

Program

Third International Conference on Porous Media and its Applications in Science, Engineering and Industry

**June 20 - 25, 2010
Montecatini Terme, Italy**

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Sunday, June 20, 2010

16:00 – 18:00	Registration
18:00 – 19:00	Reception
19:00 – 20:30	Dinner
20:30 – 21:30	Opening Keynote Talk Through thick and thin: People, places, pressures, permeability and pollutants in porous media Robert McKibbin, Massey University, New Zealand

Notes

- 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.
- Be sure to make any corrections to your name/contact information on the Master Participant List or confirm that the listing is correct. A corrected electronic copy will be sent to all participants after the conference.

Monday, June 21, 2010

- 07:30 – 08:00 Breakfast
- 08:00 – 08:50 **Keynote - Tortuosity, dispersion and turbulence in porous media**
Akira Nakayama, Shizuoka University, Japan
- 08:50 – 10:30 **Oral Session 1: Nano and Micro Scale Phenomena**
Session Chair: Amihay Freeman, Tel Aviv University, Israel
- 08:50 - 09:15 **Electroosmotic dispersion in micro-channels and its implications**
Jacob H Masliyah (invited), University of Alberta, Canada
- 09:15 - 09:40 **High ordered nanoporous alumina and macro porous silicon and its innovative applications**
Monika Lelonek, SmartMembranes GmbH, Germany
- 09:40 – 10:05 **Nutrient transport and mechanical stimuli within perfused porous substrates used in tissue engineering**
C. Oddou, University Paris Est Creteil, France
- 10:05 – 10:30 **Heat transfer enhancement in a differentially heated enclosure using nanofluids-turbulent regime**
Eiyad Abu-Nada, Leibniz Universtät Hannover, Germany
- 10:30 – 11:00 Coffee break
- 11:00 – 12:40 **Oral Session 2: Transport Through Porous Media (I)**
Session Chair: Benoît Goyeau, Ecole Centrale Paris, France
- 11:00 – 11:25 **Boundary conditions at a fluid-porous interface for a convective heat transfer problem: Analysis of the jump relations**
Aliénor d'Hueppe, CEA/DEN/DER/SSTH/LDAL, France
- 11:25 – 11:50 **Linear and nonlinear evolution of isolated disturbance in a growing thermal boundary layer in porous media**
D. Andrew S. Rees (invited), University of Bath, United Kingdom
- 11:50 – 12:15 **A review of approaches for describing gas transfer through extremely tight porous media**
Faruk Civan (invited), University of Oklahoma, USA
- 12:15 – 12:40 **Transverse permeability of fibrous porous media**
Ali Tamayol, Simon Fraser University, Canada
- 12:45 – 13:30 Lunch
- 13:30 – 15:10 **Oral Session 3: Porous Media Characteristics (I)**
Session Chair: Robert McKibbin, Massey University, New Zealand
- 13:30 – 13:55 **Application of numerical Laplace inversion methods for predicting reinfiltration rate in fractured porous media: A comparative study**
Shapour Vossoughi, University of Kansas, USA

Monday, June 21, 2010 (continued)

- 13:55 – 14:20 **An adaptable analytical Ergun-type equation for high porosity spongelike porous media**
Sonia Woudberg, University of Stellenbosch, South Africa
- 14:20 – 14:45 **Derivation of complete jump boundary conditions between homogeneous media**
Benoît Goyeau, École Centrale Paris, France
- 14:45 – 15:10 **Permeability in fixed beds of spheres with size distributions and stochastically generated porous media analogs**
Xiaolong Yin, Colorado School of Mines, USA
- 13:30 – 16:00 **Oral Session 4: Porous Media in Biological and Environmental Applications**
Session Chair: Jacob H Masliyah, University of Alberta, Canada
- 13:30 – 13:55 **Determination of the tortuosity of a porous medium by means of thermodiffusion cell**
Henri Bataller, University of Pau and the Ardour, France
- 13:55 – 14:20 **The effect of pore size and pore geometry on ion exclusion in silica nanopores**
Christian D. Lorenz, King's College London, United Kingdom
- 14:20 – 14:45 **Application of an immersed boundary method to heat and fluid flow in porous media**
David J. Lopez Penha, University of Twente, The Netherlands
- 14:45 – 15:10 **Combustion characteristics of biofuels in porous-media burners**
Subramanyam R. Gollahalli, University of Oklahoma, USA
- 15:10 – 15:35 **Interaction of atmospheric boundary layer flow with permeable Tapered Forest Edges**
Bodo Ruck, Karlsruhe Institute for Technology, Germany
- 15:35 – 16:00 **Effect of porosity on the properties of open cell titanium foams intended for orthopedic applications**
Louis-Philippe Lefebvre, National Research Council, Canada
- 16:00 – 19:30 *ad hoc* sessions / free time
- 19:30 – 21:00 Dinner

Monday, June 21, 2010 (continued)

21:00 – 22:30

Poster Sessions (with wine and beer)

Poster Session I: Convection in Porous Media

Name	Poster Title
Ekaterina Saenko	Correlating the textural characteristics and synthesis conditions of surfactant templated silica
D. Andrew S. Rees	Strongly nonlinear convection in a sidewall-heated porous cavity: A comparison with a network model
Antonio Barletta	Non-local equilibrium flow with viscous dissipation in a plane horizontal porous layer

Poster Session II: Advances in Numerical Techniques

Name	Poster Title
Aminreza Noghrehabadi	Numerical simulation of natural convection for cooling electronic devices in party porous enclosure using a local thermal non-equilibrium model
Ehsan Zaman	CFD simulations for interstitial flow in random packing of spheres: Darcy Regieme and Forchheimer's term
Bernardo Buonomo	Transient natural convection in square cavity with a vertical wall at uniform heat flux filled with a porous medium in non-Darcy and local thermal non-equilibrium model

Poster Session III: Oil Reservoirs and Geophysics

Name	Poster Title
Shapour Vossoughi	Probabilistic treatment of the disproportionate permeability reduction (DPR) in the porous medium after gel treatment
Christophe Preux	A new method of near-well upscaling for reservoir simulations based on optimization

Poster Session IV: Biotransport and Nanoscale Phenomena

Name	Poster Title
Payman Jalali	The effect of pressure induced wall deformation on the transmural flow across the thoracic aorta wall
Amir Zamani	Flow of nano-particles through porous media
Robert Crawford	From red cells to soft lubrication
Jose Manuel Valverde Millan	Nanoparticle bed fluidization as affected by an alternating electric field

Tuesday, June 22, 2010

- 07:30 – 08:00 Breakfast
- 08:00 – 08:50 **Keynote Talk - Multiple-scale analysis of transport in porous media with biofilms**
Michel Quintard, Institut de Mécanique des Fluides de Toulouse, France
- 08:50 – 10:05 **Oral Session 5: Experimental and Measurement Techniques**
Session Chair: Peter G. Tilke, Schlumberger-Doll Research, USA
- 08:50 – 09:15 **Permeability measurements for random soft porous medium and its implications to lift generation**
Robert Crawford, Villanova University, USA
- 09:15 – 09:40 **Evaporation of a non-dilute, multi-component liquid mixture from a porous wick**
Krishna M. Pillai, University of Wisconsin-Milwaukee, USA
- 09:40 – 10:05 **A review of low density porous materials used in high energy laser experiments**
Wigen Nazarov, University of St. Andrews, United Kingdom
- 10:05 – 10:35 Coffee break
- 10:35 – 12:00 **Oral Session 6: Industrial and Environmental Flow and Heat Transfer in Porous Media (I)**
Session Chair: Faruk Civan, University of Oklahoma, USA
- 10:35 – 11:00 **Use of sand beds of variable permeability in beach profile engineering**
A. Heitor Reis (invited), University of Évora, Portugal
- 11:00 – 11:25 **Scaling the water percolation in PEM fuel cell porous transport layers**
Ezequiel Medici, Michigan Technological University, USA
- 11:25 – 11:40 **Test method to quantify the wicking properties of porous insulation materials designed to prevent interstitial condensation**
Andrea Binder, Fraunhofer-Institute for Building Physics, Germany
- 11:40 – 12:00 **An X-ray tomography based modeling solution for chemical vapor infiltration of ceramic matrix composites**
William Ros, LCTS, France
- 12:30 – 13:30 Lunch
- 13:30 – 15:35 **Oral Session 7: Multiphase Transport in Porous Media**
Session Chair: Manolis M. Tomadakis, Florida Institute of Technology, USA
- 13:30 – 13:55 **Stochastic multiscale modeling of carbonate rocks**
Rudolf Hilfer (invited), University of Stuttgart, Germany
- 13:55 – 14:20 **Mass and energy transport in sloping low-temperature groundwater aquifers**
Robert McKibbin (invited), Massey University at Albany, New Zealand

Tuesday, June 22, 2010 (continued)

- 14:20 – 14:45 **Foamy oil flow and its role in heavy oil production**
Brij B. Maini, University of Calgary, Canada
- 14:45 – 15:10 **A coupled multiphase fluid flow and heat and vapor transport model
for air-gap membrane distillation**
Sumit Mukhopadhyay, Lawrence Berkeley National Laboratory, USA
- 15:10 – 15:35 **Salt transport and crystallization due to wick action**
Stephanie Veran-Tissoires, Institut de Mécanique des Fluides de
Toulouse, France
- 13:30 – 14:45 **Oral Session 8: Oil Reservoirs and Geophysics**
Session Chair: Shapour Vossoughi, University of Kansas, USA
- 13:30 – 13:55 **Conductivity of fractures in oil well cement upon contact with rock-
formation waters and dissolved CO₂**
Mileva Radonjic, Louisiana State University, USA
- 13:55 – 14:20 **Effects of the kinetics of crystallization on salt weathering of stones**
Noushine Shahidzadeh-Bonn, UR Navier, France
- 14:20 – 14:45 **Heat and solvent transport at the edge of a depletion chamber in an
in- site bitumen recovery process**
Ian D. Gates, University of Calgary, Canada
- 15:35 – 16:05 Coffee break
- 16:05 – 19:30 *ad hoc* sessions / free time
- 19:30 – 21:00 Dinner
- 21:00 – 22:30 **Poster Sessions**

Poster Session V: Transport through Porous Media (I)

Name	Poster Title
Thomas Metzger	Modeling and simulation of convective drying of gels
Anna-Lena Ljung	Drying an iron ore pellet: Investigation of the influence of surface irregularities and overall geometry
Ehsan Zaman	Mass transfer of carbon dioxide generated from the calcination reaction In a single porous sphere using CFD simulations

Tuesday, June 22, 2010 (continued)

Poster Session VI: Porous Media Characteristics (I)

Name	Poster Title
Krishna M. Pillai	Study of the closure problem for prediction of tortuosity and dispersion tensor during multicomponent transport in a consolidated porous medium
Robert Crawford	Dynamic compression of soft porous media; From finite to infinite domain
Esti Puspitaningrum	Capillary behavior in porous media: The effect of polydispersity in contact angle and pore geometry

Poster Session VII: Experimental and Measurement Techniques

Name	Poster Title
Fujio Kuwahara	A concentration visualization for the study of mechanical dispersion in porous media
Robert Crawford	Experimental study on the lift generation inside a random synthetic porous layer under rapid compaction
Andreas N. Lembach	Drop impact on porous media
Ali Tamayol	Effect Of Fiber Orientation On Flow Properties Of Fibrous Porous Structures
Valentina Zakaznova-Herzog	Electrochemical Impedance Spectroscopy Of Different Porous Materials Used As Diaphragms In Alkaline Electrolysers

Poster Session VIII: Industrial and Environmental Flow and Heat Transfer in Porous Media

Name	Poster Title
J. Gunnar Hellström	Fluid flow induced deformation of porous medium, modeling of the no erosion filter test experiment
Kamel Hooman	Scaling laws for a natural draft cooling tower: Porous medium modeling of the heat exchangers
Shapour Vossoughi	Analytical review of fluid flow performance through gas exchange in the pore structure of the natural gas hydrate
Hanna Runtti	Removal of metallic pollutants at low concentrations using industrial by-products as adsorbents
Seung Eon Kim	Characterization of porous titanium fabricated by sintering with low melting point metal particles
Shigeo Kimura	Observation of turbulent diffusion in a deciduous forest canopy during winter time
Krishna M. Pillai	PORE-FLOW: A simulation code for liquid-infiltration/wetting flows in industrial porous media

Poster Session IX: Multiphase Transport in Porous Media

Name	Poster Title
Jose Manuel Valverde	Nanoparticle fluidization as affected by alternating electric field
Kazuhisa Yuki	Numerical investigation on heat transfer characteristics of metal-particle-based porous heat sink by use of two-energy model
Po-Chuan Huang	Analysis Of Heat Transfer Enhancement In Flat-Plate Solar Water Collector using metal-foam porous blocks

Wednesday June 23, 2010

- 07:30 – 08:00 Breakfast
- 08:00 – 08:50 **Keynote Talk - Pore network study of water invasion in a hydrophobic or partially hydrophobic thin porous layer**
Marc Prat, Institut de Mécanique des Fluides de Toulouse, France
- 08:00 – 08:50 **Oral Session 9: Convection In Porous Media**
Session Chair: Ulf Sjöström, Swerea MEFOS, Sweden
- 08:00 – 08:25 **Onset of thermal convection in a vertical cylinder with a partly conducting and partly penetrative cylinder wall**
Peder A. Tyvand, Norwegian University of Life Science, Norway
- 08:25 – 08:50 **Transient mixed convection in channels partially heated filled with a porous medium in non-local thermal equilibrium**
Bernardo Buonomo, Seconda Università degli Studi di Napoli – DIAM, Italy
- 10:05 – 10:35 Coffee break
- 10:35 – 12:40 **Oral Session 10: Advances In Numerical Techniques**
Session Chair: Peder A. Tyvand, Norwegian University of Life Sciences, Norway
- 10:35 – 11:00 **Simulation of impaction filtration by porous filter**
Lilya Ghazaryan, University of Twente, The Netherlands
- 11:00 – 11:25 **A numerical study on heat transfer and mass transfer in an adsorbent: A uniform pressure approach**
Moghtada Mobedi, Izmir Institute of Technology, Turkey
- 11:25 - 11:50 **Numerical simulation of the absorption of a droplet in a porous medium**
Daniel P. Siregar, Technical University of Eindhoven, The Netherlands
- 11:50 – 12:15 **Solution of turbulent flow in porous media with boundary element method**
Janja Kramer, University of Maribor, Slovenia
- 12:15 – 12:40 **Vortex instability of free convection boundary layers in porous media**
Emily Dodgson, University of Bath, United Kingdom
- 12:45 – 13:30 Lunch
- 13:30 – 15:10 **Oral Session 11: Metal Foam Heat Exchangers (SPS I)**
Session Chair: Louis-Philippe Lefebvre, National Research Council Canada, Canada
- 13:30 – 13:55 **Numerical simulation of the flow through metallic foams: Multi-scale modeling and experimental validations**
Jean-François Héту (invited), National Research Council, Canada

Wednesday June 23, 2010 (continued)

- 13:55 – 14:20 **Entropy-energy analysis of metal foam heat exchangers as air-cooled heat exchangers**
Mostafa Odabae, The University of Queensland, Australia
- 14:20 – 14:45 **Entrance and exit effects for fluid flow in metal foam**
Nihad Dukhan, University of Detroit Mercy, USA
- 14:45 – 15:10 **Experimental and analytical study of heat transfer and fluid flow through aluminum foams**
Simone Mancin, Università degli Studi di Padova, Italy
- 13:30 – 15:35 **Oral Session 12: Transport Through Porous Media (II)**
Session Chair: Brij B. Maini, University of Calgary, Canada
- 13:30 – 13:55 **Downscaling method from macroscopic to microscopic to microscopic scale in a periodic two-dimensional porous media**
Pierre-Emmanuel Angeli, CEA, France
- 13:55 – 14:20 **A macroscopic turbulence model based on a two-scale analysis For incompressible flows in porous media**
Marie Drouin, CEA, France
- 14:20 – 14:45 **Oscillatory flow of fourth order fluid in a porous half space**
Faisal Shahzad, National University of Sciences and Technology, Pakistan
- 14:45 – 15:10 **One-domain approach for heat transfer at the fluid-porous-medium inter-region**
J. Alberto Ochoa-Tapia, Universidad Autonoma Metropolitana, Mexico
- 15:10 – 15:35 **Combined radiation and natural convection within an open-ended porous channel-validity of the Rosseland approximation**
Khalifa Slimi, Higher Institute of Transport and Logistics at Sousse, Tunisia
- 15:45 – 17:30 **Poster Sessions** (with wine and beer)

Poster Session X: Transport Through Porous Media (II)

Name	Poster Title
Ehsan Zaman	Computational study of heat penetration through porous media consisted of randomly packed spheres
D. Andrew S. Rees	Onset of convection in horizontally partitioned porous layer
Matthias Winter	Heat transfer and porous media: Basic research and application
Yoshihiko Sano	Heat transfer enhancement in cross-flow heat exchangers resulting from thermal dispersion
Nihad Dukhan	Velocity profile for Darcy flow in porous media: A two-dimensional solution
Yu-Shu Wu	Displacement of non-Newtonian fluids in linear and radial composite porous media

Wednesday June 23, 2010 (continued)

Poster Session XI: Porous Media Characteristics (II)

Name	Poster Title
Robert Crawford	Experimental study on the lift generation inside a random soft porous layer under rapid compaction
Robert Crawford	Theoretical study on the dynamic compression of soft porous Media: From finite to infinite domain
Manolis M. Tomadakis	Transport properties of fuel cell gas diffusion media
Antonio Barletta	Viscous dissipation and local non-equilibrium in a Darcy-Graetz problem with axially periodic boundary conditions.
Hossein Davarzani	A non-local thermal equilibrium model to determine the effective thermal diffusion coefficients in porous media

Poster Session XII: Advanced Mathematical Approaches in Modeling of Porous Media

Name	Poster Title
Antonio Barletta	Double-diffusive convection instability and viscous dissipation in a fluid saturated porous layer with horizontal forced flow
Andrey Levandovskiy	Mechanical simulation of porous material structure represented By a uniform cubic mesh
Karim Ghesmat	Stability analysis of nanoparticle flows in porous media
Edson A. Ticianelli	Design and stability of porous gas diffusion electrodes for proton exchange membrane fuel cells

Dinner on your own / Free evening

Thursday June 24, 2010

- 07:30 – 08:00 Breakfast
- 08:00 – 10:05 **Oral Session 13a: Bio Transport in Porous Medium (SPSII)**
Session Chair: Christian Oddou, Universite Paris Est Creteil, France
- 08:00 - 08:25 **3-D imaging of biofilms in porous media using X-ray microtomography**
Yohan Davit, Fluids Mechanics Institute of Toulouse, France
- 08:25 - 08:50 **Transport through core-shell fibrous biomaterials and biological systems**
Manolis M. Tomadakis (invited), Florida Institute of Technology, USA
- 08:50 - 09:15 **Absorption edge X-ray tomography for the analysis of particle deposition in packed bed filters**
Anja Waske, TU Dresden, Germany
- 09:15 - 09:40 **Influence of microbial biofilms on reactive transport in porous media**
Robin Gerlach (invited), Montana State University, USA
- 09:40 - 10:05 **Porous and poroelastic methods for cerebral disease diagnosis and intervention design**
Yiannis Ventikos (invited), University of Oxford, United Kingdom
- 10:05 – 10:35 Coffee break
- 10:35 – 11:25 **Oral Session 13b: Biotransport In Porous Medium (SPSII)**
Session Chair: Robin Gerlach, Montana State University, USA
- 10:35 – 11:00 **Adjustment of protein crystal porosity for biotemplating: Chemical and protein engineering tools**
Amihay Freeman, Tel Aviv University, Israel
- 11:00 – 11:25 **The effect of hypertension on the transport of LDL across the deformable arterial wall**
Payman Jalali, Lappeenranta University of Technology, Finland
- 12:30 – 13:30 Lunch
- 13:30 – 15:35 **Oral Session 14: Flow-Induced Alterations in Porous-Medium Properties and Its Impact on Transport (SPS III)**
Session Chair: Sumit Mukhopadhyay, Lawrence Berkeley National Laboratory, USA
- 13:30 – 13:55 **Moisture migration in stored granular materials**
Juan-Gabriel Avila-Acevedo, Otto von Guericke University Magdeburg, Germany
- 13:55 – 14:20 **Drying of porous media: A comparison of discrete and continuous models**
Thomas Metzger, Otto von Guericke University Magdeburg, Germany

Thursday June 24, 2010 (continued)

- 14:20 – 14:45 **Adsorption-induced deformation in porous media and application to CO₂-injected coal beds**
Laurent Brochard, Ecole des Ponts ParisTech, Université Paris-Est, France
- 14:45 – 15:10 **Modeling of electro-diffusive ion transport through charged porous materials using a multiscale iterative approach**
Peter Pivonka, University of Western Australia, Australia
- 15:10 – 15:35 **Time-dependent fluid flow and heat transfer around a circular heated cylinder embedded in a horizontal packed bed of spheres**
Gazy Al-Sumaily, Monash University, Australia
- 13:30 – 15:35 **Oral Session 15: Porous Media Characteristics (II)**
Session Chair: Christian D. Lorenz, King's College London, United Kingdom
- 13:30 – 13:55 **Application of thermoporometry to evaluate the mesoporosity of cement pastes**
Fabien Frizon (invited), National Institute of Applied Science (INSA Toulouse), France
- 13:55 – 14:20 **Upscaling transport of adsorbing solutes in partially-saturated porous media: Pore-network modeling**
S. Majid Hassanizadeh (invited), Utrecht University, The Netherlands
- 14:20 – 14:45 **Heat transfer characteristics in consolidated porous media**
Akira Nakayama (invited), Shizuoka University, Japan
- 14:45 – 15:10 **Pore network modeling of mechanical effects during drying**
Evangelos Tsotsas, Otto Von Guericke University, Germany
- 15:10 – 15:35 **Particle structuring and yield stress in magnetofluidized beds**
J M Valverde, University of Seville, Spain
- 16:00 – 20:00 *ad hoc* sessions / free time
- 20:00 **Conference Banquet**

Friday, June 25, 2010

- 07:30 – 08:00 Breakfast
- 08:00 – 10:05 **Oral Session 16: Industrial Applications of Porous Media**
Session Chair: Thomas Metzger, Otto Von Guericke University, Germany
- 08:00 - 08:25 **Deterioration in heat transfer due to axial conduction of heat in open cell metal foam**
Indranil Ghosh, Indian Institute of Technology, Kharagpur, India
- 08:25 – 08:50 **Investigation of clay content and sintering temperature on attrition resistance and compression strength of porous diatomite based material**
Noemie van Garderen, Swiss Federal Laboratories for Materials Testing and Research, Switzerland
- 08:50 – 09:15 **Infilling of pore spaces in concrete using electrically-driven solution transport systems**
Sean Morefield, US Army ERDC-CERL, USA
- 09:15 – 09:40 **Molecular dynamics study of electro-osmotic ion exclusion in silica nanopores**
Neil Haria, Materials Research Group King's College London, United Kingdom
- 09:40 – 10:05 **Modeling and analysis of permeability of anisotropic compressed non-woven filters**
Sonia Woudberg, University of Stellenbosch, South Africa
- 10:05 – 10:35 Coffee break
- 10:35 – 12:45 **Oral Session 17: Industrial and Environmental Flow and Heat Transfer in Porous Media (I)**
Session Chair: Noemie van Garderen, Empa, Switzerland
- 10:35 – 11:00 **Natural and industrial porous materials as trichloroethylene sorbents for polluted groundwater**
Dino Musmarra, Seconda Università di Napoli, Italy
- 11:00 – 11:25 **Modeling induration of iron ore pellets in a pot furnace**
Ulf Sjöström, Swerea MEFOS AB, Sweden
- 11:25 – 11:50 **Porous AL₂O₃ ceramics with controlled pore structures**
Rolf Janssen, TU Hamburg-Harburg, Germany
- 11:50 – 12:15 **Characterizing flow in oil reservoir rock using smooth particle hydrodynamics**
Peter G. Tilke, Schlumberger-Doll Research, USA
- 12:15 – 13:30 Lunch and departures