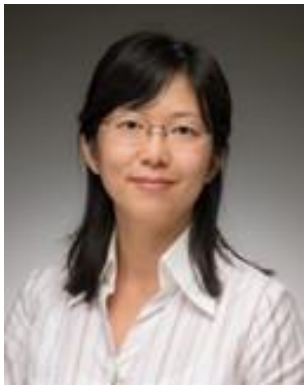
PURDUE UNIVERSITY | Environmental and Ecological Engineering

EEE Research Seminar
Date: February 18th, 2025, at 10:30AM
Location: POTR 234 (Fu Room)



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Engineering Microbes for Environmental Solutions

Abstract
The challenges of increasing environmental contamination and scarcity of natural resources necessitate innovative solutions to ensure a sustainable future. Recent advances in synthetic biology and protein engineering offer tremendous opportunities to design biological systems at the molecular level for novel functions. While synthetic biology has been mostly applied in biomedical and biomanufacturing fields, its potential for developing innovative strategies to address environmental challenges is gaining increasing attention. This talk will present our research work on leveraging synthetic and molecular biology in two areas: biocatalysis and biosensing. For biocatalysis, the discussion will focus on examples of: i) renewable biocatalysis for the efficient degradation of emerging contaminants in water reclamation and reuse, and ii) biocatalyst engineering and enzyme mining for plastic depolymerization and upcycling. For biosensing, the discussion will focus on engineering novel types whole-cell biosensors for point-of-use detection of waterborne pathogens and airborne pathogens. Underlying these research directions is the combined use of synthetic and molecular biology techniques, bioprocess and environmental engineering principles, and machine learning/AI to solve emerging environmental challenges.

Bio
Na Wei is currently an associate professor in the Department of Civil and Environmental Engineering at the University of Illinois Urbana-Champaign (UIUC). Wei is leading the Environmental Molecular and Synthetic Biology Laboratory. She received her B.S. degree in Environmental Science and Engineering from Sichuan University, China, her Ph.D. and M.S. degrees in Environmental Engineering from UIUC. She was a postdoctoral fellow in the Carl R. Woese Institute for Genomic Biology and Energy Bioscience Institute at UIUC. She received NSF CAREER award in 2017. Research in Wei's lab is focused on understanding and manipulating microbial systems at the molecular level for beneficial applications towards environmental sustainability.