Department of Civil and Environmental Engineering

DISTINGUISHED SEMINAR

Molecular Tools to Provide Insights into the Fate of Organic Contaminants in Aquatic Systems

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Thursday November 14, 2019
103 Churchill Hall
12:00 PM

This seminar is free and open to the public.

ABSTRACT: Environmental engineers have long been concerned with the fate of organic contaminants in aquatic systems, including both natural systems such as lakes and engineered systems such as drinking water treatment plants. Existing fate prediction models tend to fail for so-called 'emerging' contaminants (recently quantified, unregulated contaminants with suspected toxic activity) because these contaminants undergo more complicated processes in the environment. We have been exploring how advances in molecular level characterization tools from the pharmaceutical and biochemical sciences may offer new opportunities to understand the underlying mechanisms of contaminant fate processes for contaminants with complex chemical structures. This presentation will focus on: (i) our applications of computational chemistry tools to obtain insights into the role of electron distributions in positively-charged organic contaminant binding to clays and organic matter in environmental systems, and (ii) our recent use of high-resolution mass spectrometry to probe alterations of complex organic matter following drinking water treatment processes. Insights gained from these approaches can lead to refinements of contaminant fate models and ultimately, better management of aquatic systems.

BIO: Dr. Allison MacKay is Professor and Chair of Civil, Environmental and Geodetic Engineering at Ohio State University. Her research program is directed toward the fate of contaminants in engineered and natural aquatic systems. Current project examples include developing better guidance for drinking water plant operators to manage the treatment of toxins from algae in reservoirs, and integrating advanced molecular computation tools to identify the binding mechanisms of contaminants in sediments and soils.
She currently serves on the Board of the Association of Environmental Engineering and Science Professors. Dr. MacKay holds Doctoral and Master degrees in Environmental Engineering from Massachusetts Institute of Technology. She received a Bachelor of Applied Science degree in Engineering Science (Chemical Option) from the University of Toronto.