Environmental and Water Resources Engineering, and Center for Water and the Environment Seminar Series Presents:

Thursday, April 24th 2025, 3:30-4:30pm, ECJ 1.324

Zoom Link: https://utexas.zoom.us/j/94105241294

Encapsulated Microorganisms for Distributed Anaerobic Wastewater Treatment

Paige Novak

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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.

Background

Dr. Paige Novak specializes in research on the biological transformation of pollutants in sediment, groundwater, and wastewater. She is particularly interested in how external environmental factors influence the biodegradation of these substances. This is of critical importance in designing and implementing biologically-based remediation systems and using microorganisms to treat wastewater efficiently. She works both in the laboratory and in the field, trying to understand the interactions between microorganisms and environmental conditions, such as electron donor type or concentration. Field work that she has been involved with has focused on implementing remediation technologies that alter environmental conditions and thereby stimulate beneficial biological activity or facilitate the enrichment, amendment, or retention of desired microorganisms.

EWRE Seminar Committee Members: Becky Cantrell, Abby Chapman, Connor Coolidge, Hiromu Koyama, and Azalea Norwood
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