



Department of Civil & Environmental Engineering & Earth Science

EE/ES Series

September 2, 2019

120 DeBartolo Hall 4:00 p.m.-5:00 p.m.

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Title:

Dissecting Anaerobic digester Microbiome

Abstract:

Methanogenic biological treatment or anaerobic digestion (AD) processes have been widely used to treat and stabilize excessive sludge wasted from activated sludge processes treating domestic wastewater as it can produce biogas as an alternative energy. While AD processes can effectively convert organic waste to CO₂ and CH₄, much of the microbial ecology remains unclear. Specifically, we have rather limited understanding on the acid degradation through syntrophic interaction between syntroph and methanogens. Also, we often observed many uncharacterized or uncultivated organisms without knowing their functions in AD. What are these uncharacterized organisms doing in AD (function)? Do they interact with those known syntrophs and methanogens to achieve stable AD processes (interaction)? Clearly their contribution in AD warrants further investigation. My presentation will provide insights into these fundamental questions through the use of high-throughput DNA sequencing technologies. I first share findings on how the digestion efficiency currently achieved at a Wastewater Reclamation Plant can be explained through the analysis of microbial populations in the feed and the AD. These findings further serve as a basis to investigate/compare AD microbiome across different treatment plants at different continents to better define AD microbiome. Last, I will share the summary of an ongoing investigation of AD through a large-scale metagenomics analysis.

Bio:

Dr. Liu is the Arthur C. Nauman Endowed Professor of Environmental Engineering & Science program at the Department of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign. Prior to joining UIUC in 2008, Dr. Liu served as a faculty at National Central University, Taiwan (1998-01) and at National University of Singapore (2001-08). His research focuses on "water microbiome" that describes the ecological roles of microbes in different water systems including watershed, drinking water systems, and wastewater treatment and reclamation systems. Dr. Liu has received several awards, including the Asian Young Biotechnologist Prize (2005) and the IWA-ISME Biocluster Award Grand Prize (2018). He serves a member of the editorial board for several leading journals in Environmental Microbiology such as the ISME journal by the publisher of Nature and Frontiers in Microbiology.