

## DSU WiCCED Summer Scholars - Sensors Project

Dates of internship: June 3<sup>rd</sup>, 2019 – July 25<sup>th</sup>, 2019

Location: Delaware State University, 1200 N. DuPont Hwy, Dover, DE 19901

Number of positions available: 1-3

Faculty Mentor: Cherese Winstead

Professional Staff Mentors: TBD

**Project Topic:** Sensors

### Research Description:

Sensor research in this area will explore new approaches to developing unique sensor architectures including colorimetric sensing platforms, gold nanoparticles, and novel sensors based on polymer nanofibers. These sensors will focus on targeting nutrient concentrations and other contaminants of Delaware's waters (e.g., salinity, metals, including nutrient pollution of N and P). Several sensing platforms will be developed in this EPSCoR based upon: (1) low-cost reagent strips with a colorimetric response for simultaneous detection of phosphorus, nitrogen, and environmental contaminants. multiplex sensor; (2) multilayer substrate with immobilized functionalized gold for nitrogen, phosphorus, carbon, etc. simultaneous detection; (3) and self-assembled monolayers functionalized via chemical methods to capture and sense phosphorus, nitrogen, and other analytes, thereby tailoring light-matter interactions to amplify the sensing mechanism. These sensors will provide the basis for a future generation of ultrasensitive, high-data-rate sensors. The overall goal is to create a network of inexpensive water quality sensors to complement existing monitoring focused primarily on physical parameters such as water levels and temperature. The network will enable an early warning system to Delaware citizens and policy makers about multiscale water quality threats common to our state.

### Student Learning Objectives: Professional and Research Skills

This internship focuses on the development of the following professional and scientific skills.

Broad Professional Skills	Specific Skills
Planning and time management	Ability to set and complete specific goals of varying scope
Work independently	Independent work ethic - work independently to problem-solve
Collaborative skills	Learning to complete tasks efficiently and effectively with others
Express ideas in writing and verbally	Communicate with diverse audiences - Development of impactful poster and oral presentations. Honing ability to deliver scientific results/impacts to people of interdisciplinary background.

### Prerequisites:

At least a Sophomore (or Freshman with equivalent lab experience) ; An interest in chemistry. Please contact Tiffini Johnson ([trjohnson@desu.edu](mailto:trjohnson@desu.edu)) for specific details.

**Work Environment and Expectations:**

Laboratory environment: Science Center South, Rm 314. Hours are flexibly determined between student and mentor. Students will work part time during the fall and spring semesters, and full time during Summer Session. Students will also participate in a retreat, communications workshop and end of internship summer symposium.

**Stipend:**

\$5,000 total; \$2,500 will be paid on 6/28/19 and the final \$2,500 will be paid on 7/25/19 pending final poster completion. Both payments will be delivered via a paper check.

**Funding Source:**

National Science Foundation, Delaware EPSCoR Track I

**How to apply:** <https://ciber.desu.edu/opportunities/> or contact Ms. Tiffini Johnson at [trjohnson@desu.edu](mailto:trjohnson@desu.edu) with subject line: WICCED