

Michael D. Marsolek

Seattle University
Department of Civil and Environmental Engineering
901 12th Ave.
Seattle, WA 98122
206-296-5527
email: marsolem@seattleu.edu

Education

Northwestern University, Evanston, Illinois
Ph.D. Chemical Engineering 1999 – 2005
Dissertation Subject: *Photobiocatalysis: Coupled photocatalytic-biological treatment for recalcitrant and inhibitory wastewaters.*
Advisor: Bruce E. Rittmann

University of Minnesota, Minneapolis, Minnesota
B.S. Chemical Engineering, September 1995 - June 1999
B.S. Chemistry, September 1995 - June 1999

Experience

Assistant Professor, 2008-Present
Adjunct Professor, 2006-08
Seattle University, Seattle, Washington

- Instructor for several courses, including Principles of Environmental Engineering, Biological Principles for Environmental Engineers, Water Supply and Wastewater Engineering, Hazardous Waste Engineering, and Environmental Engineering Chemistry
- Advisor for senior design project that designed a wastewater treatment system for five rural farming families near Matagalpa, Nicaragua. The project included site visits, sampling, and detailed analysis of the coffee processing wastewater for COD, DO, turbidity, pH, and total nitrogen.
- Co-advisor for Society of Environmental Engineers and Scientists (SEES) student group.

Consultant
Blue Tree Strategies, 2008 - 2009

- Data analysis and calculation for Stalkmarket Bagasse Tableware Carbon Footprint Analysis. The analysis included assessing and determining carbon sinks and sources during the production of biodegradable tableware made from waste sugarcane biomass. Patent pending 2008.

Post-Doctoral Fellow

Arizona State University, Tempe, Arizona, 2005 – 2006

- Worked on scale-up and expansion of the capabilities of the novel intimately coupled photobiocatalytic system (PCBBR) for treatment of wastewaters contaminated with recalcitrant and inhibitory organics.
- Performed detailed analysis of phylogenetic and functional diversity of microbial communities associated with degradation of products from photocatalytic oxidation of 2,4,5-trichlorophenol.

Research Assistant

Northwestern University, Evanston, Illinois, 1999 – 2005

- Developed, for the first time, a comprehensive understanding of the effect of 2,4,5-Trichlorophenol, a USEPA priority pollutant, on the microbial community of aerobic biological treatment.
- Estimated kinetic parameters to describe inhibition in 2,4,5-Trichlorophenol biodegradation.
- Utilized photobiocatalysis to successfully degrade 2,4,5-Trichlorophenol.
- Designed, built, and operated continuous bench-scale biological reactors to examine the effect of photocatalytic by-products on biological degradation.
- Studied the microbial ecology of different bacterial communities via denaturing gradient gel electrophoresis (DGGE), and correlated this to substrate composition.
- Determined the optimum photocatalytic effluent characteristics for use in combined photocatalytic-biological treatment.
- Implemented a novel reactor system, a photocatalytic circulating bed biofilm reactor (PCBBR), which combined photocatalysis and biodegradation into a single stage, called *intimately coupled photobiocatalysis*.
 - Co-author on the invention disclosure and patent submission.
- Utilized intimately coupled photobiocatalysis to successfully degrade wastewaters contaminated with acetate and 2,4,5-Trichlorophenol.

Undergraduate Research Assistant

University of Minnesota, Minneapolis, Minnesota, 1997 – 1999

Director: Professor Wayland E. Noland, Department of Chemistry

- Synthesized 5-methyl indole derivatives as possible anti-tumor and/or anti-HIV compounds for the NIH.
- Directed the Compound Screening Program for targeting and testing novel compounds for commercial use with association from Dow, DuPont, and Merck.

Academic Honors and Presentations

Academic Papers and Publications

Author on invention disclosure and patent entitled: Intimate Coupling of Photobiocatalysis in a Photocatalytic Circulating-Bed Biofilm Reactor (PCBBR).

Michael D. Marsolek, Bruce E. Rittmann, “Biodegradation of 2,4,5-Trichlorophenol by Mixed Microbial Communities: Biorecalcitrance, Inhibition, and Adaptation.”, journal publication, *Biodegradation*, Vol. 18 (3), June, 2007.

Michael D. Marsolek, Cesar E. Torres, Martina Hausner, and Bruce E. Rittmann, “Intimate Coupling of Photocatalysis and Biodegradation in a Photocatalytic Circulating-Bed Biofilm Reactor.”, *Biotechnology and Bioengineering* (cover article), Vol. 101 (1), March, 2008.

Academic Presentations

Michael D. Marsolek, Mwendu Lefler, Mary Jo Kirisits, Kimberly A. Gray, and Bruce E. Rittmann, *American Chemical Society (ACS) National Conference*, “Photobiocatalysis: Coupled Photocatalytic-Biological Wastewater Treatment for Wastewaters Containing Biologically Recalcitrant and Inhibitory Organics such as 2,4,5-Trichlorophenol.”, oral presentation, August, 2004

Michael D. Marsolek and Bruce E. Rittmann, *American Chemical Society (ACS) National Conference*, “Biorecalcitrance, inhibition, and acclimation of an activated-sludge microbial community to 2,4,5-trichlorophenol”, poster presentation, March 2003

Winner of 1st-place poster award: Michael D. Marsolek, Mary Jo Kirisits, Kimberly A. Gray, and Bruce E. Rittmann, *Chicago Joint Conference on the Environment*, “Biological Degradation and Coupled Photocatalytic-Biological Degradation of a Recalcitrant and Inhibitory Model Organic, 2,4,5-Trichlorophenol.”, poster presentation, April, 2004

Michael D. Marsolek and Bruce E. Rittmann, *Institute for Environmental Catalysis (IEC) Conference*, “The Need for Photobiocatalysis: Biodegradation of 2,4,5-Trichlorophenol and Application to Actual Photocatalytic Effluent”, oral presentation, March, 2003

Michael D. Marsolek, Mary Jo Kirisits, and Bruce E. Rittmann, *Institute for Environmental Catalysis (IEC) Conference*, “Why Photobiocatalysis is Necessary for Degrading Biorecalcitrant Compounds”, poster presentation, September, 2002

Michael D. Marsolek, Mary Jo Kirisits, and Bruce E. Rittmann, *Institute for Environmental Catalysis (IEC) Conference*, “Photobiocatalysis”, poster presentation, March, 2002