

September 2013  
14<sup>th</sup> Annual Soil and Water Science Research Forum

### **Technology, Stewardship, & Quality of Life: Chemicals of Emerging Concern in the Balance**

Linda S. Lee, Purdue University, Department of Agronomy

The list of contaminants of emerging concern continues to grow as analytical methods and instrumentation become more sensitive. These chemicals include those of human origin that have become an issue due to the occurrence and demands of our growing populations or those with unique properties that have led to tremendous societal benefits including extending or reducing the loss of life, and improving product durability, safety, and effectiveness. However, over time, emissions from manufacturing and use have led to the increased presence of these chemicals in the environment through direct discharges, landfills, and land application of waste-derived fertilizers. Our role as soil and water scientists includes quantifying the physical, chemical, and biological processes that control persistence, distribution, and human and ecological exposure of contaminants in the environment followed by responsibly translating this information to target audiences. For most of these chemicals of emerging concern, we have yet to clearly identify their absolute or even potential impact, thus presenting numerous technical and institutional challenges in making regulatory and risk management decisions. Absence of knowledge has led to responses ranging from no action to imposing regulations that in an unnecessary burden and cost with little benefit or lead to the development of new materials for which unintended consequences are not yet known. Product stewardship is considerably complex and requires critical life cycle thinking and collaboration across multiple disciplines. Examples of environmental fate research will be detailed for two chemical classes of emerging concern (hormones and perfluorinated compounds) and the subsequent societal, regulatory, and management implications will be discussed.

**Linda S. Lee** is Professor and Associate Head in the Agronomy Department at Purdue University; Program Head for the Ecological Sciences & Engineering Interdisciplinary Graduate Program; and a Faculty Affiliate in the Division of Environmental Ecological Engineering. She joined the faculty at Purdue University in 1993 after which she has garnered over 9.5 million dollars in funding from federal and state agencies as well as industry, published nearly 100 publications with most being in top tier environmental journals, and served as primary mentor of over 25 graduate students. She has an energetic, innovative, stimulating program of research and teaching in environmental soil chemistry grounded in fundamental concepts of chemistry with direct application to known environmental problems. Her research emphasis is on understanding the processes that govern environmental fate and remediation of contaminants for use in decision tools and management guidelines for industrial and agricultural settings. Current research involves contaminants of emerging concern including pharmaceuticals and perfluorinated compounds in soils, sediments, biosolids, streams and groundwater. She has two sons, and enjoys animals, music, the outdoors, and scuba diving.