



Department of Civil & Environmental Engineering & Earth Science

EE/ES Series

November 11, 2019
120 DeBartolo Hall 4:00 p.m.-5:00 p.m.
Fangqiong Ling, Ph.D.
Washington University in St. Louis

Title:

Microbiome studies to improve water infrastructure surveillance and design

Abstract:

The microbiome in water supply and sewage infrastructure presents a long-overlooked source of information about both infrastructure status and human health. Advances in NextGen DNA sequencing technology have enabled rapid acquisition of tetrabytes of genomic data from water infrastructure, however, adequate methods for sampling, modelling, and data analysis are required to gain insights useful for engineering applications. Here, I will describe our studies using household water meters, a common residential water system component, as a sampling device, and using an ecological community assembly model to predict water bacterial community shifts due to everyday water stagnation. I will also discuss an effort utilizing the distribution of human-associated bacteria to estimate the number of upstream residents that contribute to a sewage sample, useful as a data normalization tool to advance smart infrastructure and sewage-based health studies. Taken together, these studies show that understanding of generalizable and system-specific determinants to bacterial communities in water will create new ways for water quality assessment and infrastructure design.

Bio:

Fangqiong Ling, Ph.D. is an assistant professor at the Department of Energy, Environmental and Chemical Engineering at Washington University in St. Louis. She leads an experimental and computational lab aimed at understanding the underlying forces shaping the diversity of microbial communities in built environments and exploring microbiome data as a tool to drive innovations in water infrastructure. Prior to joining Washington University, Dr. Ling studied in Tsinghua University and University of Illinois, Urbana-Champaign, and completed her postdoctoral training at Massachusetts Institute of Technology. Dr. Ling has won awards including Ralph E. Powe Junior Faculty Enhancement Award and the Alfred Sloan Foundation Microbiology of Built Environment Postdoctoral Fellowship.