Microbial Transport and Survival in the Subsurface: First International Conference

Program

White Oaks Resort and Spa, Niagara-on-the-Lake, Canada

May 10-13, 2009

Sunday, May 10th 2009

8 am	Registration
1:30 pm	Plenary session Particle and Pathogen Passage through Porous Media Charles R. O'Melia, *The John Hopkins University*
2:40 pm	Break
3 pm	Session 1: Mechanistic Investigations 1: Towards Better Representation of the Field in the Lab CHAIR: Jack Schijven, RIVM
3 pm	Laboratory Assessments of Carboxylated Microbial-Sized Microspheres to Estimate *Cryptosporidium parvum Oocyst* Fate and Transport within Russian River (Sonoma County, CA) Bank Filtration Sediments David W. Metge, *U.S. Geological Survey*
3:20 pm	Comparison of Pilot Scale Transport with Theory William P. Johnson, *University of Utah*
3:40 pm	The Influence of Influent Concentrations of Microspheres on the Removal by Sand Filtration Isabelle Papineau, *Ecole Polytechnique de Montreal*
4 pm	Break
4:30 pm	Session 2: The Unsaturated Zone - A High Risk Environment? CHAIR: Dave Rudolph, University of Waterloo
4:30 pm	The Utility of Microspheres as Surrogates for the Transport of *E. coli* in Agricultural Soil Joanne Passmore, *University of Waterloo*
4:50 pm	Colloid Transport with Advancing Wetting Fronts in Sand: Effects of Solution Ionic Strength and Surface Tension Jie Zhuang, *University of Tennessee*
5:10 pm	Impacts of nonionic and anionic surfactants on bacterial transport through unsaturated porous media Derick G. Brown, *Lehigh University*
5:30 pm	Vadose Zone Monitoring to Assess the Capability of At-Grade Designs for Onsite Wastewater Treatment of Pathogens and Nutrients Erin Motz, *University of Calgary*
7 pm	Welcome Reception

Monday, May 11th 2009

7:30 am	Registration
8:30 am	Plenary Session Deposition of Motile and Non-Motile Bacteria onto Conditioning Films Menachem Elimelech, *Yale University*
9:30 am	Break
9:50 am	Session 3: Mechanical Investigations 2 - Synthesis of Multiple Factors that Impact Microbial Transport in Porous Media CHAIR: Derick Brown, Lehigh University
9:50 am	Coupled Factors Influencing the Transport and Retention of Microbes in Porous Media Scott A. Bradford, *U.S. Salinity Laboratory*
10:20 am	Role of Biofilm on the Fate of *Escherichia coli* in Saturated Porous Media Yang Liu, *University of Alberta*
10:40 am	Improved Understanding of Mechanisms Impacting Colloid and Pathogen Transport in Saturated GUDI Environments Nicole L. McClellan, *University of Waterloo*
11 am	The Role of Inter-Strain Variability on the Sorption Behavior of *Escherichia coli* to Aquifer Sediments Carl H. Bolster, *U.S. Department of Agriculture*
11:20 am	Determining the Extent of Virulence and Influence of Motility in *Salmonella* Transport Berat Z. Haznedaroglu, *University of California, Riverside*
11:40 am	TBD Alan Roberson
Noon	Lunch

Monday, May 11th 2009

1:30 pm **Session 4: Microbial Data Collection and Regulatory Support**
CHAIR: Annie Locas, INRS Institut Armand Frappier

1:30 pm Utopia or Reality: The Quest for Correlations between Indicators and Pathogens
Pierre Payment, *INRS-Institut Armand-Frappier*

2 pm Risk Assessment Framework for Pathogens in Biosolids: Groundwater Pathway
Mira S. Olson, *Drexel University*

2:20 pm Monitoring the Occurrence of Microbial Contaminants within the Wellhead Protection Area of a Municipal Well Field in an Agricultural Setting
M. Christie, *University of Waterloo*

2:40 pm Using MPA to Characterize Surface, Ground, and Finished Drinking Waters
Jennifer L. Clancy, *Clancy Environmental Consultants, Inc.*

3 pm Break

3:30 pm **Session 5: Land Use and Subsurface Vulnerability**
CHAIR: William P. Johnson, University of Utah

3:30 pm Vulnerability of Unconfined Groundwater to Virus Contamination
Jack Schijven, *Utrecht University*

4 pm Transport of Pathogenic Prion Protein through Soil and Landfill Materials
Kurt Jacobson, *University of Wisconsin, Madison*

4:20 pm Transport of Pathogens in Agricultural Drainage Water
Robert Gordon, *University of Guelph*

4:40 pm Human Enteric Viruses as Tracers of Wastewater Pathways into Municipal Drinking Water Wells
Mark A. Borchardt, *Marshfield Clinic Research Foundation*

5 pm Biodegradation at the Limit: Tracking of Microbial Activity and Petroleum Hydrocarbon Biodegradation under Freeze-Thaw Conditions
Subhasis Ghoshal, *McGill University*

7 pm Reception and Dinner at Hillebrand Winery

Tuesday, May 12th 2009

7:30 am	Registration
8:30 am	Plenary Presentation How Important is Bacterial Chemotaxis Relative to Advective Subsurface Transport and Dispersion in Bioremediation? Ronald Harvey, *US Geological Survey*
9:30 am	Break
9:50 am	Session 5: Mechanistic Investigations 3: From the Lab to the Field CHAIR: Scott Bradford, USDA
9:50 am	"Virus Hitchhikers" – Colloid-Facilitated Virus Transport in Gravel Aquifer Media Liping Pang, *Institute of Environmental Science & Research Ltd. (New Zealand)*
10:20 am	Intra-strain Variability in Pathogen Transport Behavior Examined Using Model Groundwater Systems: Role of Temperature and Cell Acclimation Nathalie Tufenkji, *McGill University*
10:40 am	Transport and Deposition of *Pseudomonas fluorescens* in Granular Media: Role of Metabolic Activity Erwin Klumpp, *Agrosphere Institute*
11 am	Transport of *Cryptosporidium parvum Oocysts* Through Variably and Permanently Charged Soils Arvind Mohanram, *University of Hawaii, Honolulu*
11:20 am	Systematic Study on the Effects of pH, Ionic Strength and Ion Composition on Virus Attachment /Detachment in Saturated Sand Columns Gholamreza Sadeghi, *University of Utrecht*
11:40 am	Pathogen Transport in a River-Connected Alluvial Aquifer Alicja Pawlak, *University of Calgary*
Noon	Lunch

Tuesday, May 12th 2009

1:40 pm **Session 6: Evaluating Microbial Transport and Survival in Porous Media: Methodological Considerations**
CHAIR: Liping Pang, ESR

1:40 pm The Use of the PCR Technique in Determining Surface Structures of Multiple Environmental *Escherichia coli* Isolates
G. Lutterodt, *UNESCO-IHE Institute for Water Education*

2 pm Assessment of Transport and Retention of Bacteria in Porous Media using X-Ray Computed Tomography
Subhasis Ghoshal, *McGill University*

2:20 pm Colloid Transport in Granular Saturated Media: Impacts of Flow Orientation
Monica Emelko, *University of Waterloo*

2:40 pm Persistent Gene Expression and Toxin Production and Resuscitation of Viable but Noncultrable *Escherichia coli* O157:H7
Yanming Lui, *University of Alberta*

3 pm Break

3:30 pm **Session 7: Mechanical Investigations 4: Microscale Investigations**
CHAIR: William P. Johnson, University of Utah

3:30 pm Role of Divalent Cations on Deposition Kinetics of *Cryptosporidium parvum Oocysts* onto Natural Organic Matter Surfaces
Thanh H. Nguyen, *University of Illinois at Urbana-Champaign*

3:50 pm Predicting Microbial Transport in Porous Media Using Microfluidic Flow Cell Arrays
Leslie M. Shor, *Vanderbilt University*

4:10 pm Variation of Bacterial Metabolic Activity upon Adhesion to a Solid Surface
Derick G. Brown, *Lehigh University*

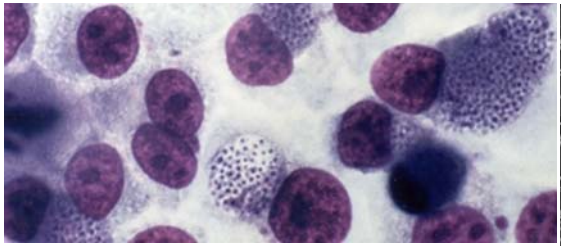
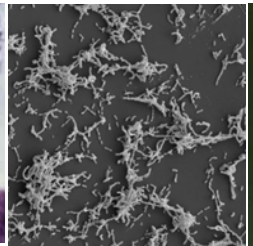
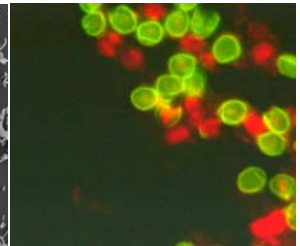
4:30 pm Quantitative Meso-Scale Imaging of Colloid Remobilization during Drainage in Porous Media: Implications for Pore-Scale Processes
Jonathan W. Bridge, *University of Sheffield*

4:50 pm Nano-Scale Forces that Affect the Transport and Biofilm Production of Metal Reducing *Desulfovibrio vulgaris*
Pauline Nesaraja, *State University of New York, Buffalo*

5:10-6:30 *Poster Session*

Wednesday, May 13th 2009

8 am	Registration
8:30 am	Plenary Presentation Water Quality and Health in the Rural Environment Joan B. Rose, *Michigan State University*
9:30 am	Break
9:50 am	Session 8: Microbial Transport and Retention in Fractured Environments CHAIR: Edwin Cey, University of Calgary
9:50 am	Molecular Mechanisms Involved in the Survival and Transport of Viruses through the Subsurface Charles Gerba, *University of Arizona*
10:20 am	Surface to Fracture Transport of *E. coli*-sized Microspheres and a Conservative Tracer in a Fractured Rock Aquifer, Perth, Ontario Titia Praamsma, *Queens University*
10:40 am	Quantifying *E. coli* Removal in Single, Saturated, Variable-Aperture Fractures S. Rodrigues, *McMaster University*
11 am	A Comparison of Bicolloid and Colloid Transport in Single, Saturated Fractures J. Qu, *McMaster University*
11:20 am	A Study of Traditional and Viral Pathogen Occurrence in Fractured Rock Wells in Rural Canada: The Potential Use of Particle Size Distribution as an Indicator of Pathogen Presence Shawn Trimper, *Queen's University*
11:40 am	Should We Be Purging When Sampling for Fecal Indicator Bacteria in Groundwater? Observations from Tests Conducted in Multi-Level Bedrock Monitoring Wells John Kozuskanich, *Queen's University*
Noon	Lunch

Wednesday, May 13th 2009

1:30 pm **Session 9: GUDI Assessment**
CHAIR: Sarah Dickson, McMaster University

1:30 pm GWUDISW and RBF – What's the Difference?
William D. Gollnitz, *Earthworks*

1:50 pm Improving Methods to Assess GWUDI for Bank Filtration Performance
T. Rauch Williams, *Carollo Engineers*

2:10 pm A Protocol for Identifying Groundwater Under the Direct Influence of Surface Water (GWUDI) in Quebec
Annie Locas, *INRS-Institut Armand-Frappier*

2:30 pm Assessing an Angled Well Riverbank Filtration Site in New Hampshire
Vasiliki Partinoudi, *University of New Hampshire*

3 pm Break

3:30 pm **Session 10: The Subsurface and Beyond**
CHAIR: Dave Rudolph, University of Waterloo

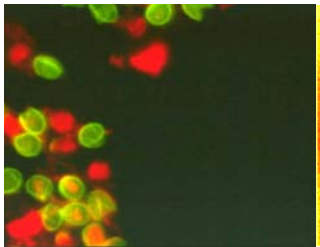
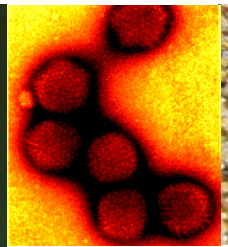
3:30 pm Impact of Cross-Flow on Particle Removal in Filtration Studies
Stephen A. Hubbs, *University of Louisville*

3:50 pm GAC Adsorption Filters as Microbial Barriers for Viruses, Bacteria and Protozoan (Oo)cycts in Water Treatment
Wim Hijnen, *KWR Watercycle Research Institute*

4:10 pm Removal of Total Coliforms, Escherichia coli, Girardia spp., Cryptosporidium ssp. And helminth eggs by direct filtration plus UV mactivation from Wastewater Treatment Plant Secondary Effluent in Brazil: Implications to Water Reuse
Ricardo Isaac, *UNICAMP, Brazil*

4:30 pm Ultrafiltration Performance as Determined by Recovery of In Situ Bacteria and Viruses
Peter S.K. Knappett, *University of Tennessee*

4:50 pm Numerical Simulations for Biological Clogging in Sand Biofilters
Mohamed Mostafa, *Carleton University*


Poster Session

Tuesday May 12th
5:10-6:30 pm

P01 'Body doubles' – modifying the surface charge of pathogen-sized microspheres to study pathogen transport in groundwater: LIPING PANG, Institute of Environmental Science & Research Ltd, Christchurch, New Zealand

P02 Microbial removal rates in subsurface media estimated from published studies of field experiments and large intact soil cores: LIPING PANG, Institute of Environmental Science & Research Ltd, Christchurch, New Zealand

P03 Modeling water flow and bacterial transport in undisturbed lysimeters under irrigations of dairy shed effluent and water using HYDRUS-1D: SHUANG JIANG, Lincoln University, New Zealand

P04 Applying groundwater contaminant flux measurement methods to assess pathogen transport in the subsurface: MARK N. GOLTZ, Air Force Institute of Technology, Wright Patterson Air Force Base, OH

P05 Colloid remobilization during evaporation from near-surface pores: implications for fate and transport in soils and the vadose zone: JONATHAN W. BRIDGE, University of Sheffield

P06 Changes in antibiotic resistance and pathogenicity of *Salmonella* exposed to artificial groundwater with residual antibiotics: BERAT Z. HAZNEDAROGLU, University of California,

P07 Pathogenic and indicator bacteria in well water and surface water from the Salmon River watershed: CASSANDRA JOKINEN, Public Health Agency of Canada

P08 The effect of microbial retention on permeability of the porous media: KOJI YAMASHITA, The University of Tokyo

P09 Investigating the influence of cell concentration and media pre-coating on bacterial migration in granular porous media: C. CHORNEWICH, McGill University

P10 Comparing the Migration Behaviour of Bacterial Pathogens in Quartz Sand and Agricultural Soil: TIM SCHINNER, McGill University

Poster Session

P11 Macromolecule Mediated Transport and Retention of *Escherichia coli* O157:H7 in Saturated Porous Media: HYUNJUNG N. KIM, University of California

P12 Validation of large volume MPN techniques using a modification of US EPA method 1601: detecting low concentrations of coliphage from secondary effluent substrata infiltration systems: RICHARD DANIELSON, BioVir Laboratories, Inc.

P13 Transport and fate of bacterial pathogens in Quebec agricultural soil: ARTI BHAKTA, McGill University

P14 Applying the RT Clean-Bed Filtration Model to Slow Sand Filters: JEFF SENDERS, University of New Hampshire

P15 Pathogens in Norwegian groundwater: current knowledge and future needs: HANNE KVITSAND, Norwegian University of Science and Technology

P16 Effective filtration monitoring of spring collector system: DENNIS MUTTI, Stantec Consulting Ltd

P17 Microscopic particulate analysis as a means of assessing river bank filtration at municipal wells in granular and factured rock aquifers along the Grand River, Waterloo, Ontario: CRAIG JOHNSTON, Stantec Consulting Ltd

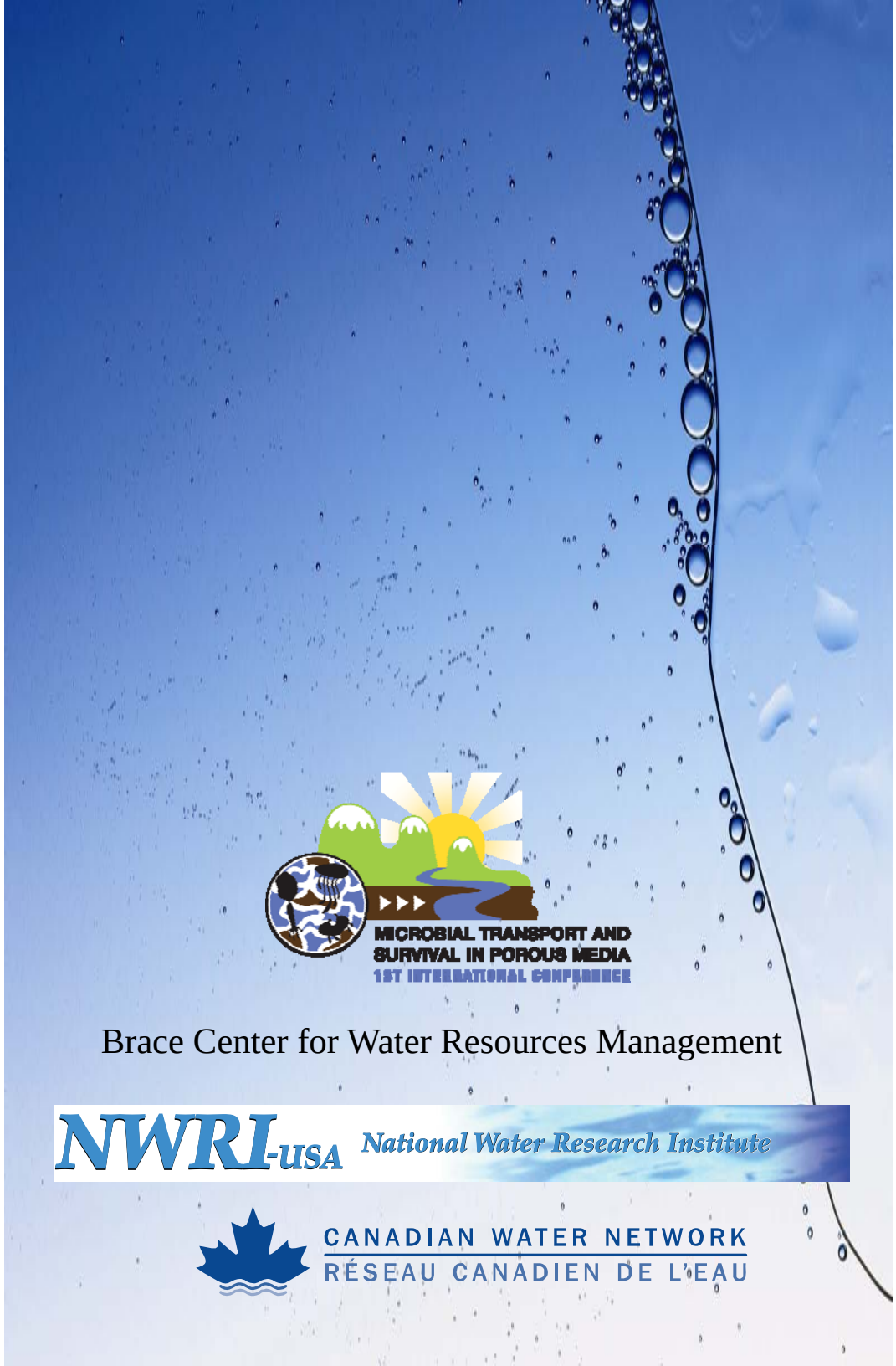
P18 A continuous sampling MPA technique for GUDI evaluations: JOHN ST. MARSEILE The Thompson Rosemount Group

P19 Characterization and modeling of pathogen risks in groundwater of NN communities in Canada: A MAZUMDER, University of Victoria,

P12 Inverse modeling of two-site kinetic attachment/detachment and liquid/solid inactivation from virus surrogate breakthrough observed in column studies of saturated basic oxygen furnace slag media: JESSE STIMSON, University of Waterloo

P21 Optimal preparation and purification of PRD1-like bacteriophage suspensions for use in environmental fate and transport studies: MESQUITA, M. M. F., University of Waterloo

P22 Pathogen Inactivation, Treatment and Fate in Constructed Treatment Wetlands: KEL P. WEBER, University of Waterloo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