

CONFERENCES












A toast at the 2nd InterPore International Conference, held at Texas A&M University, March 2010. Report - see page 2

The **3rd InterPore Conference** will take place on **March 29-31, 2011** in **Bordeaux, France**
- see announcement on page [4](#).

The **2012 meeting** will take place at **Purdue University USA**.

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InterPore-Procter and Gamble Award for Porous Media Research - 2011

This **new award** is given in recognition of outstanding contributions to topics related to swelling porous media, very thin porous media, and behavior at interfaces. Nominees must be members of InterPore. Nomination packages should include full CV of the candidate, a nomination letter including explicit reference to the contributions to the aforementioned topics, and related documentation (publications, reports) supporting the nomination.



Complete nomination packages should be submitted to nomination@interpore.org by Jan 31 2011.

The prize will consist of an award of **5000 Euros** plus a certificate.

2nd International InterPore Conference, Texas A&M, March 2010.

Report by Yalchin Efendiev



The goals of the InterPore conference, consistently with the goals of the Society, were

- ❖ to provide a forum for exchanging information and ideas between different academic communities working on different aspects of porous media;
- ❖ to provide a forum for exchanging information and ideas between different industries, environmental and public authorities, working on different aspects of porous media;
- ❖ to provide a forum for establishing close collaboration between academia and industry, in particular for establishing cross-disciplinary and cross-society links and networks.

Following the format of the first InterPore conference, the meeting had no parallel sessions, and the oral presentations were only by invitation. The Chairs of the conference, Prof. Yalchin Efendiev from Texas A&M University, and Prof. Mary Wheeler from University of Texas in Austin, together with the Program Committee, had invited prominent high quality speakers, but at the same time the ground was also given to promising young researchers. Altogether the conference was attended by over 100 participants from the academia and the industry. According to the goals of the conference, the talks varied from ones containing essential theoretical results, to those presenting first class purely experimental results. Mathematicians, physicists, mechanical, civil and chemical engineers were presenting novel results or overviews concerning flow and transport, characterization and/or structural mechanics of porous media. The presentations related to developing new methods/approaches and/or to environmental, industrial, biomedical applications.

Industrial participations included companies from the oil industry, companies providing consultancy and services on porous media characterization and simulation, as well as health care and baby care product manufacturers. Most of the speakers were presenting advanced results relevant to their particular topic; at the same time they were trying to present their results and ideas in a such a way as to be understandable for the diverse audience. Considering open questions of common interest, and/or discussing the transfer of know-how from one area/industry to another, was especially interesting. The numerous questions during the presentations and the intensive discussions assisted participants in a better understanding of the complex porous media processes and phenomena. New cross-disciplinary connections/collaborations were established.

The collected presentations will be available soon for the members of the Society on the new InterPore web page. Additionally to the oral presentations, poster sessions were organized.



The Procter&Gamble Student Award was presented at InterPore 2010 Conference to Shingo Watanabe (Texas A&M) for the Best Student Poster Presentation entitled 'A hybrid Ensemble Kalman Filter with coarse scale constraint for nonlinear dynamics'. Shingo gave an excellent presentation including articulate responses to questions. His project was well defined and involved the development of a new EnKF algorithm and demonstration of application to an important porous media optimization problem.

A key moment at the conference was the ceremony of awarding Prof. Jacob Bear for his numerous achievements in developing and promoting the understanding of the porous media (see page 7). Another award that was given was for the best poster – see photo on page 2.

An important part of the event was the Annual Meeting of the Society. The President, Professor Helmig, the Managing Director, Professor Hassanizadeh, and the Treasurer, Professor Gerritsen, reported on the activities of the Society in 2009, as well as on the planned activities for 2010. In particular, it was reported that the new InterPore website is at the final stage of development, and soon will be replacing the old one. Among the influential decisions of the Annual Meeting and the meeting of the InterPore Council, is the decision for establishing focus groups, where the interested Society members will collaborate to organize targeted discussions as well as specialty workshops on specific topics. The first two such groups are on benchmarking, moderated by Knut-Andreas Lie, and on pore scale modeling, moderated by Masa Prodanovic.

STOP PRESS !!

Majid Hassanizadeh has been awarded the **Alexander von Humboldt Prize**, also known as the Humboldt Research Award, named after the late Prussian naturalist and explorer.

It is currently valued at € 60,000 with the possibility of further support during the prize winner's life. In total, up to one hundred such awards are granted each year in all areas of science.

Majid was nominated by his longtime collaborator Professor Rainer Helmig of Stuttgart University. The award is to be used for financing research collaborations with German universities in general, and with Stuttgart University, in particular.

Majid's reaction: *I accept this award on behalf of my former and current PhD students, post-docs, and collaborators. My scientific achievements have been made possible through their valuable inputs. This is an award that I proudly share with them. A nice part of this award is that I need to spend a considerable period of time in Stuttgart for research collaborations. I eagerly look forward to that as my visits to Stuttgart have been always most enriching and rewarding.*

InterPore News www.interpore.org

Published in printable electronic form by the International Society for Porous Media (InterPore).

Circulated free of charge to members of InterPore.

Articles and news items on the study and characterisation of porous media, especially when relevant to other types of porous media, are welcomed for publication in this newsletter, issued three or four times a year.

Copy deadline for next issue: September 30th 2010

Editors:

G.Peter Matthews (Managing editor)

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LABORATOIRE INTERÉTABLISSEMENTS

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FIRST ANNOUNCEMENT
3rd International Conference
on porous media
& Annual meeting of the
International Society for Porous Media
29-31 March 2011
Bordeaux Campus, FRANCE

Objectives

The objective of the conference is to bring together porous media theoreticians, modellers, and experimentalists from academia and industry and to provide a forum for exchanging ideas and expertise for advancing the porous media science. This includes problems around developing, producing and manufacturing porous structures, characterizing them, or analyzing flow and transport that in addition, may involve thermal, chemical and mechanical aspects. The conference aims to cover descriptions of physical mechanisms in porous media at many different scales ranging from the micro to the mega scale, using theoretical, numerical or experimental approaches. All industrial applications involving porous materials are of interest. These applications may concern manufactured materials like thin and/or swelling porous materials as involved in fuel cells, paper, diapers and moisture absorbents, textiles, agrifoodstuffs, filters, concrete, ceramics, polymer composites, detergent tablets ... The conference will also address natural porous media such as soils, aquifers, and reservoirs as well as biological tissues and plants.

Main topics include

- ▶ Up-scaling in porous media
- ▶ Thin porous media
- ▶ Swelling porous media
- ▶ Advanced numerical modeling
- ▶ Pore-scale modeling
- ▶ Biological porous media
- ▶ Heat transfer in porous media
- ▶ Multiphysics & coupled phenomena
- ▶ Experimental techniques for porous media research
- ▶ Imaging applied to porous media
- ▶ Dispersion and reactive transport
- ▶ Multiphase flow in porous media
- ▶ CO₂ sequestration - Nuclear waste storage

Format of the conference

Plenary lectures given by Keynote speakers followed by parallel sessions including invited and contributed talks. Selection of contributed oral and poster presentations will be made by the Scientific Committee based upon the review of a two-page summary.

Call for contributions

Authors are invited to submit a two-page extended abstract for poster or oral presentation.

Guidelines for submission are found on

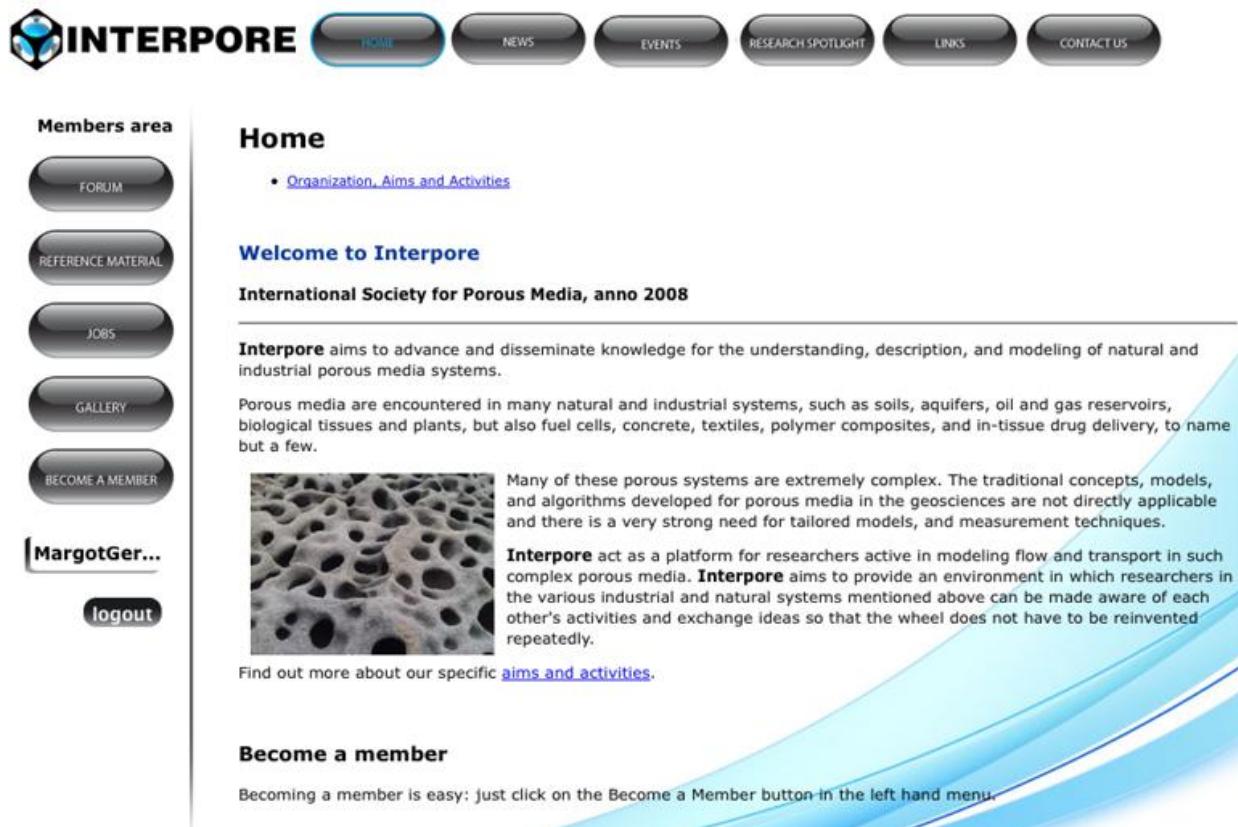
<http://interpore2011.u-bordeaux.fr/>.

Important dates

Submission deadline	Notification to authors	Early registration
October 1 st , 2010	November 30 th , 2011	Till January 17 th , 2011 (30% increase after this date)

Imminent launch of new InterPore website

We are pleased to announce the imminent launch of our new website. Below is a screenshot that gives you a glimpse of the new look:



The website will have a public area and a members-only area.

The members only area includes, amongst others,

- a member forum, where members can exchange information
- a repository of reference information (pdfs of talks, articles, books and course materials, amongst others)
- a job database where prospective employees and employers may find each other
- a gallery with photos of recent events

InterPore members that have paid their 2010 membership fees will receive an email in the next few weeks with their login information for the member area.

We are very excited about the new functions we will be able to offer our members and will spend considerable time this year building and extending our new website. We hope it will prove to be very useful and provide an effective platform for communication and dissemination of information between our members.

With regards from the publicity committee,
Margot Gerritsen, Peter Matthews, Andrea Peri, Jan Nordbotten

Tribute for Professor Magne Espedal

It was with great shock and sadness that we received the news that a founding member of InterPore, Professor Magne S. Espedal, University of Bergen, passed away on Monday January 25, 2010. Although Magne had struggled with some health problems over the last 20 years, he seemed to be in very good shape and was as enthusiastic about academic pursuits as ever. Magne went to Stuttgart on January 24, to work on the writing of a proposal for a new collaborative research and educational program together with German and Dutch colleagues. He shared his last meal with Professor Rainer Helmig, but never showed up for the meeting in the next morning. He appears to have died peacefully while sleeping.



Magne was born in a small village at the west coast of Norway in 1942. He came to the University of Bergen as a student in 1962, and obtained a permanent position in the Mathematics department in 1971. In 1990, Magne was promoted to full professor.

Magne started his professional career working on problems related to plasma physics and nuclear fusion. However, he soon realized the challenges and demands for education and research created by the development of a national petroleum industry in Norway. His research focus, therefore, changed to mathematical modeling of flows and transport in porous media. Magne was crucial in establishing a research group and educational program in reservoir mechanics in the Department of Mathematics at the University of Bergen. Later, he was one of the main forces behind the creation of the interdisciplinary Center for Integrated Petroleum Research (CIPR), which is a national center of excellence.

Magne's scientific work covered a broad range of topics. Most of his work was conducted in close collaboration with students and colleagues in the US and Europe. He has written influential papers across many topics related to modeling flows in porous media, including operator splitting methods, domain decomposition methods, and upscaling. Lately, he had been working on modeling microbial processes used for enhanced oil recovery.

Magne had many leading roles in Norwegian research, including the Norwegian Research Council. To many of us, he was an informal leader of the Norwegian community in applied mathematics. He was a member of the Norwegian Academy of Science and Letters.

Next to his truly illustrious career as a leader in the porous media research community, many of us will remember Magne even more as a great mentor and friend. He was the most popular advisor in the Bergen Mathematics Department, educating more than 100 graduate students. Equally significant, he was generous with his time whenever colleagues came to him for insights and wisdom. Magne always believed in providing the best possible environment for education and research, especially for young scientists to whom he always provided opportunities to grow and become independent researchers. Many of us owe Magne a deep debt of gratitude, and we will miss him dearly.

Our thoughts go to Magne's family.

Helge Dahle, Bergen, 18 February 2010.

Citation for Jacob Bear, InterPore Honorary Member, 2010

President Helmig, ladies and gentlemen, it is an honor for me to have introduced my mentor and friend, Jacob Bear.

The InterPore council approved the establishment of InterPore Honorary Membership Award in September 2009, and the plan was to have the first recipient honored during this Annual Meeting. There was very little time. So, the Executive Committee was asked to select the first recipient of this award. We were actually very quick in being able to decide unanimously who that person should be. The description of the award says that "... it is reserved for individuals who have made extraordinary contributions to porous medium science and technology, who are world renown in the porous media community, and whose contributions are consistent with the aims and ideals of InterPore." Well, this is a concise description of Professor Jacob Bear's carrier. He is no doubt the most familiar name to the previous, the current, and most probably the future generations of geo-hydrologists, hydrogeologists, and anyone working with flow and transport in porous media.

I first met Jacob in 1976 in Princeton, where he was visiting and gave a course on groundwater hydraulics. I was a PhD student and had of course read his papers and had a copy of his famous book, the bible of porous media. So, I attended his classes with much expectation. I still have a vivid picture of the enthusiastic, clear, and friendly manner he gave his lectures. He would explain and convey complex ideas as easily as familiar subjects. He was always well prepared and distributed extremely well-written lecture notes. In fact, his lecture notes were of such quality that they were often turned into text books later.

Jacob's carrier spans more than half a century of research and education. When he got his PhD in 1960 from UC Berkeley, he was concerned by the acute lack of appropriate tools for quantitative modeling, and by the huge gaps in fundamental understanding of the physics of flow and transport in porous media. Since then, Jacob has devoted his career to remedying this situation. He has done this by combining basic physical principles, mathematical analysis, and practical applications, to produce a coherent and systematic methodology for formulating and quantifying problems in porous systems. From the beginning, instead of talking of hydrogeology or geohydrology theories, he promoted a holistic and more general notion of "phenomena of transport in porous media." In 1967, Jacob organized the first IAHR symposium on the "Fundamentals of Transport Phenomena in Porous Media," which brought together scientists from many disciplines – hydrologists, soil physicists, reservoir engineers, etc. – who had not been communicating previously. He should have started the InterPore then! He didn't, but he has been promoting and serving the ideals of InterPore ever since.

Jacob's research has helped to mature the field of porous media flow and transport. During the 50's and 60's, he had a leading role in the formulation of hydrodynamic dispersion theories as we know them today. Around the same time, he pursued the Representative Elementary Volume (REV) approach and the theory of volume averaging – as an approach to all phenomena of transport in porous media, from microscopic to macroscopic levels. His has also made major contributions to the subject of sea water intrusion, land subsidence, modeling of displacement waves and shock waves in thermoelastic porous media, fractured media, and more recently modeling of flow and pressure changes in the brain.

*During the past forty years, a very large number of students have been inspired and instigated by him to follow a career in porous media. He has done this directly through his lectures, and indirectly through his books and research papers. The students have learned the alphabet of porous media theories by reading his books and papers. A similar role has been played by the journal *Transport in Porous Media* that has been founded by Jacob. He is the relentless force*



behind establishing this most valuable source of up-to-date research information for porous medium science and technology. This is a service that has to be valued greatly. It is no surprise then that Jacob's accomplishments have been recognized with several key honors, including AGU Fellow, the AGU Excellence in Geophysical Education Award, honorary doctorates from Delft and ETH Universities, and the Rothschild Prize (Israel).

Jacob has never stopped with bringing innovations into education. About ten years ago, during one of his many trips to the Netherlands to give a short course, Jacob called me and with his common enthusiasm told me about his plans for putting together a virtual (online) course. He asked me to meet with him to see what he meant. We did and I was amazed by what he had prepared. It was not only a full-fledged course on porous media flow and transport but a comprehensive book complete with examples, links to extra readings and much more. He enthusiastically explained how he wanted to reach millions of students and to make learning porous media modeling more fun than ever. I know he's made progress with this plan and I sincerely hope that he succeeds.

When InterPore was established in 2008, I wrote a short e-mail to Jacob about it and asked what he thinks of the idea. He immediately wrote back with a very enthusiastic e-mail saying he will support it wholeheartedly and explained why in detail. And he has done so very much. We have an alliance with Transport in Porous Media as we serve very similar goals. Springer is promoting InterPore on the website of TiPM and in their e-mail alert service.

President Helmig, ladies and gentlemen, I cannot think of anyone who deserves honorary membership of InterPore as much as Jacob Bear, a legend in porous media science.

S. Majid Hassanizadeh, Utrecht University, The Netherlands.

Response by Jacob Bear

President Helmig, my dear friend Majid, members of the Executive Committee, and colleagues, ladies and gentlemen.

It is a real honor for me to accept the appointment of Honorary Member of InterPore for 2010. I wish to express my sincere thanks to the InterPore Executive Committee for choosing me as the first recipient of this honor.

Indeed, when, in 2008, Majid wrote me about the establishment of InterPore, I immediately responded that this was an excellent idea, and that I wholeheartedly support it, and will contribute as much as I can to its success. However, as to your comment, Majid, that I should have started InterPore already in the mid- 60's, perhaps you do not know, but in 1967 I established a section of Flow through Porous Media within the framework of the International Association for Hydraulic Research, and served as its Chairman for 4 years. Then, in 1969, I convened, in Israel, the First International Symposium on the Fundamentals of Transport Phenomena in Porous Media. It brought together professionals and scientists from many disciplines, all working in and making use of the same fundamental theory. A second conference, with the same objectives, was convened a few years later in Guelph, Canada.

I started my professional/academic career as a hydrologist, specializing in groundwater, which is the major source of water in Israel. After my Ph.D. at UC Berkeley, I joined the Technion –Israel Institute of Technology, in the Dept. of Civil Engineering and started to teach and conduct research in groundwater hydrology, sea water intrusion, artificial recharge and aquifer management. So, what brought me to porous media? After a few years of work, I noted that on my desk I had books on petroleum reservoir engineering, on soil mechanics, on, irrigation and drainage, and on chemical engineering, in addition to books on groundwater hydrology.

All these disciplines were actually dealing with the same subject matter---phenomena of flow of single and multiple fluid phases, transport of chemical species, chemical reactions, stress-strain relationships, etc., in porous medium domains, whether natural or artificial. They were doing the same kind of work, but speaking different languages, attending different conferences, etc. And so, I started to develop a unified approach, a unified terminology, and I tried even a unified set of

symbols. This was first summarized in my 1972 book *Dynamics of Fluids in Porous Materials*, and later in other books and publications. In this way, I suggested a unified theory on Transport Phenomena in Porous Media, where the first step is always to understand what happens under the magnifying glass—at the microscopic level, and then leading to well posed mathematical models at the averaged macroscopic level. This theory then serves quite a large number of application disciplines, from groundwater hydrology, through agricultural engineering, reservoir engineering, chemical engineering, and even biomedical engineering.

Just as an example, I am now involved in a European Community FP7 research project on CO₂ sequestration in Deep Geological Brine Formations. To construct the model that will describe the injection spreading and storage in the brine containing formation, we need the phase diagram behavior of the CO₂, two phase variable density flow, non-isothermal conditions, reactive transport in two phase flow, deformation of the solid matrix, etc. Almost every phenomenon of transport of mass, momentum, and energy occurs in this single project. Isn't it exciting?

So you can understand why I was so glad when a strong international association – InterPore - was established. It has a very important role to play in promoting research and education in this exciting scientific field.

And again, many thanks to all those who were involved in bestowing this honor upon me.

Jacob Bear, College Station, Tx, March, 2010.

Workshop on Interfaces and Interfacial Displacement in Unsaturated Porous Media, Lauterbad, Feb 2011

Keynote speakers

- **Majid Hassanizadeh**
Utrecht University,
The Netherlands
- **Rudolf Hilfer**
University of Stuttgart,
Germany
- **Ruben Juanes**
MIT, USA
- **Sjoerd van der Zee**
Wageningen University,
The Netherlands
- **Knut Jørgen Måløy**
University of Oslo, Norway
- **Paul Meakin**
Idaho National Engineering
and Environmental
Laboratory, USA
- **Marco Dentz**
CSIC, Spain
- **Jonas Toelke**
Ingrain Inc., Houston, USA



Information and registration

- June 2010: First announcement
 15 Sept 2010: Deadline for abstract submission
 30 Oct 2010: Decision on abstract acceptance
 15 Dec 2010: Deadline for registration/payment

For additional information and abstract submission
<http://www.misis-workshop2011.uni-hannover.de>

Location/Accommodation:

Waldhotel Zollernblick
 D-72250 Freudenstadt-Lauterbad
 Schwarzwald
 Am Zollernblick 1

Organizing committee

- *Manfred Krafczyk* (TU Braunschweig)
- *Peter Lehmann and Dani Or* (ETH Zurich)
- *Hans-Jörg Vogel* (UFZ Halle)
- *Rainer Helmig* (Universität Stuttgart)
- *Wolfgang Durner* (TU Braunschweig)
- *Jan Vanderborght* (FZ Jülich)
- *Insa Neuweiler* (LU Hannover)



First Announcement International Workshop

Interfaces and interfacial displacement in unsaturated porous media

02-04 February 2011
 Lauterbad, Black Forest



Upscaling and modeling of reactive transport in partially saturated porous media.

Summer School – Utrecht 2 – 9 July 2010

Scope

Migration of solutes, nanoparticles, and colloids in the subsurface is affected by a multitude of complex, interactive physical, geochemical and microbiological processes. Simulation of these processes requires knowledge of physical processes of partially-saturated water flow and convective-dispersive solute transport with a range of biogeochemical processes. Computational modeling is an extremely valuable tool for analyzing such complex problems.

Upscaling from pore to core

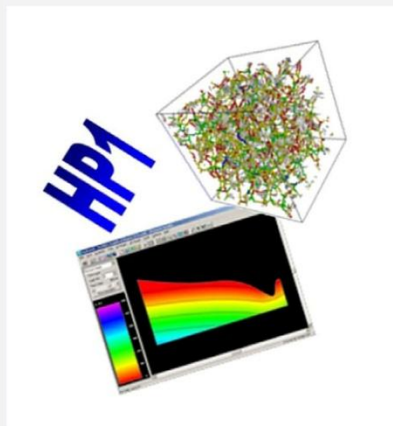
For understanding reactive transport process in complex porous media, it is crucial to identify and understand flow and transport processes at the microscopic (pore) scale, and then try to describe their manifestation at the continuum (core and field) scale. A powerful approach for transferring pore-scale information to the larger scale, and establishing relationships among the scales, is pore-scale modeling. Using pore-scale modeling, one can simulate flow and transport in detail by explicitly modeling mass transfer across interfaces and mass fluxes through pores. Micro-scale hydrodynamic and reactive processes can be explicitly modeled in detail and their effects at the larger scale quantified.

In this course

This course is designed to familiarize participants with the principles and numerical analyses of partially-saturated flow and coupled multi-component reactive transport, as well as application of state-of-the-art numerical codes at both the pore and continuum scales. Applications to solute transport, virus and colloid transport, and biodegradation will be discussed in detail. Although participants should have a general background in the principles of subsurface hydrology, the course gives an introduction to some theoretical aspects of water flow, solute transport. Hands-on computer sessions will familiarize participants with the basic use of the software packages.

Course Software

The course introduces a number of Windows-based numerical modeling software packages for simulating water, heat, and/or contaminant transport in partially-saturated porous media. These include the HYDRUS-1D and HYDRUS (2D/3D) codes, PHREEQC-2 for geochemical calculations, and HP1 for one-dimensional biogeochemical fate and transport.



Lecturers

Al Cunningham, Center for Biofilm Engineering, Montana State University, Bozeman, Montana, USA.

Niels Hartog, Deltares-Soil and Groundwater Systems, Utrecht Area, Netherlands.

Diederik Jacques, Performance Assessment Unit, Institute of Environment, Health, and Safety, Belgian Nuclear Research Centre, Mol, Belgium.

Yan Jin, Department of Plant and Soil Sciences, University of Delaware, Newark, Delaware, USA.

Jack Schijven, Microbiological Laboratory for Health Protection, National Institute of Public Health and the Environment, Bilthoven, Netherlands

Jirka Simunek, Department of Environmental Sciences, University of California, Riverside, California, USA.

Martinus Th. van Genuchten, Department of Mechanical Engineering, Federal University of Rio de Janeiro, RJ, Brazil.

Amir Raouf, Faculty of Geosciences, Utrecht University, Utrecht, Netherlands.

S. Majid Hassanizadeh, Faculty of Geosciences, Utrecht University, Utrecht, Netherlands.

Programme

Module 1, (2-4 July):

DAY 1

- An overview of vadose zone flow and transport modeling
- Introduction to HYDRUS software packages

DAY 2

- On the characterization and measurement of the hydraulic properties of unsaturated porous media
- Application of HYDRUS-1D to direct problems
- Parameter estimation and inverse modeling with HYDRUS
- Application of HYDRUS-1D to inverse problems

DAY 3

- Application of HYDRUS (2D/3D) to simple two dimensional problems
- HYDRUS practicals and general HYDRUS sessions

Module 2, (5-9 July):

DAY 4

- Fundamentals of mass transfer between phases
- Introduction to biogeochemical equilibrium and reactive transport modeling
- Introduction to PHREEQC and HP1

DAY 5

- Chromatographic transport of major cations
- Applications in PHREEQC and HP1
- Pore Network modeling, introduction
- Virus transport

DAY 6

- Pore Network modeling, unsaturated
- Virus transport
- Biodegradation

DAY 7

- Pore Network modeling, upscaling
- Virus transport
- Biodegradation

DAY 8

- Biodegradation

Target audience

The course is intended for graduate students, researchers and professionals wishing to expand their knowledge of water flow, contaminant transport and biogeochemical reactions in variably-saturated porous media.

Registration

Please register via

<http://www.geo.uu.nl/hydrogeology/reactive>

Registration fee (includes lodging, lectures, course material, refreshments, lunches, and conference dinner):

Early bird registration fee (till April 8th): *12th*
Module 1: €200; Module 2: €750
Both modules: €900

Regular registration fee: Module 1: €250; Module 2: €900
Both modules: €1100

There is a 15 % discount for student members of the International Society for Porous Media (InterPore), <http://www.interpore.org/>

Computer exercises will be carried out on your own personal laptops. Please inform us if you are not able to bring your own laptop.

Venue and Lodging

Lectures will be held at the Earth Sciences Building (Budapestlaan 4, De Uithof, Utrecht) on July 2-4 and at the Deltares building (Princetonlaan 6, De Uithof, Utrecht) on July 5-9.

Lodging will be provided at Utrecht University Campus dormitories, De Uithof, Utrecht.

Information:

Visit <http://www.geo.uu.nl/hydrogeology/reactive>

For all inquiries, contact Amir Raouf: raouf@geo.uu.nl

Tel: (+31) 030 2535137

Fax: (+31) 030 2534900

*Upscaling and modeling of
reactive transport in partially-
saturated porous media
2-9 July, 2010
Utrecht University
The Netherlands*



Organized by

Environmental Hydrogeology Group, Department of Earth Sciences, Faculty of Geosciences, Utrecht University, Utrecht, Netherlands

- Amir Raouf (UU)
- S. Majid Hassanizadeh (UU/Deltares)
- Hans Gehrels (Deltares)
- Rien van Genuchten
- Ruud J. Schotting (UU/Deltares)
- Margreet Evertman (UU)

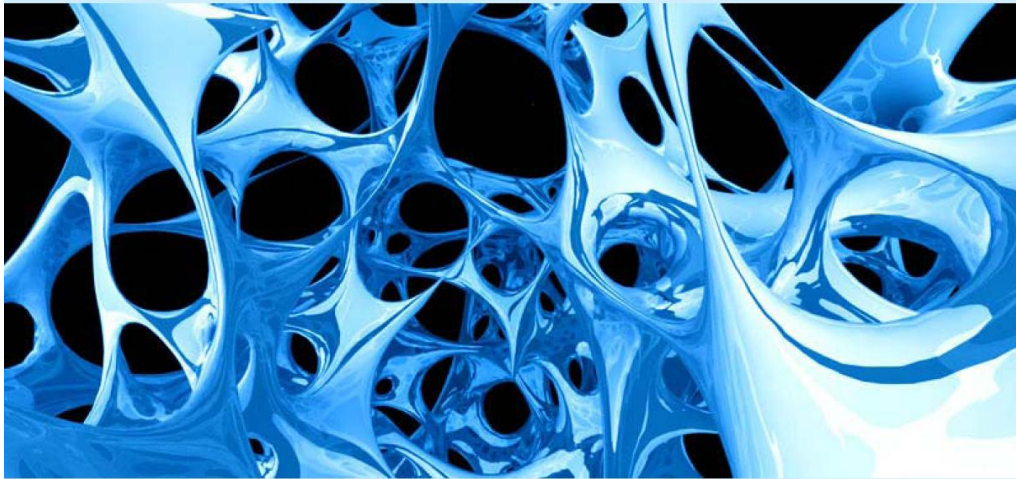
<http://www.geo.uu.nl/hydrogeology/reactive>

1st
Announcement



International symposium:
TRANSPORT IN POROUS MATERIALS
and in networked microstructures

with special focus on the link between
Microscopy and Modelling



19. - 20.8.2010
at PSI in Villigen (Switzerland)

Abstract Deadline: 15th of Mai 2010
Conference Language: English
Information: www.ssom.ch
Contact: Lorenz.Holzer@empa.ch

2011 SIAM Geosciences Conference
Long Beach, CA, March 21-24, 2011.

See: <http://www.siam.org/meeting/g11/>

3 PhD Research fellowships

at Dept. Of Mathematics - University of Bergen - Norway

Modelling and analysis of porous media and CO₂ storage

The Department of Mathematics at the University of Bergen is seeking 3 Research Fellows (PhD) for 3-year positions. We seek candidates with backgrounds in applied mathematics and particularly within the fields of numerical analysis, partial differential equations, reservoir modelling and simulation, multi-grid pre-conditioners and multi-phase flow in porous media

Description of positions:

One of the available positions is in the field of **'Modelling Transport in porous media over multiple scales'**. Applications of particular interest include oil and gas recovery as well as CO₂ storage.

The successful candidate will join a research team which aims at integrating the fields of upscaling, multi-scale methods and numerical linear algebra within the context of multi-phase flow in porous media.

Contact information:

For further information please contact Associate Professor Jan M. Nordbotten: Jan.nordbotten@math.uib.no, phone +47 55 58 48 69.

The other fellowships are initiated by two closely related projects:

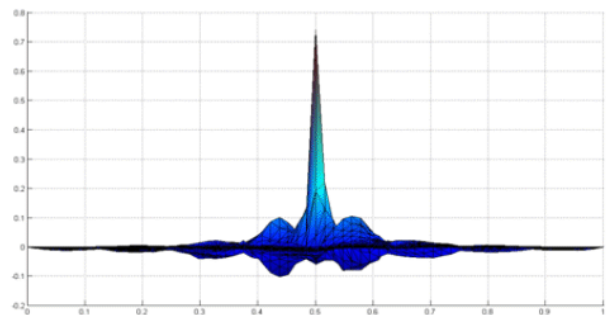
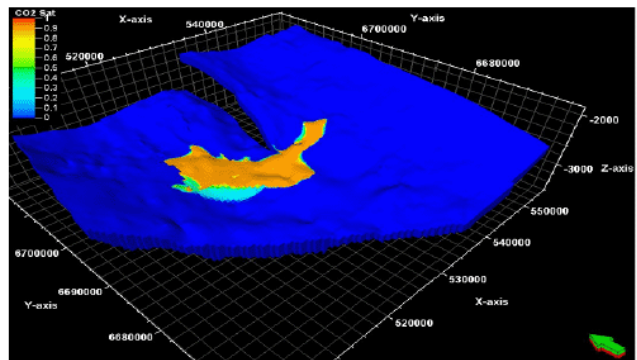
One position is financed by the Research Council of Norway through the project **"Development and Analysis of Vertically Averaged Models in Porous Media", VAMP**. The candidate will in particular focus on the development, analysis and implementation of vertically averaged method for the simulation of CO₂ plume-migration.

The other position is at the newly established **centre for environment-friendly energy research (CEER) within CO₂ storage, SUCCESS**. The candidate will focus on mathematical models for instable processes with CO₂ flow.

Contact information:

For further information, please contact Professor Helge K. Dahle helge.dahle@math.uib.no, phone +47 55 58 56 48.

Closing dates for applications: 15 and 20 June 2010.
Visit our web site for further information and to see the formal announcements: <http://www.uib.no/positions>



UNIVERSITY OF BERGEN



Position Openings for Graduate Study

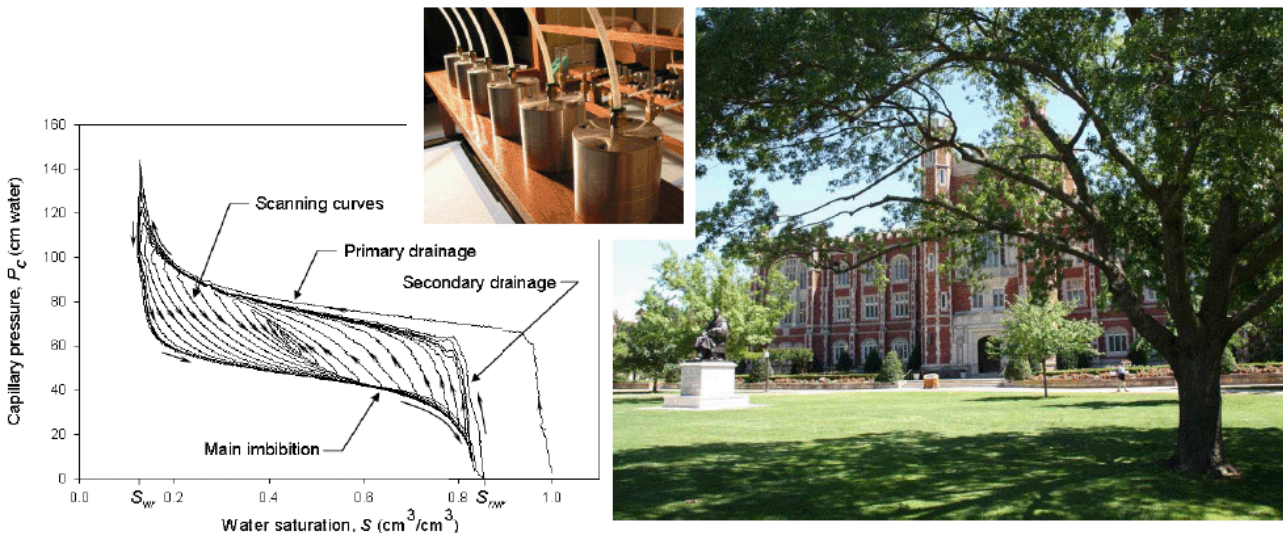
Dynamic Capillary Effects Throughout the Hysteretic Capillary Pressure-Saturation (P_c - S) Relationship: Fundamental Causes and Dependencies

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Project Summary: Dynamic capillary effects (the observed rate dependence of capillary pressure during dynamic drainage or imbibition) may have significant implications for a range of hydrologic problems, including understanding the distribution and movement of water in the unsaturated zone during extreme weather events. However, experiment-based quantitative information about the magnitude of dynamic capillary effects is extremely sparse, and proposed dependencies on system properties reported to date have been contradictory. The primary objective of the proposed work is to conduct a quantitative study of dynamic capillary effects throughout the hysteretic capillary pressure-saturation relationship using a combination of novel experimental techniques. A collaborative modeling effort using the CompSim three-dimensional multiphase flow model will use the results of experimental measurements to explore the potential impacts of dynamic effects in large-scale systems.

Positions Available: Two positions are available for this project, one each at the Ph.D. and Masters levels. The positions include a tuition waiver at the University of Oklahoma, and will provide a monthly stipend. Applications will be accepted until the positions are filled. Background in a related area is highly desirable, as is evidence of previous publication and research activity, particularly for the position at the Ph.D. level. Starting date for the two positions could be as soon as Fall 2010, but later dates are possible.

To be considered for the project, or to request more information please contact Dr. Kibbey



About CEES, the University of Oklahoma, and Norman, Oklahoma:

- School of CEES: <http://www.ou.edu/content/coe/cees.html>
- University of Oklahoma: <http://www.ou.edu/publicaffairs/oufacts.html>
- Norman Oklahoma: http://www.ou.edu/discover/discover_home/community/norman_ouklahoma.html



RESEARCH ACTIVITY

Research at the Technion-Israel Institute of Technology, Haifa, Israel

The coefficient of Dispersion and Dispersivity in a porous media

Jacob Bear and Lepnid Fel

For the case of an axisymmetric porous medium, we have shown that six independent moduli are needed in order to determine all components of the (fourth rank) dispersivity tensor. We have also listed the constraints that these moduli have to satisfy, and found the number of experiments that are required in order to determine the entire set of dispersivity moduli for 2-dim and 3-dim domains. This information is required when determining the latter by experiments for specific porous media.

Furthermore, we have studied a number of transport coefficients that appear in the laws that govern advective, diffusive, and dispersive fluxes of extensive quantities that are transported within a phase occupying the void space of a porous medium or part of it. We focused on anisotropic porous media and on the transport of mass of a dissolved chemical species, although the same conclusions are applicable to heat as the transported extensive quantity, when the solid matrix is thermally non-conducting. Making use of the basic features of tensors of second and 4th-rank, we have determined the number of independent components for each considered transport coefficient. This information will enable further research on the relationships among the various dispersivity components. It will also facilitate the planning and analysis of experiments that are conducted in order to determine the numerical values of these coefficients by inverse method.

Publications:

<http://www.springerlink.com/content/62543710p8360768/>

<http://www.springerlink.com/content/yh1537134v0770v5/>



The *International Society for Porous Media (InterPore)* is a non-profit-making independent scientific organization established in 2008.

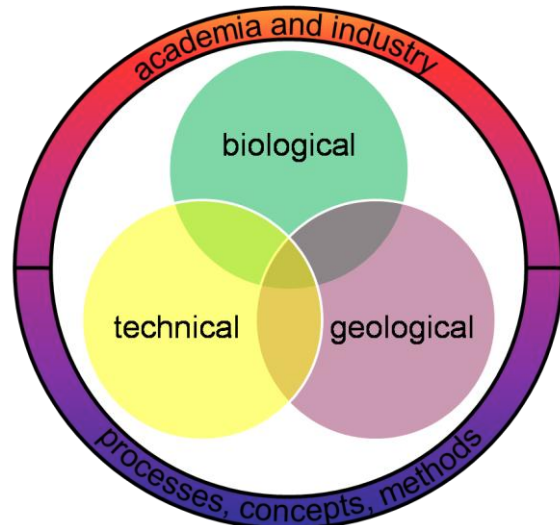
The general aim of the Society is to advance and disseminate knowledge for the understanding, description, and modeling of natural and industrial porous media systems.

Key Aims of the Society

- 🌐 facilitate connections and collaboration among industrial and academic researchers;
- 🌐 connect porous media theoreticians, modellers, and experimentalists;
- 🌐 provide a forum for exchanging ideas and expertise for the improvement of porous media models;
- 🌐 identify research questions that will lead to major improvements in the theories and models of complex porous media and to define modelling challenges;
- 🌐 facilitate training and education.

Examples of Industrial & Natural Applications of Porous Media

Fuel cells, paper-pulp drying, food production and safety, filtration, concrete, ceramics, moisture absorbents, textiles, paint drying, polymer composites, and detergent tablets. The most well-known natural porous media involving multiphase flow and transport are soils, aquifers, and reservoirs. But such processes also occur in biological tissues and plants. Recently, there has been growing interest in the biomechanics of porous tissues, engineered tissues, and in-tissue drug delivery.



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INTERPORE: "Similar solutions to diverse applications."

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