PURDUE UNIVERSITY | Environmental and Ecological Engineering

EEE Research Seminar
Date: March 4th, 2025, at 10:30AM
Location: POTR 234 (Fu Room)

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Maximizing Ecological Relevance in Ecotoxicology Research: A Case Study with Per- and Polyfluoroalkyl Substance (PFAS) in Aquatic Systems

Abstract
A foundational challenge in ecotoxicology is that, while our ultimate goal is often to predict long term effects of contaminants in very complex, natural environments, practical necessity often dictates that we rely on data from short term exposures conducted under simplified experimental conditions in the laboratory. As ecotoxicology and risk assessment increasingly embrace predictive toxicology paradigms, which rely heavily on high-throughput assays paired with modeling approaches, it is critical to consider if and how these approaches translate to "real world" outcomes. I will present a perspective based on my work aimed at understanding how PFAS, so called "Forever Chemicals," bioaccumulate and elicit toxicity in aquatic systems and will highlight some approaches my research group is using to explicitly incorporate complexity reflective of exposures in nature. By discussing experiments incorporating variables that complicate PFAS toxicity in the field, like exposure to complex PFAS mixtures, interactions with pathogens, and outcomes of exposure when community interactions are considered, I will highlight how underemphasis of ecological complexity reflective of the field could lead to undesirable outcomes in risk assessments. I will discuss how combining mechanistic experiments across levels of biological organization with mesocosm studies, *in situ* field experiments, and observational field studies, and modeling can be a useful approach for predicting contaminant effects "in the real world."

Bio
Tyler Hoskins is a Research Assistant Professor in the Department of Forestry and Natural Resources at Purdue. Tyler is an ecotoxicologist whose work aims to provide data to enable evidence-based decision making with respect to how chemical contamination affects environmental health. His work emphasizes combining diverse approaches across levels of biological organization and across study venues to maximize the applicability of findings to real world scenarios. His work at Purdue has primarily focused on the bioaccumulation and toxicity of per- and polyfluoroalkyl substances (PFAS) in aquatic environments. Current projects focus on effects of PFAS mixtures, PFAS effects on community interactions, PFAS precursor biotransformation, PFAS-protein interactions, and PFAS accumulation and effects in gamefish. In particular, Tyler has been focused on using constructed freshwater ponds to address these questions. Although ponds are ubiquitous habitats across the United States and can receive high contaminant loads, they are very poorly studied relative to jurisdictional wetlands like streams, lakes, rivers, and reservoirs.