



The University of Michigan
Dept. of Environmental & Water Resource Engineering,
in conjunction with GrEENPEAS and ESEP-21 Presents:

Dr. René P. Schwarzenbach

2005-2006 Association of Environmental Engineering & Science Professors' Distinguished Lecturer

Thursday, September 8, 2005 at 3:30 pm; 2233 GGBrown North Campus & Reception to Follow

Quantification of Sorption Equilibria of Organic Pollutants – Tackling Sorbate and Sorbent Variability by a Unifying Approach

Abstract. Partitioning processes between air or water and condensed phases (surfaces, bulk phases such as natural organic matter) play a key role in determining the behavior and the effects of organic pollutants in natural and engineered systems. To date, equilibrium adsorption or absorption coefficients of a given compound are commonly estimated by using simple one-parameter linear free energy relationships (LFERs) using compound properties such as vapor pressure, aqueous solubility, or octanol-air partition coefficients. However, the predictive power of such one-parameter LFERs is very limited because no single descriptor is able to describe appropriately all the molecular interactions that determine the partitioning of a give compound between two phases. As a consequence, different compound classes usually require different one-parameter LFERs. In constrast, as will be demonstrated in the lecture, poly-parameter LFERs that quantify the pertinent molecular interactions relevant for a given partitioning process are able to describe the sorption coefficients of a large set of structurally diverse compounds with one single equation. Furthermore, using such an approach, it is possible to characterize the sorption properties of environmentally-relevant sorbents. The sorbents discussed in the lecture include the water and ice surface, various mineral and salt surfaces, urban aerosols, and soil organic matter.

About the Lecturer. Dr. Schwarzenbach is full Professor of Environmental Chemistry at the Federal Institute of Technology (ETHZ) in Zurich, Switzerland. His research and teaching focus primarily on the distribution, fate, and effects of organic pollutants in the natural environment. The research addresses fundamental chemical as well as multidisciplinary system-oriented aspects. His textbook “Environmental Organic Chemistry,” winner of the “Chemistry Book of the Year Award” from the Association of American Publishers in 1994, has established itself as the standard text in the field of environmental organic chemistry. In 2001, he was elected as an original member of the ISI Highly Cited Researchers Database, and in 2001 he won the SETAC Environmental Education Award.

This is the first in the 2005-2006 series of lectures addressing Environmental Science, Engineering and Policy in the 21st Century. This Seminar Series is organized by GrEENPEAS and sponsored by the Environmental and Water Resources Engineering Program. Financial support is generously provided by the UofM Department of Civil and Environmental Engineering; Camp Dresser & McKee, Inc.; Limno-Tech, Inc.; Montgomery Watson Harza; The Kevin Olmstead Foundation; Barr Engineering; and TetraTech, Inc.