will be considered in detail. The associated physical consequences will be examined from the molecular scale, the pore-scale, and the reservoir scale.

Invited Speakers: Parallel Session 5 *(cont.)*
14:00 - 14:30 CET

Guang Yang
Shanghai Jiao Tong University

Coupling free flow and porous-media flow, and its applications to aerospace and mechanical engineering

The coupling of free flow and porous media flow is extensively involved in technical, environmental, and biological systems. In the first part of the talk, I will present the fundamental research with respect to the momentum transfer characteristics at the coupling interface. Then in the second part, I will talk about the roles of this coupling effect in three specific applications from the field of aerospace and mechanical engineering, namely vapor chamber heat-transfer system, transpiration cooling technology, and propellant acquisition device. The coupled free/porous media flows have also found to be often indivisible with turbulence, heat transfer, and phase change. Progress of the parameter optimization studies conducted by our group for the above mentioned applications will also be presented.

Time Block C

Award Ceremony
18:00 - 18:10 CET
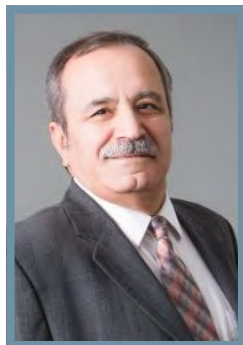
Kimberly-Clark Distinguished Lectureship Award
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Keynote Lecture
18:10 - 18:55 CET

Qinjun Kang
Los Alamos National Lab

Pore-Scale Direct Numerical Simulation of Flow and Transport in Energy and Environment

Flow and transport processes in porous media are pervasive. A better understanding of these processes is critical for addressing important problems such as petroleum and geothermal energy production, geological storage of CO_2 and nuclear waste, as well as optimization of energy storage and conversion devices for improved performance. With the rapid advancement of computers and computational methods, and rapid development of X-ray tomographic imaging techniques that provide detailed pore structures for numerical simulation, pore-scale direct numerical simulation (DNS) of flow and transport in porous media has become increasingly popular. In this talk, I will present our recent work on pore-scale DNS of various flow and transport phenomena, including supercritical CO_2 displacing brine in a heterogeneous micromodel and real rock; oil and water two-phase flow in fractionally wet porous media; corrosion of uranium dioxide in a geological repository; multiphase multicomponent reactive transport during CO_2 dissolution trapping; as well as hydrocarbon behavior in nanopores of tight reservoirs. It is shown that pore-scale DNS can be a potentially powerful numerical tool to analyze flow and transport processes in various energy and environmental systems and can shed some light on the underlying physics occurring at the fundamental scale.

Timing of Q&A sessions on Thursday				
Time Block (CET)	Q&A No.	Parallel sessions 1	Parallel sessions 2	Parallel sessions 3
A (09:00 – 09:55)	Q&A 20	MS9, part 3	MS6-B, part 2	MS10, part 4
A (10:00 – 10:55)	Q&A 21	MS9, part 4	MS20	
A (11:00 – 11:55)	Q&A 22	MS9, part 5		MS19, part 1
B (14:00 – 14:55)	Q&A 23	MS9, part 6	MS21 & MS16	MS19, part 2
B (15:00 – 15:55)	Q&A 24	MS9, part 7	MS6-B, part 3	MS22
B (16:00 – 16:55)	Q&A 25	MS9, part 8		

Question and answer: Parallel sessions 1

(MS 9) Pore-scale modelling – Part 3

Q&A 20 09:00 – 09:55 - **Chairs:** *Martin Blunt, Stephane Zaleski*

[701] Ion-Tuned Water - An Image-Based Pore-scale Study of Oil Recovery Improvement
Artur Shapoval; Yudong Yuan; Yuzhu Wang; Sheik Rahman

[85] Lattice Boltzmann simulation of amphiphilic fluids flow through porous media
Bei Wei; Jian Hou; Michael Sukop

[458] Lattice Boltzmann Simulations for micro-macro interactions during isothermal drying of porous media
Debashis Panda; Supriya B; Vikranth Kumar Surasani

[1039] An improved empirical model considering viscous coupling effect for hydraulic conductance of three-phase flow in pore network modeling
Fei Jiang; Jianhui Yang; Edo Boek; Takeshi Tsuji

[1191] Opalinus Clay experimental dataset with High Pressure Sorption, review and application to Pore Network Modelling
Georgy Borisochev; Andreas Busch; Jingsheng Ma; Lin Ma

[986] Minkowski measure fields as basis for rock-typing and upscaling
Han Jiang; Christoph Arns

[618] Discrete Multiple Media Geological Modelling Method
Jiaxin Dong; Qiquan Ran; Wen Shi

[727] The construction of multi-scale multi-component pore network model with application in shale characterization
Ke Wang; Yongfei Yang; Jun Yao;

[318] Wormholing and channelling: impact of heterogeneity on dissolution regimes in porous media using pore-scale direct numerical simulation.
Julien Maes; Hannah Menke; Alexandros Patsoukis Dimou; Sebastian Geiger

Question and answer: Parallel sessions 1 (cont.)

(MS 9) Pore-scale modelling – Part 4

Q&A 21 10:00 – 10:55 - **Chairs:** *Martin Blunt, Stephane Zaleski*

[1176] Effects of pore-size disorder on forced imbibition in porous media
Lianwei Xiao; Guangpu Zhu; Jun Yao

[1139] Using topology and energy balance to determine wettability in two and three-phase flow
Martin Blunt; Takashi Akai; Alessio Scanziani; Qingyang Lin; Abdulla Alhosani; Branko Bijeljic

[228] Pore Scale Study of Solid/Liquid Phase Change in a 3D Cubic Lattice Metal Frame
Moghtada Mobedi; Chunyang Wang

[1080] Complex interplay between wettability and pore geometry controlling dynamics of two phase flow in heterogeneous porous media
Sahar Bakhshian; Rabbani Harris ; Seyyed Hosseini; Nima Shokri

[215] A multi-scale diffuse interface/front tracking model for multi-component two-phase flow
Guangpu Zhu; Kou Jisheng; Yao Jun; Qianhong Yang

[183] Thermal coupled reactive transport in porous media based on SPH method
Qianhong Yang; Jun Yao; Zhaoqin Huang

[1017] Effective parameter identification via NMR experiment and simulation using multi-task Bayesian optimization
Rupeng Li; Igor Shikhov; Christoph Arns

[645] Curvature Correction to Model Capillary Driven Flows at the Pore-Scale Using Volume-of-Fluid
Saideep Pavuluri; Julien Maes; Florian Doster

(MS 9) Pore-scale modelling – Part 5

Q&A 22 11:00 – 11:55- **Chairs:** *Martin Blunt, Stephane Zaleski*

[394] Numerical Modeling of Wettability Alteration in Porous Media Induced by Low Salinity Water
Takashi Akai; Martin Blunt; Branko Bijeljic

[851] Pore scale disorder on tensile fracturing of porous medium using Lattice method simulation
WenXiang Tian; Gang Ma; Wei Zhou; Yao Liu; Lingxiao Chen

[1076] Micro-CT image resolution limitation effects on NMR simulation response
Yingzhi Cui; Igor Shikhov; Christoph Arns

[407] Mesoscopic modelling of fluid-solid interaction and its effect on permeability estimation
Zi Li; Sergio Galindo-Torres; Ling Li

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Question and answer: Parallel sessions 1 (cont.)

(MS 9) Pore-scale modelling – Part 5 (cont.)

Q&A 22 11:00 – 11:55- *Chairs:* Martin Blunt, Stephane Zaleski

[155] **Pore scale study of multiphase and multicomponent transport in methane hydrate bearing sediment**
Junyu Yang; Lin Shi; Zhiying Liu; Qianghui Xu; Cheng Zan

[468] **Probabilistic Modeling of Halite Nucleation and Growth in Porous Media: Pore Scale Modeling**
Mohammad Masoudi; Hossein Fazeli; Rohaldin Miri; Helge Hellevang

[670] **Investigation of salt-precipitation processes in porous-media systems at the pore scale**
Theresa Kurz; Rainer Helmig; Douglas Meisenheimer; Dorthe Wildenschild

[441] **Pore-scale study of complex transport phenomena in porous media.**
Li Chen; Kang Qinjun; Wen-Quan Tao

(MS 9) Pore-scale modelling – Part 6

Q&A 23 14:00 – 14:55 - *Chairs:* Martin Blunt, James McClure

[1259] **Pore network modeling from micro-CT X-Ray data, methodology using open source software and digital rock printing**
Aarón Sánchez; Martín A. Díaz-Viera; Mario Eduardo Ramos García; Rosario Pacheco Serrano; Manuel Coronado Gallardo

[466] **Quasi-3D pore-scale simulation of wettability heterogeneity in porous media**
Amir Jahanbakhsh; Omid Shahrokhi; M. Mercedes Maroto-Valer

[873] **Capillary Pressure of Non-Wetting Ganglia in Porous Media: a Sub-Darcy Model**
Chuanxi Wang; Ke Xu

[810] **The optimal wettability for oil recovery by waterflooding: dependence on structural factors**
Fanli Liu; Moran Wang

[1317] **Effect of grain-size distribution on the temporal evolution of interfacial area during multi-phase flow through porous media**
Fizza Zahid; Jeffrey A. Cunningham; Amy Stuart

[1024] **Simulating Diagenesis: Computing Temporal Pore Structure and Physical Properties Changes Due to Dissolution/Precipitation Under Stress and Reactive Fluid Flow**
Juan Pablo Daza; Tapan Mukerji; Amos Nur

[1244] **Pore-scale flow with the memory-efficient Lattice Boltzmann formulation**
Maciej Matyka; Michał Dzikowski

[140] **Study of the effect of pore-scale mineral wettability alterations on the relative permeability curves**
Ming Fan; James McClure; Ryan Armstrong; Mehdi Shabaninejad; Li Zhe; Laura Dalton; Dustin Crandall; Cheng Chen

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Question and answer: Parallel sessions 1 (cont.)

(MS 9) Pore-scale modelling – Part 7 (cont.)

Q&A 24 15:00 – 15:55 - *Chairs:* *Martin Blunt, James McClure*

[931] An interface-tracked dynamic network simulator for two-phase flow in porous media: recent developments and results
Santanu Sinha; Magnus Aa. Gjennestad; Morten Vassvik; Alex Hansen

[1289] Capillary bundle-Meter model for non-Newtonian fluid flow in porous media
Takshak Shende; Vahid.J Niasar; Masoud Babaei

[65] Capillary instabilities during two-phase flow process in a porous medium
Tao Zhang; Rui Wu

[1028] Contact line motion: comparing molecular dynamics, the phase field model and the sharp interface model
Ugis Lacis; Petter Johansson; Thomas Fullana; Stéphane Zaleski; Berk Hess; Gustav Amberg; Shervin Bagheri

[419] Lattice Boltzmann-pore network hybrid modelling of gas transport in nanoporous media
Wenhui Song; Maša Prodanović; Christopher J. Landry; Jun Yao

[1326] Pore network modeling of fuel cell catalyst layer performance
Amin Sadeghi, Shawn Litster; Jeff Gostick

[304] Tunable interactions during the discharge of a 2D silo.
Louison Thorens; Knut Jorgen Maloy; Mickaël Bourgoin; Stéphane Santucci

[1041] Gas separation in bent microchannel at low Reynolds number
Minh Tuan Ho; Jun Li; Wei Su; Lei Wu; Matthew Borg; Zhihui Li; Yonghao Zhang

(MS 9) Pore-scale modelling – Part 8

Q&A 25 16:00 – 16:55 - *Chairs:* *Martin Blunt, James McClure*

[913] Permeability prediction of fibrous porous media by the lattice Boltzmann method with a fluid-solid boundary reconstruction scheme
Suguru Ando; Masayuki Kaneda; Kazuhiko Suga

[979] Failure mechanism of kerogen by molecular dynamics simulations in relation to hydraulic fracturing in organic-rich shale
Tianhao Wu; Abbas Firoozabadi

[843] Pore Structure Characterization and Numerical Simulation of Electrical Conductivity for Tight Sandstone by Digital Rock Physics
Xuefeng Liu; Hao Ni; Jingxu Yan; XiaoWei Zhang

[147] A unified multiple transport mechanism model for gas through shale pores
Fanhui Zeng; Yu Zhang; Jianchun Guo; Qiang Zhang; Wenxi Ren; Jianhua Xiang

[124] Pore-scale Simulation of Gas Flow in Microscopic Porous Media with Complex Geometries
Yuhang Wang; Saman Aryana

[1183] Reconstruction of Porous Media Based On Variational Autoencoders Method Using 2D Slice
Yurun Li; Qihong Feng; Sen Wang; Jiawei Ren

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Question and answer: Parallel sessions 1 (cont.)

(MS 9) Pore-scale modelling – Part 8 (cont.)

Q&A 25 16:00 – 16:55 - **Chairs:** Martin Blunt, James McClure

[1241] **Review and Comparison of Numerical Strategies to Estimate the Full Permeability Tensor of Anisotropic Materials From Micro-Tomography Images.**
Hermes Scandelli; Jean Lachaud; Azita Ahmadi

[1027] **Transfer of mass and momentum at interface between porous media and free flows.**
Shervin Bagheri; Ugis Lacis; Simon Pasche; Yogaraj Sudhakar

Question and answer: Parallel sessions 2

(MS 6-B) Interfacial phenomena in multiphase systems – Part 2

Q&A 20 09:00 – 09:55 - **Chairs:** Ke Xu, Holger Ott

[856] **Effect of Salinity on Water-Alternating-Gas (WAG) Injection in Microporous Media.**
Vishnu Bhadran; Yit-Fatt Yap; Afshin Goharzadeh

[31] **Critical Gas Saturation and Relative Permeability for Pressure Depletion and Gas Injection Processes.**
Steffen Berg; Ying Gao; Apostolos Georgiadis; Niels Brussee; Ab Coorn; Hilbert van der Linde; Jesse Dietderich; Faruk Omer Alpak; Daniel Eriksen; Miranda Mooijer-van den Heuvel; Jeff Southwick; Matthias Appel; Ove Bjorn Wilson

[539] **Study on Film effects during isothermal diffusion dominated evaporative drying of square capillary tube using Lattice Boltzmann model.**
Supriya B; Debashis Panda; Nicole Vorhauer; Vikranth Kumar Surasani

[1220] **Mechanism Study on the Influence of Low Salinity Water on Interface Characteristics of the Fluid and Rock.**
Di Zhu; Binfei Li; Zhaomin Li; Haifeng Li

[337] **Microscopic flow mechanism of shale oil based on digital cores with multi-mineral phases.**
Lian Duan; Hai Sun; Jun Yao; Lei Zhang; Yongfei Yang

[643] **Direct imaging of bubble ripening in two-dimensional porous media micromodels.**
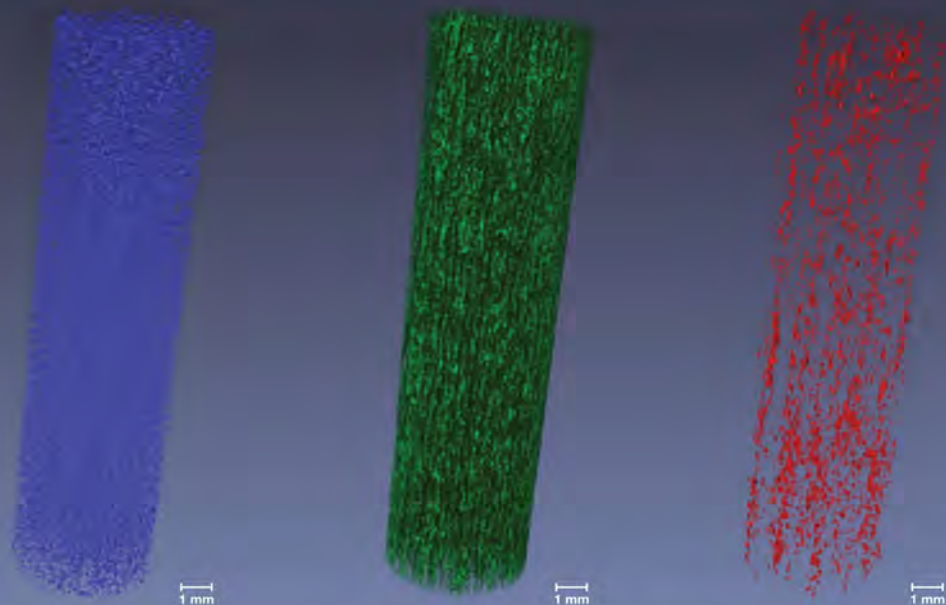*Nerine Joewondo; Valeria Garbin; Ronny Pini*

[101] **Influence Mechanism of Potential Determining Ions on Oil-in-water Emulsion Stability in Smart Water-flooding.**
Rukuan Chai; Yuetian Liu; Liang Xue

[1261] **Inverse Gas Chromatography– a way to determine structural and surface chemical properties of the internal rock surfaces for core-scale wettability characterization.**
Maja Ruecker; Majid Naderi; Daryl Williams; Apostolos Georgiadis; Paul F Luckham

Question and answer: Parallel sessions 2 (cont.)

(MS 20) Biophysics of living porous media: theory, experiment, modeling and characterization

Q&A 21 10:00 – 10:55 - Chairs: Dominik Obrist, Fred Vermolen

[1278] **A scale-independent framework for whole brain simulation of blood flow in the human brain.**
Erlend Hodneland; Jan Martin Nordbotten

[372] **Simulating vertebroplasty: A look into the biomechanics and modelling challenges.**
Zubin Trivedi; Christian Bleiler; Arndt Wagner; Oliver Röhrle

[305] **Diffusion and convection in brain extracellular spaces embedded with perivascular networks.**
Vegard Vinje; Miroslav Kuchta; Marie E. Rognes; Timo Koch; Kent-Andre Mardal

[767] **A new making method of artificial core through changing epoxy resin form.**
Kun Xie; Kaoping Song; Xiangguo Lu; Bao Cao; Jian Hou; Wei Lin ; Jinxiang Liu; Weijia Cao; Cheng Su

[2] **Various Mathematical Approaches to Mechanical Simulations in Wound Healing Processes.**
Qiyao Peng; Fred Vermolen

[1047] **Modeling perfusion in cardiac tissue.**
Rodrigo Weber dos Santos; João R. Alves; Evandro D. Gaio; Rafael AB de Queiroz

[361] **Pore-Scale Modeling for Open-Sorption Pipe Reactor by Lattice Boltzmann Method.**
Bin Guo; Huijin Xu; Changying Zhao

[38] **Modeling fluid flow/heat/mass transport in an idealized fractal porous structure.**
Chenqian Wu; Huijin Xu; Changying Zhao

(MS 21) Effective elastic, thermal, electrical and optical properties of porous materials, cellular materials, foams and metamaterials

Q&A 23 14:00 – 14:55 - Chairs: Yongfei Yang, Hamed Aslannejad

[251] **How to take into account of clay content in computing elastic moduli of arenites from micro-tomographic images.**
Jiabin Liang; Stanislav Glubokovskikh; Boris Gurevich; Maxim Lebedev; Stephanie Vialle; Alexey Yurikov

[536] **Elastic equivalent numerical modeling of porous media digital core.**
Shi-kai Jian; Liyun Fu; Qiang Liu; Lijie Cui

[70] **Analysis of Low Resistivity of Gravel Sandstone Reservoir in Beibuwan Basin Based on Petrophysical Experiments.**
Weichao Yan; Jianmeng Sun; Likai Cui

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Question and answer: Parallel sessions 2 (cont.)

(MS 16) Fluid Interactions with Thin Porous Media

Q&A 23 14:00 – 14:55 - Chairs: Yongfei Yang, Hamed Aslannejad

[87] Water transport in a gas diffusion layer of polymer electrolyte fuel cells in the presence of polytetrafluorethylene.
Dieter Froning; Uwe Reimer; Werner Lehnert

[349] Dynamics of capillary rise and finger formation in angular pores.
Thijs de Goede; Rozeline Wijnhorst; Daniel Bonn; Noushine Shahidzadeh

[169] Characterization of capillary flow within hybrid woven screens in vertical and horizontal directions.
Ye Wang; Yilin Lin; Guang Yang; Jingyi Wu

[23] Occurrence of temperature spikes at a wetting front during spontaneous imbibition.
Hamed Aslannejad; S. S. Majid Hassanizadeh; Alex Terzis; Bernhard Weigand

[821] Multiscale study of natural gas components behavior under nanoconfinement.
Vítor Sermoud; Gabriel Barbosa; Amaro Barreto Jr.; Frederico Tavares; Iuri Segtovich; Jessica Maciel

(MS 6-B) Interfacial phenomena in multiphase systems – Part 3

Q&A 24 15:00 – 15:55 - Chairs: Grigori Chapiro, Hai Sun

[367] Experimental investigation of contact angle change and oil globule movement in a capillary.
Lifei Yan; Hamed Aslannejad; S. Majid Hassanizadeh; Amir Raoof

[571] Interfacial Viscoelasticity in Crude Oil-water Systems.
Ahmed M. Saad; Stefano Aime; Sharath Mahavadi; Y-Qiao Song; Maxim Yutkin; Tadeusz Patzek; David A. Weitz

[163] Effect of proppant wettability on fines transport and retention in propped fractures during gas–water two-phase flow in coalbed methane reservoirs.
Fansheng Huang; Changyin Dong; Xiaosen Shang

[261] An investigation of the Effect of Gravity on Foam in Model Fractures.
Kai Li; William Rossen; Karl-Heinz Wolf

[414] Multiphase flow in deformable media.
Dawang Zhang; Bjornar Sandnes

[295] Micro Perspective of Capillary Force Hysteresis: Theoretical and Experimental Research on the Relationship Between Capillary Pressure and Saturation in Microscale Capillaries.
Menggang Wen; Yun Li

[317] Novel Method for Improving Injectivity of Polymer solution in Porous Media.
Mohsen Mirzaie Yegane; Julia Schmidt; Fatima Dugonjic-Bilic; Benjamin Gerlach; Pacelli Zitha

[371] The Impact of Grid Refinement on Simulated Injectivity in Surfactant-Alternating-Gas Foam Enhanced Oil Recovery.
Rodrigo Orlando Salazar Castillo; Lily Qian; William R. Rossen

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Question and answer: Parallel sessions 3

(MS 10) Advances in imaging porous media: techniques, software and case studies – Part 3

Q&A 20 09:00 – 09:55 - **Chairs:** Adrian Sheppard, Nima Shokri

[1020] X-ray CT core flooding study to understand the impact of clay interlayers on supercritical CO2 migration in sandstones.
Liang Xu; Matthew Myers; Cameron White; Qi Li

[553] Microstructure characterization and permeability modeling of creeping porous media under various pressures.
Yuxuan Xia; Jianchao Cai; Sai Xu; Haitao Tian; Yang Liu

[1150] Dynamic synchrotron microtomography and pore-network modelling for direct in-situ capillary flow observation in 3D printed lab-on-chips.
Agnese Piovesan; Tim Van De Looverbosch; Pieter Verboven; Clement Achille; Cesar Parra Cabrera; Elodie Boller; Yin Cheng; Rob Ameloot; Bart Nicolai

[257] Quantitative Measurement of Supercritical CO2-Water Immiscible Displacement in the Micromodel under Drainage Conditions.
Changzhong Zhao; Yi Zhang; Baokun Zhao; Yongchen Song

[45] Enhanced Gas Recovery evaluated with 1D NMR imaging and relaxometry measurements.
Ming Li; Sarah J. Vogt; Xiaoxian Yang; Paul Connolly; Eric F. May; Michael L. Johns

[725] Study on Formation Damage Mechanism of a Sandstone Reservoir based on Micro-Computed Tomography.
Zhiyu Wang; Yongfei Yang; Jun Yao; Xinze Li; Yingwen Li; Changfu Liu

[262] Level set based automatic in-situ contact angle measurement.
Yingfang Zhou

[1211] Continuous Surface Force Lattice Boltzmann Method for thin-gap flows - comparison with sharp interface FEM solutions.
Michał Dzikowski; Marcin Dabrowski

(MS 19) Electrochemical processes in porous media – Part 1

Q&A 22 11:00 – 11:55- **Chairs:** Pablo García-Salaberri, Ezequiel Medici

[389] Pore-network modeling of gas diffusion layers in polymer electrolyte fuel cells using a continuum-based formulation
Pablo Ángel García-Salaberri; Iryna Zenyuk; Jeff Gostick; Adam Z. Weber

[1219] Modelling non-isothermal effects in a proton exchange membrane fuel cell (PEMFC)
Sagrario Muñoz; V. María Barragán

[1247] Reactive transport in porous media: Modeling electro-diffusion process using Nernst-Planck-Poisson Equation
Sara Tabrizinejadas; Jerome Carrayrou; maarten saaltink; Marwan Fahs

Question and answer: Parallel sessions 3 (cont.)

(MS 19) Electrochemical processes in porous media – Part 1 (cont.)

Q&A 22 *11:00 – 11:55- **Chairs:** Pablo García-Salaberri, Ezequiel Medici*

[144] On volume averaging modelling of porous electrodes – intrinsic phase average and macroscopic flux definition at solid/electrolyte interface
Xiaoguang Yin; Zeyong Wang; Thomas Sweijen; S. S. Majid Hassanizadeh; Baohua Li

[924] Non-isothermal Battery Modelling
Astrid F. Gunnarshaug; Lena Spitthoff

[365] Multiphysics modeling of a vanadium redox flow battery.
Vanesa Muñoz Perales; Santiago Enrique Ibañez-León; Sabrina Berling; Enrique García-Quismondo; Jesús Palma; Pablo Ángel García-Salaberri; Marcos Vera

[381] "Hot Spots" observed in pore scale simulation of flow in carbon fibre felt electrodes may limit the efficiency of Redox Flow Battery operation.
Farrel Gray; Ioannis Zacharoudiou; Rhodri Jervis; Edo Boek

[634] Research on Different Storage Space Types of Marine Carbonate Buried Hills and Their Impact on Liquid Production Capacity------A case from the X structure of Shijiutuo uplift in Bohai Bay Basin.
Peng Shi; Yong Hu; Caiqi Zhang; Zhou Fang; Guangming Pan

(MS 19) Electrochemical processes in porous media – Part 2

Q&A 23 *14:00 – 14:55 - **Chairs:** Jeff Gostick, Iryna Zenyuk*

[1277] Towards scalable multi-scale open-source solvers for ionic transport and electrochemistry
Matteo Icardi; Federico Municchi; Robert Barnett

[1204] Comparing chronopotentiometric behavior in homogeneous cation- and anion- exchange membranes
Chunyu Tian; Kim Roger Kristiansen; Signe Kjelstrup; V. María Barragán García

[772] Study on electrokinetic reactive fluid in dielectric porous media with Lattice Boltzmann Method
Haijing Li; Herman Clercx; Federico Toschi

[249] PEM fuel cell performance studies of a tree-like pattern milled on graphite flow field plates
Marco Sauermoser; Signe Kjelstrup; Natalya Kizilova; Bruno G. Pollet

[150] Visualizing 3D distribution of wet domain in microporous layer in polymer electrolyte fuel cell by X-ray computed tomography under water vapor supply
Satoru Kato; Satoshi Yamaguchi; Wataru Yoshimune; Yoriko Matsuoka; Akihiko Kato; Yasutaka Nagai; Takahisa Suzuki

[442] Pore-scale study of reactive transport processes in porous electrodes of pemfc
Ting Min; Li Chen; Kang Qinjun; WenQuan Tao

[436] Evaporative Salinization in Porous Media.
Emna Mejri; Rainer Helmig; Rachida Bouhlila

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Question and answer: Parallel sessions 3 (cont.)

(MS 19) Electrochemical processes in porous media – Part 2 (cont.)

Q&A 23 *14:00 – 14:55 -* **Chairs:** *Jeff Gostick, Iryna Zenyuk*

[1162] 4-D Imaging of Desaturation of the Frozen Gas Diffusion Layers by Synchrotron X-ray Radiography.
Zhang Yuzhou

(MS 22) Catalysis and adsorption/absorption processes in porous media

Q&A 24 *15:00 – 15:55 -* **Chairs:** *Huijin Xu, Satoru Kato*

[884] Thermal stimulation to activate the desorption of shale gas over organic-rich shales.
Xinlei Li; Lijun You; Yili Kang ; Jiang Liu ; Mingjun Chen

[158] Experimental study on evolution law of key parameters and characterization of initial gas desorption of coal particles.
Chaojie Wang; Xiaowei Li; Changhang Xu; Yue Niu

[512] Sorption characteristics of biomass-based carbonaceous materials for containment of volatile organic compounds (VOC).
Hamid Rajabi; Mojgan Hadi Mosleh; Amanda Lea-Langton; Parthasarathi Mandal

[1016] Measuring and Modelling Supercritical Adsorption in Shales.
Humera Ansari; Martin Trusler; Geoffrey Maitland; Claudio Delle Piane; Ronny Pini

[1309] Multiple Retention Mechanisms during Transport in Porous Media: Numerical modelling and empirical parameters evaluation.
Jocenrique Carlo de Oliveira Rios; Adriano dos Santos; Sidarta Araújo de Lima

[961] 3D pore scale simulation of reactive flow in catalytic filter on CT image.
Oleg Iliev; Torben Prill; Pavel Toktaliev; Robert Greiner; Martin Votsmeier

[289] Pore Structure Analysis for Exhaust Particle Filter Development.
Atsushi Tanaka; Naoto Miyoshi; Akemi Sato

[7] Geothermal Brine Reinjection from SaltPower Generation: A Microcalorimetry Study.
Jacquelin Cobos Mora; Erik Gydesen Søgaard

[1140] Investigation of adsorption and diffusion behaviors of multi-component gases in kerogen.
Yu Shi; Xiaona Yang

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For Kimberly-Clark to grow and prosper, we must be an inclusive organization that applies the diverse experiences and passions of its team members to brands that make life better for people all around the world. We actively seek to build a workforce that reflects the experiences of our consumers. When you bring your original thinking to Kimberly-Clark, you fuel the continued success of our enterprise. We are a committed equal opportunity employer and all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability status, protected veteran status, sexual orientation, gender identity, age, pregnancy, genetic information, citizenship status, or any other characteristic protected by law.

Interactive card magic show
17:30 - 17:55 CET

What you did not know about the porosity of cards

Jaime Gómez-Hernández, the president of the local organizing committee of InterPore2019, also known as the magician Placebus, will perform a live interactive card magic show. You can simply enjoy the show by connecting to the live event at the specified time and watching it, or you can participate and play along so that the magic will take place at your fingertips; the only thing you need is a regular deck of poker cards and a desk space in front of you onto which to deal the cards. You will see the magic happening in front of you and will understand a little bit about the abnormal porosity of poker cards.

Those of you who were lucky enough to catch Jaime's live act last year in Valencia know - you do not want to miss this!
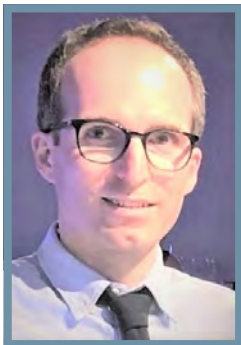
Award Ceremony
18:00 - 18:10 CET

InterPore - PoreLab Award for Young Researchers
Hamad Aslannejad
Utrecht University, The Netherlands

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.

Rien van Genuchten Early-Career Award of Porous Media for a Green World
Basant Yadav
Cranfield University, England

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 widely varying fields.

Keynote Lecture
18:10 - 18:55 CET

Dominik Obrist
University of Bern

Microscopical lesions of the transport system of organs and their relation to clinically observable large-scale phenomena

Many diseases are directly related to microscopical lesions of the transport system of organs: Cystic fibrosis, for example, leads to obstructions of the smallest airways; Multiple sclerosis can be connected to leaking capillaries in the brain; and recovery after a heart attack can be limited by microvascular obstruction of the heart muscle. Reliable and accurate diagnosis of such lesions is important for the early detection and targeted treatment of the diseases. Unfortunately, their clinical diagnosis is very difficult, because the small structures are inaccessible to interventional instruments and the resolution of imaging modalities is too coarse. Therefore, diagnosis is typically based on limited information obtained from large-scale phenomena which can be observed clinically.

We developed multi-scale models which allow us to infer the state of microscopical lesions from observable large-scale phenomena. To this end, it is helpful to model the smallest structures of an organ as porous medium which is coupled with a large-scale advective transport model. We will present several computational and experimental multi-scale models of organs and demonstrate how they can be used to support the diagnosis of diseases of the brain, heart and lung.

Diagnosis of lesions of microvascular structures in the human body is difficult, because these structures are inaccessible to classical interventional instruments and the resolution of clinical imaging modalities is too coarse.

Many organs of the human body can be split into large scale systems and small scale systems. Whereas the large scales are typically connected to transport processes (e.g. arteries transporting blood from the heart to the tissue), the small-

THURSDAY, 3 SEPTEMBER 2020
Time Block C

Keynote Lecture *(cont.)*
18:10 - 18:55 CET

scale systems are seen as the place for substance exchange (e.g. capillary blood vessels where o2 and CO2 are exchanged between blood and tissue).

Pathologies of the small scale structures are difficult to diagnose and treat because of a lack of accessibility of these structures with clinical instruments and a lack of observability with the available imaging modalities. Therefore, there is a need for developing diagnostic methods which allow us to infer pathological conditions at small scale from observations at large scale.

I will present methods on the example of three different organs: diagnosis of microvascular lesions in the myocardium after heart attack, in the brain of MS patients and in the lung for Cystic fibrosis and congenital microvascular malformations in the extremities.

Closing Ceremony
18:55 - 19:10 CET

InterPore
International Society for Porous Media

HERIOT WATT UNIVERSITY

13th International Conference on Porous Media
& Annual Meeting
May 31 - June 3, 2021 - Edinburgh, Scotland
Short Courses on May 30 & June 4

The scientific program will include subjects related to porous media and range from **pore-scale modeling**, **pore-scale imaging**, to **experimental and numerical methods on larger scales**, to **sensitivity and uncertainty analysis**.

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 poromechanics
- Fuel cells and batteries
- Food, wood, composites
- Fibers and textiles
- Filters, foams, membranes, papers
- Ceramics and construction materials

Local Organizing Committee

School of Energy, Geoscience, Infrastructure and Society
Heriot Watt University

Co-Chairs: Andreas Busch, Florian Doster, Sebastian Geiger

Venue and city

The 13th Annual InterPore Meeting will be held at the Edinburgh International Conference Centre (EICC) in the heart of Edinburgh, Scotland. Home to three UNESCO Heritage Sites, four Universities and named the UK's "Greenest City", Edinburgh is full of history, culture and places waiting to be explored.

EICC's state-of-the-art facilities include adaptable auditoria, break-out suites and spacious exhibition and reception areas all complemented by the latest technologies. The EICC is easily accessible by public transportation and is only 10km away from Edinburgh International Airport, which offers over 300 flights a day to more than 130 UK and worldwide destinations.

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InterPore2020

12ᵗʰ ANNUAL MEETING

Detailed Program, Addendum
30 August 2020

Timing of Q&A sessions on Tuesday				
Time Block (CET)	Q&A No.	Parallel sessions 1	Parallel sessions 2	Parallel sessions 3
A (10:05 – 11:00)	Q&A 7	MS1, part1	MS13, part1	MS17, part1
A (11:05 – 12:00)	Q&A 8	MS1, part2	MS13, part2	MS6-A, part2
B (14:35 – 15:30)	Q&A 9	MS1, part3	MS13, part3	MS14, part1
B (15:35 – 16:30)	Q&A 10	MS1, part4	MS13, part4	MS18, part1
C (18:00 – 18:55)	Q&A 11	MS1, part5	MS13, part5	MS18, part2
C (19:00 – 19:55)	Q&A 12	MS1, part6	MS4	MS17, part2
C (20:00 – 20:55)	Q&A 13	MS6-A, part3	MS23, part1	MS14, part2

Question and answer: Parallel sessions 3

(MS 18) Innovative Methods for Characterization, Monitoring, and In-Situ Remediation of Contaminated Soils and Aquifers– Part 2

Q&A 11 18:00 – 18:55 - **Chairs:** *Marios Valavanides, Qi Li*

[1310] **The first nanoremediation pilot-test in Brazil: site selection criteria and nZVI mobility studies**
Daphne Silva Pino; Reginaldo Bertolo; Petr Kvapil; Carlo Bianco; John Etim; Tannaz Pak

[1283] **Method of Moments to Characterize a Reservoir Using a Single Non-Ideal Tracer Test**
Deepshikha Singh; Jyoti Phirani

[1282] **Quantifying wetted area of sediments during multiphase flow in geological porous media**
Deepshikha Singh; Jyoti Phirani

[1170] **EUTROFICATION CONTROL TREATMENTS AND CARBON GAS EMISSIONS**
DAngelo A. Sandoval; Anne M. Hansen; Armando González-Sánchez; Rodolfo Sosa-Echeverría

[1271] **Mathematical modeling of the fate and transport of per- and polyfluoroalkyl substances (PFAS) in the vadose zone**
Bo Guo; Jicai Zeng; Mark Brusseau

[113] **Micro-Scale Mechanism Analysis of NAPL Contamination Remediation in Heterogeneous Porous Media**
Xiaopu Wang; Xu Wang; Yan Li

[181] **Migration and Residual Trapping of Immiscible Fluids during Cyclic Injection**
Sookyun Wang

WEDNESDAY, 2 SEPTEMBER 2020

Timing of Q&A sessions on Wednesday				
Time Block (CET)	Q&A No.	Parallel sessions 1	Parallel sessions 2	Parallel sessions 3
A (09:35 – 10:30)	Q&A 14	MS6-A, part 4	MS2	MS12, part 1
A (10:35 – 11:30)	Q&A 15	MS6-A, part 5	MS15, part 1	MS10, part 1
B (14:35 – 15:30)	Q&A 16	MS6-A, part 6	MS5	MS10, part 2
B (15:35 – 16:30)	Q&A 17	MS6-A, part 7	MS15, part 2	MS23, part 2
C (19:05 – 20:00)	Q&A 18	MS9, part 1	MS6-B, part 1	MS12, part 2
C (20:05 – 21:00)	Q&A 19	MS9, part 2	MS15, part 3	MS10, part 3

Question and answer: Parallel sessions 1

(MS 6-A) Physics of multi-phase flow in diverse porous media– Part 4

Q&A 14 09:35 – 10:30 - **Chairs:** *Ryan Armstrong, Tannaz Pak*

[801] Gas Slippage in Partially Saturated Tight Rocks
Steffen Nolte; Mohammadebrahim Shabani; Reinhard Fink; Bernhard M. Krooss; Alexandra Amann-Hildenbrand

[766] Oil Recovery Characteristics of Supercritical CO2 Huff-n-Puff Process in Ultra-Low Permeable Porous Media
Dongxing Du; Yinjie Shen ; Di Zhao; Weifeng Lv; Ninghong Jia; Tong Li; Yingge Li

[1230] Study on multi-phase seepage of complex pore network in strongly heterogeneous carbonate reservoir based on various methods：A case study in Upper Cretaceous Khasib of the E Oilfield in the Middle East
Hao Lu; Hongming Tang; Yijun Wang

[199] Study on micro seepage model of nanopore in shale gas reservoir considering diffusion and slippage effect.
Lijuan Jiang; Hongguang Sun

[1214] Mechanism study on water plugging and EOR by nitrogen foam injection in bottom-water reservoirs
Danqi Chen; Binfei Li; Zhengxiao Xu; Kun Liu; Huiyu Yang; Zheyang Liao

[700] Experimental study on enhanced oil recovery of offshore heavy oil reservoirs by activated water flooding
Xin Chen; Yiqiang Li; MingYue Sui; Jian Zhang; Han Zhang

[589] Measurement and Research of Two-phase Micro-force of Foam Fluid and Heavy Oil
Zihan Gu; Zhaomin Li; Teng Lu; Zhengxiao Xu; Sheng Li; Xinru Zhao

[288] A SEM Study on the "Smart Water" Assisted Polymer Flooding in Sandstone Reservoirs
Hongna Ding; Xinjian Tan

12ᵗʰ ANNUAL MEETING

Detailed Program, Addendum
31 August 2020

Timing of Q&A sessions on Tuesday				
Time Block (CET)	Q&A No.	Parallel sessions 1	Parallel sessions 2	Parallel sessions 3
A (10:05 – 11:00)	Q&A 7	MS1, part1	MS13, part1	MS17, part1
A (11:05 – 12:00)	Q&A 8	MS1, part2	MS13, part2	MS6-A, part2
B (14:35 – 15:30)	Q&A 9	MS1, part3	MS13, part3	MS14, part1
B (15:35 – 16:30)	Q&A 10	MS1, part4	MS13, part4	MS18, part1
C (18:00 – 18:55)	Q&A 11	MS1, part5	MS13, part5	MS18, part2
C (19:00 – 19:55)	Q&A 12	MS1, part6	MS4	MS17, part2
C (20:00 – 20:55)	Q&A 13	MS6-A, part3	MS23, part1	MS14, part2

Question and answer: Parallel sessions 1

(MS1) Porous Media for a Green World: Energy & Climate – Part 4

Q&A 10 15:35 – 16:30 - **Chairs:** *Rainer Helmig, William Rossen, Julien Maes*

[465] An investigation of caprock-cement integrity for CO2 storage.
Amir Jahanbakhsh; Jonaid Hasan Bajwa; Nazia Mubeen Farooqui; M. Mercedes Maroto-Valer; Mojgan Hadi Mosleh; Harshit Agrawal; Anna Korre; Sevket Durucan

[447] A novel approach towards understanding pore attributes of shale.
Debanjan Chandra; Vikram Vishal

[1227] Carbon Dioxide Plume in Bespoke 2D Porous Micromodels.
Niloy De; Patrice Meunier; Yves Méheust; François Nadal;

[992] Experimental Investigation on the Effects of Ion Type/Valency and Ionic Strength of Formation Water on Rock-Fluid Interactions during CO2 Geological Storage.
Shima Ghanaatian; Omid Shahrokhi; Susana Garcia; M. Mercedes Maroto-Valer

[1246] Numerical Simulation of CO2 enhanced gas recovery (CO2-EGR) for the optimal CO2 injection perforation position and injection rate.
Liu Shuyang; Sun Baojiang

[315] Evaluation of CO2 enhanced recovery potential as pre-pad in tight reservoir compared with slickwater.
Liyao Fan; Yuliang Su; Lei Li; Mingyu Cai; Zheng Chen; Chengwei Wang; Xiaogang Gao

[946] CO2 Storage Potential in Naturally Fractured Reservoirs.
Rafael March; Florian Doster; Sebastian Geiger

[751] Application of GIS and Remote Sensing in Landuse Land Cover Change Detection: A Study of District Malakand, Pakistan.
Muhammad Yasir; Hui Sheng; Sami Ur Rehman; Atif Zafar; Muhammad Ilyas; Asif Mehmood

Question and answer: Parallel sessions 3

(MS 18) Innovative Methods for Characterization, Monitoring, and In-Situ Remediation of Contaminated Soils and Aquifers– Part 2

Q&A 11 18:00 – 18:55 - *Chairs:* Marios Valavanides, Qi Li

[1310] **The first nanoremediation pilot-test in Brazil: site selection criteria and nZVI mobility studies**
Daphne Silva Pino; Reginaldo Bertolo; Petr Kvapil; Carlo Bianco; John Etim; Tannaz Pak

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[181] **Migration and Residual Trapping of Immiscible Fluids during Cyclic Injection**
Sookyun Wang

InterPore2020

12th ANNUAL MEETING

Detailed Program, Addendum
1 September 2020

Timing of Q&A sessions on Tuesday				
Time Block (CET)	Q&A No.	Parallel sessions 1	Parallel sessions 2	Parallel sessions 3
A (10:05 – 11:00)	Q&A 7	MS1, part1	MS13, part1	MS17, part1
A (11:05 – 12:00)	Q&A 8	MS1, part2	MS13, part2	MS6-A, part2
B (14:35 – 15:30)	Q&A 9	MS1, part3	MS13, part3	MS14, part1
B (15:35 – 16:30)	Q&A 10	MS1, part4	MS13, part4	MS18, part1
C (18:00 – 18:55)	Q&A 11	MS1, part5	MS13, part5	MS18, part2
C (19:00 – 19:55)	Q&A 12	MS1, part6	MS4	MS17, part2
C (20:00 – 20:55)	Q&A 13	MS6-A, part3	MS23, part1	MS14, part2

Question and answer: Parallel sessions 3

(MS 18) Innovative Methods for Characterization, Monitoring, and In-Situ Remediation of Contaminated Soils and Aquifers– Part 2

Q&A 11 *18:00 – 18:55* - Chairs: *Marios Valavanides, Qi Li*

[1310] **The first nanoremediation pilot-test in Brazil: site selection criteria and nZVI mobility studies**
Daphne Silva Pino; Reginaldo Bertolo; Petr Kvapil; Carlo Bianco; John Etim; Tannaz Pak

[1283] **Method of Moments to Characterize a Reservoir Using a Single Non-Ideal Tracer Test**
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Xiaopu Wang; Xu Wang; Yan Li

[181] **Migration and Residual Trapping of Immiscible Fluids during Cyclic Injection**
Sookyun Wang

[1142] **An experimental study on the impacts of gas pressure on carbon isotope fractionation during methane desorption in shale rock**
Yongbo Wei

Time Block (CET)	Q&A No.	Parallel sessions 1	Parallel sessions 2	Parallel sessions 3
		Timing of Q&A sessions on Wednesday		
A (09:35 – 10:30)	Q&A 14	MS6-A, part 4	MS2	MS12, part 1
A (10:35 – 11:30)	Q&A 15	MS6-A, part 5	MS15, part 1	MS10, part 1
B (14:35 – 15:30)	Q&A 16	MS6-A, part 6	MS5	MS10, part 2
B (15:35 – 16:30)	Q&A 17	MS6-A, part 7	MS15, part 2	MS23, part 2
C (19:05 – 20:00)	Q&A 18	MS9, part 1	MS6-B, part 1	MS12, part 2
C (20:05 – 21:00)	Q&A 19	MS9, part 2	MS15, part 3	MS10, part 3

Question and answer: Parallel sessions 3

(MS 10) Advances in imaging porous media: techniques, software and case studies – Part 1

Q&A 15 10:35 – 11:30 - *Chairs:* Liwei Zhang, Matthijs de Winter

[1292] Measuring contact angles in a two-phase flow experiment using home-laboratory micro-computed tomography.
Kim Robert Tekseth; Dag Werner Breiby

[796] *Facilitating visualization and analysis of time-resolved X-ray micro-CT data using sliding widow reconstruction and flip point detection.*
Marijn Boone; Jan Dewanckele; Arno Merkle; Tom Bultreys; Tim De Kock

[555] SEM, Raman and Micro-CT characterization of CO_2–Induced Wellbore Cement degradation.
Yan Wang; Liwei Zhang; Xiuxiu Miao; Manguang Gan

[391] The influence of confining pressure and flow process on the corrosion of wellbore cement under geological storage environment.
Manguang Gan; Liwei Zhang; Xiuxiu Miao; Yan Wang; Xiaochun Li

[1260] Relaxing the Capillary Equilibrium Constraint for Automated Contact Angle Measurement of Time-Resolved X-ray Micro-Tomography Images in Porous Media.
Omid Shahrokhi; Amir Jahanbakhsh; M. Mercedes Maroto-Valer

[551] Distribution and Quantitively Evaluation of Micro Residual Oil after Polymer Flooding based on CT Scanning.
Liu Tao; Yongfei Yang; Jun Yao; Lei Zhang; Hai Sun

[875] Experimental Study on Phase Transition Characteristics of CO_2 in Porous Media of Low Permeability Reservoirs.
Huo hongbo; Li jinman; Ma kuiqian; Hu yong; Li Hongyuan

[405] A fractal analysis of stress sensitivity of a porous medium based on the thick-walled Cylinder Model.
Xin Su; Zhaoqin Huang; Jun Yao

Timing of Q&A sessions on Thursday				
Time Block (CET)	Q&A No.	Parallel sessions 1	Parallel sessions 2	Parallel sessions 3
A (09:00 – 09:55)	Q&A 20	MS9, part 3	MS6-B, part 2	MS10, part 4
A (10:00 – 10:55)	Q&A 21	MS9, part 4	MS20	
A (11:00 – 11:55)	Q&A 22	MS9, part 5		MS19, part 1
B (14:00 – 14:55)	Q&A 23	MS9, part 6	MS21 & MS16	MS19, part 2
B (15:00 – 15:55)	Q&A 24	MS9, part 7	MS6-B, part 3	MS22
B (16:00 – 16:55)	Q&A 25	MS9, part 8		

Question and answer: Parallel sessions 3

(MS 10) Advances in imaging porous media: techniques, software and case studies – Part 3

Q&A 20 09:00 – 09:55 - **Chairs:** Adrian Sheppard, Matthijs de Winter

[1020] X-ray CT core flooding study to understand the impact of clay interlayers on supercritical CO2 migration in sandstones.
Liang Xu; Matthew Myers; Cameron White; Qi Li

[553] Microstructure characterization and permeability modeling of creeping porous media under various pressures.
Yuxuan Xia; Jianchao Cai; Sai Xu; Haitao Tian; Yang Liu

[1150] Dynamic synchrotron microtomography and pore-network modelling for direct in-situ capillary flow observation in 3D printed lab-on-chips.
Agnese Piovesan; Tim Van De Looverbosch; Pieter Verboven; Clement Achille; Cesar Parra Cabrera; Elodie Boller; Yin Cheng; Rob Ameloot; Bart Nicolai

[257] Quantitative Measurement of Supercritical CO2-Water Immiscible Displacement in the Micromodel under Drainage Conditions.
Changzhong Zhao; Yi Zhang; Baokun Zhao; Yongchen Song

[45] Enhanced Gas Recovery evaluated with 1D NMR imaging and relaxometry measurements.
Ming Li; Sarah J. Vogt; Xiaoxian Yang; Paul Connolly; Eric F. May; Michael L. Johns

[725] Study on Formation Damage Mechanism of a Sandstone Reservoir based on Micro-Computed Tomography.
Zhiyu Wang; Yongfei Yang; Jun Yao; Xinze Li; Yingwen Li; Changfu Liu

[262] Level set based automatic in-situ contact angle measurement.
Yingfang Zhou

[1211] Continuous Surface Force Lattice Boltzmann Method for thin-gap flows - comparison with sharp interface FEM solutions.
Michał Dzikowski; Marcin Dabrowski