November 21, 2025

Encapsulated Microorganisms for Distributed Anaerobic Wastewater Treatment

Paige Novak

Professor & Chairmen, University of Minnesota

Seminar Details

Friday, Nov 21, 2025
2:30pm – 4:00pm

UH Campus
Classroom & Business Building
Room CBB 104

Online via Teams https://www.cive.uh.edu/research/beyer-distinguished-lecture

ABSTRACT: With the challenges of climate change we must use all of our options to decrease carbon emissions. One area of current focus for environmental engineers is resource recovery from wastewater. We are studying the use of encapsulated microorganisms to accomplish this goal by providing a low-energy small footprint method to achieve resource recovery from high strength industrial wastewater. Novak will present research from her lab focused on understanding the interactions between the encapsulated biomass, the encapsulant itself, and the outside environment. Diffusion and partitioning experiments were used to understand how encapsulant chemistry can be used to modify the in-encapsulant environment. Batch and continuous flow reactors were used to monitor biomass leakage, encapsulant breakage, and community shifts. Results suggested that PEG-based encapsulants provide ease of use, control of encapsulant environment, and acceptable longevity. It was also shown that flexible and robust communities can be developed for encapsulation, taking advantage of their ability to grow and adapt within the encapsulant. Finally, modeling studies by collaborators and pilot-scale studies with real industrial wastewater show promise for facilitating the application of encapsulation technology

BIOGRAPHY: Paige Novak is a Department Head and the Joseph T. and Rose S. Ling Chair in Environmental Engineering in the Department of Civil, Environmental, and Geo- Engineering at the University of Minnesota. Novak's area of interest is the biological transformation of hazardous substances in sediment, groundwater, and wastewater, resource recovery, and particularly how engineers can influence these processes. She received her B.S. in Chemical Engineering from The University of Virginia and her M.S. and Ph.D. in Environmental Engineering from The University of Iowa. Novak was an Aldo Leopold Leadership Program Fellow in 2009 and has been the recipient of several awards, including the Sara Evans Woman Scholar/Leader Award (UMN, 2013), the Bill Boyle Educator of the Year Award (Central States Water Environment Association, 2013), the Samuel Arnold Greeley Award (American Society of Civil Engineers, 2011), and the Paul L. Busch Award (The Water Environment Research Foundation, 2007). She was named Fellow of the Water Environment Federation in 2016 and of the Association of Environmental Engineering and Science Professors in 2019. From 2013 to 2019 Novak served on the National Research Council's Standing Committee on Chemical Demilitarization. She served as the Editor in Chief of the Royal Society of Chemistry's journal Environmental Science: Water Research and Technology from 2019-2023.