



Stony Brook University

Department of Civil Engineering  
College of Engineering and Applied Sciences

## SPRING 2021 ONLINE SEMINAR SERIES

**Dr. Heather Bischel, Ph.D.**

Assistant Professor, Department of Civil & Environmental Engineering,  
University of California, Davis

**Monday, April 5<sup>th</sup>, 2:40 – 3:35 PM**

### Informing enzyme-based treatment of pesticides in agricultural drainage

#### Abstract

Cost-effective treatment strategies are needed to degrade pesticides in agricultural drainage systems. Woodchip denitrification bioreactors are a best management practice (BMP) for nitrogen removal from agricultural tile drainage. We assessed the potential for pesticide removal alongside nitrate in a field-scale woodchip bioreactor system installed in California's Central Coast region. We then designed and tested reactor operation strategies to enhance pesticide removal using bench-scale woodchip bioreactors. We disentangled adsorptive and microbial removal mechanisms for two important pesticides, imidacloprid and diuron. We are now developing novel bioaugmentation strategies to jumpstart enzymatic activity using a molecular screening workflow. Molecular docking simulations using enzyme receptors may offer an efficient means to identify and propagate beneficial enzymes, and thus microbes, with benign substrates. We applied a virtual ligand screening workflow and in vitro enzyme turnover studies to identify enzymes with the capacity to degrade target pesticides.



**ZOOM LINK:** Meeting ID: 950 6760 3617; Passcode: 426506  
<https://stonybrook.zoom.us/j/95067603617?pwd=dXQybnEprSkNITFY3WHIwYjViUG95UT09>

## **Speaker Bio**

Heather Bischel is an Assistant Professor in the Department of Civil & Environmental Engineering at the University of California, Davis working in the areas of water quality and resource-oriented sanitation. Her research aims to protect and improve environmental and human health through sustainable water and sanitation. Current research projects in her laboratory include: (1) development and implementation of rapid virus monitoring for wastewater surveillance and water reuse, (2) use of environmental proteomic approaches to assess bioaccumulation and biotransformation of PFAS and pesticides, and (3) low-cost technology development that harnesses microorganisms and insects to safely recover resources from human waste. She received a B.S. from the University of California, Berkeley, and an M.S. and Ph.D from Stanford University.