Environmental Engineering Seminar

The Astani Department of Civil & Environmental Engineering presents

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Date: April 20th, 2021
Time: 11:00 am – 12:00 pm
Zoom link: https://usc.zoom.us/j/97228056404
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Unravelling Removal Processes for Polar Organic Contaminants in Aquatic Systems

Urbanization and water scarcity have caused growing concern for impaired water quality, presenting new challenges for water treatment systems. In particular, organic compounds that contain polar functional groups (such as pesticides, flame retardants, and munitions components) are more mobile in aquatic environments and more difficult to remove in treatment systems. Understanding the removal of these contaminants is further complicated because multiple processes may be occurring simultaneously (such as sorption, biodegradation, and abiotic degradation). Two studies will be discussed that address this overarching problem as it relates to the removal of organic contaminants from urban stormwater, and the remediation of groundwater contaminated with munitions components (i.e., explosives). Approaches utilizing novel analytical tools (high resolutions mass spectrometry, next generation sequencing, and compound specific isotope analysis), porous media contaminant transport modeling, and various experimental scales were applied to probe the underlying removal mechanisms for the contaminants of interest. Findings reveal the importance of characterizing both removal processes and transport processes when assessing contaminant fate in complex environmental systems.

About the Speaker

Dr. Ulrich grew up on the Iron Range in Virginia, MN, and her educational background includes degrees in chemical and bioengineering engineering, chemistry, and environmental engineering. Prior to joining NRRI she worked as a postdoctoral researcher at the Swiss Federal Institute for Aquatic Science and Technology (Eawag) in Zurich, Switzerland, as well as at the Colorado School of Mines.

Dr. Ulrich's group combines interdisciplinary insights from environmental engineering, analytical chemistry, microbiology, and materials science to evaluate contaminant fate and transport in aquatic systems. She specializes in developing water treatment and remediation applications that utilize black carbon sorbents for organic contaminant removal; including past work evaluating biochar for the removal of pesticides from stormwater, as well as activated carbon for the removal of perfluoralkyl substances (PFAS) from groundwater. She also works closely with the Materials and Bioeconomy group to develop biochar materials for water treatment applications, with a specific interest in evaluating biochar performance for contaminant at the field scale.

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