

# REPPERGER RESEARCH INTERN PROGRAM

RESEARCH PROJECT #: AFRL-RHB-26-09

## **Biosensor development for rapid and non-invasive health and performance assessment**

**PROJECT DESCRIPTION:** Microelectronic and biosensor advancements have led to sensor diagnostics flooding the market, however, their accuracy, form-factor, and the data that they provide may not be useful to the USAF/SF. These technologies include wearables like smart watches, continuous glucose meters for diabetics, environmental monitoring for chemical or biological agents, or point-of-care devices like rapid antibody tests for illnesses. This project will involve research in understanding the current technical climate of sensors/biosensors for health and human performance, determination of pathways to advance biofluid sampling and collection, aid in threat recognition, creation of unique electrode fabrication, ruggedization of technology for device fielding, and/or creation of a novel (bio)sensor for a specific human health and performance objective. Projects will build upon the reported biosensing successes and create strategies to overcome the challenges that limit their commercialization and practical use in humans.

**LEARNING OBJECTIVES:** Participate in the application of biology, chemistry and material science to produce biosensors and test their effectiveness in biofluids; Gain experience in analyzing biosensing data and quality control of biosensing devices.

**ACADEMIC LEVEL:** Undergraduate; Masters; Doctoral

**DISCIPLINES NEEDED:** Engineering, Physics, Chemistry, Biochemistry

**RESEARCH LOCATION:** Wright-Patterson Air Force Base, Dayton, Ohio

**RESEARCH MENTOR:** Trevor Tilly, Ph. D  
Environmental Engineering, University of Florida, 2020



Dr. Trevor Tilly is an aerosol scientist and Research Engineer in the Health and Performance Sensing and Assessment Core Research Area (HPSA), at the 711th Human Performance Wing, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. Dr. Tilly was a recipient of the Science, Math, and Research for Transformation (SMART) Scholarship, and is currently focused on advancing electrochemical aptamer-based sensors to wearables and field deployable health and human performance monitors.

*Photo courtesy of Air Force Research Laboratory*