DEPARTMENT OF CHEMICAL AND ENVIRONMENTAL ENGINEERING
COLLEGE OF ENGINEERING AND APPLIED SCIENCES

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

APPLICATION DEADLINE: 03/31/2024

PROJECT TITLE: Fate of per- and polyfluoroalkyl substances: from sources to tap

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Project Description

Poly- and perfluoroalkyl substances (PFAS) are ubiquitous environmental contaminants that have been the subject of numerous and increasing numbers of investigations worldwide due to their persistence and significant adverse health effects to humans and animals. PFAS are widely referred to as “forever” chemicals and are conceivably the most challenging emerging contaminants threatening drinking water quality nowadays. PFAS molecules have a chain of linked carbon and fluorine atoms. Because the carbon-fluorine bond is one of the strongest, these chemicals do not degrade easily in the environment. Consuming potable water contaminated with PFAS is a primary exposure pathway for the community. To reduce or eliminate PFAS from entering tap water, the efficacies of different drinking water treatment technologies have been carefully examined by the scientific community. The current project aims to provide the student with an opportunity to investigate the occurrence (in Ohio River), and removal of PFAS by conventional drinking water treatment technologies including but not limited to adsorption and chemical disinfection. The student will be involved in one or more of the following tasks: PFAS treatment under environmentally relevant conditions, enrichment of PFAS from ultra-low concentration (ng/L and sub-ng/L) water (e.g., Ohio River water or groundwater from the Great Miami Buried Valley Aquifer), and analysis by advanced mass spectrometry instruments. The undergraduate student will be working in Dr. Niu’s Emerging Contaminants Lab and be jointly supervised by a doctoral student and the PI. The project represents an opportunity to learn the fate and exposure of emerging contaminants, to familiarize with the principles of water treatment, to operate drinking water treatment units on the laboratory scale, and to gain experience with advanced analytical instrumentation. The outcomes of the project could guide more efficient and systematic management of PFAS from the sources to tap.