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

Thursday, March 26th 2026, 3:30-4:30 pm, ECJ 1.324

Zoom Link: https://utexas.zoom.us/j/84820581097

Harnessing the power of genomics to understand antimicrobial resistance emergence in the environment

Dr. Helen Nguyen

Presentation Abstract

Antimicrobial resistance is a "silent pandemic" that poses a global threat to human and animal health, food safety and security and the environment. The emergence of resistance is accelerated by the widespread overuse of antibiotics in both clinical and agricultural settings. Yet, the emergence of resistance is almost exclusively monitored in acute hospital settings and misses the long-term and invisible evolution and spread of antibiotic resistance in agriculture and the environment. I will present recent research conducted at Illinois on using environmental surveillance to study the emergence of antimicrobial resistance. The first study will show how we used high fidelity high resolution whole genome sequencing to determine the source of multi-drug-resistant *Salmonella enterica* spreading in surface water right after Hurricane Florence in 2018. The second study is the development of CRISPR combined with next-generation sequencing to overcome the challenge of missing ARG in complex environmental samples. This novel method allows us to identify ARG of clinical importance that would be missed by regular next generation metagenomic sequencing. The third study proposes several pathways for bacteria to develop resistance based on whole genome sequencing of *E. coli* isolates collected from Champaign County. Implementable public health intervention will also be presented.

Presenter Background

Dr. Helen Nguyen is Ivan Racheff endowed professor of environmental engineering at University of Illinois. Dr. Nguyen is the recipient of the AEESP/CH2M Hill Outstanding Dissertation Award, NSF CAREER award, ASCE/EWB Sustainable Development Award, 2012, and University of Illinois College of Engineering Dean's Award for Research Excellence, University of Illinois award for Excellence in advising undergraduate students. She was also awarded a Fulbright Fellowship to Israel and two Visiting Fellowships from the Japanese Society for the Promotion of Science. She is currently a co-Editor-in-Chief for Environment International, and Editor-in-Chief of GeoHealth. She leads a research group focusing on pathogen transmission and control. Besides several projects based in the US, her group has conducted research in developing countries on human resilience to waterborne infectious disease outbreaks related to extreme natural events. She has published more than 120 peer-reviewed papers on a wide range of topics related to pathogen control and detection, the human health impact of water reuse, food safety, impacts of the extreme floods on pathogen spreading, pathogens in drinking water distribution systems, and water quality after natural disasters. She has led multiple interdisciplinary projects funded by the National Science Foundation, the Environmental Protection Agency, and the US Department of Agriculture. Her research has been featured on Washington Post , New York Times, BBC, and Bloomberg News.

Spring 2026 Seminar Committee Members: Ana Lăcău, Ella Junker, Hani Ghamkhar, Julia Barkelew, Tzu-Ann Lee
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