

Friday September 23, 2016 - 2:00-4:30pm, Davis Centre, Room 1302 (DC-1304)



Elizabeth A. Edwards, Professor

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“Harnessing natural biogeochemical cycles for waste treatment: examples of successful environmental biotechnologies”

Groundwater, surface water and soil contamination are serious threats to global health and prosperity. Petroleum hydrocarbons, industrial solvents, pesticides and metals are examples of frequent culprits. Some microbes have evolved and adapted to transform or detoxify contaminants in the environment. Many industrial and municipal wastewater treatment processes already make extensive use of amazing microbial communities for clean-up. With deeper understanding of the underlying processes afforded through community DNA sequencing and related technologies, new or improved approaches for water and waste treatment are being developed. For example, a remarkable group of microbes called *Dehalococcoides* can dechlorinate the common dry-cleaning solvent tetrachloroethene and the ubiquitous industrial solvent trichloroethene to the benign product ethene. Remarkably, these organisms grow as they detoxify these chemicals, spawning effective and growing commercial bioremediation and bioaugmentation approaches. This is just one example of the many other natural communities of microbes that are being tapped for their unique abilities to convert wastes to re-useable and thus valuable products.

Biosketch:

Elizabeth A. Edwards, PhD, P. Eng., FCAE, FRSC, Professor, Department of Chemical Engineering and Applied Chemistry, and Cell and Systems Biology (Status only), University of Toronto. Dr. Elizabeth Edwards holds Bachelor's and Master's degrees in Chemical Engineering from McGill University, Montreal, and a PhD degree (1993) in Civil and Environmental Engineering from Stanford University. She is internationally known for her work on anaerobic bioremediation, the application of molecular biology and metagenomics to uncover novel microbial processes, and the transition of laboratory research into commercial practice to develop bioremediation and bioaugmentation strategies for groundwater pollutants. She is also the founding director of BioZone, a Centre for Applied Bioscience and Bioengineering Research at the University of Toronto and a Tier 1 Canada Research Chair in Anaerobic Biotechnology. In 2016, she was awarded the Killam Prize in recognition of outstanding career achievements.

Keywords: *biodegradation, bioremediation of toxic chemicals, anaerobic digestion of industrial and municipal wastes, biotransformation of waste to high value products*

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