

# ***Program***

## **Fourth International Conference on Porous Media and its Applications in Science, Engineering and Industry**

**June 17-22, 2012  
Potsdam, Germany**

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**Kambiz Vafai**  
University of California, Riverside, USA

### **Co-Chairs**

**Adrian Bejan**  
Duke University, USA

**Akira Nakayama**  
Shizuoka University, Japan



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## **Sunday, June 17, 2012**

16:30 – 18:00	Registration
18:00 – 19:00	Reception
19:00 – 20:30	Dinner
20:30 – 21:30	Opening Keynote Talk <b>Porous Media in the Oilfield</b> Peter Tilke, Schlumberger-Doll Research, USA

### **Notes**

- Meals will be in the Restaurant “Templiners” (with exception of banquet-location to be announced)
- Taping and photography of any presentations are prohibited.
- Speakers – Please leave at least 5 minutes for questions and discussion.
- Please do not smoke at any conference functions.
- Turn your cellular telephones to vibrate or off during technical sessions.
- Please write your name on your program so that it can be returned to you if lost.
- After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.

## **Monday, June 18, 2012**

- 07:00 – 08:00 Breakfast
- 08:00 – 08:50 **Keynote – Processing and properties of porous composite metal foams**  
Afsaneh Rabiei, North Carolina State University, USA
- Oral Session 1: Transport through Porous Media (I)**
- 08:50 - 09:15 **Fluid flow and solute transport in unevenly-stratified groundwater aquifers**  
Robert McKibbin, Massey University at Albany, New Zealand
- 09:15 - 09:40 **How to calculate hydraulic tortuosity easily?**  
Maciej Matyka, University of Wroclaw, Poland
- 09:40 – 10:05 **Fluid flow and aerosol transport in T-shaped 3D structures**  
Ana Serrenho, Évora Geophysics Centre, Portugal
- 10:05 – 10:35 Coffee break
- 10:35 – 11:00 **Coupling mass transport in inner and outer flows while modeling drying from a pore-network model**  
Krishna M. Pillai, University of Wisconsin-Milwaukee, USA
- 11:00 – 11:25 **A new experimental technique to study the flow in a porous layer via rheological tests**  
Claudia Carotenuto, Second University of Naples, Italy
- Oral Session 2: Porous Media Characteristics (I)**
- 11:25 – 11:50 **Pore-scale modeling of the impacts of geochemical transformations on flow**  
Sumit Mukhopadhyay, Lawrence Berkeley National Laboratory, USA
- 11:50 – 12:15 **Channel segregation during columnar solidification influence of inertia**  
Dominique Gobin, CNRD-EM2C-Ecole Centrale Paris, France
- 12:15 – 12:40 **The flow around circular cylinders partially coated with porous media**  
Bodo Ruck, Karlsruhe Institute of Technology (KIT), Germany
- 12:45 – 14:00 Lunch

**Monday, June 18, 2012 (continued)**

**Concurrent - Oral Session 3: Porous Media in Biological and Environmental Applications**

- 14:00 – 14:25      **Porous media for catalytic renewable energy conversion**  
Nico Hotz, Duke University, USA
- 14:25 – 14:50      **Interaction of gusts with forest edges**  
Bodo Ruck, Karlsruhe Institute of Technology (KIT), Germany
- 14:50 – 15:15      **Toward a porous media model of the human lung**  
Christopher T. DeGroot, University of Western Ontario, Canada

**Concurrent - Oral Session 4: Nano and Micro Scale Phenomena**

- 14:00 – 14:25      **3D porous media reconstruction using a simulated annealing technique**  
Alysson Nunes Diógenes, Universidade Federal do Paraná, Brazil
- 14:25 – 14:50      **Unsteady magnetohydrodynamic flow of a micropolar fluid due to constant accelerated disk with no slip conditions in a porous medium**  
Faisal Shahzad, National University of Sciences and Technology CAE Campus, Pakistan
- 14:50 – 15:15      **Soret Dufour effect on the stability of a micropolar fluid in a porous medium**  
Jaimala Bishnoi, Ch. Charan Singh University, India
- 15:15 – 15:40      **Laws of non-symmetric optimal flow structures, from the macro to the micro-scale**  
Heitor Reis, University of Évora, Portugal
- 15:40 – 16:05      **Moderate Reynolds number flow through a microchannel filled with an array of micro-cylinders**  
Kamel Hooman, University of Queensland, Australia
- 16:05 – 19:30      *ad hoc* sessions / free time
- 19:30 – 21:00      Dinner
- 21:00 – 22:30      **Poster Sessions** (with wine and beer)

**Tuesday, June 19, 2012**

07:00 – 08:00 Breakfast

08:00 – 08:50 **Keynote Talk – Residual saturation dynamics and hysteresis in porous media**  
Rudolf Hilfer, University of Stuttgart, Germany

**Oral Session 5: Experimental and Measurement Techniques**

08:50 – 09:15 **Experimental investigation of drying by pore networks: Influence of pore size distribution and temperature**  
Nicole Vorhauer, Otto von Guericke University Magdeburg, Germany

09:15 – 09:40 **Measurements on the flow of vapors near saturation through porous Vycor glass membranes**  
Thomas Loimer, Technical University of Vienna, Austria

09:40 – 10:05 **Imaging, microanalysis and modeling of the microbially induced CaCO<sub>3</sub> precipitation process**  
James Connolly, Montana State University, USA

10:05 – 10:35 Coffee break

**Oral Session 6: Industrial and Environmental Flow and Heat Transfer in Porous Media (I)**

10:35 – 11:00 **Numerical modeling of ground-water flow and contaminant transport in a saturated porous medium**  
Mohammad Sadegh Valipour, Semnan University, Iran

11:00 – 11:25 **Turbulent heat transfer analysis of silicon carbide ceramic foam as a solar volumetric receiver**  
Akira Nakayama, Shizuoka University, Japan

11:25 – 11:50 **Macroscopic turbulent models for heat transfer in catalyst packed beds**  
Fabrice Mathey, Air Liquid, France

11:50 – 12:15 **Local heat transfer coefficients and bed porosity between a horizontal cylinder and bubbling fluidized bed of Gerdart B materials**  
Francesco Di Natale, University of Naples, Italy

12:15 – 13:30 Lunch

**Tuesday, June 19, 2010 (continued)**

**Concurrent Oral Session 7: Multiphase Transport in Porous Media**

- 13:30 – 13:55      **A novel numerical approach for the solution the problem of two-phase, immiscible flow in porous media using shifting matrix technique**  
Amgad Salama, King Abdullah University of Science and Technology, Saudi Arabia
- 13:55 – 14:20      **Computational modeling technique for numerical simulation of immiscible two-phase flow problems involving flow and transport phenomena in porous media with hysteresis**  
Eduardo Abreu, Universidade Estadual de Campinas (UNICAMP), Brazil
- 14:20 – 14:45      **Hyperslow drainage**  
Marc Prat, Institut de Mécanique des Fluides de Toulouse, France

**Concurrent Oral Session 8: Oil Reservoirs and Geophysics**

- 13:30 – 13:55      **Theoretical fundamentals, critical issues, and adequate formulation of effective shale gas and condensate reservoir simulation**  
Faruk Civan, University of Oklahoma, USA.
- 13:55 – 14:20      **A multicore numerical framework for assessing the permeability of reservoir rocks**  
Peter G. Tilke, Schlumberger-Doll Research Center, USA
- 14:20 – 14:45      **Modern hardware architectures accelerate porous media flow computations**  
Michal Kulczewski, Poznan Supercomputing and Networking Center, Poland
- 14:45 – 19:30      *ad hoc* sessions / free time
- 19:30 – 21:00      Dinner
- 21:00 – 22:30      **Poster Sessions** (with wine and beer)



**Wednesday June 20, 2012**

- 07:00 – 08:00 Breakfast
- 08:00 – 08:50 **Keynote Talk – Controlling chaos in porous media convection by using feedback control**  
Peter Vadasz, Northern Arizona University, USA
- Oral Session 9: Convection In Porous Media**
- 08:50 – 09:15 **Natural convection of miscible two phases due to density difference in saturated porous media**  
Tetsuya Suekane, University of Tokushima, Japan
- 09:15 – 09:40 **Double diffusive convection due to a horizontal wavy surface in a porous medium**  
Mahesha Narayana, University of KwaZulu-Natal, South Africa
- 09:40 – 10:05 **Analysis and experiment for Darcy flow convection in cylindrical metal foram**  
Nihad Dukhan, University of Detroit Mercy, USA
- 10:05 – 10:35 Coffee break
- Oral Session 10: Advances In Numerical Techniques**
- 10:35 – 11:00 **A finite volume method for the solution of fluid flows coupled with the mechanical behavior of compacting porous media**  
Clovis R. Maliska, Federal University of Santa Catarina, Brazil
- 11:00 – 11:25 **Lattice Boltzmann method for modeling heat and mass transfer during drying of deformable porous medium**  
Hussein El Abrach, Monastir National Engineering School, Tunisia
- 11:25 - 11:50 **Laminar slot-jet impinging on confined porous medium in local thermal non-equilibrium conditions with bottom surface at uniform heat flux**  
Oronzio Manca, Università degli Studi di Napoli, Italy
- 11:50 – 12:15 **A finite difference, multi-point flux numerical approach to flow problems in porous media: numerical examples**  
Amgad Salama, King Abdullah University of Science and Technology, Saudi Arabia
- 12:15 – 13:30 Lunch

**Wednesday June 20, 2012 (continued)**

**Concurrent Oral Session 11: Biotransport In Porous Medium (I)**

- 13:30 – 13:55      **Transport modeling of skin electroporation and the thermal behavior of the stratum corneum**  
Sid Becker, University of Canterbury, New Zealand
- 13:55 – 14:20      **Chemical activation of gasification carbon residue for phosphate removal**  
Sari Kilpimaa, University of Oulu, Finland
- 14:20 – 14:45      **Calcium carbonate mineralization and strontium co-precipitation under continuous and pulsed flow conditions in porous media reactors**  
Ellen Lauchnor, Montana State University, USA
- 14:45 – 15:10      **Modeling and analysis of the transport phenomena in the mammary glands**  
Ana Quezada, University of California Riverside, USA
- 15:10 – 15:35      **An analytical solution for the low-density lipoprotein (LDL) transport in an artery**  
Shujuan Wang, University of California Riverside, USA

**Concurrent Oral Session 12: Transport through Porous Media (II)**

- 13:30 – 13:55      **Capillary transport of cryogenic liquids in porous media**  
Ming Zhang, University of Bremen, Germany
- 13:55 – 14:20      **Moderate Reynolds number flow through a microchannel filled with an array of micro-cylinders**  
Kamel Hooman, University of Queensland, Australia
- 14:20 – 14:45      **Gas flow behavior in extremely low permeability rock**  
Sumit Mukhopadhyay, Lawrence Berkeley National Laboratory, USA
- 14:45 – 15:10      **Instability and species transport in sloping layered warm-water aquifers**  
Robert McKibbin, Massey University at Albany, New Zealand
- 15:10 – 15:35      **Reduction and solutions for unsteady flow of a Sisko fluid for cylindrical geometry**  
Shirley Abelman, University of the Witwatersrand, South Africa
- 15:50                **Optional Excursion**
- 20:00                Dinner

**Thursday June 21, 2012**

07:00 – 08:00

Breakfast

**Oral Session 13: Biotransport in Porous Medium (II)**

08:00 - 08:25

**Development of active porous medium filters based on plasma textiles**

A.V. Kuznetsov, North Carolina State University, USA

08:25 - 08:50

**Adsorption of iaminaribiose in an *in situ* product recovery process**

Thomas Waluga, Technische Universität Braunschweig, Germany

08:50 - 09:15

**Sap flow and heat transport in trees**

John M. Stockie, Simon Fraser University, Canada

09:15 - 09:40

**Biofilm-mediated mineral precipitation – applications in geologic carbon sequestration and beyond**

Robin Gerlach, Montana State University, USA

09:40 - 10:05

**Effect of steady streaming on the flow of micropolar fluid through a constricted annulus in the presence of catheter**

D Srikanth, Defense Institute of Advanced Technology, India

10:05 – 10:35

Coffee break

**Oral Session 14: Metal Foam Heat Exchangers and Industrial and Environmental Flow and Heat Transfer in Porous Media**

10:35 – 11:00

**Fluid flow and heat transfer in inclined heat exchanger bundles**

Kamel Hooman, University of Queensland, Australia,

11:00 – 11:25

**Material and height effects on the heat transfer performance of metal foams cooled by air in forced convection**

Simone Mancin, University of Padova, Italy

11:25 – 11:50

**Metal foam heat exchangers for heat transfer augmentation from fuel cell systems**

Mostafa Odabae, University of Queensland, Australia

12:00 – 13:30

Lunch

**Thursday June 21, 2012 (continued)**

**Concurrent Oral Session 15: Industrial Applications of Porous Media**

13:30 – 13:55 **Diesel spray interaction with highly porous structures for supporting of liquid distribution in space and its vaporization**  
Miroslaw Weclas., Georg-Simon-Ohm-University of Applied Sciences,  
Nuremberg, Germany

13:55 – 14:20 **Unconventional gas resources in the U.S.**  
Shapour Vossoughi, University of Kansas, USA

14:20 – 14:45 **Air cooling using a matrix of ceramic tubes**  
Mohamed Ali, King Saud University, Saudi Arabia

**Concurrent Oral Session 16: Porous Media Characteristics (II)**

13:30 – 13:55 **Experimental and numerical investigation of flow through a porous medium downstream of a sharp bend**  
Emma Kelly, University of Limerick, Ireland

13:55 – 14:20 **A numerical determination of gel permeability on the pore-scale**  
Marc-Florian Uth, Hamburg University of Technology, Germany

14:20 – 14:45 **Tomographic immersed boundary method for permeability prediction of realistic porous media**  
D.J. Lopez Penha, University of Twente, The Netherlands

14:45 – 15:10 **A geometric pore-scale model for predicting the permeability of 3D flow through fibrous porous media**  
Sonia Woudberg, Stellenbosch University, South Africa

15:10 – 15:35 **Analysis of vortex flow through porous media**  
Fatemeh Hassanipour, University of Texas at Dallas, USA

16:00 – 20:00 *ad hoc* sessions / free time

20:00 **Conference Banquet**

**Friday, June 22, 2012**

07:00 – 08:00 Breakfast

**Oral Session 17: Industrial Applications of Porous Media**

08:00 - 08:25 **Application of macro-cellular SiC reactor to diesel engine-like injection and combustion conditions**

Mirosław Weclas., Georg-Simon-Ohm-University of Applied Sciences  
Nuremberg, Germany

08:25 – 08:50 **Shale caprock integrity under carbon sequestration conditions**

Mileva Radonjic, LSU, USA

08:50 – 09:15 **Analysis and treatment of industrial wastewater through chemical coagulation – adsorption process: A case study of clariant Pakistan**

Syed Farman Ali Shah, Mehran University of Engineering and Technology,  
Pakistan

09:15 – 09:40 **Porous Vycor-glass for climate-regulation applications**

Ferdinand Somorowsky, Fraunhofer ISC, Germany

09:40 – 10:10 Coffee break

10:10 – 12:15 Future directions / *ad hoc* discussions/ free time

12:15 – 13:30 Lunch and departures

## Poster List

1. **Global stability for thermal convection in a rotating couple-stress fluid saturating a porous medium: Galerkin method**  
Sunil Kumar, National Institute of Technology, India
2. **Linear stability of natural convection in a multilayer system of fluid and porous layers with internal heat sources**  
Saman Shalhaf, Islamic Azad University, Iran
3. **Three-dimensional simulation of fluid flow in porous media by boundary element method**  
Janja Kramer, University of Maribor, Slovenia
4. **Modified adaptive local–global upscaling method**  
Dmitry Kolyukhin, Centre for Integrated Petroleum Research, Norway
5. **The effect of high-frequency vertical vibration in a suspension of gyrotactic microorganisms saturating porous medium**  
Yogeshver Dutt Sharma, National Institute of Technology, India
6. **Non-Newtonian buoyancy induced flow over an isothermal axisymmetric body in a porous medium saturated by a nanofluid with internal heat generation**  
Shobha Bagai, University of Delhi, India
7. **Porosity variations at the sediment-water interface**  
Maciej Matyka, University of Wroclaw, Poland
8. **Measurements of surface exhalation characteristics of porous fiber reinforced composites.**  
Markus Selzer, German Aerospace Center, Germany
9. **Experimental study of natural convection in a rectangular cavity packed with porous media**  
Puttabasvsetty Nagaraju, Vijaya College, India
10. **Influences of ion and electron beams on porous biopolymers and its applications**  
Pikul Wanichapichart, Prince of Songkla University, Thailand
11. **Analysis of industrial processes with dead time**  
Veena Sharma, National Institute of Technology Hamirpur, India
12. **Influence of segmental roughness on the performance of hydrodynamically lubricated porous bearings**  
Rajesh Kumar Sharma, National Institute of Technology Hamirpur, India
13. **Investigation of lotion distribution in wet wipes by pore network model and micro computed tomography**  
Nicole Vorhauer, Otto Von Guericke University of Magdeburg, Germany

14. **Study of sorptive deformation of porous sorbents using dilatometric method**  
Andrei Tvardovskiy, Tver State Technical University, Russia
15. **Equilibrium assumptions in multiphase flow: Revisited**  
Philipp Nuske, University of Stuttgart, Germany
16. **Effect of moisture movement on tested thermal conductivity of moist aerated autoclaved concrete**  
Marta Deganello, Universita Degli Studi di Padova, Italy
17. **Analysis of phase change material slurry through rectangular porous channel**  
Fatemeh Hassanipour, University of Texas at Dallas, USA
18. **Adjoint state method for the fractional mobile-immobile model**  
Boris Maryshev, DEN-DM2S-STMF-LATF, CEA/Saclay, France
19. **Numerical analysis of heat - mass transport and pressure built-up in 2D unsaturated porous medium subjected to a combined microwave and vacuum system**  
Khomgris Chaiyo, Thammasat University, Thailand
20. **Flow and heat transfer in triangular permeable duct**  
Fatemeh Hassanipour, University of Texas at Dallas, USA