

43rd CENTRAL CANADIAN SYMPOSIUM ON WATER QUALITY RESEARCH

Science Meets Policy



Canadian Association on Water Quality
Environment Canada

Program Schedule

February 11th and 12th, 2008

Canada Centre for Inland Waters
Burlington, Ontario



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MESSAGE FROM THE PROGRAM CHAIR

“It is my pleasure to welcome you to the 43rd Central Canadian Symposium on Water Quality Research. This year’s theme is “Science Meets Policy”, and we have assembled a strong technical programme encompassing a variety of disciplines. Our goal is to convene a symposium to benefit delegates interested in a broad range of water quality issues. We are also pleased to offer an interactive sessions on Harmful Algal Blooms (HABs) and open a workshop on the subject to the general public. In addition, we are pleased to welcome Dr. Pierre Payment as our plenary speaker, who will open the Symposium with a presentation on public health and drinking water standards. On behalf of the organizing committee, welcome to Burlington, and I wish you a successful and informative Symposium.

C.H. Marvin
Programme Chair

Environment's Canada
National Water Research Institute

Distinguished Speaker Award 2008

Dr. Pierre Payment

“Public health and drinking water standards: are we doing more harm than good?”

After more than a century of drinking water treatment and standards, we have come to point in time when a few voices are challenging the value of some of our actions and standards. Science used to evolve more slowly and was validated before being applied at large. In this age of rapid communication, we are seeing the application of new knowledge on a large scale even before the science is truly validated. On the contrary we are still using data that cannot be transferred because science at the time could not provide the depth needed.

As scientists, we must learn to communicate our knowledge in a manner that includes understanding the larger picture and the context. Some read so many papers that they conclude from the abstract and use this as the basis for subsequent discussions. In my own field, how many times I have seen incorrect interpretation of the data published. These can be perpetuated for generations, especially if they are in a textbook ... This information is relayed to those who must make public health decisions on what is safe and what is not. It is then translated in regulations at the Federal and Provincial levels: what is the level of confidence that we can have in the final product?

How much is lost in the translation? Has the science been truly validated? What are the consequences of changing one disinfection technology for another? Setting the standard lower for a chemical or pathogen is a socio-economic decision with consequences: have they been taken into account? What are the criteria that are used to demonstrate that there was a benefit and not a net societal loss?

We live in a society and at a time where we enjoy what is the highest quality of life. We have taken this for granted and we are quibbling about minuscule incremental improvements to correct apparently enormous risks while being blind to the large risks. As scientists and regulators, the message that we are sending to the Canadian population is that we are all going to die of cancer caused by chemicals, if we survive the microbes ... This is light years away from reality.

43rd Central Canadian Symposium on Water Quality Research

Program Schedule and Presentations

Sunday, February 10, 2008

CCIW Boardroom (L205)	
14:00 to 19:00	CAWQ Board Meeting

Monday, February 11, 2008

7:45	Main Mall <ul style="list-style-type: none"> Registration Poster Installation 		
Auditorium			
8:30	Opening Remarks: Dr Ron Droste (President: CAWQ)		
8:35	Welcome to the Canada Centre for Inland Waters: Chris Marvin (Program Chair)		
8:40	Introduction of NWRI Distinguished Speaker: Dr. Tom Edge		
8:45	Third Annual NWRI Distinguished Speaker Series and CAWQ Plenary Lecture: Dr. Pierre Payment “Public Health and Drinking Water Standards: Are We Doing More Harm Than Good?”		
9:20	NWRI Distinguish Speaker Award: Presented by Jacinthe Leclerc; A/Director General, Water Science & Technology Directorate, Science & Technology Branch, Environment Canada		
	Auditorium Advances in Wastewater Treatment Technologies and Approaches Chairs Hongde Zhou and Wayne Parker	South Seminar Environmental Modeling Chairs Ferdous Ahmed and Hugh Monteith	North Seminar Biotechnology-Environmental Applications and Potential Risks Chairs Bin Zhu and Réal Roy
9:40	Evaluation of a pilot scale membrane supported biofilm reactor treating high strength industrial sewage. A.-E. STRICKER , H. LOSSING, J. H. GIBSON, and Y. HONG	Calibrating Watershed Models with Limited Data. F. AHMED	Differential Gene Expression in a Lab and Environmental Strain of <i>Escherichia coli</i> using Microarrays and its Potential Use in Bacterial Source Tracking. C. MARTENS and R. ROY
10:00	Ammonia Extraction using AmRHEX to Reduce Recycle Water Ammonia Load from an Anaerobic Sludge Digester. K. HAGGERTY	Dispersion and Hydrodynamic Connectivity of Near-Surface Waters: Applications of a 3D Ocean Circulation Model. J. ZHAO , R. YERUBANDI, and J. SHENG	Survival and Persistence of Introduced Bacteria in Freshwater Microcosms. B. ZHU , J. R. LAWRENCE, Y. WEI, J. ROY, and T. HE
10:20	Ammonia Removal during Canadian Winters: An Investigation of Nitrifying Biofilms at Low Temperatures. R. DELATOLLA , D. BERK, N. TUFENKJI, and Y. COMEAU	Land-use Management and Watershed Health. D. NIKKAMI , M. SHABANI, and H. AHMADI	Differential Gene Expression In Rainbow Trout (<i>Oncorhynchus mykiss</i>) Exposed to Carbamazepine. T. NEHELL , K. BURNISON, J. SHERRY, B. LEE, D. CRUMP, and S. KENNEDY

Note: Names appearing in bold are presenters competing for the Philip H. Jones Award

10:40 Health Break - Main Mall			
10:55	Efficiency of Phosphorus Removal in Pond Based Trout Farms by Collecting Accumulated Sludge. C. SANCHEZ , F. CHAZARENC, and Y. COMEAU	Geostatistical Analysis of Lake Ontario Sediment Contamination. T.G. ADAMS , K.W. FORSYTHE, and M.-C. ARCHAMBAULT	Effect of athermal microwave exposure and digestion temperature in the anaerobic degradation of wastewater sludge. N. COELHO , M. BERROUET, K. KENNEDY, and R. DROSTE
11:15	Limit of Treatment (LOT) Nutrient Removal from Wastewater: The Move from BNR Through ENR to UNR. J.A. OLESZKIEWICZ and J. H. HWANG	Analyzing Lake Erie Sediment Contamination Trends. M.-C. ARCHAMBAULT , K.W. FORSYTHE, and T.G. ADAMS	Characterization of WAS Pretreatment by Ultrasound. P. KIANMEHR , W. PARKER, and J. CHALLEN-URBANIC
11:35	Model-Based Evaluation of Aerated Facultative Lagoon Upgrades. D. HOUWELING , C. BYE and Y. COMEAU	A Survey of Some Physico-Chemical and Polyaromatic Hydrocarbon (PAH,s) Contents of Sediments at the International Zone, Northwest of the Persian Gulf. A. H. CHARKHABI , A. KALANTARI2, M. KHAMECHIAN, and P. SHAFIEI	Bioplastics Production by the Isolated Polyhydroxyalkanoate (PHA) Accumulating Bacterial Strains from Pulp and Paper Industry Wastewater Activated Sludge. S. YAN , S. BALA SUBRAMANIAN, R.D. TYAGI and R.Y. SURAMPALLI
11:55	Regional Variations in Constructed Wetland Designs for Optimal Protection of Receiving Waters. S. SPEER , P. CHAMPAGNE, and B. ANDERSON	Towards Mathematical Models of Activated Sludge with Intrinsic Parameters. D. FRIGON	Dynamics of Mixed Liquor Characteristics and Impacts on Fouling in Submerged Membrane Bioreactors for Municipal Wastewater Treatment. A. FARQUHARSON , and H. ZHOU
12:15	Lunch - Main Mall	CAWQ Annual General Meeting - South Seminar Room	
13:00	Poster Session "Meet and Greet" - Main Mall		
	Auditorium Advances in Wastewater Treatment Technologies and Approaches Chairs Hongde Zhou and Wayne Parker	South Seminar Environmental Modeling Chairs Ferdous Ahmed and Hugh Monteith	North Seminar Biotechnology-Environmental Applications and Potential Risks Chairs Bin Zhu and Réal Roy
13:25	Nanoparticles in Wastewater Sludge - Future Concern. S.K. BRAR and R.D. TYAGI	Modeling Biotransformation of Estrogenic Hormones in Municipal Wastewater Treatment. H. MONTEITH , H. ANDRES, S. SNOWLING, and O. SCHRAA	Membrane Pervaporation to Reuse Contaminated Blackish Water for Agricultural Microirrigation. E.E. QUIÑONES-BOLAÑOS , H. ZHOU
13:45	Polycyclic Synthetic Musk Partitioning in a Suspended Growth Aerobic Activated Sludge System. V. PILEGGI , L.A. LISHMAN, and S.N. LISS	An Optimization Modeling for Water Quality Management Under Uncertainty. P. GUO , G.H. HUANG, and H. ZHU	Drinking Water Source Protection The Clean Water Act and the Great Lakes: From Science to Policy. M. KELLER

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14:05	Membrane Fouling by Anaerobically Digested Sludge. M. DAGNEW , W. PARKER, and J. CHALLEN-URBANIC	The Structural Harmony Chart of Hydrosphere as the Controlling Tool in Environmental Modeling. <u>R. VEDOM</u>	Drinking Water Source Protection Mainstreaming Climate Change in Drinking Water Source Protection Planning in Ontario. R. de LO, A. BERG, and M. RETALLACK *Presented by R. FINDLAY
14:25	Trash and Grit Removal from Activated Sludge by Microscreening and Hydrocycloning. M. MANSOUR-GEOFFRION , D. LAMARRE, P. DOLD, I. TAKACS, and Y. COMEAU	P and T for Small Communities Nitrogen Removal through Recirculation and the use of Carbon Media in the AQUA Wetland System. <u>A. HELLEBUST</u> and L. ROZEMA	Collaborative Study to Protect Lake Ontario Drinking Water. <u>S. WATSON</u> and L. F. MOORE
14:45	Auditorium Advances in Wastewater Treatment Technologies and Approaches Chairs Hongde Zhou and Wayne Parker	Health Break - Main Mall South Seminar Policies and Technologies for Small Communities Chair Jim Higgins	North Seminar Drinking Water Source Protection Chairs Larry Moore and Simon Gautrey
15:00	Electrokinetic Flotation of Paint Sludge Water in a Kinetic Model Tank. <u>J. SHANG</u> and Y. XU	Treatment Wetlands for Wastewater Treatment in Small Communities in Northern Canada. <u>J. HIGGINS</u> and M. LINER	Polar Passive (POCIS) Samplers to Evaluate Nearshore Contamination in Lake Ontario and Lake Erie. <u>H. LI</u> , P. HELM, and C. METCALFE
15:20	Photoreactivation of indicator organisms following UV disinfection of a physicochemically treated wastewater. C. HALLMICH and R. GEHR	Sustainable Point-of-Use/Entry Drinking Water Treatment in Canada. M. A. HAMOUDA , W. B. ANDERSON, and P. M. HUCK	Campylobacters: Occurrence at two Lake Ontario Beaches. <u>I.U.H. KHAN</u> , A. LOUGHBOROUGH, and T.A. Edge
15:40	Application of Humic Substances to Enhance Leachate Treatment. <u>J. KOCHANY</u> and E. LIPCZYNSKA-KOCHANY	Full-Scale Process Evaluation of Recirculating Biofilters: A Case Study for Residential Wastewater Treatment. <u>Z. HU</u> and G. GAGNON	An Investigation of Techniques for Hydraulic Intake Entrainment Envelope Delineation. T. OLATUNJI , R. CARRIVEAU, D. TING
16:00	Visualization of Pollutant Transport Using Transparent Soil. <u>J. LIU</u>	Investigating the Performance of Constructed Wetlands in the Treatment of Municipal Wastewater in Northern Communities. D. SHRESTHA, <u>B. WOOTTON</u> , and C. METCALFE	Perfluoroacids in Canadian Rivers. B. SCOTT, C. SPENCER, E. LOPEZ, and D. MUIR
16:20		Sustainable Wastewater Infrastructure for Small Communities. <u>T. BIRKELAND</u>	Ethanol Fuels Potential Impacts on Source Water. J. DE FREITAS , and J. BARKER
16:45	Poster Session "Meet and Greet" - Main Mall		
17:30	AGILENT TECHNOLOGIES RECEPTION at Emma's Back Porch Pub 2084 Old Lakeshore Rd. (5 minute walk from Travelodge Hotel)		

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Tuesday, February 12, 2008

07:30 Main Mall		• Registration			
Auditorium		South Seminar		North Seminar	
A Tribute to Jim Maguire		Advances in Water Treatment Technologies and Approaches		Science, Policy, and Legislation	
Chairs Mehran Alaei and Adrienne Bartlett		Chairs Rajesh Seth and Onita Basu		Chairs Hugh Simpson and Neil Hutchinson	
8:00	Introductory Remarks John Carey Screening Chemicals in Commerce to Identify New Persistent and Bioaccumulative Chemicals: New Results Derek Muir	Fractal Analyses of Floccs for Modelling of Solid/Liquid Separation in Water Treatment. <u>B. GORCZYCA</u> and A. VAHEDI	Marking the 35th anniversary of the Great Lakes Water Quality Agreement. <u>G. KRANTZBERG</u>		
8:20	A Bit of Chemistry, a Bit of History. Brian Brownlee	Application of Multivariate Statistical Analysis for Factors of Trihalomethanes (THMs) Formation in Drinking Waters. <u>S. CHOWDHURY</u> , P. CHAMPAGNE, and J. MCLELLAN	Linking Water Science to Policy: Observations From a Series of National Workshops. K. SCHAEFER and <u>A. BIELAK</u>		
8:40	Jim, TBT and Me. Uwe Borgmann	Rigorous Quantitative Analysis of Microbial and Particulate Data. <u>P. SCHMIDT</u> , and M. EMELKO	The Information Delivery Challenge: Addressing Communication Gaps Between Science and Policy. <u>B. SNEYD</u>		
9:00	Toxicity and Bioaccumulation of Tributyltin in Freshwater Invertebrates. Adrienne Bartlett	Enzyme-Based Detection of E coli and Total Coliforms in Drinking Water Using Fibre Optics and Fluorescence. <u>N. HEWAGE</u> , M. SALEH, and E. GARDNER	Linking Phosphorus Offsetting Strategies to Regulatory Mechanisms to Improve Water Quality. <u>N. HUTCHINSON</u>		
9:20		Health Break - Main Mall			
Auditorium		South Seminar		North Seminar	
Harmful Algal Blooms		Advances in Water Treatment Technologies and Approaches		Science, Policy, and Legislation	
Chairs Sue Watson and Greg Boyer		Chairs Rajesh Seth and Onita Basu		Chairs Hugh Simpson and Neil Hutchinson	
9:40	Environmental Influences on Cyanobacterial Abundance and Microcystin Concentrations in Three Grand River Reservoirs. <u>S. J. YAKOBOWSKI</u> , S. J. GUILDFORD, L.-A. CHIAVAROLI, and Y. KOZLOV	A Low Cost Method for Protozoan Enumeration from Large Water Volumes for Performance Demonstrations. <u>A.J. ARNOLD</u> and M.B. EMELKO	Effective Communication Tools to Build and Promote The City of Hamilton's DWQMS. <u>C. MCKAY</u> , R. GONZALEZ, and M.FAZIO		
10:00	Chlorination of the Cyanotoxin microcystin-LR: Reactant Consumption and By-Products Elucidation. <u>S. MEREL</u> , F. MONTEAU, B. LEBOT, O. THOMAS, and M. CLEMENT	Exploring Pre-treatment for the Solar Water Disinfection (SODIS) Process. <u>L. HIRTLE</u> and S. ANDREWS			

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	Auditorium	South Seminar	North Seminar
	Harmful Algal Blooms Chairs Sue Watson and Greg Boyer	Advances in Water Treatment Technologies and Approaches Chairs Rajesh Seth and Onita Basu	Applications of Remote Sensing and GIS to the Assessment of Watershed Health Chairs Raul Ponce-Hernandez and Bill Pain
10:20	Cyanobacterial Hepatotoxin Variants in the Ontario Environment. <u>W. ZHANG</u> , C. LO, J. PARMAR, F. SUN, E. CHEN and J. LI	Influences of Dissolve Organic Matter on Aqueous Photolysis of PAHs. <u>G. LI</u> , G. HUANG, and Y. CHEN	Trends in Water Clarity of the Lower Great Lakes From Remotely Sensed Aquatic Colour. C.E. BINDING, J.H. JEROME, R.P. BUKATA, and W.G. BOOTY
10:40	Limitation of Bloom Forming Cyanobacteria by Ferrous Iron. <u>L. MOLOT</u> , G. LI, D. FINDLAY, and S. WATSON	Factors Affecting the Removal of Pharmaceuticals and Personal Care Products (PPCPs) during Ozonation Treatment of Drinking Water. <u>C. YUE</u> , R. SETH, S. TABE, P. YANG, X. ZHAO, C. HAO, L. SCHWEITZER, and T. JAMAL	Mapping Wetland Vegetation in the Coastal Wetlands of Georgian Bay: Can We Track Changes Using Remote Sensing Techniques? <u>J. MIDWOOD, D. ROKITNICKI- WOJCIK</u> , and P. CHOW-FRASER
11:00	A Proposed Bluegreen Algal Bloom Indicator: Low-Nitrate- Days (LND). <u>G.K. NÜRNBERG</u>	South Seminar Stormwater and Urban Lake Management Chairs Deborah Sinclair and Sandra Kok	Utilization of Satellite Imagery: Earth Observation Put to Work for You. S. STOODLEY, B. BERASI, and B. LENNON *Presented by <u>B. PAIN</u>
11:20	Commercially-Available Immunoassays for Microcystin Analysis. <u>E. CHEN</u> , C. LO, J. PARMAR, F. SUN, W. ZHANG, and J. LI	Particle Size Characteristics and Trace Metal Content of Particulate Matter in an Urban Sewershed. <u>M. STONE</u> , and J. PRICE	Utilization of Remotely Sensed Data for Mapping Impervious Surfaces. S. STOODLEY, and B. BERASI *Presented by <u>B. PAIN</u>
11:40	The Occurrence of Anatoxin-a and Other Cyanobacterial Toxins in Lake Erie and Lake Ontario: It is More Than Just Microcystins. <u>G. BOYER</u> , X. YANG, and S. THOMAS	Radial Sedimentation Pond. <u>F. AHMED</u>	Soil Map Upgrade Challenges in Ontario: 1. Modelling Approaches for Valley Complex Improvements. <u>J. D. ASPINALL</u>
12:00	Cyanobacterial Impairments in the Great Lakes-St. Lawrence River: Benthic Fingerprints of Anthropogenic Activity. <u>S.B. WATSON</u> , C. HUDON, and A. CATTANEO	Determinants of Water Quality in Urban Ponds: A Limnological Approach. <u>A.S. CHIANDET</u> and M.A. XENOPOULOS	Atmospheric Deposition of Phosphorus Over Lake Simcoe. <u>J. RAMKELLAWAN</u> , B. GHARABAGHI, and J.G. WINTER
12:20	Lunch - Main Mall		WQRJC Editorial Board Luncheon

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	Auditorium Harmful Algal Blooms Chairs Sue Watson and Greg Boyer	South Seminar Stormwater and Urban Lake Management Chairs Deborah Sinclair and Sandra Kok	North Seminar Applications of Remote Sensing and GIS to the Assessment of Watershed Health Chairs Raul-Ponce Hernandez and Bill Pain
13:20	Harmful Algal Blooms Technical Session (Workshop) Chairs Sue Watson and Greg Boyer	Wet Weather Performance of a Green Roof in Waterloo, Ontario. K. VANDER LINDEN, and <u>M. STONE</u>	Tracking Saturated Areas in the Landscape: A Topographic Approach. <u>C. ONAFRYCHUK</u>
13:40		Sediment Removal Efficiency of Compost Biofilters. <u>V. TALEBAN</u> , K. A. FINNEY, B. GHARABAGHI, E. MCBEAN, and R. RUDRA	A Bayesian Approach to Causal Discovery of Resource Degradation and its Application to Land Degradation Assessment and Conservation for Water Protection at Source. R. PONCE-HERNANDEZ AND <u>O. AHMED</u>
14:00		Weeping Tile Disconnection as an Effective Method of Extraneous Flow Reduction. D. WATT, R. TRIPP, and G. HOLMAN *Presented by <u>T. STEPHENS</u>	A Paradigm of Integration of Remote Sensing, GIS and Modeling Tools for Assessment and Monitoring of Watershed Ecosystem Health and Water Protection at Source. <u>R. PONCE-HERNANDEZ</u>
14:20	Health Break - Main Mall		
14:30	Harmful Algal Blooms Public Open Session (Workshop) Chairs Sue Watson and Greg Boyer	Development of an Inexact Urban Stormwater Management Model. <u>X. ZHANG</u> , and G. HUANG	
14:50		Performance Benchmarking and Verification of Hydrodynamic Separators - ETV Canada. <u>J. NEATE</u> , <u>M. EI-HALLAK</u> , T. BOWERING, and A. LI	

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15:10		Urban Lake Assessment and Management: City of Brampton Example. <u>D. SINCLAIR</u> and N. HUTCHINSON	
15:30			
15:50			
Auditorium			
16:30	Presentation of Philip H. Jones Award		
16:35	Concluding Remarks		



Agilent Technologies

Many thanks to Agilent Technologies for their generous sponsorship of our Monday Evening Social Event at Emma's Back Porch.

Commercial Exhibitors

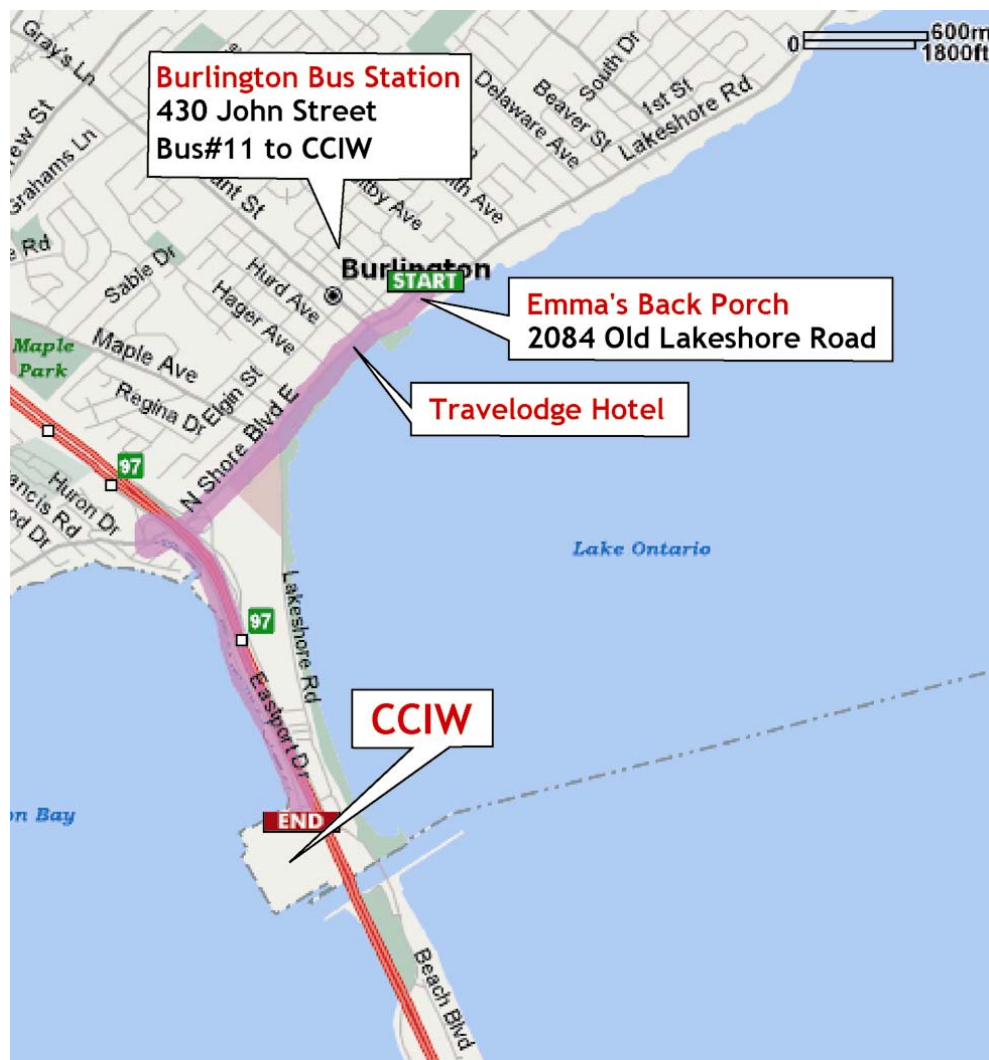
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MONDAY NIGHT MIXER

We are hosting a complimentary social event on Monday, Feb. 11, 2008, at Emma's Back Porch in Burlington. The event is a short distance down the street from the Travelodge Hotel, and parking lots on Old Lakeshore Rd. and Lakeshore Rd. are available.

Emma's Back Porch
2084 Old Lakeshore Road (access via Lakeshore Rd., east of Brant St.)
Tel.: (905) 634-2084



Poster Presentations

	Authors	Title
AWWT	<u>R. ORREGO-FUENTEALBA</u> , J. GUCHARDI, V. HERNANDEZ, R. KRAUSE, L. ROTI, AND D. HOLDWAY	Pulp Mill Treatment Technologies Have Differential Endocrine Disrupting Effects on Rainbow Trout.
AWWT	<u>N. ROSSO</u> , B. WOOTTON, C. METCALFE, AND B.C. ANDERSON	Assessing the Ability of Treatment Wetlands to Mitigate Contaminants in Wood Waste Leachate on the Madawaska - Ottawa Valley River Watershed in Whitney, Ontario.
AWWT	<u>S.I. HUSSAIN</u> , D.W. BLOWES, A. CAMPBELL, D. OLDING, C.J. PTACEK, N. HUTCHINSON, AND D. SINCLAIR	Evaluation of Reactive Materials for the Removal of Phosphate in a Hypolimnetic Withdrawal Treatment System.
AWT	<u>C. GUTHRIE</u> , E. REARDON, AND J. VOGAN	Pd/MCM-41-Catalyzed Hexamethylphosphoramide Degradation.
BEA	<u>S. HILL</u> , F. SUEN, AND T.A. EDGE	Microbial source tracking of fecal pollution at a beach on the Ottawa River.
EM	<u>J. CAO</u>	A Numerical Investigation on Flow, Transport, and Biotransformation of a Suite of Chemicals in Porous Media.
SPL	<u>B. SNEYD</u>	Assessing Canada's Water Information Challenges.
DWSP	<u>S.J. CAGAMPAN</u> , J.M. GRABUSKI, J. STRUGER, AND B. RONDEAU	Automated Solid Phase Extraction of Sulfonyl ureas and Related Herbicides in Fortified Water and Natural Water Samples using LC-ESI/MS/MS.
DWSP	<u>J. BYER</u> , J. STRUGER, P.KLAWUNN, AND E.SVERKO	Analytical Evaluation of ELISA as a Water Quality Monitoring Tool for Surface Water Samples.
DWSP	<u>J. BYER</u> , <u>J. STRUGER</u> , P.KLAWUNN, AND E.SVERKO	Large Scale Field Utilization of the ELISA Method as a Water Quality Monitoring Tool for Surface Water Samples.
DWSP	<u>L. D. HESLIP</u> , J. STRUGER, P. J. KLAWUNN, O. B. ALLEN, AND G. J. UMPHREY	Multivariate Analyses on Ontario Pesticide Residue Data Gathered through the National Water Quality Surveillance Program.
SUL	<u>M.A. MARCUS</u> AND P.C. FROST	Suitability of Urban Pond Ecosystems for Zooplankton Growth.

Symposium Committee

Organizing Committee Chair
Michael Forbes

Program Committee Chair
Chris Marvin

Advances in Wastewater Treatment and Technologies

Chairs: Hongde Zhou and Wayne Parker

Environmental Modeling

Chairs: Ferdous Ahmed and Hugh Monteith

Biotechnology-Environmental Applications and Potential Risks

Chairs: Bin Zhu and Réal Roy

Polices and Technologies for Small Communities

Chair: Jim Higgins

Drinking Water Source Protection

Chairs: Larry Moore and Simon Gautrey

Advances in Water Treatment Technologies and Approaches

Chairs: Rajesh Seth and Onita Basu

Science, Policy, and Legislation

Chairs: Hugh Simpson and Neil Hutchinson

Harmful Algal Blooms

Chairs: Sue Watson and Greg Boyer

**Applications of Remote Sensing and GIS to the Assessment of
Watershed Health**

Chairs: Raul Ponce-Hernandez and Bill Pain

Stormwater and Urban Lake Management

Chairs: Deborah Sinclair and Sandra Kok

Symposium Coordinator
Denis Carr

Graphic Design
Grazyna Modzynski

Special Thanks To:

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