

**Opportunity Title:** Student-Faculty research team-Biological Agent (simulant)

Detection

**Opportunity Reference Code:** DoD-FSR-FY20-4

**Organization** U.S. Department of Defense (DOD)

**Reference Code** DoD-FSR-FY20-4

**Application Deadline** 2/18/2020 11:59:00 PM Eastern Time Zone

**Description** The Joint Science and Technology Office for Chemical and Biological Defense (JSTO-CBD) Faculty-Student Team defense lab research for [Minority Serving Institutions \(MIs\)](#) is now accepting applications from faculty at Minority Institutions (MI) interested in participating in a 10-week summer research team experience. Faculty applications should include information for one undergraduate student who will join the research team. A separate application must be completed by the named student upon selection of the faculty.

The faculty-student team provides for faculty members of underserved academic communities to team with an undergraduate student for a summer research experience associated with real-world DoD science and technology requirements. This research experience is designed to increase and enhance faculty/student awareness of the mission space and goals of JSTO-CBD and the greater DoD research environment. Faculty and student research teams will conduct research at a [Department of Defense lab](#), normally within commuting distance of a MI. Limited housing allowance may be available for faculty/student teams not within a commuting distance to the research site.

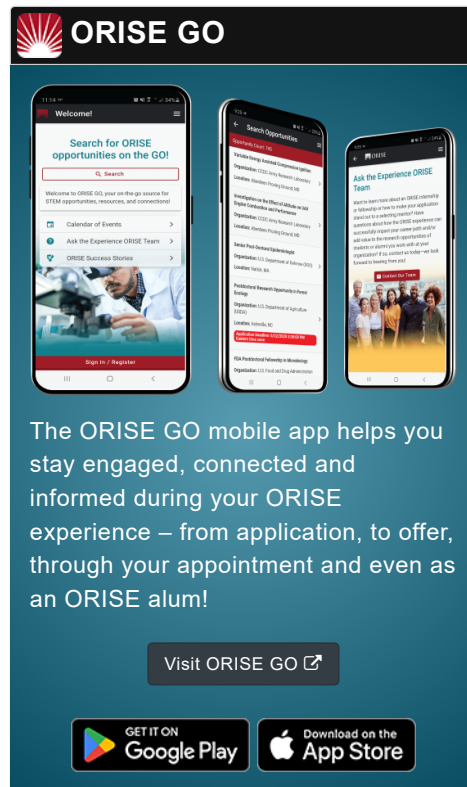
#### Participant Benefits:

- Stipend of \$1800 per week for faculty during the 10-week research experience period
- Limited Travel Reimbursement for local commuting or a housing allowance
- Students will receive a stipend of \$600 per week during the 10-week research experience period

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**Location:** Natick, MA

The current state-of-the-art and fastest detection of deleterious bio-agents relies heavily on specific target molecules (antibodies) and genetic sequencing amplification (PCR). The drawbacks to these techniques include lack of environmental stability, production cost, and insufficiently fast response time, and any of these precludes their use in dynamic field environments. Furthermore, engineering attempts to obviate some of these drawbacks encounter production limitations in terms of device fabrication standards. We are attempting to simultaneously overcome these limitations to realize a true

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fieldable bio-agent sensor by utilizing the following aspects: 1) Antimicrobial peptide (AMP) multiplexed arrays for multi-agent detection; 2) novel data science drive algorithms for fast and accurate detection; 3) self-supported curvilinear 3D printed microfluidic devices with concurrent sensing ligand depositions. We have previously demonstrated the capability of small AMP sensor arrays to discriminate bacterial lipopolysaccharides as well as the performance of 3D printed microfluidic sensor arrays. Herein the objective is to discover new sets of AMP arrays for specific bio-agent targets including viruses, Gram positive bacteria, and biotoxins. The student will be tasked with testing the binding response of existing and new AMP sequences towards select (benign) targets of interest to DTRA using both the 3D printed electrochemical sensors as well as traditional surface plasmon resonance.

Description of duties:

- Participating in research related to the development of 3D printed biological agent sensors utilizing antimicrobial peptide arrays.
- Engaging in continued knowledge and skill development while receiving mentorship to successfully solve research challenges related to biosensing using arrays of antimicrobial peptides.
- Participating in the execution, collection, processing, and analysis of sensor data.
- Participating in discussions with external collaborators; opportunities to present results.
- Under this program the participant will be exposed to a range of experimental methods and techniques which will require self-motivation, independent focus, and communication skills to contribute to the overall project goals

The candidate will work with and receive guidance from both the project lead and CDC-SC employee as well as the academic collaborators. After appropriate training, independent lab work is expected.

#### **How to Apply**

1. Faculty members submit a Faculty Application and Curriculum Vitae (CV).
2. Selected faculty will be notified and will receive an invitation to submit a Team Application.

If you have questions, send an email to **FSR@orau.org**. Please include the name of the Faculty-Student Team in the subject of your email.

**Qualifications    Eligibility Requirements**

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### Faculty Eligibility

To be eligible for this program, faculty must: The candidate should have taken general, organic, analytical chemistry, and some biochemistry with demonstrated success in the course lab sections. Experience with electrochemistry and surface plasmon resonance desired but not required. Proficiency in Microsoft Excel expected.

- Be a U.S. citizen or LPR (green card)
- Be teaching FULL time at an institution defined under [Institution Eligibility](#) (see below) as an MSI during the 2019-2020 year and plan to continue research at the same MSI during the 2020-2021 academic year.  
Be teaching an academic discipline related to a [DTRA research area](#).
- Have Ph.D. (or Master's degree, if teaching at an eligible community college) in a discipline, major, or concentration directly related to a [DTRA research area](#).
- Not be receiving compensation for faculty time during the ten week appointment period from any other federally-funded research program.
- Be able to participate in the program for ten consecutive weeks during the same period as other team members. Full-time on-site participation at the DoD lab is required.
- Have coverage under a health insurance plan before arriving at the appointment site and maintain coverage during the appointment.

### Institution Eligibility Information

Most accredited U.S. post-secondary institutions that meet the statutory criteria for identification as Minority Serving Institutions are listed at: <http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>

Institutions that meet at least one of the following criteria are eligible:

- Must be an accredited two- or four-year institution of higher education whose enrollment of a single minority or a combination of minorities exceeds 50 percent of the total enrollment (20 U.S.C 1067k(3)); or
- Must be an accredited two- or four-year Historically Black College or University under Title III Part B of the Higher Education Act of 1965, as amended (20 U.S.C. 1060 et seq.); or
- Must be an accredited two- or four-year Hispanic-Serving Institution under Title V of the Higher Education Act of 1965, as amended (20 U.S.C. 1101 et seq.); or
- Must be a Tribal College or University cited in the Equity in Educational Land Grant Status Act of 1994, the Tribally Controlled College or University Assistance Act of 1978, or

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the Navajo Community College Assistance Act of 1978; or a Native American-Serving, Nontribal Institution as defined by the Department of Education:

<http://www2.ed.gov/about/offices/list/ocr/edlite-minorityinst-list-pg9.html>; or

- Must be an Alaska Native-serving institution and eligible as such in accordance with 20 U.S.C. 1058(b) and 20 U.S.C. 1059d(b)(2); or
- Must be a Native Hawaiian-serving institution and eligible as such in accordance with 20 U.S.C. 1058(b) and 20 U.S.C. 1059d(b)(4).

#### Eligibility Requirements

- **Citizenship:** LPR or U.S. Citizen
- **Degree:** Doctoral Degree.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (12 )
  - **Communications and Graphics Design** (2 )
  - **Computer, Information, and Data Sciences** (16 )
  - **Earth and Geosciences** (21 )
  - **Engineering** (27 )
  - **Environmental and Marine Sciences** (14 )
  - **Life Health and Medical Sciences** (45 )
  - **Mathematics and Statistics** (10 )
  - **Other Non-Science & Engineering** (2 )
  - **Physics** (16 )
  - **Science & Engineering-related** (1 )
  - **Social and Behavioral Sciences** (27 )

**Affirmation** I affirm that:

- I am a United States citizen or have LPR status (green card).
- I am able to participate in the program for ten consecutive weeks during the same period as other team members. Full-time on-site participation at the assigned lab is required.
- I am a full-time faculty member at an eligible [Minority Serving Institution \(MSI\)](#) at the time of application. This also encompasses those institutions with [high Hispanic Enrollment](#) and [American Indian and Alaska Native-Serving Institutions](#).
- I will have coverage under a health insurance plan before arriving at the appointment site and maintain coverage during the appointment.