香港科技大學
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

土木及環境工程學系
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

SEMINAR

UNLEASH THE POWER OF INTERFACIAL CHEMISTRY FOR POLLUTANT DETECTION AND REMEDIATION

Speaker

Prof. Wenqing Xu

Villanova University, PA

Abstract

One of the grand challenges in environmental engineering is designing a future without pollution and waste. In this talk, I will discuss my group's efforts in interfacial chemistry to develop novel adsorbents and sensors for environmental remediation and pollutant monitoring. I will first examine how surface modification of pyrogenic carbonaceous matter (PCM), including biochar and activated carbon, can enhance the retention of highly mobile contaminants. Using short- and ultrashort-chain per- and polyfluoroalkyl substances (PFAS) in stormwater as an example, we evaluate nitrogen-functionalized activated carbons and metal-incorporated biochars and demonstrate that surface functionalization improves adsorption kinetics and capacity, particularly for sulfonate-containing PFAS, while substantially delaying breakthrough in column systems. Coupled with a one-dimensional intraparticle pore diffusion model, these findings enable robust parameterization of sorbent performance and reliable prediction of full-scale filter behavior and lifetime.

I will then present our progress on a novel molecularly imprinted polymer (MIP) that is both conductive and redox-active, designed for electrochemical detection of PFAS in water. This platform achieves high selectivity and ultralow detection limits (below 1 pg L-1), offering a promising approach for rapid, field-deployable contaminant monitoring.

Biography

Dr. Wenqing Xu is a professor in the Department of Civil and Environmental Engineering at Villanova University, PA. The central focusof her research program is to better understand the various ways that nature detoxifies contaminants by the integration of chemical, biological, and material sciences approaches to (i) attenuate pollutant transport and thereby protect source water and (ii) degrade contaminants with novel materialsto provide safe drinking water. Dr. Xu has served as a principal and co-principal investigator of projects funded by the Department of Defense (DoD-SERDP), the National Science Foundation, the National Instituteof Environmental Health Sciences, and the Environmental Protection Agency on research involving the development of reactive adsorbents for pollutant abatement, such as chlorinated solvents, pesticides, munitions constituents, per- and poly-fluoroalkyl substances (PFAS), and disinfection byproducts (DBPs). She has taught undergraduate courses such as Introduction to Environmental Sciences and Engineering, Water and Wastewater Treatment, Capstone Design, and graduate coursessuch as AquaticChemistry and Physicochemical Processes. She is a recipient of various awards,including the NSF CAREER award(2018) and the University Scholarly Achievement Award (2020). She is active in several professional engineering associations and is the associate editor of the journal Environmental Engineering (ASCE). She is also an award committee member for the Franklin Institute in Philadelphia. She received her B.S. and M.S. degrees in environmental engineering from Nankai University in China (2007)and Johns Hopkins University (2009), respectively, and a Ph.D. degree in environmental engineering from Yale University (2014).

11 June 2026
Thursday

11:00am-12:00noon

Room 3574 (Lift 27/28), Civil Engineering Conference Room, HKUST

Enquiry:

Ms. Crystal Lau
cecrystal@ust.hk