

DEPARTMENT OF ENVIRONMENTAL AND PUBLIC HEALTH SCIENCES  
COLLEGE OF MEDICINE

FOR APPLICATION YEAR: 2025

PROJECT TITLE: Environmental and Genetic drivers of diabetes and neurodegeneration

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**Project Description**

I am a PI in the Department of Environmental and Public Health Sciences in the Environmental Genetics and Molecular Toxicology Division. I have a diverse research background, starting as a marine biologist, then progressing to a neuropathologist, and eventually an environmental toxicologist. My primary research focus is investigating the mechanisms by which the environmental toxicant arsenic increases the risk of developing diabetes and neurodegenerative diseases using cell and animal-based models of chronic arsenic exposure, with a particular emphasis on oxidative stress, autophagy, and carbohydrate metabolism. My other main research effort centers on determining how ferroptosis, an iron- and lipid peroxidation-driven mode of cell death, promotes the progression of Parkinson's disease using different models of alpha-synuclein overexpression. Our lab uses a variety of cellular and molecular biology techniques, including mammalian cell culture, western blotting to determine changes in protein expression, real time PCR assessment of mRNA levels, immunofluorescence analysis of protein localization, and CRISPR gene editing to knock out genetic targets of interest. Students in the lab can expect to get hands on training on how to perform these critical techniques, as well as how to implement proper experimental design, survey relevant scientific literature, and organize data for a scientific poster or presentation.