



PURDUE
ENGINEERING

ENVIRONMENTAL AND
ECOLOGICAL ENGINEERING

EEE Research Seminar
DATE: Tuesday, February 20, 2018
TIME: 10:30 A.M.
LOCATION: Fu Room POTR 234

Dr. Joel Gerard Burken, Chair and Distinguished Curators' Professor
Missouri University of Science and Technology

Plants as Bio-sentinels: Mother Nature Assessing our Exposome

Abstract

Plants interact intimately with their environment. Although stationary, plants are masters of mass transfer and extract water, nutrients, carbon, oxygen and all that is needed to be the dominant terrestrial, multicellular biomass on earth. Plants concurrently change their environment while collecting and storing chemicals and elements from the surrounding water, air, and soil in the environment, all by harnessing the energy of the sun and wind. Fundamental breakthroughs in understanding plant-contaminant interactions have led to novel approaches that now being used in the new field of phytoforensics as well as phytoremediation. Recent breakthroughs range from analytic chemistry to fundamental organic molecule fate at the biotic/abiotic interface to using unmanned aerial vehicles to assess plant exposure and relate to human exposures.

Methods have been developed that can assess contaminants *in-planta*, offering not just screening, but long-term monitoring possibilities for solvents, hydrocarbons and also energetics such as RDX, HMX, and Perchlorate. Now we have data on contaminants in the otherwise obscured subsurface environment can be gathered to help in contaminated-site delineations that are too often costly and inaccurate, thereby improving remediation efficacy and protecting human health.

Plants can be used for a wide range of environmental applications if understood. We have just never tried to 'listen to the Mother Nature' regarding the contaminants in our environment, nor have we learned to ask Mother Nature to help fix the problems related to our chemical exposure and disease burden.

Bio

Dr. Burken received his PhD from the University of Iowa in 1996, where he conducted some of the initial research on phytoremediation. He has been at Missouri University of Science and Technology (formerly University of Missouri – Rolla) since 1997. He currently serves as Chair and Curators' Distinguished Professor of the Civil, Architectural and Environmental Engineering Department, and is a member of the US EPA Science Advisory Board. Dr. Burken has also held temporary positions at: EAWAG in Zurich Switzerland (research intern), at the National Environment Research Institute (NERI) in Denmark (visiting researcher and OECD Fellow) and at the University of Canterbury, New Zealand as an Erskine Fellow.