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OVERVIEW – RESEARCH PROGRAM

RESEARCH DIRECTION

The goal of my research program is to develop alternate water and waste management technologies, and sustainable environmental approaches. Environmental engineering research in this area is generally governed by fundamental physical, chemical and biological processes which can be applied to a variety of systems. This has allowed me to explore the application of these fundamental processes in a relatively broad range of research opportunities. Under this broader scope, my research activities are generally focused under one of four themes: (1) the extraction of value-added products from municipal, industrial and agricultural organic residues; (2) the determination and implementation of alternate waste management strategies for industrial, agricultural and municipal biosolids and solid waste; (3) the development and investigation of passive and semi-passive treatment systems for the mitigation of municipal, industrial and agricultural wastewaters; and (4) the use of risk-based decision-making approaches in the risk assessment of urban water management systems. The evolution of these research areas, as well as my contributions and publications under each theme are briefly summarized below.

To date, my research efforts have led to 3 significant research awards, 33 journal publication (18 published, accepted or in press and 4 submitted with 11 in preparations), 6 technical reports, 18 refereed conference contributions, 11 non refereed contributions and 6 invited lectures. In addition, in 2003, I was invited to participate in two ASCE Hazardous, Toxic and Radioactive Waste Task Committees, responsible for the compilation and editing of two books: (1) *Remediation Technologies for Soil and Groundwater Contamination*, and (2) *Natural Processes and Systems for Hazardous Waste Treatment*. I contributed chapters on *Fundamental Processes* [24], *Phytoremediation* [25], *Phytoprocesses* [26] and *Wetlands* [27] to these books. The editorial committee was composed of international leaders in the field of hazardous and emerging waste mitigation. As a result of my efforts with the ASCE and US EPA grant application review committees, I was invited to contribute a chapter on *Contaminants in Personal Care Products* for a book on *Emerging Contaminants of Concern: Fate, Transport and Treatment* and was invited to serve as Associate Editor of Practice Periodicals of Hazardous, Toxic and Radioactive Waste Management. In recognition of my research on the use of biomass as a sustainable feedstock for the production of bio-energy, I have contributed a chapter on *Bio-Mass* [23] for publication in a book entitled *Future Energy: Sustainable and Clean Energy Alternatives for our Planet* to be published by Elsevier with contributions from a number of international experts working in this emerging area. My research program has contributed significantly to the training of HQP through the supervision of 1 PDF (completed), 14 Master's students (11 completed, 3 in progress), 6 Ph.D. students (6 in progress) and 22 undergraduate students (20 completed and 2 in progress), as outlined in the *Training of Highly Qualified Personnel*.

EXTRACTION OF VALUE-ADDED PRODUCTS FROM MUNICIPAL, INDUSTRIAL & AGRICULTURAL ORGANIC RESIDUES

The sustainable extraction of bio-based products is an emerging research area with potentially important societal, economic and environmental impacts, particularly in developing countries. As an early researcher in this innovative field, my efforts have focused on the development of procedures to employ waste materials as biomass

feedstocks, representing an alternate waste management approach. In 2001, I established a 3-year \$236.8K collaborative project with Agronix Inc. aimed at developing processes to extract agri-products and commodity chemicals from agricultural and municipal residues. The feasibility of extracting value-added products from municipal biosolids, crop residues and livestock manures was investigated, and design requirements for the extraction of lignocellulose from hog and poultry manures, municipal sludges, crop residues and brewer's yeast in a bench-scale system were elaborated [3,5,8,11,13,22,35,41,45,58,60,61,63,64+1 manuscript in preparation]. In keeping with this research theme, I obtained a \$540K grant from CFI/OIT in 2002 to establish a research facility for the development and testing of innovative biosolid waste management technologies. I was also awarded a Petro-Canada Young Innovator Award in 2002 for my proposed work on the feasibility of producing bio-ethanol using cellulose extracted from municipal and agricultural organic residues. This work received the Russell Ackoff Award [41] (*International Journal of Solid Waste Technology and Management*) in 2005, for the best paper and significant research contributions in an emerging area. Ongoing research efforts in this area include projects to further investigate the pretreatment of waste materials prior to lignocellulosic material extraction, as well as the use of these materials for the production of cellulase, and the recovery of mono-sugars as precursors for the production of xylitol and sorbitol via hydrogenation. The use of agricultural livestock manures and other agricultural residues as feedstocks for these ongoing research efforts was the subject of my Early Researcher Award application submitted to the Ontario Ministry of Research Innovation which was successfully awarded in 2007. The importance of research in this field is to introduce sustainable waste management strategies; reduce water, soil and air contamination associated with the landspreading of organic waste materials; contribute to the mitigation of greenhouse gases; and broaden the source of feedstock materials for the emerging bio-products industry.

DETERMINATION & IMPLEMENTATION OF ALTERNATE WASTE MANAGEMENT STRATEGIES FOR INDUSTRIAL, AGRICULTURAL & MUNICIPAL BIOSOLIDS & SOLID WASTE

A second area of significant research contribution involves the investigation of alternative solid waste management practices for industrial, agricultural and municipal biosolids and solid waste. In 2000, a collaborative project with Compost du Québec was completed which assessed the bioavailability of N and C compounds during the composting of pulp and paper sludge, and the impact of amendment addition on the optimization of large-scale in-vessel composting systems. From the results obtained at the laboratory-scale, amendment mixtures were employed in small-scale and large-scale in-vessel systems, and the time required to obtain a biostabilized compost was reduced significantly, 10 days & 18 days, respectively [14,15,46,48]. A \$124K pulp and paper biosolids project was undertaken with St. Marys Paper/ULERN in 2003 to examine the use of St. Mary's Paper biosolids for gravel pit and mining site rehabilitation, as well as their potential use as a soil amendment or backfill material at landfill sites [2,4,40,42,63]. In 2007, a collaborative research effort with the City of Kingston/Utilities Kingston was initiated which will explore the feasibility of using of fats, oils and greases and other municipal organic wastes to augment biogas production from the anaerobic digestion of municipal sludges at the City of Kingston Ravensview wastewater treatment facility which is scheduled for commissioning in 2009. The results of the bench-scale and pilot-scale testing will lead to a series of recommendations for possible implementation at the full-scale facility. These three research initiatives have had an impact in the elaboration

of alternate waste management strategies, which can be extrapolated to the management of other organic waste materials through the use of strategies which do not pose risks to public health or the environment. More recently a collaborative effort with colleagues at Lakehead University which will investigate the production of H₂-rich fuel gas through the catalytic supercritical water gasification of wet biomass feedstocks was the subject of a successful \$819,525 OCE Atikokan Bioenergy Research Center Funding application. Part of this funding will be used to assess the feasibility of using wet biomass feedstocks including forest/agricultural crop residues and municipal solid waste and to determine optimal operating conditions for catalytic supercritical waste gasification. This research has the potential to provide significant contributions to the emerging bio-energy sector in understanding the use of various biomass feedstocks in gasification technology applications.

DEVELOPMENT & INVESTIGATION OF PASSIVE & SEMI-PASSIVE TREATMENT SYSTEMS FOR THE MITIGATION OF MUNICIPAL, INDUSTRIAL & AGRICULTURAL WASTEWATERS

One of my most significant contributions has been my involvement in a number of collaborative projects using passive and semi-passive treatment systems for wastewater mitigation. A mature constructed wetland system designed to treat agricultural runoff in Embrun, Ontario was investigated with U of Guelph to examine the role of plants in the removal of nutrients [10,43], as well as the impact of hydrodynamic pathways and sludge sedimentation on treatment efficiency [38,44,53+1 manuscript in preparation]. In another project completed in 2006, a biogeochemical characterization of a Northern Ontario natural wetland impacted by alkaline mine drainage was performed and treatment processes within the system were identified [7,36,56+1 manuscript in preparation]. A collaborative coastal fringe wetland project was undertaken in 2005 with Malroz Engineering/City of Kingston, which aims to characterize the performance of a constructed wetland treating diffuse landfill leachate. In 2006, I joined a Queen's U/Loyalist Township Council research team involved in the determination of stable C and N isotope assimilation in a natural wetland used to polish secondary effluent as part of a 5-year study to assess the Amherstview Wastewater Treatment Plant discharge impact on the Bayview Bog. The performance of a bench-scale combined passive treatment system for the mitigation of AMD under various hydraulic and constituent loadings, and varying treatment component sequences were found to affect the fate of metals within the combined system, particularly the peat biofilter [21,49,62,67]. Another study demonstrated the effect of temperature on metal retention potential in a peat biofilter and its effect on the bound form of heavy metals in peat [12,21,31,47+2 manuscripts in preparation] and impact on remediation mechanisms. The use of peat and other natural adsorbents/biofilter has been applied in the treatment of landfill leachate, where kinetic, equilibrium and bench-scale experiments were conducted to determine the performance and clogging rate of these filter media under various loading and aeration rates to determine the impact on treatment efficiency and the scale-up requirements [37+3 manuscripts in preparation]. In the fall of 2006, a \$77,570 research project was initiated with ERRG/US Forest Service to assess the feasibility of implementing a full-scale passive treatment system for the mitigation of AMD at a remote abandoned mine site in Sierra National Forest, California. To date, the system has been tested at the bench-scale and is now operating at the pilot-scale [54,55+2 manuscript in preparation]. On a more analytical scale, earlier research aimed to better understand biofilm growth and cometabolic constituent removal in the treatment of recalcitrant compounds in biofilter and attached growth systems. The work involved the

development of a numerical model which could simulate growth, oxygen (electron acceptor), substrate (electron donor), and secondary substrate (recalcitrant compound diffusion and removal through the biofilm [16,17,50,51]. Research in this area employing organic biofilters and biofilm systems could have considerable significance in the development of sustainable low-cost mitigation and reclamation strategies for the remediation of metal-contaminated municipal and industrial waste streams.

USE OF RISK-BASED DECISION-MAKING APPROACHES IN THE RISK ASSESSMENT OF URBAN WATER MANAGEMENT SYSTEMS

In March 2005, a project was undertaken which focuses on decision-making approaches in the risk assessment of disinfection by-products (DBPs) in drinking water. The primary objective is to develop a model-based methodology of risk-based decision-making for water treatment strategies dealing with the formation of DBPs. The outcome of the study will lead to the better definition of best management practices in the control of DBPs in drinking water considering health risks, disinfection performance, technology feasibility and cost [1,6,9,19,20,39,52,57,59+2 manuscript in preparation]. Similar concepts can then be applied in other environmental risk-based decision approaches such as the management of contaminated water discharges, waste management and natural resources management. In the spring of 2006, a study was initiated with Clearford Industries Inc, which aims to quantify the flow attenuation capacity [28,29,30] and reduced solids loading impact of decentralized clarifier tank/low flow gravity sewer systems on receiving municipal sewer infrastructure and wastewater treatment plant, as well as the risks associated with the implementation of these systems. The valuable concepts developed as a result of these two research projects will be extended to other risk-based mitigating approaches including the management of contaminated urban water and wastewater, natural resource management and the application of alternate waste management strategies.

EDUCATION

Throughout my academic studies I demonstrated early evidence of professional and research excellence. The results from my undergraduate thesis in Biology at McGill University led to significant conclusions which were published. The advanced research methodologies were presented at an invited conference workshop [18,68]. From the design concepts that I developed for my undergraduate thesis in Engineering at the University of Guelph, I was hired by my industry sponsor in Yellowknife in the NWT, which allowed me to continue the work that I had initiated in the establishment of a decentralized wastewater treatment facility for the remote village of Sakha in Yakut, Siberia. Both of my graduate degrees were supported by NSERC post-graduate scholarships (PGS-A and PGS-B). I was awarded the Senate medal for Applied Science at Carleton University for the research conducted and presented in my Master's thesis in which I developed a numerical model for predicting cometabolic degradation of recalcitrant compounds in biofilms [16,17,50,51]. At the doctoral level I was awarded a Canadian Geotechnical Society student paper award in 1999 for my research on the development of a passive treatment system for the mitigation of acid mine drainage in remote locations [67], a system which has been further developed and is now being tested at the pilot-scale at an abandoned mine-site in Sierra National Forest in California [54,55+2 manuscripts in preparation]. I was also awarded the Claudette MacKay-Lassonde PhD Scholarship by the Canadian Engineering Memorial Foundation (CEMF) and recognized as one of the top female doctoral students in engineering in Canada.

- 2001 Doctor of Philosophy (Ph.D). Environmental Engineering. Carleton University. **Thesis:** Development of a Combined Passive Treatment System for the Mitigation of Acid Mine Drainage.
- 1996 Master of Applied Science (M.A.Sc.). Civil Engineering (Environmental). Carleton University. **Thesis:** Intracellular Reducing Power Applications to Dual Substrate Cometabolic Biodegradation Modelling. **(Awarded Senate Medal)**
- 1993 Bachelor of Science in Engineering (B.Sc.(Eng.)). Water Resources Engineering. University of Guelph. **Thesis:** Design of a Biological Sewage Treatment Plant for Small Northern Communities - Sakha Village, Yakut, Siberia.
- 1990 Bachelor of Science (B.Sc.) in Biology (Major) and Northern Studies (Minor). McGill University. **Thesis:** The Atlantic Glass Sponges *Pheronema carpenteri* (Thomson) and *Pheronema grayi* (Kent) are Synonyms.

RESEARCH AWARDS

Since my appointment to the rank of Assistant Professor in August 2001, I have received 3 significant awards, all of which have been related to my research in the bio-products and bio-energy areas. These demonstrate the recognition of my expertise and leading edge research contributions at a regional, provincial and international level in this emerging research area.

- 2007 **Early Researcher Award:** Awarded by the Ontario Ministry of Research and Innovation to attract and retain and the best and brightest research talent in high-priority economic research sectors: **Title:** Recovery of Value-Added Products from Agricultural Livestock Manures.
- 2005 **Russell Ackoff Award:** Best Paper Award by the International Journal of Solid Waste Technology and Management for the best paper. **Title:** Enzymatic Hydrolysis of Cellulose from Various Waste Sources and Their Feasibility as Feedstocks for Ethanol Production.
- 2002 **Petro-Canada Young Innovator Award.** The award aims to recognize, promote and support outstanding young faculty researchers whose academic work is particularly innovative, enhances the learning environment in the department in which they study and has the potential to be significant to society. **Title:** Ethanol Production from Municipal, Industrial and Agricultural Biosolids.

PROFESSIONAL & ACADEMIC EXPERIENCE

- Dec 2006-Present Assistant Professor. Department of Civil Engineering (Primary Appointment) and Department of Chemical Engineering (Cross-Appointment). Queen's University.
- Jul 2005-Dec 2006 Assistant Professor. Department of Civil Engineering. Queen's University.

- Jul 2005-Present Adjunct Professor. Department of Civil and Environmental Engineering. Carleton University. Ottawa-Carleton Institute of Environmental Engineering (OCIENE). Ottawa-Carleton Institute of Civil Engineering (OCICE). Carleton Environmental Science Institute.
- Aug 2001-Jun 2005 Assistant Professor. Department of Civil and Environmental Engineering. Carleton University. Ottawa-Carleton Institute of Environmental Engineering (OCIENE). Ottawa-Carleton Institute of Civil Engineering (OCICE). **Granted Tenure July 1 2003**
- Jul 1998-Jul 2001 Lecturer (Faculty Appointment) Department of Civil and Environmental Engineering. Carleton University. Ottawa-Carleton Institute of Environmental Engineering (OCIENE). Ottawa-Carleton Institute of Civil Engineering (OCICE).
- Sep 1997-Jun 1998 Sessional Lecturer. Department of Civil and Environmental Engineering. Carleton University. Ottawa-Carleton Institute of Civil Engineering (OCICE).
- Jan 1994-Jul 2001 Graduate Research and Teaching Assistant. Department of Civil and Environmental Engineering. Carleton University. Carleton University. Ottawa-Carleton Institute of Environmental Engineering (OCIENE). Ottawa-Carleton Institute of Civil Engineering (OCICE).
- May 1993-Dec1993 Environmental Engineer. Ferguson Simek Clark, Architects and Engineers. Yellowknife, NWT.

RESEARCH EXPERIENCE

Successful environmental engineering research, particularly in emerging areas, requires a multi-disciplinary approach. As such, my research efforts have generally involved a balance of individual initiatives and collaborative projects which have allowed for the sharing and exchange of knowledge and resources and the better training of graduate and undergraduate students.

RESEARCH INITIATIVES

PASSIVE TREATMENT SYSTEMS

- Investigating the use of natural biosorbents (chitin, zebra mussel shells, peat, compost and other organic residues) for the mitigation of waste streams contaminated with heavy metals.
- Examining the fate of heavy metals in biofilters using peat and other natural biosorbents under various loading and climatic conditions.
- Testing the impact of different substrate/amendment mixtures on heavy metal removal and sulphate reduction in peat biofilters.
- Assessing changes in heavy metal removal and sulphate reduction in peat biofilters as a function of constituent and hydraulic loadings and climatic conditions.

- Determining landfill leachate (Trail Road Landfill) treatment efficiency and scale-up requirements using a peat biofilter preceded by an aerobic attached growth chamber.
- Impact of using a peat biofilter preceded by an aerobic attached growth chamber on system hydraulics and clogging of peat biofilter systems the system.
- Conceptualization, development and design of a bench-scale passive treatment system for the mitigation of acid mine drainage.
- Evaluation and characterization of a combined passive treatment system for the mitigation of acid mine drainage under variable loading and temperature conditions.
- Biogeochemical modeling of acid mine drainage through a combined passive treatment system.

RECOVERY OF VALUE-ADDED PRODUCTS FROM ORGANIC RESIDUES

- Bench-scale design and testing of a chemical extraction process that employs agricultural and process residues (crop residues, sugar cane bagasse, corn, brewers' yeast and livestock manures) for the extraction of agri-products and commodity chemicals.
- Production of bio-ethanol from cellulose derived from organic residue sources such as agricultural manures, crop residues and municipal biosolids; quantity and quality of product, and feasibility of large-scale production.
- Extraction of enzymes from organic waste residues for the enzymatic hydrolysis of lignocellulosic feedstocks.
- Conversion of mono-sugar to sorbitol and xylitol through the aqueous-phase hydrogenation of hydrolysates derived from organic waste residue feedstocks.

COLLABORATIVE RESEARCH PROJECTS

ESTABLISHED AT QUEEN'S UNIVERSITY

- Add biopolymers from crop residues project with Cunningham (Michael Fitzpatrick, PhD; Dan Krasznai, BEng)
- Add optimized landfill bioreactor cells project in San Diego with Performance Plants
- Add Optimizing anaerobic digestion-derived biogas for use in solid oxide fuel cells project with Thurgood/Anderson/Salsali/Peppley (Chenxi Li, PhD; Mark Milne, BEng)
- Add Syngas production for solid oxide fuel cells using wet biomass in catalytic supercritical water gasification project with Peppley/Matovic/Xu (Linghong Zhang, PhD)
- Add Greenroof Project with MacDougall/Bisby/Anderson/Ramsey
- Add Urban bioretention facility design & modelling project with Filion (Roy-Poirier, MSc)

➤ Add VOC's in fractured bedrock project with Kueper/(David Rodriguez, PhD)

- Investigating the production of H₂-rich fuel gas through the catalytic supercritical water gasification of wet biomass feedstocks such as peat, forest/agricultural crop residues, livestock manures and organic municipal solid waste. The study aims to assess the feasibility of using these wet biomass feedstocks and determine the optimal operating conditions. The project, which was initiated in September 2007 represents a collaborative effort with Dr. Charles Xu in the Department of Chemical Engineering at Lakehead University, Peat Resources Ltd and the Thunder Bay Water Pollution Control Plant.
- Feasibility of using of fats, oils and greases to augment biogas production at the City of Kingston Ravensview wastewater treatment facility which is scheduled for commissioning in 2009. Bench-scale and pilot-scale testing is anticipated, the results of which will lead to a series of recommendations for implementation at the full-scale facility. This experimental stage of this study was initiated in May 2007 in collaboration with Dr. Bruce Anderson in the Department of Civil Engineering at Queen's University, the City of Kingston and Utilities Kingston.
- Determination of the risks of impacting the water quality in bedrock aquifers overlain by only a thin veneer of surficial soils during the application of nutrients in an agricultural setting. Based on the comparison and the general observations made from a monitoring well network, specific recommendations regarding nutrient application (including timing) in the is environment will be provided, including possible suggestions for modifying farm-specific Nutrient Management Plans. This project sponsored by the MOE was initiated in May 2007 in addition to on-going fractured bedrock research in the in the Tay River Watershed area and is conducted in collaboration with Dr. Kent Novakowski in the Department of Civil Engineering at Queen's University.
- Field-scale characterization of solids profile and accumulation rates, as well as estimation of requirements for solids removal frequency to maintain optimal operating conditions in Brooklyn Concrete clarifier tanks at Wardsville (Ontario) residential and Cramahe (Ontario) commercial installations. The field-scale investigation was initiated in May 2007 in conjunction with Clearford Industries and in collaboration with Dr. James McLellan in the Department of Chemical Engineering at Queen's University.
- Selection of optimal sulfate reducing bacteria reactor (SRBR) substrate material and corresponding optimal operating conditions for the mitigation of acid mine drainage. The results of the bench-scale study which was initiated in September 2006 were employed to design and test a pilot-scale SRBR passive treatment system to treat acid mine drainage generated at the Williams Brothers Mine site in Sierra National Forest (California). The pilot-scale system was constructed and implemented at the field site in May 2007. This project was undertaken in conjunction with the US Forest Service and Engineering Remediation Resources Group located in San Francisco (California), with the collaboration of Dr. Heather Jamieson in the Department of Geological Engineering at Queen's University.
- Evaluation of risk-based decision-making approaches in risk assessments related to municipal systems. More specifically, the study has focused on decision-making approaches in the risk assessment of disinfection by-products (DBPs) in drinking water. This project was undertaken in collaboration with Dr.

James McLellan in the Department of Chemical Engineering at Queen's University in September 2006.

- Characterization of flow attenuation potential and flow attenuation equations of Brooklyn Concrete 4500 L clarifier tank with simple flow attenuation devices. The system flow characterization equations will also be applied to model of flow attenuation in a STEG system network to determine in-system peaking factors under various flow conditions and the impact of these decentralized systems on receiving municipal sewage works. The project, undertaken in collaboration with Clearford Industries, has been completed in 3 phases, the first of which was initiated in May 2006 and with the third completed in January 2008.
- Assessment of stable carbon and nitrogen isotopes assimilation in a natural wetland used to polish secondary effluent from the Amherstview Wastewater Treatment Plant. This project is part of a larger 5-year study which aims to assess the impact of the wastewater treatment plant discharge on the Bayview Bog. The portion of the project was undertaken in collaboration with Dr. Kevin Hall in the Department of Civil Engineering at Queen's University and the Loyalist Township Council in May 2006 and completed in March 2007.
- Establishment of a field-scale demonstration system to characterize the performance of a coastal fringe constructed wetland for the treatment of diffuse landfill leachate. The project was undertaken in collaboration with Dr. Bruce Anderson in the Department of Civil Engineering at Queen's University, Malroz Engineering Inc. and the City of Kingston, Ontario in the September of 2005.

ESTABLISHED AT CARLETON UNIVERSITY

- Alkaline mine drainage mitigation through a Northern Ontario natural wetland in Cobalt. Water quality monitoring, the identification of remediation processes and the impact of variations in climate on treatment efficiency are being investigated. Project undertaken in collaboration with Dr. Fred Michel in the Department of Earth Sciences at Carleton University from September 2003 to August 2007.
- Assessment of Monahan Drain Constructed Wetland Stormwater Facility flow calibration curve and monitoring analysis. Project undertaken in collaboration with CH2M-Hill and the City of Ottawa from July 2003 to May 2004.
- Examination of the use of St. Mary's Paper (Sault Sainte-Marie) biosolids for gravel pit and mining site rehabilitation, as well as potential use as a soil amendment or backfill material at landfill sites. Project undertaken from December 2002 to April 2005 in collaboration with the Upper Lakes Environmental Research Network (ULERN) and St. Mary's Paper.
- Investigation of constructed wetland system hydraulics, sludge sedimentation and treatment efficiency at the Dignard Wetland (Embrun, Ontario) designed for the treatment of agricultural runoff. Study was undertaken in collaboration with the Ms. Anna Crolla and Mr. Chris Kinsley from the University of Guelph satellite campus at Alfred from September 2002 to November 2004.
- Investigation of the role of plants in the removal of nutrients in a constructed wetland treating agricultural wastewater at the Dignard Wetland (Embrun, Ontario). Study was undertaken in collaboration with Ms. Anna Crolla and Mr. Chris Kinsley from the University of Guelph satellite campus at Alfred from May 2002 to December 2004.

- Examination of process optimization of in-vessel composting using pulp and paper sludge as a feedstock material. Examination of bulking agents and amendment addition for field-scale and large-scale composting operations. Project undertaken from September May 1999 to August 2000 in collaboration with Agriculture Canada and Compost du Québec.

PUBLICATIONS, INVITED LECTURES & WORKSHOPS

RATIONALE FOR AUTHORSHIP & PUBLISHING STRATEGY

The generation of scientific papers involves: experimental design, experimental execution and management; data gathering and analysis; and writing. A significant contribution to one of these components is essential to be included as an author. The authorship order is based on the role of each author with respect to these. I believe that students should be provided the opportunity for first authorship, which is demonstrated if the student takes on a primary role in two of these components. Students whom I have supervised are outlined in bold in the following list of publications. In cases where my students were primary authors or where the publication resulted from my undergraduate research, my role was that of co-principal author as my contributions to the manuscript development and editorial process were significant. Due to the delay in publishing and the rapid advances being made in the emerging bio-products and bio-energy fields, new information is often disseminated via conferences and scientific meetings.

SUMMARY OF RESEARCH CONTRIBUTIONS

<i>Type of Contribution</i>	Number of Lifetime Contributions as:		
	<i>Principal Author</i>	<i>Co-Principal Author</i>	TOTAL
Published, Accepted & In-Press Refereed Journal Manuscripts	10	10	20
Published, Accepted & In- Press Book Chapters	4	2	6
Submitted Refereed Journal Manuscripts	1	4	5
Technical Reports	4	2	6
Refereed Conference Proceedings	8	12	20
Non-Refereed Conference Proceedings	1	10	11
Invited Lectures	6	1	7
TOTAL	34	41	75

REFEREED JOURNALS (published, in-press or accepted)

1. **Chowdhury, S.**, P. Champagne and J. McLellan. *Factors Influencing the Formation of Trihalomethanes in Drinking Water: Results from a Multivariate Statistical*

- Investigation of the Ontario Drinking Water Surveillance Program Database*. Water Quality Research Journal of Canada. (Accepted for publication May 26, 2008)
2. Champagne, P., P. Van Geel and W. Parker. *Impact of Constituent Loading and Temperature on the Mitigation of AMD in Peat Biofilters*. Mine Water and Environment (Accepted for publication March 22, 2008)
 3. Champagne, P. and **T. Westman** (2008) *Land Application and Passive Stabilization of Pulp and Paper Biosolids: A Case Study*. International Journal of Environment and Waste Management. (Accepted for publication September 5, 2007) (**invited paper**)
 4. Champagne, P. and **T. Westman** (2008) *Pulp and Paper Mill Biosolids as a Resource: Growth and Composting Studies Using St. Marys Paper Biosolids*. International Journal of Environment and Waste Management. (Accepted for publication August 2, 2007) (**invited paper**)
 5. **Chowdhury, S.** and P. Champagne (2008) *Selecting Water Disinfection Processes Using Fuzzy Synthetic Evaluation (FSE) Technique*. Water Quality Research Journal of Canada. (In Press. Accepted March 19, 2007)
 6. Champagne, P. and **C. Li** (2008) *Bio-Product Recovery from Lignocellulosic Materials Derived from Poultry Manure*. Bulletin of Science, Technology and Society. 28(3):219-226 (**invited paper**)
 7. Champagne, P. (2008) *Bioethanol from Agricultural Waste Residues*. International Journal of Environmental Progress. 27(1):51-57 (**invited paper**)
 8. **Chowdhury, S.** and P. Champagne (2008) *An Investigation on Parameters for Modeling THMs Formation*. Global NEST Journal 10(1):80-91 (On-line publication January 25, 2008. Accepted for publication December 10, 2007)
 9. **Kelly, J.**, P. Champagne and F. Michel. (2007) *Assessment of Metal Attenuation in a Natural Wetland System Impacted by Alkaline Mine Tailings, Cobalt, Ontario*. Mine Water and Environment 26(3):181-190 (On-line publication August 1, 2007)
 10. Champagne, P. (2007) *The Feasibility of Producing Bio-Ethanol from Agricultural Waste Residues: A Canadian Perspective: Resources, Conservation and Recycling*. 50:211-230 (On-line publication October 2, 2006). (**invited paper**)
 11. **Chowdhury, S.**, P. Champagne and T. Husain (2007) *Fuzzy Risk-Based Decision-Making Approach for Selection of Drinking Water Disinfectants*. Journal of Water Supply: Research and Technology-AQUA. 56(2):75-93
 12. **Gottschall, N.**, C. Boutin, A. M. Crolla, C. B. Kinsley and P. Champagne (2007) *The Role of Plants in the Removal of Nutrients in a Constructed Wetland Treating Agricultural (Dairy) Wastewater, Ontario, Canada*. Ecological Engineering. 29(2): 154-163. (On-line publication November 13, 2006)
 13. Champagne, P. **T. Levy**, and **M.-J. Tudoret** (2005) *Recovery of Value-Added Products from Hog Manure – A Feasibility Study*. International Journal of Solid Waste Technology and Management. 31(3):147-157. (**invited paper**)
 14. Champagne, P., P. Van Geel and W. Parker (2005) *Development of a Combined Passive System for the Reduction of Metals and Sulphate in Acid Mine Drainage*. Mine Water and Environment. 24(3):124-133

15. Li, C. and P. Champagne (2005). *Feasibility of Using Waste Materials as Feedstocks for Ethanol Production* International Journal of Solid Waste Technology and Management. 31(2):93-101. **(invited paper)**
16. Dinel, H., T. Marche, M. Schnitzer, T. Pare and P. Champagne (2004) *Co-composting of Paper Mill Sludge and Hardwood Sawdust Under Two Types of In-Vessel Processes*. Journal of Environmental Science and Health, Part B – Pesticides, Food Contaminants, and Agricultural Wastes. 39(1):139-151.
17. Marche, T., M. Schnitzer, H. Dinel, T. Pare, P. Champagne, H.-R. Schulten and G. Facey (2003) *Chemical Changes During Composting of Paper Mill Sludge-Hardwood Sawdust Mixture*. Geoderma. 116(3-4):345-356.
18. Champagne, P., W.J. Parker and P.J. Van Geel (1999) *Modeling Cometabolic Biodegradation of Organic Compounds in Biofilms*. Water Science and Technology. 39(7):147-152. **(invited paper)**
19. Champagne, P., P.J. Van Geel and W.J. Parker (1998) *A Proposed Transient Model for Cometabolism in Biofilm Systems*, Biotechnology and Bioengineering, 60(5):541-550.
20. Reiswig, H.M. and P. Champagne (1995) *The Atlantic Glass Sponges Pheronema carpenteri (Thompson) and Pheronema grayi (Kent) are Synonyms*, Zoological Journal of the Linnean Society (London), 115:373-384.

REFEREED JOURNALS (submitted/under review)

21. Champagne, P. and C. Li. *Enzymatic Hydrolysis of Cellulosic Municipal Wastewater Treatment Process Residuals as Feedstocks for the Recovery of Simple Sugars*. Journal of Bioresource Technology. (Submitted for publication April 15, 2008).
22. Chowdhury, S., P. Champagne and P.J. McLellan. *Uncertainty Characterization Approaches for Risk Assessment of DBPs in Drinking Water: A Review*. Journal of Environmental Management (Submitted May 1, 2008)
23. Clyde, E., P. Champagne, H. Jamieson. *The Use of Passive Treatment Alternatives for the Mitigation of Acidic Drainage at the Williams Brothers Mine, California: Bench-Scale Study*. Environmental Geochemistry (Submitted May 14, 2008).
24. Speer, S., P. Champagne, A. Crolla and C. Kinsley. *Hydraulic Performance of a Mature Wetland Treating Milkhouse Wastewater and Agricultural Runoff*. Ecological Engineering (Submitted June 1, 2008)
25. Zhang, L., P. Champagne and C. Xu. *Review of Thermochemical Processes of Biomass Conversion for Bioenergy Production*. **Canadian Journal of Chemical Engineering** (submitted June 10, 2008)

BOOK CHAPTERS (published, in-press or accepted)

26. Champagne, P. (2008) Chapter 9 – Bio-mass in *Future Energy: Sustainable and Clean Energy Alternatives for our Planet*. T. Letcher, Ed (In Press, to be published by Elsevier in July 2008). **(invited chapter)**
27. Champagne, P. (2008) Chapter 4 – Personal Care Products in *Emerging Contaminants of Concern: Fate, Transport and Treatment*. A. Bhandary and R.

Surampalli, Eds. ASCE (Under Editorial Review, to be published in October 2008).
(invited chapter)

28. Champagne, P. and A. Bhandari (2007) Chapter 2 - Fundamental Processes *in Remediation Technologies for Soil and Groundwater Contamination*. A. Bhandari, R. Surampalli, P. Champagne and S.K. Ong, Eds. ASCE. 456 p. **ISBN 13: 9780784408940. (invited chapter)**
29. Champagne, P. (2007) Chapter 10 - Phytoremediation *in Remediation Technologies for Soil and Groundwater Contamination*. A. Bhandari, R. Surampalli, P. Champagne and S.K. Ong, Eds. ASCE. 456 p. **ISBN 13: 9780784408940. (invited chapter)**
30. Banerji, S.K., R.Y. Surampalli, P. Champagne, R.D. Tyagi and B. Subramanian S.Y. (2008) Chapter 6 – Phytoprocesses *in Natural Processes and Systems for Hazardous Waste Treatment*. To be published by the American Society of Civil Engineers (ASCE) in 2007. S.K. Ong, R. Surampalli, A. Bhandari, P. Champagne, R. Tyagi and I. Lo Eds. **ISBN 13: 9780784409398 (invited chapter)**
31. Champagne, P. (2008) Chapter 7 - Wetlands *in Natural Processes and Systems for Hazardous Waste Treatment*. To be published by the American Society of Civil Engineers (ASCE) in 2007. S.K. Ong, R. Surampalli, A. Bhandari, P. Champagne, R. Tyagi and I. Lo Eds. **ISBN 13: 9780784409398 (invited chapter)**

TECHNICAL REPORTS

32. Champagne, P. and T. Bowen (2007) *Flow Attenuation in a Septic Tank Effluent Gravity (STEG) System Clarifier Tank: Flow Attenuation Characteristics of Clarifier Tank and Selected Flow Attenuation Devices – Final Testing Report* prepared for Clearford Industries, Inc. Queen's University Coastal Laboratory, Department of Civil Engineering. 40 pp.
33. **Speer, S.** and P. Champagne (2007) *Flow Attenuation in a Septic Tank Effluent Gravity (STEG) System Clarifier Tank: Comprehensive Clarifier Tank Testing – Preliminary Testing Report* prepared for Clearford Industries, Inc. Queen's University Coastal Laboratory, Department of Civil Engineering. 28 pp.
34. Champagne, P (2006) *Flow Attenuation in a Septic Tank Effluent Gravity (STEG) System Clarifier Tank – Phase I*. Final Report prepared for Clearford Industries, Inc. Queen's University Coastal Laboratory, Department of Civil Engineering. 23 pp.
35. Champagne, P. (1996) *The Use of Peat in Industrial and Municipal Wastewater Treatment*, Internal Report, Department of Civil and Environmental Engineering, Carleton University, September, 1996. 129 pp.
36. Champagne P. and P.S Chisholm (1992) *AQUAWASTE - A Model for Land Based Rainbow Trout Rearing Operation.*, User's Guide, Ontario Ministry of Agriculture and Food. 37 pp.
37. Chisholm, P.S. and P. Champagne (1991) *Preliminary Modeling of Land Based Rainbow Trout Rearing Operation*. Ontario Ministry of Agriculture and Food. 26 pp.

REFEREED CONFERENCE PROCEEDINGS (full papers)

38. Champagne, P. (2008) *Canada's Potential for Deriving Bioenergy and Biofuels from Organic Residuals*. 2nd International Symposium on Energy from Biomass and Waste. November 17-20. Venice, Italy
39. Champagne, P. and C. Li (2008) *Biosorption of Cadmium (II) and Nickel from Synthetic Landfill Leachate by Sphagnum Peat Moss and Crushed Mollusk Shells in Fixed-Bed Columns*. 5th Asian-Pacific Landfill Symposium. October 22-24. Sapporo, Japan
40. **Chowdhury, S.**, P. Champagne and J. McLellan (2008) *Factorial Analysis of Trihalomethanes Formation in Drinking Water*. Water Environment Federation Technology & Exhibition Conference. October 18-22. Chicago, IL
41. Champagne, P. and **C. Li** (2007) *Enzymatic Hydrolysis of Cellulosic Material Derived from Municipal Wastewater Treatment Sludges for Ethanol Production*. 22nd International Conference on the Solid Waste Technology & Management. March 18-21. Philadelphia, PA
42. **Kelly, J.**, P. Champagne and F. Michel (2006) *Mitigation of Alkaline Mine Drainage in a Natural Wetland System*. 2nd International Conference on Evolution, Monitoring, Simulation, Management and Remediation of the Geological Environment and Landscape. J. Martin-Duque, C. Brebbia, D. Emmanouloudis and U. Mander Eds. June 6-8. Rhodes, Greece. p. 115-124. ISBN: 1-84564-168-X
43. Champagne, P. and **Md. Khalekuzzaman** (2006) *A Sequential Aerated Peat Biofilter System for the Treatment of Landfill Leachate*. Proceedings of the 2nd International Conference on Evolution, Monitoring, Simulation, Management and Remediation of the Geological Environment and Landscape. J. Martin-Duque, C. Brebbia, D. Emmanouloudis and U. Mander Eds. June 6-8. Rhodes, Greece. p. 125-134. ISBN: 1-84564-168-X
44. **Speer, S. I.** and P. Champagne (2006) *Constructed Wetlands: The Canadian Context*. Proceedings of the 2nd IASTED International Conference on Advanced Technology in the Environmental Field. L. Ubertini Ed. February 6-8. Lanzarote, Spain. p. 1-6. ISBN: 0-88986-552-3
45. **Chowdhury, S.** P. Champagne and A. Sarkar (2006) *Use of Treated Wastewater" Evaluation of Wastewater Minimization Strategies Using Fuzzy Techniques*. Proceedings of the 2nd IASTED International Conference on Advanced Technology in the Environmental Field. L. Ubertini Ed. February 6-8. Lanzarote, Spain. p. 25-31. ISBN: 0-88986-552-3
46. **Westman, T.**, P. Champagne and L. Greco (2005) *From Waste to Product: Developing Pulp and Paper Mill Biosolids into a Marketable Product*; WEF/AWWA/KY-TNWEA Joint Residual and Biosolids Conference; April 17-20; Nashville, TN.
47. **Li, C.** and P. Champagne (2005) *Enzymatic Hydrolysis of Cellulose from Various Waste Sources and Their Feasibility as Feedstocks for Ethanol Production*; 20th International Conference on Solid Waste Technology and Management. R. Mersky and W. Shieh Eds; April 3-6; Philadelphia, PA. pp. 10 (CD ROM). ISSN: 1091-8043
(recipient of the Russell Ackoff Award)
48. **Westman, T.**, P. Champagne and L. Greco (2005) *Biosolids Land Application as a Method of Passive Stabilization of Pulp and Paper Mill Biosolids*; 20th International

Conference on Solid Waste Technology and Management. R. Mersky and W. Shieh Eds; April 3-6; Philadelphia, PA. pp. 10 (CD ROM). ISSN: 1091-8043

49. **Gottschall, N.**, C. Boutin, A. M. Crolla, C. B. Kinsley and P. Champagne (2004) *The Role of Plants in the Removal of Nutrients in a Constructed Wetland Treating Agricultural Wastewater*; IWA 9th International Conference on Wetland Systems Pollution Control; September 26-30; Avignon, France. pp. 4 (CD ROM)
50. **Speer, S. I.**, A. M. Crolla, C. B. Kinsley and P. Champagne (2004) *Hydrodynamic Pathways in a Maturing Constructed Wetland*; IWA 6th International Conference on Waste Stabilization Ponds and 9th International Conference on Wetland Systems Pollution Control; September 27-October 1; Avignon, France. p. 179-187.
51. **Levy, T.**, P. Champagne, **M.-J. Tudoret** and H. Dinel (2003) *Feasibility Study on the Recovery of Commodity Chemicals and Agri-Products from Hog Manure*; 18th International Conference on Solid Waste Technology and Management. R. Mersky and W. Shieh Eds; March 23-26; Philadelphia, PA. pp. 10 (CD ROM). ISSN 1091-8043
52. **Marche, T.**, P. Champagne, M. Schnitzer, H. Dinel and T. Pare (2003) *Characteristics of Paper Mill Sludge in a Co-Composting Process*; 18th International Conference on Solid Waste Technology and Management. R. Mersky and W. Shieh Eds; March 23-26; Philadelphia, PA. pp. 10 (on CD ROM). ISSN 1091-8043
53. Champagne, P., P. Van Geel and W. Parker (2002) *A Combined Passive System for the Mitigation of Acid Mine Drainage*; Proceedings of the Joint CSCE/EWRI of ASCE International Conference on Environmental Engineering. W. Stiver and R. Zytner Eds; July 21-24; Niagara Falls, Ontario. pp. 10 (CD ROM). ISBN: 0-88955-532-X
54. Champagne, P., **T. Marche**, H. Dinel, M. Schnitzer and T. Pare (2002) *Composting Paper Mill Sludge*; Proceeding of the Joint CSCE/EWRI of ASCE International Conference on Environmental Engineering. W. Stiver and R. Zytner Eds; July 21-24; Niagara Falls, Ontario. pp. 12 (on CD ROM) ISBN: 0-88955-532-X
55. Champagne, P., **L. MacLennan**, W. Parker and P. Van Geel (1999) *Preliminary Evaluation of a Passive Treatment System for the Mitigation of Acid Mine Drainage*. 38th Annual Conference of Metallurgists – 29th Annual Hydrometallurgical Meeting, Canadian Institute of Mining, Metallurgy and Petroleum. G. Harris and S. Omelon Eds. August 22-26, Quebec City, Quebec. p. 169-183. ISBN: 0-919086-87-X.
56. Parker, W., P. Champagne and P. Van Geel (1998) *Modeling Cometabolic Biodegradation of Organic Compounds in Biofilms*. IAWQ Specialty Conference On Microbial Ecology of Biofilms. October 8-10, Lake Bluff, Illinois.
57. Champagne, P. (1997) *A Transient Model for Cometabolism of Hazardous Compounds in Biofilm Systems*, 90th Annual Meeting and Exhibition of the Air & Waste Management Association. June 8-13, Toronto, Ontario

NON-REFEREED CONFERENCE PROCEEDINGS (full papers)

58. **Chowdhury, S.**, P. Champagne and J. McLellan (2008) *Factors Influencing the Formation of Trihalomethanes in Drinking Water: Results from a Multivariate Statistical Investigation of the Ontario Drinking Water Surveillance Program Database*. Canadian Association on Water Quality. 43rd Central Canadian Symposium on Water Quality Research. February 11-12. Burlington, ON.

59. **Speer, S.**, P. Champagne and B. Anderson (2008) *Regional Variations in Constructed Wetland Designs for Optimal Protection of Receiving Waters*. Canadian Association on Water Quality. 43rd Central Canadian Symposium on Water Quality Research. February 11-12. Burlington, ON.
60. **Clyde, E.**, P. Champagne, H. Jamieson and C. Gorman (2007) *Passive Treatment of Acidic Drainage at Williams Brothers Mine: Bench- and Pilot-Scale Studies Mariposa County, CA*. 50th Annual Association of Environmental and Engineering Geologists Meeting "Engineering Challenges of Mine Reclamation". September 24-29. Los Angeles, CA. (**invited paper**)
61. **Clyde, E.**, P. Champagne, H. Jamieson, C. Gorman and J. Sourial (2007) *Investigation of Passive Treatment Alternatives for the Mitigation of Acid Mine Drainage at an Abandoned Mine (California)*. Mining and Environment IV Conference. October 19-27. Sudbury, Ontario.
62. Michel, F. and P. Champagne (2007) *Distribution of Heavy Metals in Contaminated Surface Waters and Alkaline Tailings with Typha litifolia in a Wetland Environment. Crosswise Lake, Cobalt, Ontario*. Mining and Environment IV Conference. October 19-27. Sudbury, Ontario.
63. **Chowdhury, S.** and P. Champagne (2006) *Multi-Criteria Decision Making In Fuzzy Environment*. 34th Annual Congress of the CSCE. May 23-26. Calgary, Alberta. GC-073.
64. Champagne, P. (2006) *Bioethanol from Agricultural Waste Residues*. International Interdisciplinary Conference on Sustainable Technologies for Environmental Protection. p. 18-24. January 7-9. Coimbatore, India. (**Plenary Address**)
65. **Chowdhury, S.**, P. Champagne and A. Sarkar (2005) Evaluation of Drinking Water Treatment Technology-An Entropy Based Fuzzy Application. *Proceedings of the International Conference on Environmental Management*. October 11-14. Hyderabad, India
66. **Henderson, B.**, P. Champagne, **M.-J. Tudoret** and H. Dinel (2003) *The Chemical Separation of Cellulose for Lignin in Sugarcane Bagasse*; 8th Specialty Conference on Environment and Sustainable Engineering and 31st Annual Congress of the CSCE; June 4-7; Moncton, New Brunswick. ENK-283
67. **Levy, T.**, P. Champagne, **M.-J. Tudoret** and H. Dinel (2003) *Bio-Chemical Integrated Recycling of Hog Manure*; 8th Specialty Conference on Environment and Sustainable Engineering and 31st Annual Congress of the CSCE; June 4-7; Moncton, New Brunswick. ENK-284
68. **Rouhani, P.**, P. Champagne and P. Van Geel (2003) *Impact of Hydraulic and Constituent Loading on a Combined Passive System for the Treatment of Acid Mine Drainage*; 8th Specialty Conference on Environment and Sustainable Engineering and 31st Annual Congress of the CSCE; June 4-7; Moncton, New Brunswick. ENR-282.

INVITED LECTURES/WORKSHOPS

69. Champagne, P. (2008) - *Frontiers of Science* at the 5th World Science Centre Congress. Jun 2008 (**plenary speaker**)

70. Champagne, P. (2007) *Bio-Ethanol from Organic Residues in Canada*. Invited Speaker. Robert & Joyce Jones Civil Engineering Forum, Queen's University. January 18, Kingston, Ontario
71. Champagne, P. (2006) *Bioethanol from Agricultural Waste Residues*. International Interdisciplinary Conference on Sustainable Technologies for Environmental Protection. January 7-9. Coimbatore, India. (**plenary address**)
72. Champagne, P. (2004) *Chemistry of Wastewater*, Invited Speaker, Ontario On-Site Wastewater Association, 5th Annual Ontario On-Site Wastewater Conference and Exhibition, March 8-9, Ottawa, Ontario.
73. Champagne, P. (2002) *Site Remediation Through Bioproducts Utilization*, Invited Speaker, Northern Ontario Bioproducts Initiative, December 6, Sault Ste. Marie, Ontario.
74. Champagne, P. (1999) *Combined Passive Treatment Systems for the Mitigation of Acid Mine Drainage*, Invited Lecture Series, Ottawa Geotechnical Group (Canadian Geotechnical Society), October 19, Ottawa, ON. (**recipient of the Canadian Geotechnical Society Graduate Student Paper Award**)
75. Reising, H. M., and P. Champagne (1994) *The Atlantic Hexactinellids Pheronema carpenteri (Thomson) and P. grayi (Kent) Are Synonyms*. IX Workshop on Atlantic-Mediterranean-Caribbean Sponges. February 15-20. Harbor Branch Oceanographic Institution, Fort Pierce, Florida. (**invited workshop**)

GRANTS AND CONTRACTS SUPPORTING RESEARCH

The following grant and contract funding has been used to support my research activities since the time of my appointment to the rank of Assistant Professor at Carleton University (August 2001). Total grants and contracts (excluding student scholarships):

As PI: \$1,463,940
 As co-PI: \$1,151,481
Total: \$2,615,421

Title of Project and Names of Applicants (PI is underlined)	Funding Source	Amount per Year	Years of Tenure	
<u>P. Champagne</u> , H. Salsali, B. Anderson, C. Thurgood <i>Municipal Organic Waste Materials to Augment Biogas Production</i>	Ontario Centres of Excellence (OCE) – Interact Program (Applied for)	\$13,500	2008	2009
<u>P. Champagne</u> , H. Salsali, B. Anderson, C. Thurgood <i>Optimized Biogas Production from Anaerobic Digestion for Use in Solid Oxide Fuel Cells</i>	NSERC Strategic Project Grant (Applied for)	\$142,175 \$122,533 \$111,013	2008 2009 2010	2009 2010 2011
<u>P. Champagne</u> , <u>B. Peppley</u> , D. Matovic, C. Xu <i>Biomass Gasifier/Fuel Cell</i>	NSERC Strategic Project Grant (Applied for)	\$165,000 \$164,200 \$164,200	2008 2009 2010	2009 2010 2011

<i>System Integration for Small Scale Combined Heat and Power</i>				
P. Champagne, <u>C. MacDougall</u> , L. Bisby, B. Anderson, J. Ramsey	NSERC Strategic Project Grant (Applied for)	\$151,590 \$56,630 \$37,420	2008 2009 2010	2009 2010 2011
<i>Predictive Model for Green Roof Thermal and Stormwater Retention Performance</i>				
P. Champagne, J. Ramsey, K. Novakowski, B. Anderson.	NSERC RTI (Equipment Grant)	\$76,800	2008	
<i>Characterization of Organic Constituent Degradation</i>				
P. Champagne, <u>C. Xu</u> , L. Catalan, A. Gilbert, B. Liao, E. Mohammedhassan, Y. Ohtsuka	Ontario Centres of Excellence (OCE) – Atikokan Bioenergy Research Centre	\$400,750 \$418,775	2007 2008	2008 2009
<i>Co-Firing Peat and Biomass with Coal for Power</i>				
P. Champagne	Early Researcher Award (ERA) - Ontario Ministry of Research Innovation	\$28,000 \$28,000 \$28,000 \$28,000 \$28,000	2007 2008 2009 2010 2011	2008 2009 2010 2011 2012
<i>Recovery of Value-Added Products from Agricultural Livestock Manures</i>				
P. Champagne, <u>B. Anderson</u>	NSERC Undergraduate Student Research Award (USRA) (J. Stirling)	\$4,000	2007	
P. Champagne	Clearford Industries, Inc	\$35,173	2007	
<i>Flow Attenuation in a Septic Tank Effluent Gravity System Clarifier Tank – Phase II</i>				
P. Champagne, <u>K. Novakowski</u>	Ontario Ministry of the Environment (MOE)	\$70,000 \$70,000	2007 2008	2008 2009
<i>Nutrient Application Over a Shallow Bedrock Aquifer</i>				
P. Champagne, <u>J. McLellan</u> , Clearford Industries, Inc.	NSERC Post Graduate Industrial Scholarships (H. Lossing)	\$21,000 \$21,000	2007 2008	2008 2009
<i>Assessing the Downstream Impacts of a Grey Water Siphon for Use With Small Diameter Gravity Sewers</i>				
P. Champagne	US Forest Service/ERRG Engineering	\$22,650* \$39,420* (*1.15 \$US/\$CND rate)	2006 2007	2007 2008
<i>Removal Action Design at Williams Brothers Mine Sierra National Forest</i>				

<u>P. Champagne</u> <i>Bench-Scale Testing of Sulfate Reducing Bacteria System for the Remediation of Acid Mine Drainage at Williams Brothers Mine Sierra National Forest</i>	US Forest Service/ERRG Engineering (Equipment Grant)	\$15,500* (*1.15 \$US/\$CND rate)	2006	
<u>P. Champagne</u> <i>Flow Attenuation in a Septic Tank Effluent Gravity System Clarifier Tank – Phase I</i>	Clearford Industries, Inc.	\$12,071	2006	
<u>P. Champagne</u> <i>Agricultural Wastes as Feedstocks for the Production of Bio-Ethanol</i>	NSERC Discovery Grant	\$21,200 \$21,200 \$21,200 \$21,200 \$21,200	2006 2007 2008 2009 2010	2007 2008 2009 2010 2011
<u>P. Champagne, J. Ramsay, B. Anderson, D. Lefebvre, B. Ramsay, A. Rutter</u> <i>Treatment and/or Fate of Organics in Wastes</i>	NSERC RTI (Equipment Grant)	\$149,956	2006	
<u>P. Champagne</u> <i>Feasibility of Using Hog Manure and Sewage Sludge for the Production of Cellulase by <u>Trichoderma reesei</u></i>	Queen's University ARC	\$5,826	2006	2007
<u>P. Champagne</u>	Queen's University Travel Award	\$1,500	2006	
<u>P. Champagne</u>	Queen's University Research Initiation Grant	\$65,000	2005	
<u>P. Champagne, ULERN</u> <i>Development of Pulp and Paper Biosolids as a Marketable Resource</i>	St. Marys Paper, Inc. (Carleton's Portion 50%)	\$74,200 \$49,800	2003 2004	2004 2005
<u>P. Champagne</u>	NSERC Undergraduate Student Research Award (USRA) (B. Henderson)	\$4,000	2002	
<u>P. Champagne</u> <i>Ethanol Production from Municipal, Industrial and Agricultural Biosolids</i>	Petro-Canada Young Innovator Award	\$10,000	2002	

<u>P. Champagne</u> <i>Research Facility for the Development and Testing of Innovative Biosolids Waste Management Technologies</i>	Canadian Foundation for Innovation (New Opportunities) (CFI Matching Funds) – Infrastructure Grant	\$220,000	2002	
<u>P. Champagne</u> <i>Research Facility for the Development and Testing of Innovative Biosolids Waste Management Technologies</i>	Ontario Innovative Trust (CFI Matching Funds) – Infrastructure Grant	\$220,000	2002	
<u>P. Champagne</u> <i>Research Facility for the Development and Testing of Innovative Biosolids Waste Management Technologies</i>	Agronix, Inc. (CFI Matching Funds, Industrial Partner) – Infrastructure Grant	\$100,000	2002	
<u>P. Champagne</u> <i>Process Development for the Recovery of Agri-Products and Commodity Chemicals from Animal Manure and Biosolid Sources</i>	Agronix, Inc.	\$56,800 \$98,000 \$82,000	2001 2002 2003	2002 2003 2004
<u>P. Champagne</u> <i>Development of Combined Passive Treatment Systems for the Mitigation of Acid Mine Drainage</i>	NSERC Discovery Grant	\$19,000 \$19,000 \$19,000 \$19,000 \$19,000	2001 2002 2003 2004 2005	2002 2003 2004 2005 2006
<u>P. Champagne</u>	Carleton University (RIG)	\$15,000	2001	

RESEARCH WORK IN PROGRESS

FUTURE DEVELOPMENT IN RESEARCH AT QUEEN'S

I joined the Department of Civil Engineering at Queen's University in September 2005 leaving the Department of Civil and Environmental Engineering at Carleton University, where I held a tenured faculty position at the rank of Assistant Professor since 2003. The decision to come to Queen's University to a non-tenured, renewed appointment was not an easy one, but I felt that joining the faculty at Queen's University would present a number of research opportunities which would otherwise not be available to me at Carleton. Since September 2005, I have been striving to build a solid foundation for my research program which can continue to evolve as I establish a strong research profile and continue to conduct leading edge research to develop alternate water and waste management technologies and sustainable environmental approaches. I have established a number of individual and collaborative research projects with colleagues at Queen's University (Bruce Anderson, Kevin Hall, Heather Jamieson, Jim McLellan, Kent Novakowski, Bernie Kueper), as well as with colleagues at other Universities (Charles Xu and Lionel Catalan at Lakehead University, Fred Michel at Carleton University). I have also begun to form significant research ties within my community (City of Kingston,

Utilities Kingston, Malroz Engineering), with industries within the region (Clearford Industries Inc located in Ottawa) and on an international basis (Environmental Remediation Resources Group San Francisco California). Brief synopses of these collaborative projects are highlighted in the *Collaborative Research Projects* section.

In the last two years, I have attracted \$1,594,621 in new research funding (excluding and student scholarships), \$443,140 as PI and \$1,151,481 as co-PI, from a variety of government and institutional grants and awards, as well as a number of industrial partners. Included in this funding was an Early Researcher Award (ERA) awarded by the Ontario Ministry of Research Innovation on the basis of demonstrated research excellence particularly in emerging and innovative research areas, and my first NSERC renewal application which was successfully renewed with a 10.4% increase in funding in 2006. This new funding has collectively enabled me to reestablish a strong and innovative research program here at Queen's University within a relatively short period of time. A number of funding proposals have been submitted in the past 4 months or are currently being prepared for submission as can be seen from the *Grants and Funding Applications in Preparation and Under Review*.

Bio-energy and the recovery of value-added bio-products from biomass have emerged as a target research areas in Canada and on a global level, a number of funding and collaborative opportunities have emerged in the last year. As my growing research program at Queen's University has aimed to contribute valuable research and establish an expertise in these areas. I currently have a number of grant applications and funding initiatives for which I am the PI or co-PI at various stages of preparation. These are listed in the *Grants and Funding Applications in Preparation* section below. I have recently participated in the collaborative submission of a \$818,525 research proposal to the Ontario Centres of Excellence (OCE) on bio-energy with colleagues at Lakehead University, which was successfully awarded and will allow us to explore direct and indirect co-firing of biomass as an alternative to the use of coal for energy generation. More specifically, I will be investigating the feasibility of using wet biomass feedstocks such as agricultural crop residues, livestock manures, peat, forestry residues, and organic municipal waste in the production of H₂-rich fuel gas via catalytic supercritical water gasification. An augmented biogas production project was initiated in May 2007 with Utilities Kingston and the City of Kingston which will investigate the feasibility of using of fats, oils and greases to augment biogas production at the City of Kingston Ravensview wastewater treatment facility. Bench-scale and pilot-scale testing is anticipated, the results will be used in the design of the full-scale facility. I intend to apply for a Queen's University Chancellor's Research Award (CRA) in February 2008 which will aim to complement the proposal of my ERA and expand the biomass feedstock to include crop residues, municipal biosolids and sludges.

PUBLICATIONS IN PREPARATION

JOURNAL PUBLICATIONS

Chowdhury, S., P. Champagne, J. McLellan. *Association of Disinfection Byproducts (DBPs) with Bladder and Colorectal Cancer Incidents: Canadian Perspectives*. Journal of Water and Health (Final draft form to be submitted July, 2008).

Li, Chenxi, P. Champagne. *Removal of Cadmium, Nickel, Manganese and Cobalt Ions from Aqueous Solutions Using Low-Cost Natural Adsorbents*. Journal of Hazardous Materials (Final draft form – to be submitted June 2008)

Li, Chenxi, P. Champagne. *Comparative fixed-bed column study on the adsorption of cadmium (II) and nickel (II) ions in binary metal aqueous solutions using peat and crushed mollusk shells*. Journal of Hazardous Materials (Final draft form – to be submitted June 2008)

Clyde, E., P. Champagne, H. Jamieson, C. Gorman, J. Sourial. *The use of a Passive Treatment System for the Mitigation of Acid Mine Drainage at the Williams Brothers Mine: Pilot-Scale Study*. Environmental and Engineering Geoscience (Final draft form – to be submitted August 2008).

Chowdhury, S., P. Champagne, J. McLellan. *Feasibility of Uncertainty Characterization Approaches in the Management of Disinfection By-Products (DBPs) in Drinking Water*. Journal of Water and Health (Final draft form to be submitted March, 2008).

Speer, S., P. Champagne. *Constructed Wetland for the Mitigation of Agricultural Wastewaters: The Canadian Context*. Management of Environmental Quality (Revised draft form – to be submitted June 2008).

Champagne, P., **Caijian. Li**. *Pre-Treatment Optimization of Sugarcane Bagass and Corn Stovers for Sugar Recovery Using Enzymatic Hydrolysis*. Bioresource Technology (Revised draft form to be submitted August 2008).

Rouhani, P., P. Champagne, P. Van Geel; *Hydraulic and Constituent Loading Effects in a Bench-Scale Combined Passive System Treating Acid Mine Drainage*; Mine Water and the Environment (Revised draft form - to be submitted July 2008)

Champagne, P., **M. Khalekuzzaman**. *Landfill Leachate Treatment in an Aerated Peat Biofilter System – A Bench-Scale Study*. Environmental Science and Technology (Revised draft form – to be submitted September 2008)

Michel, F., P. Champagne. *Distribution of Heavy Metals in Typha latifolia in a Wetland Environment Contaminated by Alkaline Tailings. Crosswise Lake (Cobalt, Ontario)*. Mining Water and the Environment (Preliminary draft form – to be submitted August 2008).

Champagne, P., P. Van Geel, W. Parker. *Sequential Extraction of Heavy Metals from Contaminated Peat Moss*. Water Research (Preliminary draft form - to be submitted September 2008).

BOOK CHAPTERS

Champagne, P. Chapter 4 – Personal Care Products in *Contaminants of Concern - Fate, Transport and Treatment*. R. Surampalli and A. Bhandari, Eds (To be submitted January 2008 and published by the American Society of Civil Engineers (ASCE) June 2008). **(invited book chapter)**

GRANTS AND FUNDING APPLICATIONS IN PREPARATION AND UNDER REVIEW

Title of Project and Names of Applicants (PI is	Funding Source	Anticipated Project Amount	Target Application
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underlined)		Requested	Date
<u>P. Champagne, B. Anderson, Utilities Kingston, City of Kingston</u> <i>Municipal Organic Waste Materials to Augment Biogas Production</i>	Ontario Centres of Excellence (OCE) – Centre of Excellence for Energy – Interact Program	\$13,500	Feb 28 2008

TRAINING OF HIGHLY QUALIFIED PERSONNEL (HQP)

In the past, I have been fortunate to work with students who were highly motivated and eager to learn. In instances of co-supervision, I was the primary graduate or undergraduate supervisor with the exception of David Rodriguez, Titia Praamsma, Jan Stirling and Nadia Mykytczuk. To date, I have supervised and trained a total of 43 HQP at Queen's University and Carleton University:

- 1 Post-doctoral Fellow (completed): 1 sole supervision
- 6 PhD Student (current): 1 sole supervision, 5 joint supervision
- 3 MSc/MASc Students (current): 3 joint supervision
- 12 MSc/MASc Students (completed): 7 sole supervision, 5 joint supervision
- 22 Undergraduate Research Theses: 1 joint supervision (current), 2 sole supervision (current), 16 sole supervision (completed), 3 joint supervision (completed)
- 7 Undergraduate Research Assistants: 4 sole supervision (completed), 3 joint supervision (completed).

TRAINING OF HIGHLY QUALIFIED PERSONNEL: GRADUATE STUDENTS

DEGREE	YEAR	CANDIDATE NAME	THESIS TITLE
Ph.D. (Civil Eng.) (Bruce Anderson co-supervisor)	In Prog. (2011)	Chenxi Li	Use of Fats Oils and Grease to Augment Gas Production in Anaerobic Digestion of Municipal Wastewater Treatment Sludge
Ph.D. (Civil Eng.) (Bernard Kueper co-supervisor)	In Prog. (2011)	David Rodriguez	Monitoring and Modelling of TCE and BTEX in Fractured Bedrock
Ph.D. (Civil Eng.)	In Prog. (2011)	Linghong Zhang	Use of Municipal Sludge as a Biomass Feedstock for Supercritical Water Gasification
M.Sc. (Chem Eng.) (Michael Cunningham co-supervisor)	In Prog. (2010)	Michael Fitzpatrick	Biopolymers from biosourced residual Materials

M.Sc. (Civil Eng.) (Yves Fillion co-supervisor)	In Prog. (2010)	Audrey Roy-Poirier	Municipal Stormwater Management Using Natural Attenuation Systems.
Ph.D. (Civil Eng.) (Kent Novakowski co-supervisor)	In Prog. (2010)	Titia Praamsma	Nutrient Application Over a Shallow Bedrock Aquifers
M.Sc. (Civil Eng.) (James McLellan co-supervisor)	In Prog. (2009)	Heather Lossing	Factors Affecting Solids Accumulation Rates in Clarifier Tanks at Residential and Commercial Installations in Ontario.
Ph.D. (Civil Eng.) (Bruce Anderson co-supervisor)	In Prog. (2009)	Sean Speer	Performance of a Coastal Fringe Wetland for the Treatment of Diffuse Landfill Leachate
Ph.D. (Civil Eng.) (James McLellan co-supervisor)	In Prog. (2009)	Shakhawat Chowdhury	Risk-Based Decision-Making for DBPs in Drinking Water
M.Sc. (Civil Eng.)	In Prog. (to defend May 2008)	Wang Xue	Recovery of Sugars from Municipal Sludges and Biosolids
M.Sc. (Geology) (Heather Jamieson co-supervisor)	2008	Erin Clyde	The Applicability of Passive Treatment Systems for the Mitigation of Acid Mine Drainage at the Williams Brothers Mine, Mariposa County, California: Bench- & Pilot-Scale Studies.
M.Sc. (Civil Eng.)	2008	Chenxi Li	Batch & Bench-Scale Fixed-Bed Column Evaluations of Heavy Metal Removals from Aqueous Solutions & Synthetic Landfill Leachate Using Low-Cost Natural Adsorbents.
M.Sc. (Civil Eng.) (Kevin Hall co-supervisor)	2007	Whitney Szabo	A Study on the Assimilation of Stable- Carbon and Stable-Nitrogen Isotopes in a Natural Wetland Used to Polish Domestic Effluent
M.Sc. (Earth Sciences) (Fred Michel co-supervisor)	2006	Jennifer Kelly	Biogeochemical Characterization of a Wetland Impacted by Alkaline Mine Tailings Located in North Cobalt, Ontario
M.A.Sc. (Env. Eng.)	2005	Md. Khalekuzzaman	A Bench-Scale Sequential Aerated Peat Biofilter System Treating Landfill Leachate Under Varied Loading Rates
M.A.Sc. (Env. Eng.)	2005	Trish Westman	From Waste to Product: Developing Pulp and Paper Mill Biosolids Into a Marketable Resource
M.Sc. (Biology) (Celine Boutin co-supervisor)	2004	Natalie Gottschall	The Role of Plants in the Removal of Nutrients at a Constructed Wetland Treating Agricultural Runoff
M.A.Sc. (Env. Eng.)	2004	Caijian Li	Enzymatic Hydrolysis of Cellulose from Various Waste Sources for the

M.A.Sc. (Env. Eng.)	2004	Sean Speer	Production of Ethanol. Hydrodynamic Pathways in a Mature Constructed Wetland.
Post-Doctoral Fellow	2001-2003	Marie-Josée Tudoret	Process Development for the Recovery of Agri-Products and Commodity Chemicals from Animal Manure and Biosolids
M.A.Sc. (Env. Eng.)	2003	Thomas Levy	Feasibility Study on the Recovery of Commodity Chemicals and Agri-Products from Hog Manure.
M.A.Sc. (Civil Eng.) (Paul Van Geel co-supervisor)	2003	Peyman Rouhani	Impacts of Hydraulic and Constituent Loading on a Combined Passive System for the Treatment of AMD.

TRAINING OF HIGHLY QUALIFIED PERSONNEL: UNDERGRADUATE

DEGREE	YEAR	CANDIDATE NAME	THESIS/PROJECT TITLE
B.Sc. (Chem. Eng.)	In Prog. (2009)	Dan Krasznai	Pretreatment of Cellulosic Biomass for Pentose and Glucose Sugar Recovery
B.Sc. (Chem. Eng.) (Bruce Anderson co-supervisor)	In Prog. (2009)	Mark Milne	Pretreatment of Municipal Sludge to Optimize Biogas Production from Anaerobic Digestion
B.Sc. (Chem. Eng.)	In Prog. (2009)	Blair Walker	Biohydrogen Production Through Enhanced Cycles of Photo and Dark Fermentation
Research Assistant (NSERC USRA)	2008	Dan Krasznai	Pretreatment of Cellulosic Biomass for Pentose and Glucose Sugar Recovery
Research Assistant (NSERC USRA) (Bruce Anderson co-supervisor)	2008	Mark Milne	Pretreatment of Municipal Sludge to Optimize Biogas Production from Anaerobic Digestion
Research Assistant (Ron Neufeld co-supervisor)	2008	Chee-Lam Tam	Treatment of Metal Contaminated Waters Using Algae-derived Polysaccharides
B.Sc. (Chem. Eng.) (Bruce Anderson co-supervisor)	2008	Jackline Ankomah	The Anaerobic Digestion of MSW and Wastewater Treatment Sludge Mixtures
B.Sc. (Chem. Eng.) (Bruce Anderson co-supervisor)	2008	Mark Gupta	The Use of Fats Oils and Grease to Enhance Gas Production In the Anaerobic Digestion of Wastewater Treatment Sludges
Research Assistant (Clearford Industries Research Contract)	2007	Tara Bowen	Flow attenuation in a Septic Tank Effluent Gravity (STEG) system clarifier tank: Comprehensive Clarifier Tank Testing – Phase I

Research Assistant	2007	Vanessa Mann	Biogeochemical Characterization of Soils and Vegetation of a Wetland Impacted by Alkaline Mine Drainage
Research Assistant (NSERC USRA)	2007	Jan Stirling	Preliminary Study for Augmenting Anaerobic Gas Production Using Fats Oils and Greases
B.Sc. (Env. Science)	2005	Nadia Mykytczuk	Pathogen Detection Methods for Fecal Contaminated Waters; Health Risk Assessment at Petrie Island Beach
B.Eng. (Environmental)	2004	Giulia Brustesco	Use of Peat Filter in Treating Landfill Leachate and Industrial Process Water
B.Eng. (Environmental)	2004	T. Pat Sammon	Monahan Drain Constructed Wetland Stormwater Facility, Design & Monitoring Analysis
B.Eng. (Environmental)	2003	Brian Henderson	Development of a Bench-Scale Process for the Chemical Extraction of Cellulose from Sugarcane Bagass Using Biochemical Integrated Recycling Technologies.
Research Assistant (NSERC USRA)	2002	Brian Henderson	Extraction of Cellulose from Brewer's Yeast
B.Eng. (Environmental)	2002	Scott Ambridge	Characterization of Municipal Biosolids and Potential Use for the Extraction of Commodity Chemicals and Agri-Products
B.Sc. (Env. Science)	2002	Kristina Bramwell	Multi-Component Isotherm Models to Describe the Adsorption of Metals in Acid Mine Drainage onto Peat.
B.Eng. (Environmental)	2002	Adnan Khalid	Development of an Enzymatic Process for the Conversion of Cellulose to Ethanol.
B.Eng. (Environmental)	2002	Genevieve Roy	The Use of Coagulants for the Separation of Colloids from Solution in Suspension of a Hog Manure Slurry.
B.Eng. (Environmental)	2002	Sean Speer	Peat Module Sequencing in Passive Treatment System for Acid Mine Drainage
B.Eng. (Environmental)	2000	Rinaldo Cristiano	Hydraulic & Contaminant Loading Impact on the Removal of Heavy Metals in a Peat Filter.
B.Eng. (Environmental)	2000	Todd Marche	Pulp and Paper Sludge Composting.
B.Eng. (Environmental)	2000	Marie-Eve Ouellet	The Reduction of Effluent Discharge Costs at Labatt Brewery, Montreal.
B.Eng. (Environmental)	2000	John Sourial	Long-Term Performance of a Bench-Scale Passive Treatment System for the Mitigation of Acid Mine Drainage.

B.Eng. (Environmental)	1999	Thomas Levy	Soil Bioengineering & Biotechnical Stabilization.
B.Eng. (Environmental)	1999	Lorri MacLennan	Bench Scale Evaluation of a Combined Passive Treatment System for the Mitigation of Acid Mine Drainage.
B.Eng. (Environmental)	1999	Surandran Selvaratnam	Metal Extraction from Peat & Mushroom Compost.
B.Eng. (Environmental)	1999	Julia Tarnowski	Feasibility Study of the Production of Biogas from Cow Manure to Power the Turbogenerator.

ADMINISTRATIVE SERVICE

UNIVERSITY

Jan 2004-Jun 2005	Carleton University Academic Staff Association - Salary, Benefits and Welfare Chair (Carleton University)
Jan 2004-Jun 2005	Carleton University Academic Staff Association – Steering Committee (Carleton University)
Sep 2003-Jun 2005	Carleton University Academic Staff Association - Academic Unit Council Representative (Carleton University)
Oct 2002-May 2003	Faculty of Journalism and Mass Communications – Hiring Committee, External Faculty Member Representative (Carleton University)

FACULTY OF APPLIED SCIENCE

Jun 2007-Present	Internal Academic Review Committee – Department of Electrical and Computer Engineering (Queen’s University)
Feb 2007-May 2007	Dean’s Advisory Committee – Associate Dean (Academic) Search Committee (Queen’s University)
May 2004-Jun 2005	Hiring Committee, Faculty of Engineering, Faculty members (Carleton University)
Mar 2003-May 2004	Hiring Committee, Faculty of Engineering, Environmental Technologist (Carleton University)

DEPARTMENTAL

Apr 2008-Present	Hiring Committee (Civil Engineering, Queen’s University)
Sep 2005-Present	Scholarship Committee (Civil Engineering, Queen's University)
May 2006-Apr 2007	Renewal, Promotions and Tenure Committee (Civil Engineering, Queen's University)

May 1999-Jul 2004 Co-op Advisor (Civil and Environmental Engineering, Carleton University)

RECRUITMENT

May 2006 – 2007: Admitted Students' Day (Civil Engineering, Queen's University)
Mar 2006 Civil Orientation (Civil Engineering, Queen's University)
Sep 2000 – 2003 Ontario University Fair, Toronto Ontario (Civil and Environmental Engineering, Carleton University)
Oct 1998 – 2002 University Day (Civil and Environmental Engineering, Carleton University)
Mar 1999 – 2004 March Break Activities (Civil and Environmental Engineering, Carleton University)
May 1999 – 2001 Telephone Campaign (Civil and Environmental Engineering, Carleton University)

SCHOLARLY SERVICE

GRADUATE STUDENT RESEARCH REVIEW

THESIS DEFENSE COMMITTEES - MEVIEWER

Mar 1999 M. Eng. Civil Eng. (S. Bayne) - Carleton University
July 2000 M.Sc. Chemistry (Supeno) - Carleton University
Sep 2001 Ph.D. Civil Eng. (L. Masse) - University of Ottawa
Jan 2002 M.A.Sc. Mechanical Eng. (S. Clarke) - Carleton University
Apr 2003 M.A.Sc. Civil Eng. (H. Shahriari) - University of Ottawa
May 2003 M.A.Sc. Env. Eng. (K. Lange) - Carleton University
Dec 2003 M.A.Sc. Civil Eng. (M. Vasen) – University of Ottawa
Feb 2004 M.A.Sc. Civil Eng. (S. Banks) – University of Ottawa
Apr 2004 M.A.Sc. Civil Eng. (S. Asif) – University of Ottawa
Dec 2004 M.A.Sc. Civil Eng. (V. Paris) – University of Ottawa
Feb 2006 M.A.Sc. Civil Eng. (J. Hatchey) – Queen's University
Apr 2006 M.Sc. Geological Sciences. (S. Goure) – Queen's University
Aug 2006 Ph.D. Chem. Eng. (D. Nielsen) - Queen's University
Aug 2006 M.Sc. Civil Eng. (I. bou Jaoude) – Queen's University
Sep 2006 Ph.D. Geology. (J. Benavides) – Queen's University
May 2007 M.Sc. Civil Eng. (H. Tan) – Queen's University

Jul 2007 Ph.D. Chemistry (R. Wang) - Queen's University
Sep 2007 M.Sc. Civil Eng. (J.K. Pierre) - Queen's University

THESIS DEFENSE COMMITTEES - MHAIR

Nov 2005 M.Sc. Electrical Eng. (L. Golipour) – Queen’s University
Jun 2006 M.Sc. Chemical Eng. (B. Zhang) – Queen's University
Jan 2007 M.Sc. Chemical Eng. (L. Tang) – Queen's University
May 2007 M.Sc. Electrical Eng. (J.-P. Thibault) – Queen's University
Aug 2007 M.Sc. Chemical Eng. (B. Erdinc) - Queen's University
Feb 2008 M.Sc. Electrical Eng. (M.G. Uddin) – Queen’s University

GRADUATE ADVISORY COMMITTEES

Jan 2002-Jul 2005 Ph.D. Env. Eng. (H. Salasali) – Carleton University
Apr 2003-May 2004 M.Sc. Earth Sciences (S. Burke) - Carleton University
Mar 2004-Jul 2005 Ph.D. Env. Eng. (S. Alkabi) - Carleton University
Jan 2006-Aug 2006 Ph.D. Chem. Eng. (D. Nielsen) - Queen's University
Dec 2006-Present Ph.D. Civ. Eng. (J. Levison) - Queen's University
Mar 2007-Present Ph.D. Civ. Eng. (J. Kozustanick) - Queen's University
Apr 2008-Present Ph.D. Chem. Eng. (U.) – Queen’s University

PEER RESEARCH REVIEWS

FUNDING & RESEARCH PROPOSAL REVIEWS

Dec 2006 – Present Grant Proposal Reviewer and Committee Panelist: US EPA –
National Center for Environmental Research
Dec 2006 Fate and Effects of Hormones in Effluent from
CAFOs
Mar 2007 Uncertainty Analyses of Models in Integrated
Environmental Assessments
Aug 2003 – Present Grant Proposal Reviewer and Committee Panelist: US EPA –
Small Business Innovative Research Funding Program (SBIR)
Aug 2003 Animal Environmental Management
Sep 2004 Dairies & CAFO’s and Chronic Wasting Disease
Sep 2004 Wastewater in Arid Climates and Stormwater
Sep 2005 Management of Poultry and Other Feeding
Operations
Sep 2005 Water and Wastewater Management/Pollution
Sep 2005 Indicators for Beaches and Recreational Waters

Sep 2006 Agriculture and Rural Community Improvement and
Management of Animal Feeding Operations

Feb 2004 Expert Committee Reviewer: Le fonds Québécois de la recherche
sur la nature et les technologies

Periodic reviewer (3-4 per year) for NSERC grant application programs including

- Discovery Grants (DG)
- Idea to Innovation Grants (I2I)
- Strategic Projects Grants (SPG)
- Collaborative Research & Development Grants (CRD)

Periodic reviewer (3-4 per year) for OCE grant application programs including

- Collaborative
- Other

Periodic reviewer (1-2 per year) for OMAFRA grant application programs including

- Regular one
- Special one

Periodic reviewer (1 per year) for MRI grant application programs including

- Innovation Demonstration Fund (IDF)

JOURNAL PUBLICATION REVIEWS

Periodic reviewer (each 1-3 times per year) for the following journals:

- International Journal of Soil and Sediment Contamination
- Journal of Bioresource Technology
- Environmental Re/Views (NRC)
- Journal of Environmental Engineering and Science
- Ecological Engineering
- Practice Periodical of Hazardous, Toxic, and Radioactive Waste Management
- Journal of Environmental Informatics
- Journal of Environment and Waste Management
- Journal of Environmental Progress
- Journal of Applied Sciences in Environmental Sanitation.

EDITORIAL

- Apr 2006-Present Editorial Board: Journal of Applied Sciences in Environmental Sanitation
- Jan 2007-Present Associate Editor: Practice Periodical of Hazardous, Toxic, and Radioactive Waste Management, American Society of Civil Engineers (ASCE)
- Aug 2003-Present Editorial Committee Member and Co-Editor: ASCE Hazardous, Toxic & Radioactive Waste Committee
- Remediation Technologies for Soil and Groundwater Contamination (book published March 2007)
 - Natural Processes and Systems for Hazardous Waste Treatment (book to be published Fall 2007)

PROFESSIONAL & COMMUNITY SERVICE

As an academic and a professional engineer, professional and community activities including youth outreach have also been very important in terms of establishing myself as an expert in the field of environmental engineering. The activities that I have summarized in the following sections are primarily professional and community-based. My professional and community service activities range from local to international contributions.

PROFESSIONAL SERVICE

- May 2006-Mar 2007 Scientific Committee: International Conference on Solid Waste Technology and Management held March 18-21 2007 in Philadelphia, Pennsylvania
- Sep 2005-Present American Society of Civil Engineers-Breadth of Knowledge Committee
- May 2005-Feb 2006 International Program Committee and Plenary Address: International Conference on Sustainable Technologies for Environmental Protection held January 7-9 2006 in Coimbatore, India
- Apr 2005-Mar 2006 International Program Committee: Conference on Advanced Technology in the Environmental Field (IASTED), Association of Science and Technology for Development held February 6-8 2006 in Lanzarote, Spain
- 2003-2006 Scholarship Judge: Undergraduate student competitions, Canadian Geotechnical Society
- 2002-2007 Scholarship Judge: Graduate and undergraduate student competitions, Canadian Engineering Memorial Foundation

- Oct 2001-Aug 2007 Director: Canadian Engineering Memorial Foundation Board of Directors
- Apr 2000 Focus Group Participant: Relevancy of the Engineering Profession in Canada, Canadian Council of Professional Engineers
- Oct 1998-Aug 1999 Member the bid preparation and presentation (ICWES11-Japan) team for the 12th International Conference for Women Engineers & Scientists (ICWES12) held in Ottawa July 26-31 2002
- Jul 1997-Oct 1997 50th Canadian Geotechnical Conference Organizing Committee, Canadian Geotechnical Society for the national conference held in Ottawa October 20-22 1997

COMMUNITY SERVICE

- Jan 2007 – Present Queen's University Research Opportunities Representative: City of Kingston Committee on Organic and Solid Waste Management Alternatives
- Nov 2006 – Present Researcher and advisor: City of Kingston/Utilities Kingston Grease Waste to Bioenergy Feasibility Study
- Apr 1999 - Jun 2005 Ottawa Science Fair Judge
- Mar 1997 - Mar 1998 Hawkesbury General Summit Committee – Environmental Subcommittee
- May 1995 - Mar 1997 Hawkesbury and Area Waste Management Study Plan – Public Liaison Committee
- May 1995 - Jan 1997 Hawkesbury and Area Waste Management Study Plan – Waste Management Alternatives Committee

OUTREACH & OTHER ENGINEERING CONTRIBUTIONS

Throughout my academic career, I have been involved in a number of youth and community science and engineering outreach activities, in which I intend to continue my involvement. My past outreach and engineering-related teaching activities and contributions are summarized below:

- Organized Girl Guide full-day workshops (2003, 2004) hosted by the Faculty of Engineering & Design at Carleton University aimed at meeting the requirements to earn their Engineering and Science Badges with activities in environmental, civil, mechanical, biomedical, computer and systems engineering, and mathematics.
- Contributed to the Learning-in-Retirement Program offered by Carleton University Development and Alumni Services by offering 6-hours of lectures on *Environmental Engineering Issues* in the 2002 Spring Seminar Series.
- From 1998-2004, developed and taught the curriculum and activities for four one-week Enrichment Mini-Courses (Pollution P.I. – Prevention Inspirator, To Air is Human, Strength and Structures - Why Things Don't Fall Down, You Go Eng-

Girl) offered by Carleton University to Intermediate and Secondary School students.

- Provided leadership and instruction to gifted Secondary School students through the Shad Valley Program. Participation in the program has evolved from guest lecturer (1997) to seminar/workshop instructor (1998, 1999) to faculty leader (2001).
- Provided workshops entitled *Undergraduate Tutorials in Science & Engineering: A brief commentary on what is expected from TAs with regards to delivering course materials and marking students' work* offered to new Science and Engineering Teaching Assistants during the TA Orientation Sessions in the Fall 2002 and 2003
- Participated in the Carleton University "Professional Practice Course" from 1999 to 2001 by giving lectures on Environmental Issues to Students enrolled in the senior years of their respective engineering programs, as well as in the Carleton University Technology, Society and Environment Program in 2002 by providing lectures in innovative Environmental Engineering approaches

PROFESSIONAL MEMBERSHIPS

I am a member of the following professional associations which provide professional and scientific information, support and contact information which I am able to incorporate in my teaching, research and consulting activities.

- Professional Engineers of Ontario (PEO)
- International Water Association (IWA)
- Solid Waste Association of North America (SWANA)
- Water Environment Federation (WEF)
- American Society of Civil Engineers (ASCE)