

Program

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

June 17-21, 2007

Sheraton Kauai Resort Hotel

**2440 Hoonani Road, Poipu Beach, Koloa, Kauai, Hawaii 96756
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Sunday, June 17, 2007

16:30 - 18:30	Registration
18:30 – 19:30	Reception
19:30 – 21:00	Dinner Buffet

IMPORTANT ANNOUNCEMENTS

- Audiotaping, videotaping and photography of presentations are strictly 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 copy will be sent to all participants after the conference.

Monday, June 18, 2007

- 07:30 – 08:30 Breakfast
- 08:30 – 08:40 Welcome – Chair and ECI Liaison
- 08:40 – 09:30 **Special Session: Flow Transport in Industrial Applications**
- Recent Advances in Modeling Unsaturated Flow in LCM Processes used for Manufacturing Polymer Composites*
Krishna M. Pillai, University of Wisconsin-Milwaukee, USA
- The Role of Porous Media in Modeling Fluid Flow within Hollow Fiber Membranes of the Total Artificial Lungs*
Joseph L. Bull, University of Michigan, USA
- 09:30 – 10:00 Coffee Break
- 10:00 – 10:30 *Various volume fractions of smooth muscle cells affect molecular diffusion through the arterial wall*
Mahsa Dabagh, Lappeenranta University of Technology, Finland
- 10:30 – 11:30 **Keynote: Porous Media in Biology: Research & Industrial Applications**
Jacques Huyghe, Eindhoven University of Technology, The Netherlands
- 12:00 – 13:00 Lunch
- 13:00 – 17:00 Free time / *ad hoc* sessions
- 17:00 – 18:00 Mai Tai hour with entertainment
- 18:00 – 18:50 **Session 1: Advances in Numerical Techniques**
- Practical Finite-Analytic Method- An Overview*
Faruk Civan, University of Oklahoma, USA
- Simulation of Flow and Transport at the Micro(Pore) Scale*
David Trebotich, Lawrence Livermore National Laboratory, USA
- 18:50 – 20:05 **Session 2: Experimental and Measuring Techniques**
- Experimental Investigation of Pebble Beds Structure and Porosity Influence on Heat Transfer Characteristics*
S. Rimkevicius, Lithuanian Energy Institute, Lithuania
- Rendering the Transient Hot Wire Experimental Method to Porous Media Applications*
Peter Vadasz, Northern Arizona University, USA
- Design and Simulation of a Spout fluid bed coating system*
Joel Plawsky, Rensselaer Polytechnic Institute, USA
- 20:30 – 21:30 Dinner
- 21:30 – 23:00 **Poster Session / Social Hour**

Tuesday, June 19, 2007

- 07:30 – 08:30 Breakfast
- 08:30 – 09:15 **Session 3: Bio Transport in Porous Medium**
- Keynote:**
Vascularized Smart Materials: Designed Porous Media for Self-Healing and Self-Cooling
Adrian Bejan, Duke University, USA
- 09:15 – 10:30 *Protein crystal mediated biotemplating*
Amihay Freeman, Tel Aviv University, Israel
- Bacterial Chemotaxis Tranverse to Axial Flow in Microfluidic Channels*
Roseanne M. Ford, University of Virginia, USA
- Macroscopic governing equations for bioheat transfer phenomena*
A. Nakayama, Shizuoka University, Japan
- 10:30 – 11:00 Coffee Break
- 11:00 – 12:15 **Session 4: Advanced Mathematical Approaches to the Modeling of Porous Medium**
- A General Purpose Physical Velocity Formulation for Numerical Simulation of Flows through Porous Media*
Huiying Li, Fluent Inc., USA
- Derivation and Implementation of a Volume-Averaged Entropy Generation Functional for Non-Equilibrium Heat Transfer in High-Conductivity Metal Foams*
Lee J. Betchen, University of Western Ontario, Canada
- A Novel Methodology to Describe Solute Transport in Porous Media*
Branko Bijeljic, Imperial College, United Kingdom
- 12:30 – 13:30 Lunch
- 13:30 – 17:15 Free time / *ad hoc* sessions
- 17:15 – 18:15 Mai Tai hour with entertainment
- 18:15 – 19:05 **Session 5: Particle Migration and Deposition in Porous Media**
- A numerical modeling of composting process with aeration*
F. Kuwahara, Shizuoka University, Japan
- Permeability Impairment and Flow Reduction in Porous Media under Non-Equilibrium Particle Deposition Conditions*
Faruk Civan, University of Oklahoma, USA

Tuesday, June 19, 2007

19:05 – 20:20

Session 6: Industrial and Environmental Heat Transfer and Flow in Porous Media

Mass transfer in a solvent vapor extraction (vapex) heavy oil recovery process

Yongan Gu, University of Regina, Canada

Sieve analysis for the purpose of selecting sand production control devices

Shapour Vossoughi, University of Kansas, USA

Transition from Trickling to Pulsing Regime in a Trickle Bed Reactor- A Parametric Study

Ajay Bansal, National Institute of Technology, India

20:30 – 21:30

Dinner

21:30 – 23:00

Poster Session / Social Hour

Wednesday, June 20, 2007

- 07:30 – 08:30 Breakfast
- 08:30 – 09:15 **Special Session: Porous Media Applied to Marine and Environmental Problems**
- Keynote:** *Marine biogeochemical studies using non-invasive experimental methods, numerical simulation and hydrodynamic instability*
Arzhang Khalili, Max Planck Institute for Marine Microbiology, Germany
- 09:15 – 10:15 *Monotonic Growth of Motile Microorganisms*
Peter Vadasz, Northern Arizona University, USA
- Stability of Gravity Driven Convection in a Cylindrical Porous Layer Subjected to Vibration
S Govender, University of Kwa Zulu Natal, South Africa
- 10:15 – 10:45 Coffee Break
- Mixed convection around buried offshore installations in a porous seabed*
Arzhang Khalili, Max Planck Institute for Marine Microbiology, Germany
- Modeling of Coupled Heat Transfer and Reactive Transport Processes in Porous Media: Application to Seepage Studies at Yucca Mountain, Nevada
Sumit Mukhopadhyay, Lawrence Berkeley National Laboratory, USA
- 12:00 – 13:00 Lunch
- 13:30 – 15:35 **Session 7: Natural and Forced Convection in Porous Medium**
- Extension of the Porous Media Model of Heat Transfer to Nanofluid Suspensions*
Peter Vadasz, Northern Arizona University, USA
- Fluid Flow and Convection Heat Transfer in Mini/Microporous Media*
Pei-Xue Jiang, Tsinghua University, China
- Natural Convection around a Horizontal Cylinder in the Presence of Nanofluids*
Eiyad Abu-Nada, Hashemite University, Jordan
- Exploration of Thermal Dispersion by Direct Numerical Simulation of an Idealized Spherical-Void-Phase Porous Metal*
S. A. Mohsen Karimian, University of Western Ontario, Canada
- The role of microstructural characteristics in conductive and convective heat transfer within porous media*
Mahsa Dabagh, Lappeenranta University of Technology, Finland
- 15:35 – 16:05 Coffee Break

Wednesday, June 20, 2007

16:05 – 17:20

Two-Phase Flow Through a Porous Bed of Packings: A Parametric Study on Dynamic Liquid Saturation

Ajay Bansal, National Institute of Technology, India

The Effect of Local Thermal Non-equilibrium on the Infiltration of Hot Fluid into a Porous Domain

D.A.S. Rees, University of Bath, UK

Non-Darcy natural convection in a cavity filled with a heat-generating porous medium: thermal non-equilibrium model

Q.W. Wang, Xi'an Jiaotong University, China

17:20 – 18:10

Session 8: Conduction in Porous Medium

Diffusion and permeation of non reactive gas through cement-based materials

Fabien Frizon, French Atomic Energy Commission, France

The paradox of heat conduction in porous media subject to lack of local thermal equilibrium

Peter Vadasz, Northern Arizona University, USA

18:10 – 20:00

Break

20:00 – 22:00

Conference Banquet

Thursday, June 21, 2007

- 07:30 – 08:30 Breakfast
- 08:30 – 10:30 **Special Session: Thermo-Hydro-Chemo-Mechanical Coupling in Geomaterials**
- Coupled Thermal-Hydrologic-Mechanical Impacts of Geological CO₂ Sequestration*
Brian J. McPherson, University of Utah, USA
- A Chemo-Thermo-Mechanically Coupled Analysis of Subsurface Ground Deformation induced by Methane Hydrate Dissociation*
Fusao Oka, Kyoto University, Japan
- Temperature Effects on Hydraulic Properties of Geosynthetic Clay Liners*
Hossam Abuel-Naga, Monash University, Australia
- A Coupled Geomechanical-Transport Modelling of Sand Production in Petroleum Reservoirs*
Guillaume Servant, IFP, France
- 10:30 – 11:00 Coffee Break
- 11:00 – 11:50 *Linear stability analysis of miscible thermo-viscous flow in porous media*
M. N. Islam, University of Calgary, Canada
- Electro-Diffusive transport in charged porous media: From the particle level scale to the macroscopic scale using volume averaging*
David W. Smith, University of Melbourne, Australia
- 11:50 – 13:05 **Session 9: Evaporation, Condensation, Capillary Effect, and Reactive Flow in Porous Media**
- Moisture transport and pressure build up at high temperature in concrete: a model of fire spalling*
L. Pel, Eindhoven University of Technology, the Netherlands
- A New Approach to the Modelling of Immiscible Displacement in Porous Media - Interacting Capillary Bundle Models*
Mingzhe Dong, University of Regina, Canada
- 13:05 – 13:20 **Closing Remarks**
- 13:30 Lunch and adjournment

Poster Presentations

Special Session: Flow Transport in Industrial Applications

1. An Experimental Study of Mobilization and Creeping Flow of Oil Slugs in a Water-Filled Capillary
Mingzhe Dong, University of Regina, Canada

Multiphase in Porous Media

2. Smoothed Particle Hydrodynamics Model for Reactive Transport and Biomass Growth
Alexandre M. Tartakovsky, Pacific Northwest National Laboratory, USA
3. Application of MRI to the measurement of two-phase flow of supercritical CO₂ and water in porous rocks
Tetsuya Suekane, Tokyo Institute of Technology, Japan
4. Heat Removal performance of Particle-Sintered Porous media Counter to heat Flux Input and its Phase Change Characteristics
Kazuhisa Yuki, Tohoku University, Japan
5. Voda Multiphase Flow Code for Investigation of Napl Behavior at heterogeneous Sand Layers
Jiri Mikyska, Czech Technical University in Prague, Czech Republic
6. Analytical and Numerical Solution for One-Dimensional Two-Phase Flow in Homogeneous Porous Medium
Michal Benes, Czech Technical University in Prague, Czech Republic
7. Hydrocarbon Recovery from Porous Media and Reduction of Asphaltene Deposition during CO₂ Extraction Process
Ali H. Al-Marzouqi, UAE University, United Arab Emirates

Experimental and Measuring Techniques

8. Adaptable deterministic geometric pore-scale modelling for different porous media
JP du Plessis, University of Stellenbosch, South Africa
9. Development of Groundwater Flowmeter
Shigeo Kimura, Kanazawa University, Japan
10. Experimental study of tree networks for minimal pumping power
Mohammad Sayeed, C. Abdul Hakeem College of Engineering and Technology, India

Evaporation, Condensation, Capillary Effect, and Reactive Flow in Porous Media

11. Viscous Fingering Instability of Reactive and Anisotropically Dispersive Flows in Porous Media
Karim Ghesmat, University of Calgary, Canada

12. Evaluation of the Viscous Finger Width
Marina N. Ivashneva, Moscow MV Lomonosov State University, Russia
13. Frost Behavior of a Fin Surface with a Non-Uniform Temperature Distribution
Kwan-Soo Lee, Hanyang University, Korea

Particle Migration and Deposition in Porous Media

14. Convective venting of porous media fractures
Maria Ines Dragila, Oregon State University, USA

Advanced Mathematical Approaches to the Modeling of Porous Medium

15. Equivalent Particle Diameter for Pressure Drop Porous Metals
Nihad Dukhan, University of Detroit Mercy, USA

Industrial and Environmental Heat Transfer and Flow in Porous Media

16. Wicking of Perfectly Wetting Liquids into a Metallic Mesh
Nicolas Fries, Zarm, Center of Applied Space Technology & Microgravity, Germany
17. Seepage and critical hydraulic gradients in tailings dams and natural formations
Isabel Jantzer, Lulea University of Technology, Sweden
18. Mechanical and Electric properties of Porous High Strength AC9A Aluminum Alloy
Chi Y. A. Tsao, National Cheng Kung University, Taiwan

Combined Heat and Mass Transfer in Porous Medium

19. Global stability for penetrative double-diffusive convection in a porous medium
Antony A. Hill, University of Durham, United Kingdom
20. Fluid Flow, Solute Mixing and Precipitation in Porous Media
George D. Redden, Idaho National Laboratory, USA

Natural and Forced Convection in Porous Medium

21. Carbon Dioxide Impinging Jet Heat Transfer of a Porous Surface by a Circular Nozzle with a Flange
Kouichi Kamiuto, Oita University, Japan
22. Flow through a Hexagonal Array of Perturbed Spheres at low to high Reynolds number
J. Gunnar I. Hellstrom, Lulea University of Technology, Sweden
23. Numerical Simulation of Forced Pulsating Channel Flow over two Heat Blocks Mounted with Porous Covers
Po-Chuan Huang, National Taipei University of Technology, Taiwan
24. Heatline visualization of natural convection in a porous cavity occupied by a fluid with temperature dependent viscosity
Kamel Hooman, The University of Queensland, Australia

25. Three-dimensional numerical study of time-periodic natural convective heat transfer in an inclined cubic enclosure with porous medium
Q W Wang Xi'an Jiaotong University, China
26. Drag Coefficient of a Porous Obstacle
Yasushi Kakimoto, Shizuoka University, Japan

Porous Media Applied to Marine and Environmental Problems

27. Mean Flow and Linear Stability of an Oscillatory Particulate Suspension
Arzhang Khalili, Max Planck Institute for Marine Microbiology, Germany
28. Stability of buoyancy-opposed mixed convection in a sediment layer with relevance to hydrothermal vents
Arzhang Khalili, Max Planck Institute for Marine Microbiology, Germany