



ENVIRONMENTAL AND ECOLOGICAL ENGINEERING

EEE Research Seminar

DATE: Wednesday, February 10, 2016

TIME: 3:30 P.M.

LOCATION: Potter 234, Fu Room

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Professor of Chemical Engineering
The Ohio State University

Including Nature in Engineering for Innovation and Sustainability

ABSTRACT

Even though all human activities depend on goods and services from nature, its role is usually ignored or undervalued, resulting in ecological degradation and resource depletion. Growing interest in sustainable development has encouraged the development and use of methods such as life cycle assessment and footprint analysis, but these methods also mostly ignore the role of nature. The resulting decisions may miss opportunities of relying on nature for meeting human needs in an environmentally and economically superior manner, and cause unintended harm by increasing dependence on vulnerable or degraded ecosystems. This talk will describe the framework of techno-ecological synergy for assessing and designing synergies between technological and ecological systems. This framework compares the demand and supply of ecosystem services at multiple spatial scales to determine the extent to which systems exceed carrying capacity for each service. This encourages efforts toward harmony with nature by not only reducing environmental impact as done by existing methods, but also protecting and restoring ecosystems that provide needed services. At local scales such as a manufacturing site, TES seeks designs that treat local ecosystems such as wetlands, trees and soil as part of the manufacturing process, while at larger scales this approach seeks policies to stay within planetary boundaries. Applications demonstrate the benefits of TES over LCA and other methods for sustainability assessment, and its ability to expand the design space and discover innovative “win-win” solutions that cannot be found by conventional design approaches.

BIO

Bhavik Bakshi is a Professor of Chemical and Biomolecular Engineering at The Ohio State University. He also holds appointments in Civil, Environmental and Geodetic Engineering at OSU and as a Visiting Professor at the Indian Institute of Technology in Mumbai, India. His research is motivated by the need for a sustainable engineering that meets societal needs without degrading ecosystems. His work is developing systematic and scientifically rigorous methods for understanding the interaction between engineering and the environment and for developing decisions and designs toward sustainability. This includes methods for analyzing the life cycle of existing and emerging technologies to avoid unexpected side-effects of engineering decisions, and for designing systems that meet human needs while benefiting from synergies between technological and ecological systems. His awards include a CAREER award from the National Science Foundation, Research Excellence in Sustainable Engineering award from the American Institute of Chemical Engineers, and several best paper awards. He received his B. Chem. Eng. from the University of Bombay, and MSCEP and Ph.D. from MIT, with a minor in technology and environmental policy from MIT and Harvard.