

**ELIZABETH A. EDWARDS**  
**Professor**

**CURRICULUM VITAE**

**CONTACT INFORMATION**

Work Address: Department of Chemical Engineering and Applied Chemistry  
University of Toronto  
200 College Street  
Toronto, Ontario, M5S 3E5

Telephone: Work: 416-946-3506 (office);  
416-978-8605 (fax)

Electronic Mail: elizabeth.edwards@utoronto.ca  
Websites: www.chem-eng.utoronto.ca/~biodegraders;  
www.beem.utoronto.ca  
www.biozone.utoronto.ca

**EDUCATION**

1988-1993: Ph.D. Environmental Engineering and Science (1993)  
Stanford University, California  
Thesis topic: Biodegradation of aromatic compounds in subsurface  
environments under anaerobic conditions  
Thesis supervisors: Dr. D. Grbic-Galic and Dr. P.L. McCarty

1983-1985: M.Eng., Chemical Engineering (1985)  
McGill University, Montreal  
Thesis topic: Potential applications of adsorbents for blood detoxification  
in patients with kidney failure.  
Thesis supervisor: Dr. T.M.S. Chang

1980-1983: B. Eng., Chemical Engineering (1983)  
McGill University, Montreal

**WORK EXPERIENCE**

Jan. 2011-Present Director, BioZone: Centre for Applied Bioscience and Bioengineering  
Professor, Department of Chemical Engineering and Applied Chemistry  
University of Toronto

July 2006-Present Professor, Department of Chemical Engineering and Applied Chemistry  
University of Toronto

- 2001-2006 Associate Professor (Tenure granted July 2001)  
Department of Chemical Engineering and Applied Chemistry  
University of Toronto
- March 2002-Present Cross-Appointed, Cell and Systems Biology, University of Toronto
- 1997-2001 Assistant Professor  
Department of Chemical Engineering and Applied Chemistry  
University of Toronto
- 1997-2000 Adjunct Professor, Dept. of Civil Engineering, McMaster University  
1996-1998 Adjunct Professor, Biology Dept., University of Waterloo.
- 1995-1997 Assistant Professor  
Department of Chemical Engineering  
McMaster University, Hamilton, Ontario
- 1992-1995: Environmental Engineer  
Beak Consultants Ltd., Guelph, Ontario  
Bioremediation assessment and treatability studies; focus on intrinsic biotransformation of chlorinated solvents and aromatic hydrocarbons in groundwater. Development of criteria for Environment Canada's biotechnology regulations.
- 1988-1992: Research Assistant (for Dr. D. Grbic-Galic), Department of Civil Engineering, Stanford University. Ph. D. thesis research on the biodegradation of alkylbenzenes (BTEX compounds) under methanogenic and sulphate-reducing conditions.
- 1991: Teaching assistant (for Dr. Grbic-Galic), Department of Civil Engineering, Stanford University. Assisted teaching Environmental Microbiology Laboratory Course.
- 1985-1988: Engineer, J.E. Seagram & Sons, Ltd., LaSalle, Québec. Optimized fermentation conditions for high substrate and product concentrations.
- 1983-1985: Research Assistant (for Dr. T.M.S. Chang), Dept. of Physiology, McGill University, M. Eng. thesis research investigating the potential application of adsorbents for blood detoxification in patients with kidney failure.
- 1982: Junior Engineer, Petro-Canada, Inc., Calgary, Alberta. Summer job conducting a study of coal gasification processes.

**AWARDS**

- 2011 Professional Engineers of Ontario (PEO) Engineering Medal – Research And Development
- 2011 Fellow, Canadian Academy of Engineering

2011	Fellow, American Association for the Advancement of Science (AAAS)
2010	Society of Chemical Industry Kalev Pugi Award For contributions to Science and Business in Canada
2010	Strategic Environmental Research Development Program (SERDP: US EPA, DOD, DOE) "Project of the Year" for work on Elucidation of the Mechanisms and Environmental Relevance of cis-Dichloroethene and Vinyl Chloride Biodegradation (Collaboration with Geosyntec, Cornell, Toronto, Georgia Tech)
2009	Synergy Award with Geosyntec Consultants and SiREM (NSERC)
2009	Discovery Accelerator Supplement (NSERC)
2009	Shimizu Visiting Professor, Stanford University
2008-2010	Killam Research Fellowship (2 years) (Canada Council for the Arts)
2003	Ontario Premier's Research Excellence Award (PREA)
2001	Strategic Environmental Research Development Program (SERDP: US EPA, DOD, DOE) "Project of the Year" for work on Perchlorate (Collaboration with Geosyntec)
1995-1997	Natural Science and Engineering Research Council (NSERC) Women's Faculty Award (held at McMaster University)
1988-1991	F.C.A.R. Scholarship for Ph.D. Studies (Québec government) Natural Science and Engineering Research Council (NSERC) Scholarship for Ph.D. studies (declined)
1983-1985	Natural Science and Engineering Research Council (NSERC) Scholarship for M.Eng. studies
1983	Distinction in Chemical Engineering (McGill)
1981 & 1982	W.H. Howard Scholarship (McGill) Faculty Scholar
1980	J.B. Phillips Chemical Engineering Entrance Award (McGill)

### **PROFESSIONAL ASSOCIATIONS**

Member of the Professional Engineers of Ontario (1997-present)

Registration number: 90528993

Member of the Order of Engineers of Quebec (1986-1997)

Member of the American Society for Microbiology (ASM- since 1990)

Member of Editorial Board for *Applied and Environmental Microbiology* (2011-present)

Member of the Association of Environmental Engineering and Science Professors (AEESP)

Member of the American Chemical Society (ACS)

### **RESEARCH INTERESTS**

Biodegradation and bioremediation of organic compounds in groundwater, hydrocarbons and chlorinated solvents, anaerobic microbial biotransformation reactions, isotope fractionation,

environmental biotechnology, environmental microbiology, anaerobic digestion, wastewater treatment, molecular microbiology and ecology, endocrine disrupting compounds, microarray and sequencing technology, environmental genomics, metagenomics, bioaugmentation, site remediation, groundwater.

## **SUMMARY OF RESEARCH SUPERVISION**

### **PhD Students:**

- *9 Current:* M. Hajighasemi (Co-supervised); F. Luo; S. Tang; A. Islam (Co-sup); L. Hug; R. Gitiafroz; C. Washer; I. Yang (Co-sup); P. Chan (Co-sup)
- *6 Graduated:* E. Bester (10; PDF Ryerson); A. Grostern 08; PDF Berkeley); A. Waller (09; PDF Heidelberg); J. Dinglason-Panlilio (07; Assistant Prof, U. Washington-Tacoma); M. Duhamel (05; PDF/Project Manager, U of Toronto); A. Ulrich (04; Assistant Prof /U of Alberta).

### **Master's Students:**

- *6 Current:* O. Molenda; W. Zhou (Co-sup); C. Tran; J-J Li; K. Wei; C. Tran
- *23 Graduated:* M. Manchester (11); A. Zila (11); W. Chan (09); E. Moore (09); I. Yang (08); M. Wong (08); A. Simmonds (07); M. Nandi (06); S. Toquica (06); S. Little (05); C. Whang (04); C. Washer (04); D. Seepersad (03); N. Mason (02); J. Dinglason (02); E. Francois (02); A. Waller (02); S. Wehr (01); E. Lloyd (00); A. Rezende (99); S. Burland (98); M. Ficker (98); M. Nales (97).

### **Undergraduate Thesis Students:**

- *2 Current:* A. Tse (co-sup); E. Zhang;
- *26 Completed*

### **Post Doctoral Fellows:**

- *4 Current:* Dr. R. Goacher (10-present); Dr. X. Liang (11-present); Dr. T. Meyer (10-present); Dr A. Perez-de-Mora (09-present)
- *4 Past:* Dr. M. Duhamel (07-08); Dr. A. Grostern (08-09); Dr. K. Mo (01-05); Dr. D. Wang (02-05)

### **Visiting scholars:**

- *Current:* Dr. L. Laquitaine, Guadeloupe (Nov-Dec 2010 & Oct-Nov 2011)
- *Past:* Dr. K-C. Loh, National University of Singapore (02-03).

### **Staff Supervised:**

- *Current:* Dr. M. Duhamel (Proj. Manager; 09-); C. Heidorn (10-); E. Sulisawati (09-); L. Lomheim (09-)
- *Past:* D. Zhang (02-04); C. Heidorn (02-03) ); P. Dennis (00-01); S. Dworatzek (99-02); K. Krastel (97-99).

## **THESES UNDER MY SUPERVISION**

### **Doctorate Theses Completed:**

Gitiafroz, R. 2012. Microorganisms and Metabolic Pathways Involved in Anaerobic Benzene Biodegradation under Nitrate-reducing conditions (Dept. Chemical Engineering & Applied Chemistry).

Bester, E. 2010. Biofilm-Derived Planktonic Cell Yield: A Mechanism For Bacterial Proliferation (Dept. Chemical Engineering & Applied Chemistry; Co-supervised; Gideon Wolfaardt was primary supervisor).

Waller, A. 2009. Molecular Investigation of Chloroethene Reductive Dehalogenation by the

- Mixed Microbial Community KB1 (Dept. Chemical Engineering & Applied Chemistry).  
Grostern, A., 2008. Investigation of Community Dynamics and Dechlorination Processes in Chlorinated Ethane-Degrading Microbial Cultures (Dept. Cell and Systems Biology)  
Dinglasan-Panlilio, J. 2007. Fluorotelomer degradation (Dept. of Chemistry; Co-supervised; Scott Mabury was primary supervisor)  
Duhamel, M. 2005. Microbial Community Dynamics during Reductive Dechlorination (Dept. Chemical Engineering & Applied Chemistry).  
Ulrich, A. 2004. Anaerobic Benzene Biodegradation (Dept. Chemical Engineering & Applied Chemistry).

**Master's Theses Completed:**

- Manchester, Marie (2011). Characterization of dechlorinating populations in the WBC-2 Consortium  
Zila, Anna (2011). A Molecular Study of Field Bioaugmentation Using the KB-1<sup>®</sup> Mixed Microbial Consortium: The Application of Real-Time PCR in Analyzing Population Dynamics  
Chan, Winnie (2009). Characterization of Reductive Dehalogenases in a Chlorinated Ethene-Degrading Bioaugmentation Culture.  
Moore, Eve (2009). Developing a Protocol to for the Enrichment and Characterization of a Methanogenic Toluene-degrading and Benzene-degrading Community.  
Chan, Peter (2008). Survey of hydrolytic dehalogenases (co-supervised with E. Pai; Biochemistry)  
Wong, Max (2008) Discovery and characterization of hydrolytic dehalogenases from genomic data.  
Yang, Ivy (Minqing) (2008). Anaerobic Treatment of In-Mill Wastewaters Collected from a Pulp and Paper Mill (co-supervised with D.G. Allen).  
Simmonds, Allison, (2007). Quality control of and chlorinated ethene degradation rates in KB-1, a commercial trichloroethene-dechlorinating bacterial culture  
Toquica Diaz, Sandra P., 2006 (Botany). Distribution of bacterial in a PCE-contaminated aquifer during bioremediation  
Nandi, Monisha. 2006. Biochemical and molecular characterization of anaerobic benzene-degrading, nitrate-reducing cultures.  
Little, Sandra, 2005. Anaerobic Benzene Biodegradation.  
Washer, Cheryl. 2004. Anaerobic Toluene Biodegradation.  
Whang, Charles. 2004. Differential display applied to anaerobic benzene-degrading cultures.  
Seepersad, D. 2003. Enhanced Dissolution of a Tetrachloroethylene DNAPL in a Two-Dimensional Model Aquifer  
Mason, N. 2002. Co-degradation of benzene, toluene and ethanol in groundwater  
Dinglasan, J. 2002 Biodegradation of 1,2-Dichloroethane under a variety of terminal electron-accepting processes (Dept. of Chemistry)  
Francois, E. 2002. DNA Microarrays for Monitoring Endocrine Disrupting Compounds  
Waller, A. 2002. Bioremediation of Perchlorate-Contaminated Groundwater  
Wehr, S. 2001. Characterization of a TCE-dechlorinating culture  
Lloyd, E. 2000. Degradation of petroleum in biopiles (M. Eng)  
Rezende, A. 1999. Land Application of Bleached Pulp and Paper Mill Effluents (M. Eng)  
Burland, S. 1998. Anaerobic Benzene Biodegradation.  
Ficker, M. 1998. Characterization of a Toluene-Degrading Methanogenic Consortium

Nales, M. 1997. Evaluation of Anaerobic Benzene Biodegradation for in Situ Passive Bioremediation.

## RESEARCH SUPPORT – Current

*Principal or co-Principal Investigator in the following efforts:*

- **National Science and Engineering Council of Canada (NSERC).** Discovery Grant & Accelerator Supplement (2009-2013) Contaminant-degrading processes revealed through metagenomic analysis of microbial consortia; \$365,000
- **Genome Canada and Ontario Research Fund** Bioproducts and Enzymes from Environmental Metagenomes (BEEM) with 12 co-PIs (2009-2013); \$10.9 million.
- **Canada Foundation for Innovation and Ontario Research Fund** BioZone: A Bioengineering Research Facility for Energy, Environmental and Economic Sustainability (Phase I 2008-2009; Edwards, Master, and Mahadevan and Phase II 2009-2014; Edwards & 8 others); \$6,334,136.
- **SERDP** Strategic Environmental Research and Development Program (US DoD). BioReD: Biomarkers and Tools for Reductive Dechlorination Site Assessment, Monitoring, and Management (2007-2011; Löffler, Ritalahti and Edwards); \$576,889 (U of Toronto portion).

*As Collaborator:*

- **Ontario Research Fund.** Innovative strategies for combined remedies for cleanup of contaminated sites (2011-2015); \$3,213,700
- **NSERC** Strategic Grant: Investigation of CSIA as an innovative quantitative tool for performance assessment of remediation of contaminated sites (2009-2011); \$467,200
- **NSERC** Strategic Grant: Surface-Modified Iron Nanoparticles for Remediation: Multiscale Investigations of Transport, Reactivity and Aggregation (2009-2011); \$410,000
- **SERDP** Strategic Environmental Research and Development Program (US DoD). Standardized procedures for use of nucleic acid-based tools (2007-2011; US Navy, Geosyntec and others). \$150,357 (U of Toronto portion).
- **Bill and Melinda Gates Foundation:** Reinvent the Toilet Challenge. Y.L. Cheng, J.L. Torero, J. Gerhard, L.L. Diosady, E. Edwards, M. Kortschot, H. Mahler, Y. Lawryshyn (2011-2012) \$400,000.

## PUBLICATIONS

### Refereed Journal Publications:

69. Wagner, D.D. , L.A. Hug, J.K. Hatt, M.R. Spitzmiller, E.Padilla, K.M. Ritalahti, E.A. Edwards, K.T. Konstantinidis, and F.E. Löffler Unique genome features distinguish *Geobacter lovleyi* from other members of the *Geobacteraceae*. **Submitted** to BMC Genomics.
68. Alison S. Waller, Laura A. Hug, Kaiguo Mo, Devon R. Radford, Karen L. Maxwell, and Elizabeth A. Edwards. Transcriptional Analysis in a Dehalococcoides-Containing Microbial

- Consortium Reveals Prophage Activation. Published online ahead of print on 16 December 2011 *Appl. Environ. Microbiol.* doi:10.1128/AEM.06416-11.
67. Laura A. Hug, Annette R. Rowe, Robert G. Beiko, Ruth E. Richardson, Elizabeth A. Edwards. Comparative metagenomics of three *Dehalococcoides*-containing enrichment cultures provides insight into the role of the non-dechlorinating community. **Submitted** to ISMEJ.
  66. Mundle, S.O.C., Johnson, T., Lacrampe-Couloume, G., Perez-de-Mora, A., Duhamel, M., Edwards, E.A., McMaster, M.L., Cox, E., Revesz, K. and Sherwood Lollar, B. Monitoring biodegradation of ethane and bioremediation of chlorinated ethenes at a contaminated site. **Accepted pending review.** ES&T.
  65. Chan, W., Grostern, A., F.L. Löffler and E. A. Edwards. **2011.** Quantifying the effects of 1,1,1-Trichloroethane and 1,1-Dichloroethane on Chlorinated Ethene Reductive Dehalogenases. *Environ. Sci. Technol.* 45 (22), pp 9693–9702.
  64. Liang, X.; Howlett, M.R., Nelson, J., Grant, G., Dworatzek, S., Lacrampe-Couloume, G., Zinder, S., Edwards, E.A., Sherwood Lollar, B. **2011.** Pathway-Dependent Isotope Fractionation during Aerobic and Anaerobic Degradation of Monochlorobenzene and 1, 2, 4-Trichlorobenzene. *Environmental Science and Technology.* 45(19): 8321-8327.
  63. Hug, Laura A., Maryam Salehi, Paulo Nuin, Elisabeth Tillier and Elizabeth Edwards. **2011.** Design and verification of a pan-genome microarray oligonucleotide probe set for *Dehalococcoides* spp. *Applied & Environmental Microbiology.* 77(15):5361-5369.
  62. McMurdie, Paul J., Laura A Hug, Elizabeth A Edwards, Susan Holmes and Alfred M Spormann. **2011.** Site-Specific Mobilization of Vinyl Chloride Respiration Islands by a Mechanism Common in *Dehalococcoides*. *BMC Genomics.* 12(1):287.
  61. Eckert, T., B. Brunner, E. A. Edwards, U. G. Wortmann. **2011.** Microbially mediated re-oxidation of sulfide during dissimilatory sulfate reduction by *Desulfobacter latus* *Geochimica et Cosmochimica Acta.* 75(12):3469-3485.
  60. Chan, Peter; Yakunin, Alexander; Edwards, Elizabeth; Pai, Emil **2011.** "Mapping the Reaction Coordinates of Enzymatic Defluorination" *J Am Chem Soc.* 133(19):7461-7468.
  59. Sherwood Lollar, B., S. Hirschorn, S.O.C. Mundle, A. Grostern, E.A. Edwards, and G. Lacrampe-Couloume. **2010.** Insights into Enzyme Kinetics of Chloroethane Biodegradation Using Compound Specific Stable Isotopes *Environ. Sci. Technol.* 44 (19), pp 7498–7503.
  58. Bester, E., Kroukamp, O., Hausner, M., Edwards, E., and Wolfaardt G.M. **2010.** Biofilm form and function: carbon availability affects biofilm architecture, metabolic activity and planktonic cell yield. *Journal of Applied Microbiology.* p1176. In press.
  57. Islam, M. A., Edwards, E. A., Mahadevan, R., **2010,** Characterizing the Metabolism of *Dehalococcoides* with a Constraint-Based Model. *PLoS Computational Biology* 6, (8), e1000887.
  56. Yang M. I., Edwards E. A. and D. G. Allen. **2010.** Anaerobic Treatability and Biogas Production Potential of Selected Pulp and Paper In-Mill Streams. *Water Science & Technology* 62: 2427-2434.
  55. Grostern, A., M. Duhamel, S. Dworatzek and E.A. Edwards, **2010.** Chloroform respiration to dichloromethane by a *Dehalobacter* Population. *Environmental Microbiology* 12(4): 1053-1060.

54. Chan, Wing Yiu, Max Wong, Alexei V. Savchenko, Alexander F. Yakunin, Emil F. Pai and Elizabeth A. Edwards. **2010**. Sequence- and Activity-Based Screening of Microbial Genomes for Novel Dehalogenases. *Microbial Biotechnology* 3(1), 107–120.
53. Bester, Elanna, Edwards, Elizabeth A. and Wolfaardt, Gideon M. **2009**. Planktonic cell yield is linked to biofilm development. *Can. J. Microbiology*. 55(10):1195-1206.
52. Morrill, P.L., Sleep, B.E., Seepersad, D.J., McMaster, M.L., Hood, E.D., LeBron, C., Major, D.W., Edwards, E.A., and Sherwood Lollar, B. **2009**. Stable Carbon Isotope Fractionation During Reductive Dechlorination of Chlorinated Ethenes Close to a PCE DNAPL Source. *J. Cont. Hydrology*. 110(1-2):60-71.
51. Grostern, A., W.W.M. Chan, and E.A. Edwards. **2009**. 1,1,1-trichloroethane and 1,1-dichloroethane reductive dechlorination kinetics and co-contaminant effects in a *Dehalobacter*-containing mixed culture. *Environ. Sci. Technol.* 43(17):6799-6807.
50. Grostern, A. and E.A. Edwards. **2009**. A *Dehalobacter* co-culture that dichloroeliminates 1,2-dichloroethane to ethene and identification of the putative reductive dehalogenase gene. *Appl. Environ. Microbiol.* 75(9): 2684–2693.
49. Mancini, S.A., C.E. Devine, M. Elsner, M.E. Nandi, A.C. Ulrich, E.A. Edwards, and B. Sherwood Lollar. **2008**. Isotopic Evidence for Different Initial Reaction Mechanisms for Anaerobic Benzene Biodegradation. *Environ. Sci. Technol.* 42(22):8290–8296
48. Hood, E. D., D. W. Major, J. W. Quinn, W.-S. Yoon, A. Gavaskar, and E. A. Edwards. **2008**. Demonstration of Enhanced Bioremediation in a TCE Source Area at Launch Complex 34, Cape Canaveral Air Force Station. *Ground Water Monitoring & Remediation* 28(2):98–107.
47. Edwards, A.M. and E.A. Edwards. **2007**. A Future for the Protein Structure Initiative. *Structure* 15: 1525-1526.
46. Hirschorn, S.K., A. Grostern, G. Lacrampe-Couloume, E.A. Edwards, L. Mackinnon, C. Repta, D.W. Major, and B. Sherwood Lollar. **2007**. Quantification of biotransformation of chlorinated hydrocarbons in a biostimulation study: Added value via stable carbon isotope analysis. *J. Contam. Hydrol.* 94:249-260.
45. Hirschorn, S.K., Dinglasan-Panlilio, M.J., E. A. Edwards, G. Lacrampe-Couloume, B. Sherwood Lollar. **2007**. Isotope analysis as a natural reaction probe to determine mechanisms of biodegradation of 1,2-dichloroethane. *Env. Microbiol.* 9(7): 1651-1657.
44. Duhamel, M. and E. A. Edwards. **2007**. Growth and yields of dechlorinators, acetogens, and methanogens during reductive dechlorination of chlorinated ethenes and dihaloelimination of 1,2-dichloroethane. *Environ. Sci. Technol.* 41(7); 2303-2310.
43. Washer, C. and E. A. Edwards. **2007**. Identification and expression of benzylsuccinate synthase genes in a toluene-degrading methanogenic consortium. *Appl. Environ. Microbiol.* 73: 1367-136.
42. Friis, A.K., Edwards, E.A., Albrechtsen, H.-J., Udell, K.S., Duhamel, M. and P.L. Bjerg. **2007**. Dechlorination after thermal treatment of a TCE-contaminated aquifer: Laboratory experiments. *Chemosphere*. 67(4): 816-825.
41. Mancini, S. A., S. K. Hirschorn, M. Elsner, G. Lacrampe-Couloume, B. E. Sleep, E. A. Edwards, and B. Sherwood Lollar. **2006**. Effects of trace element concentration on enzyme controlled stable isotope fractionation during aerobic biodegradation of toluene. *Environ. Sci. Technol.* 40(24): 7675-7681.

40. Grostern, A. and E. A. Edwards. **2006**. A 1,1,1-trichloroethane-degrading anaerobic mixed culture enhances the biotransformation of mixtures of chlorinated ethenes and ethanes. *Appl. Environ. Microbiol.* 72(12):7849-7856.
39. Duhamel, M. and E.A. Edwards. **2006**. Microbial Composition of Chlorinated Ethene-Degrading Cultures Dominated by *Dehalococcoides*; *FEMS Microbiol. Ecol.* 58(3): 538-549.
38. Löffler, F. E., and E. A. Edwards. **2006**. Harnessing microbial activities for environmental cleanup. *Curr. Opin. Biotechnol.* 17:274–284.
37. Morrill P.L., Sleep B.E., Slater G.F., Edwards E.A., Sherwood Lollar B. **2006**. Evaluation of isotopic enrichment factors for the biodegradation of chlorinated ethenes using a parameter estimation model: towards an improved quantification of biodegradation. *Environ. Sci. Technol.* 40(12); 3886-3892.
36. Sleep, B.E., Seepersad, D.J., Mo, K., Heidorn, C.M., Hrapovic, L., Morrill, P.L., McMaster, M.L., Hood, E.D., LeBron, C., Lollar, B.S., Major, D.W. and E.A. Edwards. **2006**. Biological enhancement of tetrachloroethene dissolution. *Environ. Sci. Technol.* 40(11); 3623-3633.
35. Liu, J.R., E.A. Edwards and S.N. Liss. **2006**. The effect of phosphorus limitation on microbial floc structure and gene expression in activated sludge. *Wat. Sci. Technol.* 54(1):247–255.
34. Dinglasan-Panlilio, Dworatzek, S., M. J., Mabury, S. A., and E.A. Edwards. **2006**. Microbial oxidation of 1, 2-dichloroethane under anoxic conditions with nitrate as electron acceptor in mixed and pure cultures. *FEMS Microbiol. Ecol.* 56.355-364.
33. Grostern, A., and E. A. Edwards. Growth of *Dehalobacter* and *Dehalococcoides* spp. during degradation of chlorinated ethanes. **2006**. *Appl. Environ. Microbiol.* 72(1):428-436.
32. Waller, A.S. Krajmalnik-Brown, R., Löffler, F. E. and E.A. Edwards. **2005**. Multiple reductive-dehalogenase-homologous genes are transcribed during dechlorination by a *Dehalococcoides*-containing mixed culture. *Appl. Environ. Microbiol.* 71(12): 8257–8264.
31. Ulrich, A.C. Beller, H., and E. A. Edwards. **2005**. Metabolites Detected During Biodegradation of <sup>13</sup>C<sub>6</sub>-Benzene in Nitrate-Reducing and Methanogenic Enrichment Cultures. *Environ. Sci. Technol.* 39(17); 6681-6691.
30. Chartrand, M.M.G., Waller, A., Mattes, T.E., Elsner, M., Lacrampe-Couloume, G., Gossett, J.M., Edwards, E.A. and B. Sherwood Lollar. **2005**. Carbon isotopic fractionation during aerobic vinyl chloride degradation. *Environ. Sci. Technol.* 39:1064-1070.
29. Morrill, P., Lacrampe-Couloume, G., Sleep, B., Edwards, E.A., McMaster, M., Major, D.M., and B. Sherwood Lollar. **2005**. Stable Carbon Isotope Evidence for Reductive Dechlorination of Perchloroethene at Kelly AFB, TX. *J. Contaminant Hydrology.* 76:279– 293.
28. Morrill, P.L., Seepersad, D.J., Lacrampe-Couloume, G., Edwards, E.A., Sleep, B.E., McMaster, M.L., Major, D.W. and Sherwood Lollar, B. **2004**. The use of stable carbon isotope analysis to model enhanced dissolution of tetrachloroethene. *Geochim. Cosmochim. Acta* 68, A458-A458.
27. Wang D.Y., McKague B., Liss S.N. and Edwards E.A. **2004**. Gene Expression Profiles for Detecting and Distinguishing Potential Endocrine Disrupting Compounds in Environmental Samples. *Environ. Sci. Technol.* 38(23); 6396-6406.

26. Hirschorn, S.K., M.J. Dinglasan, M. Elsner, S. Mancini, G. Lacrampe-Couloume, E. A. Edwards, and B. Sherwood Lollar. **2004**. Pathway dependant isotopic fractionation during aerobic 1,2-dichloroethane biodegradation. *Environ. Sci. Technol.* 38(18):4775-4781.
25. Duhamel, M., Mo, K. and E. A. Edwards. **2004**. Characterization of a highly enriched *Dehalococcoides*-containing culture that grows on vinyl chloride and trichloroethene. *Appl. Environ. Microbiol.* 70(9):5538-5545.
24. Dinglasan, MJA., Ye, Y., Edwards, E.A. and S A Mabury. **2004**. Fluorotelomer Alcohol Biodegradation Yields Polyfluorinated Acids. *Environ. Sci. Technol.* 38(10):2857-2864.
23. Waller, A.S., Cox E.E., and E.A. Edwards. **2004**. Perchlorate-reducing microorganisms isolated from contaminated sites. *Environ. Microbiol.* 6(5), 517–527.
22. Wang, D.-Y. , Fulthorpe, R., Liss, S.N., and E.A. Edwards. **2004**. Identification of Estrogen Responsive Genes by cDNA Microarray and Characterization of A Novel Early Estrogen-Induced Gene: EEIG1. *Molec. Endocrinol.* 18(2):402–411
21. Adriaens, P. , P. Goovaerts, S. Skerlos, E. Edwards, and T. Egli. **2003**. Intelligent Infrastructure For Sustainable Potable Water: A Roundtable for Emerging Transnational Research and Technology Development Needs. *Biotechnology Advances* 22(1-2):17-26.
20. François, E.A., Wang, D., Fulthorpe, R.F., Liss, S.N. and E.A. Edwards. **2003**. DNA Microarrays for Monitoring Endocrine-Disrupting Compounds. *Biotechnology Advances* 22(1-2):119-134.
19. Discussion of Environment vs. Bacteria or Let's Play, 'Name that Bacteria' by David Major, GeoSyntec Consultants Inc.; Elizabeth Edwards, University of Toronto; Perry McCarty, Stanford University; James Gossett, Cornell University; Edwin Hendrickson, Dupont; Frank Loeffler, Georgia Institute of Technology; Stephen Zinder, Cornell University; David Ellis, Dupont; John Vidumsky, Dupont; Mark Harkness, General Electric; Gary Klecka, Dow Chemical; and Evan Cox, GeoSyntec Constultants Inc. *Ground Water Monitoring & Remediation*, 23(2): 32–48, **2003**.
18. Dennis, P., E. A. Edwards, S. N. Liss, and R. Fulthorpe. **2003**. Monitoring Gene Expression In Mixed Microbial Communities Using DNA Microarrays. *Appl. Environ. Microbiol.* 69(2):769-778.
17. Ulrich, A.C. and E.A. Edwards. **2003**. Physiological and Molecular Characterization of Anaerobic Benzene-Degrading Mixed Cultures. *Environ. Microbiol.* 5(2):92-102.
16. Mancini, S.A., Ulrich, A.C., Lacrampe-Couloume, G., Sleep, B., Edwards, E.A., and B. Sherwood Lollar. **2003**. Carbon and Hydrogen Isotopic Fractionation During Anaerobic Biodegradation of Benzene. *Appl. Environ. Microbiol.* 69:191-198.
15. Major, D. W., M. McMaster, E. Cox, E. A. Edwards, S. Dworatzek, E. E. Hendrickson, M. G. Starr, J. Payne, and L. Buonamici. **2002**. Field demonstration of successful bioaugmentation to achieve dechlorination of tetrachloroethene to ethene. *Environ. Sci. & Technol.* 36(23); 5106-5116.
14. Duhamel, M., S. Wehr, L. Wu, H. Rizvi, D. Seepersad S. Dworatzek, E.E. Cox, and E. A. Edwards. **2002**. Comparison of anaerobic dechlorinating enrichment cultures maintained on different chlorinated ethenes. *Wat. Res.* 36: (17) 4193 - 4902.

13. Slater, G.F., B. Sherwood Lollar, B. Sleep, and E. Edwards. **2001**. Variability in Carbon Isotopic Fractionation during Biodegradation of Chlorinated Ethenes: Implications for Field Applications. *Environ. Sci. & Technol.* 35(5): 901-907.
12. Beller, H.R. and E.A. Edwards. **2000**. Anaerobic toluene activation by benzylsuccinate synthase in a highly enriched methanogenic culture. *Appl. Environ. Microbiol.* 66(12):5503-5505.
11. Ward, J. A.M., J. M.E. Ahad, G. Lacrampe-Couloume, G F. Slater, E. A. Edwards, and B. Sherwood Lollar. **2000**. Hydrogen isotope fractionation during methanogenic degradation of toluene: potential for direct verification of bioremediation. *Environ. Sci. & Technol.* 34:4577-4581.
10. Bloom, Y., R. Aravena, E. Edwards, Hunkeler, D, and S.K. Frape. **2000**. Stable carbon isotope fractionation of trichloroethene during microbially-mediated reductive dechlorination. *Environ. Sci. & Technol.* 34:2768-2772.
9. Ahad, J.M.E., B. Sherwood Lollar, E.A. Edwards, and G. Slater. **2000**. Carbon isotope fractionation during anaerobic biodegradation of toluene: implications for intrinsic bioremediation. *Environ. Sci. & Technol.* 34:892-896.
8. Ficker, M., K. Krastel, S. Orlicky and E.A. Edwards. **1999**. Molecular characterization of a methanogenic toluene-degrading consortium. *Appl. Environ. Microbiol.* 65(12):5576-5585.
7. Burland, S. and E. Edwards. **1999**. Benzene biodegradation linked to nitrate reduction. *Appl. Environ. Microbiol.* 65(2):529-533.
6. Nales, M., B. Butler and E. Edwards. **1998**. Anaerobic benzene biodegradation: a microcosm survey. *Bioremediation J.* 2(2):125-144.
5. Edwards, E.A. and D. Grbic-Galic. **1994**. Anaerobic degradation of toluene and o-xylene by a methanogenic consortium. *Appl. Environ. Microbiol.* 60(1):313-322.
4. Edwards, E.A., A.M. Edwards, and D. Grbic-Galic. **1994**. A method for detection of aromatic metabolites at very low concentrations: application to detection of metabolites of anaerobic toluene degradation. *Appl. Environ. Microbiol.* 60(1):323-327.
3. Edwards, E.A. and Grbic-Galic, D. **1992**. Complete mineralization of benzene by aquifer microorganisms under strictly anaerobic conditions. *Appl. Environ. Microbiol.* 58(8):2663-2666.
2. Edwards, E.A., L.E. Wills, M. Reinhard, and D. Grbic-Galic. **1992**. Anaerobic degradation of toluene and xylene by aquifer microorganisms under sulphate-reducing conditions. *Appl. Environ. Microbiol.* 58(3):794-800.
1. Wolfe, E.A. (maiden name) and T.M.S. Chang. **1987**. Orally ingested microencapsulated urease and an ammonium absorbent, zirconium phosphate, to remove urea in kidney failure. *Int. J. Artificial Cells and Organs*, 10(4):269-274.

**Other Refereed Contributions (conference papers, book chapters and reports):**

22. Hug, L.A., Vrionis, H., Major, D., and Edwards, E.A. (in press) Chapter 12: Research Needs, in "Bioaugmentation for Groundwater Remediation". SERDP and ESTCP Remediation Technology Monograph Series on Bioaugmentation. **2011**

21. Lebron, C. A., C. Acheson, C. Yeager, D. Major, E. Petrovskis, N. Barros, P. Dennis, X. Druar, J. Wilkinson, E. Ney, F. E. Loeffler, K. Ritalahti, J. Hatt, E. Edwards, M. Duhamel, and W. Chan **2008**, *An Overview of Current Approaches and Methodologies to Improve Accuracy, Data Quality and Standardization of Environmental Microbial Quantitative PCR Methods*. SERDP ER-1561. [www.serdp.org/content/download/8647/105495/file/ER-1561\\_LR\\_PMA\\_Final](http://www.serdp.org/content/download/8647/105495/file/ER-1561_LR_PMA_Final).
20. Edwards, E.A. **2008**. Molecular Biology Tools in Bioremediation. AFCEE workshop extended abstract. San Antonio, Texas March 25-27, 2008
19. Edwards, E.A. and F.L. Löffler. **2006**. Advancement of Nucleic Acid-Based Tools for Monitoring *In Situ* Reductive Dechlorination. Final Project Report - Savannah River National Labs – October, 2006.
18. Emelko, Monica B., Hood, Eric D. and Elizabeth A Edwards. 2006. Bioaugmentation for chlorinated solvent remediation, Proceedings of the IASTED conference - Advanced Technology in the Environmental Field, Lanzarote, Spain - February 6 - 8, 2006
17. Geosyntec Consultants 2004. (many co-authors). Bioaugmentation for Remediation of Chlorinated Ethenes: Technology Development, Status, and Research Needs. *White paper Prepared for: Environmental Security Technology Certification Program (DOE) Arlington, Virginia*. 118 pp.
16. Duhamel, M., K. Mo, P.C. Dennis, E.R. Hendrickson, S. Dworatzek, X. Druar, D. Major, and E.A. Edwards. 2004. Microbial diversity in anaerobic enrichment cultures dechlorinating tetrachloroethene and trichloroethene to ethene. Proceedings of the Anaerobic Digestion Conference, August 29-September 2, Montreal, QC Vol. 1 p. 556-562.
15. Ross, N., A.-M I. Abbey, S. Lesage, T. V. McDaniel, P. A. Martin, E. A. Edwards, D. W. Major. 2003. Biosafety of Bioremediation Approaches in a Tetrachloroethylene-contaminated Environment, *Paper A-20*, in: V.S. Magar and M.E. Kelley (Eds.), *In Situ and On-Site Bioremediation-2003*. Proceedings of the Seventh International In Situ and On-Site Bioremediation Symposium (Orlando, FL). ISBN 1-57477-139-6, published by Battelle Press, Columbus, OH,
14. Major, D. W., M. McMaster, E. Cox, B.J. Lee, E.E. Gentry, E. Edwards, S. Dworatzek. 2001. Successful Bioaugmentation to Achieve Complete Dechlorination of Chlorinated Ethenes. In: *Bioaugmentation, Biobarriers, and Biogeochemistry*, Leeson, Alleman, Alvarez and Magar (eds). Battelle Press. p. 27-34.
13. Cox, E.E., E. Edwards and S. Neville. 2000. "In Situ Bioremediation of Perchlorate in Groundwater, Chapter 21. In: *Perchlorate in the Environment*, E.T Urbansky (Ed.). Kluwer Academic/Plenum Publishers, New York.
12. Cox, E.E., E. Edwards, S. Neville, G. Swanick and D. Major. 2000. "Accelerated Bioremediation of Perchlorate and Trichloroethene in Groundwater". In: *Remediation of Chlorinated and Recalcitrant Compounds*, Volume 2, Battelle Press. May 2000.
11. Cox, E., Major, D., Edwards, E. and P. Virden. 2000. Natural Attenuation of 1,2-Dichloroethane in Groundwater at a Chemical Manufacturing Facility. In: *Remediation of Chlorinated and Recalcitrant Compounds*, Volume 2, Battelle Press. May 2000.
10. Aravena, R, Hunkeler, D, Bloom, Y. and Butler, B., Edwards, E., Frappe, S.K. and E. Cox. 1999. Application of Compound-Specific Carbon Isotope Ratios in Organic Contaminant

- Studies. Proceedings of the International Symposium on Isotope Techniques in Water Resources, Development and Management, May 10-14, Vienna, Austria.
9. Rezende, A. A. and E.A. Edwards. 1999. Land application of pulp and paper mill effluents – a literature review. 1999 Annual Meeting of the Air & Waste Management Association, June 20-24, St. Louis, MO.
  8. Cox, E. M. McMaster, T.A. McAlary, D. W. Major, L. Lehmicke, and E.A. Edwards. 1998. Accelerated bioremediation of trichloroethene: from field and laboratory studies to full scale. First International Conference on Remediation of Chlorinated and Recalcitrant Compounds. May 18-21, Monterey, California
  7. Edwards, E., and E. Cox. 1997. Field and laboratory studies of sequential anaerobic-aerobic chlorinated solvent biodegradation.” *in* In Situ and On-Site Bioremediation: Volume 3. Fourth International Symposium on *In Situ* and On-Site Bioreclamation:, New Orleans, LA, April 28-May 1. Symposium Chairs, B.C. Alleman and A. Leeson. Battelle Press, pp 261-265.
  6. Nales, M. and E. Edwards. 1997. Evaluation of anaerobic benzene biodegradation for in situ passive bioremediation. Final Report prepared for the National Energy Board, Calgary, Alberta.
  5. Cox, E., E. Edwards, L. Lehmicke, and D. Major. 1995. Intrinsic biodegradation of trichloroethene and trichloroethane in a sequential anaerobic - aerobic aquifer. *in* Intrinsic Bioremediation, Hinchee, R.E., Wilson, J.T. and Downey, D.C. (eds.), Battelle Press, pp. 223-231.
  4. Major, D., E. Cox, E. Edwards, and P. Hare. 1995. Intrinsic dechlorination of trichloroethene to ethene in a bedrock aquifer. *in* Intrinsic Bioremediation, Hinchee, R.E., Wilson, J.T. and Downey, D.C. (eds.), Battelle Press, pp 197-203.
  3. Edwards, E.A., L.E. Wills, D. Grbic-Galic, and M. Reinhard. 1991. Anaerobic degradation of toluene and xylene-Evidence for sulphate as the terminal electron acceptor, *in* Proceedings of *In Situ* and On-Site Bioreclamation: An International Symposium, 19-21 March, San Diego CA, R.E. Hinchee and R.F. Olfenbuttel (ed.), Butterworth-Heinemann, Stoneham, MA, pp 463-471.
  2. Grbic-Galic, D., S.M. Henry, E.M. Godsy, E.A. Edwards, and K.P. Mayer. 1991. Anaerobic degradation of aromatic hydrocarbons and aerobic degradation of trichloroethylene by subsurface microorganisms, *in* Organic Substances and Sediments in Water, Volume 3: Biological. Lewis Publishers Inc. pp 239-266.
  1. Beller, H.R., E.A. Edwards, D. Grbic-Galic, S.R. Hutchins, and M. Reinhard. 1991. Microbial degradation of alkylbenzenes under sulfate-reducing and methanogenic conditions, U.S.E.P.A. Report #600/S2-91/027, August.

#### **Non-Refereed Contributions:**

#### **Scholarly Invitations (2010, 2011 only)**

55. Invited Speaker. Canadian Society for Chemical Engineering Annual Meeting, London, ON. October 2011

54. Invited Speaker. June **2011** Dehalobacter unveiled: A Key Player in the Detoxification of Chlorinated Alkanes at Contaminated Sites. Battelle International Symposium on Bioremediation and Sustainable Technologies, Reno, NV. June 27-30, **2011**.
53. Invited Speaker. Metagenomics and Chlorinated Solvents. Presented at an OGI-sponsored Workshop entitled Environmental Metagenomics – the Ontario Landscape. April 8, **2011**, Toronto.
52. Invited Speaker – Microarrays MARS Toronto, June 14, **2010**
51. Invited Speaker – Canadian Society for Microbiology, June **2010**.
51. Invited TEDx GTA talk. New Frontiers in Bioremediation May 18, **2010**.
50. Invited Speaker – Future Directions in Bioremediation – Centre for Environment Earth Day Symposium – U of Toronto, April 22, **2010**
49. Invited Speaker - Ryerson University – March 31, **2010**
48. Invited Speaker – University of Toronto Scarborough – February 12, **2010**

### **Contributions to Reports and White Papers**

1. Strategic Environmental Research and Development Program (SERDP). **2008**. An Overview Of Current Approaches And Methodologies To Improve Accuracy, Data Quality And Standardization Of Environmental Microbial Quantitative Pcr Methods Project ER-1561 30 January 2008
2. Final Report: SERDP and ESTCP Expert Panel Workshop on Research and Development Needs for the Environmental Remediation Application of Molecular Biological Tools October **2005**.
3. Bioaugmentation For Remediation Of Chlorinated Ethenes: Technology Development, Status, And Research Needs *Prepared For:* Environmental Security Technology Certification Program *Prepared By:* Geosyntec Consultants Project Number TR0128 30 March **2004**

**Workshops Organized**

- Second Annual Bioproducts and Enzymes from Environmental Metagenomes (BEEM) Research Meeting, University of Toronto, October 5-6, 2011
- First Annual BEEM Research Meeting, University of Toronto November 18-19, 2010
- BioZone Doors Open Event, University of Toronto Wednesday September 22, 2010
- Protein Function and Environmental Metagenomes, University of Toronto Wednesday November 26th, 2008
- Special Mini-Symposium On Anaerobic Environmental Biotechnology University of Toronto, Monday, May 21<sup>st</sup>, 2007

**Sessions Organized (2011-2012 only):**

- Session Chair & Organizer: ASM Annual General Meeting San Francisco, 2012
- Session Chair on Identifying and Modeling Biodegradative Pathways at the Battelle International Symposium on Bioremediation and Sustainable Technologies, Reno, NV, June 27-30, 2011.

**Conference Abstracts (Oral and Poster; presenter underlined): (2010-11 only)**

158. Manchester, M., M. Zarek, L. Hug, S. Dworatzek, M. Lorah and E. Edwards. 06/2011. Characterization of Dechlorinating Populations in the WBC-2 Consortium. 28 June 2011. Battelle International Symposium on Bioremediation and Sustainable Technologies, Reno, NV. (Platform)
157. C.E. Devine, R. Gitia-Froz, and E.A. Edwards. Metabolic Pathways, genes and Enzymes in Anaerobic Benzene-Degrading Cultures: From “Omics” to Application. Battelle International Symposium on Bioremediation and Sustainable Technologies, Reno, NV. June 27-30, 2011. (Platform)
156. Mundle, S.O.C., Johnson, T., Lacrampe-Couloume, G., Duhamel, M., Perez-de-Mora, A., Edwards, E.A., Kluger, R., Sherwood Lollar, B., Tiedeman, C. R., Revesz, K., Imbrigiotta, T. E., Cox, E. Using <sup>13</sup>C isotope signatures of ethene as a direct indicator to assess the accumulation of toxic daughter products of trichloroethene. Battelle International Symposium on Bioremediation and Sustainable Environmental Technologies, Reno, NV. June 2011. (Platform)
155. Chan, C.H., Tang, S., Eckert, T., Lacrampe-Couloume, G., Edwards, E.A., Sherwood Lollar, B. Compound specific isotope analysis on biotic degradation of chloroform and implication for monitoring anthropogenic-sourced trichlorinated carbon compounds. Battelle International Symposium on Bioremediation and Sustainable Environmental Technologies, Reno, NV. June 2011. (Platform)
154. Tang, S. and E. Edwards. Identification of *Dehalobacter* reductases that dechlorinate 1,1,1-trichloroethane, chloroform and 1,1-dichloroethane (poster). 21 May 2011, American Society for Microbiology General Meeting, New Orleans, LA.
154. L.A. Hug, A.R. Rowe, D. Parks, R.G Beiko, R.E. Richardson, & E.A. Edwards. Comparative metagenomics of three *Dehalococcoides*-containing dechlorinating microbial consortia. (poster) American Society for Microbiology General Meeting. New Orleans, LA, U.S.A. May 21-24, 2011.

153. Liang, X.; Devine, C.E.; Nelson, J.L.; Sherwood Lollar, B.; Zinder, Z.H.; Edwards. E.A. Anaerobic Conversion of Monochlorobenzene and Benzene to CH<sub>4</sub> and CO<sub>2</sub> in Bioaugmented Microcosms. 111<sup>th</sup> American Society for Microbiology General Meeting, New Orleans, LA, May 21-24, 2011
152. Liang, X.; Howlett, M.R.; Nelson, J.L.; Grant, G.; Dworatzek, S.; Lacrampe-Couloume, G.; Zinder, Z.H.; Edwards. E.A.; Sherwood Lollar, B. Pathway-Dependent Isotope Fractionation during Aerobic and Anaerobic Degradation of Monochlorobenzene and 1, 2, 4-Trichlorobenzene. 241<sup>st</sup> American Chemical Society National Meeting, Anaheim, CA. Mar. 27-31. 2011
151. Islam, M. A., E. A. Edwards and R. Mahadevan. 05/2011. Investigating the Metabolism of *Dehalococcoides* and Associated Community Members. 17 May 2011. Genome Biology and Bioinformatics Work in Progress Seminar Series, University of Toronto, Toronto, Ontario, Canada. (platform)
150. Hanchen (Cleo) Ho, Cheryl Devine, Robert Beiko, Laura Hug, Elizabeth Edwards, Radhakrishnan Mahadevan A Functional Analysis of the Metagenome of an Anaerobic Benzene-Degrading Community. Poster presented at the 13th CSChE Ontario-Québec Biotechnology Meeting, Kingston, ON, May 12-13, 2011
149. Yi Xuan (Jine Jine) Li, Ilan Adler, Cheryl Devine, and Elizabeth Edwards. Searching for Microbes in Deep Hypersaline Anoxic Basins. Poster presented at the 13th CSChE Ontario-Québec Biotechnology Meeting, Kingston, ON, May 12-13, 2011
148. Tran C, Edwards EA, Yakunin A, Chan P, and Dinglasan-Panlilio J. Isolation of a Putative and Characterization of Known Hydrolytic Dehalogenases. Poster presented at the 13th CSChE Ontario-Québec Biotechnology Meeting, Kingston, ON, May 12-13, 2011
147. Wei, K., S. Tang and E. A. Edwards. 05/2011. Biodegradation of Chlorofluorocarbon-113 in Anaerobic Enrichment Cultures. 12 May 2011. CSChE Ontario-Quebec Biotechnology Meeting, Ontario, Canada. (Platform)
146. Fei Luo, Cheryl Devine, Roya Gitiafroz, Christina Heidorn, Yunchen Gong, Elizabeth Edwards. Anaerobic benzene biodegradation in enriched cultures. Presentation at the 13th CSChE Ontario-Québec Biotechnology Meeting, Kingston, ON, May 12-13, 2011 (Platform)
145. Hug, L.A., McMurdie II, P.J., Waller, A.S., Holmes, S., Spormann, A., and Edwards, E.A. Testing a novel metagenome binning heuristic. JGI Users Meeting March 21-24, 2011 Walnut Creek, CA. (Poster)
144. Cox E, Austrins C, Spain J, Shin K, Nishino S, Gossett J, Giddings C, Johari WLBW, Edwards EA, Perez de Mora A, Sherwood Lollar B, and Mundle SOC, Poster entitled "The truth is out there: unraveling the mystery of the missing cDCE, vinyl chloride and ethene", SERDP / ESTCP Partners in Environmental Technology Technical Symposium and Workshop, Washington DC, Nov. 30-Dec. 2, 2010. (Platform)
143. Lebron C, Major D, Dennis P, Loeffler FE, Ritalahti K, Hatt JK, Edwards EA, Yeager C, Ogles D, and Acheson C, Poster entitled "Standardized procedures for use of nucleic acid-based tools for microbial monitoring", SERDP / ESTCP Partners in Environmental Technology Technical Symposium and Workshop, Washington DC, Nov. 30-Dec. 2, 2010.
142. Loeffler FE, Ritalahti K, Edwards EA, and Lee M, Poster entitled "Comprehensive MBT approaches for site assessment and bioremediation monitoring at chlorinated solvent sites", SERDP / ESTCP Partners in Environmental Technology Technical

- Symposium and Workshop, Washington DC, Nov. 30-Dec. 2, 2010.
141. Islam MA, Edwards EA and Mahadevan R, Poster entitled "Visualizing gene expression data with a pan-genome-scale metabolic model of *Dehalococcoides*", Genome Biology and Bioinformatics Annual Retreat, Toronto, May 26, 2010
  140. Hug, L.A., McMurdie II, P.J., Waller, A.S., Holmes, S., Spormann, A., and Edwards, E.A. Testing a novel metagenome binning heuristic with an enrichment culture simulated metagenome. ISME. Seattle, WA, U.S.A. August 22-27, 2010.
  139. Marie Manchester, Matt Zarek, Sandra Dworatzek, Michelle Lorah, Laura Hug and Elizabeth Edwards. Characterization of Dechlorinating Populations in the WBC-2 Consortium. ISME. Seattle, WA, U.S.A. August 22-27, 2010.
  138. A. Pérez-de-Mora, A. Zila, M. McMaster, J. Roberts, C. Austrins, G. Lacrampe-Couloume, B. Sherwood Lollar, P. Schmitt-Kopplin, E.A. Edwards. Anaerobic Bioremediation of Volatile Organic Compounds in a Fractured Bedrock System: Insights from a Bioaugmentation Trial in Canada. ISME. Seattle, WA, U.S.A. August 22-27, 2010.
  137. S. Tang, A. Grostern, W. Chan and E. Edwards (2010), "Characterization of Dehalobacter cultures that reductively dechlorinate chlorinated ethanes and chloroform", 13th ISME conference, Seattle, WA, US.
  136. Cheryl E. Devine, Laura A. Hug, Paul J. McMurdie, and Elizabeth A. Edwards. Combined proteomic and metagenomic analysis of a benzene-degrading methanogenic culture ISME. Seattle, WA, U.S.A. August 22-27, 2010.
  135. Yang, M.I., Allen, D.G., Edwards, E.A. The Effect of Pulp Mill Effluents on the Microbial Properties of Anaerobic Granules. The 13th International Symposium for Microbial Ecology, August, 2010, Seattle.
  134. Roya Gitiafroz, Cheryl E. Devine, Laura Hug, Lutgarde Raskin and Elizabeth A. Edwards. Bacteria Involved in Benzene Biodegradation under Nitrate-Reducing Conditions. ISME. Seattle, WA, U.S.A. August 22-27, 2010.

## TEACHING

NB: The Killam Fellowship provided 2 years of teaching relief, from July 2008 to July 2010.

### Undergraduate Teaching

Instructor – CHE 320 S – Environmental Chemistry - Department of Chemical Engineering and Applied Chemistry, University of Toronto.

Years: 2012

Instructor – CHE 403 S – Professional Practice - Department of Chemical Engineering and Applied Chemistry, University of Toronto.

Years: 2011, 2012

Instructor – CHE 113S Concepts in Chemical Engineering - Department of Chemical Engineering and Applied Chemistry, University of Toronto.

Years: 2005; 2006; 2007; 2008 (1/3 of course – module on Bioengineering)

Faculty Advisor – CHE430F - Plant Design - Department of Chemical Engineering and Applied Chemistry, University of Toronto.

Years: 1997, 1998, 1999, 2002, 2006

[One project entitled " Proposed Anaerobic Digester for Tembec's Acid Condensate" won

first place in the Pulp and Paper National Student Problem Solving Competition  
1999/2000]

Instructor – CHE391S/F – Organic Chemistry and Biochemistry (for students in the Engineering Science programme) - Department of Chemical Engineering and Applied Chemistry, University of Toronto.

Years: 1998(S), 1999(S), 2000(S), 2001(S), 2001 (F), 2002(F), 2004(F), 2005(F), 2006(F), 2007(F)

Instructor – CHE466F - Bioprocess Engineering - Department of Chemical Engineering and Applied Chemistry, University of Toronto.

Years: 1998 (with Prof. Allen); 2000, 2001, 2002(partial), 2004; 2005(F); 2011(F, with Dr. Jeremic and Dr. Vuong)

Supervisor - CHE 499Y - Chemical Engineering Thesis, University of Toronto.

Years: 1998-99 (3 students), 99-00 (4 students), 00-01 (3 students), 01-02 (3 students), 02-03 (2 students), 04-05 (3 Full year, 1 half year); 05-06 (2 full year); 06-07 (2 full year); 07-08 (2 full year); 11-12 (2 full year students)

Guest Lecturer (3 hrs/term) – MPL444 - Environmental Microbiology 4<sup>th</sup> year undergraduate elective - Department of Molecular and Medical Genetics, University of Toronto

Years: 1997, 1998, 1999, 2000.

Instructor – ChE 2D4 – Chemical Engineering Principles 1– Department of Chemical Engineering, McMaster University.

Years: 1996 (with Prof. Wood).

Supervisor – ChE 4YO4 – Senior Independent Project (full year) – Department of Chemical Engineering, McMaster University.

Years: 1996-97 (1 student).

Instructor - Eng 4U3 – Unit Operations and Processes in Environmental Engineering (Spring) – Departments of Chemical and Civil Engineering, McMaster University.

Years: 1996, 1997.

Faculty coordinator – Civ Eng 3Q3 – Water Quality Modelling (Fall) – Department of Civil Engineering, McMaster University.

Years: 1995, 1996.

### **Graduate Teaching:**

Instructor – CHE 1134 – Advances in Bioengineering - Department of Chemical Engineering and Applied Chemistry, University of Toronto.

Years: 2006 (S); 2008 (S; with Emma Master)

Course Coordinator – CHE 2011 – Graduate Seminars - Department of Chemical Engineering and Applied Chemistry, University of Toronto.

Years: 2005(S), 2010, 2011

Instructor – JCC1313F – Environmental Microbiology - Department of Chemical Engineering and Applied Chemistry, University of Toronto.

Years: 1999, 2000, 2001, 2002, 2007(S), 2007(F; with Emma Master), 2010 (F)

Guest Lecturer (4 hrs/term) – BTC 1801-Bio Controls; Natural Products -Master's of Biotechnology Program, Mississauga Campus, University of Toronto

Years: 2002, 2003, 2004, 2005, 2006.

Instructor – Civ Eng 796 – Special Topics in Civil Engineering (Biodegradation/Environmental Microbiology) – Department of Civil Engineering, McMaster University.  
Years: 1996 (spring and fall).

### **TECHNOLOGY TRANSFER**

- License Agreement Signed between GeoSyntec and U of Toronto for exclusive use of the KB-1 dechlorinating culture. A division of GeoSyntec consultants called SIREM laboratories was founded in Guelph to market culture and has hired 3 U of T graduates for this venture.

### **PUBLICITY/INTERVIEWS**

- May 18, 2010: TEDx GTA presentation. New Frontiers in Bioremediation.
- January 2009. ASM Web-podcast interview: <http://meetthescientist.wordpress.com/>
- January 2007. Technology Solutions brief entitled “Natural Attenuation gets a Boost” in the journal Environmental Science & Technology (Jan 1, 2007, p 15)
- March 2005. “Helping Nature Take Care of Civilization’s Mess”. *Engineering Dimensions* (Professional Engineers of Ontario Magazine) March/April 2005, Volume 26(2):58
- Dec. 13, 2004. *Globe and Mail* Newspaper Article: “Bacteria Enlisted to Gobble up Water Toxins”.
- October 19, 2003. *New York Times* article entitled "The New Toxic-Site Cleanup Agent: A Bacterium that Gobbles up Poison".

End of C.V.