

**Frontiers in Biological Sciences
Seminar Series Presents**

Integrated Modeling of Microbial Ecology in Subsurface Environments

Speaker: Dr. Krishna Mahadevan

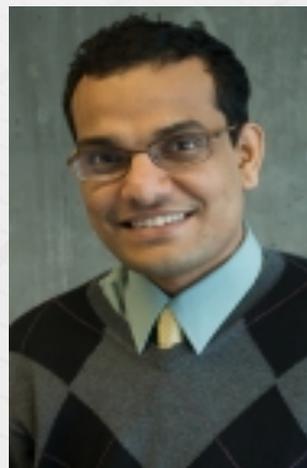
Department of Chemical Engineering
and Applied Chemistry
University of Toronto

Date: Thursday, May 12, 2011

Time: 8:30 – 9:30 a.m.

Place: EMSL Auditorium

Contact: Hilda Paz
Hilda.Paz@pnl.gov



Recent advances in experimental and computational technologies have enabled the detailed characterization of biological systems. In particular, the molecular components of these systems, including the list of genes, proteins they encode, and compounds that interact with these proteins, can be determined. This availability of tools to analyze system-wide changes at the gene, protein, and metabolite level has created significant opportunities to understand cellular functions resulting in the emergence of systems biology. Specifically, constraint-based modeling approach has proven successful in predicting the physiology of well-studied and poorly characterized microorganisms.

Dr. Mahadevan will give an overview of a constraint-based modeling approach and recent developments in this area, including limitations, and discuss the development of metabolic models for environmentally relevant bacteria and their use in optimizing practical applications in electricity generation and bioremediation. Finally, he will present extensions of this approach for analyzing microbial ecology in the subsurface; specifically, using genome-based approaches to study the competition dynamics between different species of iron-reducing bacteria critical for uranium bioremediation. Results provide an improved understanding of factors controlling growth and respiration of the microbial population and their impact on bioremediation in heterogeneous environments.



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