

DEPTS OF ELECTRICAL ENG AND COMPUTER SCIENCE, CHEMICAL ENG, AND BIOMEDICAL  
ENG

COLLEGE OF ENGINEERING AND APPLIED SCIENCE

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE students

APPLICATION DEADLINE: 02/25/2022

PROJECT TITLE: Biosensors Breakthrough - Enabling Wearable Biochemical Sensing Beyond Glucose

Jason Heikenfeld, 824 Rhodes Hall,  
heikenjc@ucmail.uc.edu, 513-884-4094

### Project Description

This project will address the bottleneck which has prevented the medical field from moving beyond sensing of glucose with enzymatic sensors. Unlike enzymatic glucose sensors, electrochemical aptamer-based sensors are rapidly adaptable to measuring other molecules in the body. However, aptamer sensors degrade rapidly in live animals (less than 6-12 hours) and must be inserted through an highly-invasive incision. The student will be paired with a Ph.D. student to develop a multi-day longevity breakthrough for aptamer sensors and demonstration of that longevity on simple minimally-invasive needle sensors like those currently used in commercial wearable glucose biosensors. This breakthrough will then accelerate adoption of biosensors beyond glucose/diabetes into fields such as cardiac, kidney, fertility, and drug concentration monitoring.

1. area of the research - electrochemical sensors.
2. research tasks the student will be performing - sensor fabrication and testing.
3. training that the mentor will provide to the UPRISE student - fabrication, experimental, data analysis, and innovation skills.
4. specific requirements, if any, that the mentor expects the student to meet - none other than excitement/ambition about solving this important problem for biosensors.