**Opportunity Title:** Augmented Reality for Environmental Management Internship
**Opportunity Reference Code:** DOE-MSIPP-18-4-LANL

**Organization** U.S. Department of Energy (DOE)

**Reference Code** DOE-MSIPP-18-4-LANL

**How to Apply** A complete application must include the following to be considered:

- Completion of all required fields in the application and successful application submission
- Undergraduate or graduate transcripts as appropriate
- Two recommendations

If you have questions, send an email to Kerri Fomby at kerri.fomby@orau.org. Please include the reference code for this opportunity in your email.

For Technical information, contact Cassandra Casperson at casperson@lanl.gov.

**Application Deadline** 1/12/2018 11:59:00 PM Eastern Time Zone

**Description** The Minority Serving Institutions Partnership Program (MSIPP) Internships is a new program to promote the education and development of the next generation workforce in critical science, engineering, technology, and math (STEM) related disciplines that complement current and future missions of DOE national laboratories. The MSIPP Internship program is designed to provide an enhanced training environment for next generation scientists and engineers by exposing them to research challenges unique to our industry.

MSIPP Interns will be given the opportunity to complete Summer Internships aligned with ongoing U.S. Department of Energy Office of Environmental Management (DOE-EM) research under the direction of a host national laboratory. The internship will be performed at the host national laboratory, utilizing their facilities and equipment under the guidance of a research staff member.

Minority Serving Institutions are institutions of higher education enrolling populations with significant percentages of undergraduate minority students.

**Project:** A primary concern for the Department of Energy - Environmental Management mission is ensuring that critical infrastructure maintains its structural integrity over the course of many years. If the structural integrity of holding tanks, pipe lines, pressure vessels or other key infrastructure is compromised the result could be the unintended release of dangerous waste or chemicals into the environment. The impact of such a release include damage to the environment, health hazards for humans, and a degradation in the public trust of the DOE. Unfortunately, to date the tools available to structural

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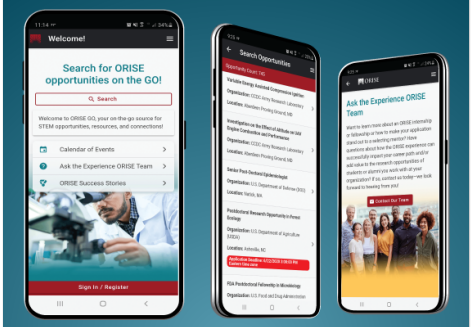

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inspectors to perform structural inspections has been very limited. In many cases inspectors are limited to using their eyes, ears, a tape measure and a hammer to perform an inspection. Notes are taken using a pad of paper and a pencil. In some cases a tablet computer might be used to take notes along with a digital camera for documentation. Unfortunately these techniques are clumsy and result in very few data points being measured and recorded. In some cases thermal imagers or ultrasonic non-destructive testing techniques might be used, but these techniques are expensive, and bulky to deploy. In this work we will focus on developing novel structural inspection tools for environmental management applications based on emerging augmented reality technology. Augmented reality technology allows for holograms to be placed in the real world. It represents an exciting new way for inspectors to both collect, interact with, visualize, and analyze inspection data. For example, modern augmented reality devices typically come equipped with a depth imager. This imager can be used to make high-resolution 3D models of critical infrastructure on-the-fly during an inspection. This data could be used to precisely track how concrete beams or steel panels are corroding. A high-resolution 3D measurement of a corroded area could be made. If measurements are made year after year, inspectors will be able to instantly overlay the measurements from the prior year to visually compare how the structure has changed. A plot can be made on-the-fly showing how the volume of corrosion has changed. Furthermore, RGB imaged can be taken all over the structure and used to compare with prior year inspections. Eventually all this data can be fed to machine learning algorithms and finite element models to provide additional insight into structural integrity. Another major advantage of augmented reality devices is that they are typically hands-free, thus providing the inspector the use of their hands to perform tap tests or to navigate difficult terrain or to even better operate while repelling off the side of a structure. Augmented reality itself could be interfaced with other sensors to not only record data, but to also overlay data from ultrasonic or thermal imagers onto the actual structure as desired in order to get a more complete picture of structural integrity. The goal of this work is to develop the first generation of augmented reality – based tools to enable the structural inspector of the future. These tools will allow for unprecedented data collection and analysis in order to ensure critical infrastructure is safe and secure for use and to ensure environmental release of waste do not occur. Furthermore, this work will directly impact the future development of smart-PPE for use across the DOE to achieve the Environmental Management mission.

**Location:** This internship will be located at Los Alamos National Laboratory.

**Salary:** Selected candidate will be compensated by either a stipend or salary, and may include one round trip domestic travel

to and from the host laboratory. Stipends and salaries will be commensurate with cost of living at the location of the host laboratory. Housing information will be provided to interns prior to arrival at the host laboratory, and will vary from lab to lab.

**Application Deadline:** January 12, 2018

**Expected Start Date:** The program is 10 weeks in duration, starting May 21, 2018. Start date is flexible based on laboratory and candidate availability.

**Qualifications**

Eligible applicants must:

- Be a citizen of the United States,
- Be at least 18 years of age**,**
- Currently enrolled as a full-time undergraduate or graduate student at an accredited Minority Serving Institution, http://orise.orau.gov/msipp/documents/approved-msi-school-list.pdf,
- Working toward a science, technology, engineering, or mathematics (STEM) degree,
- Have an undergraduate or graduate cumulative minimum Grade Point Average (GPA) of 3.0 on a 4.0 scale, and
- Pass a drug test upon selection to participate in the MSIPP

  *The process and timing for drug testing varies from lab to lab. Use of Marijuana/Cannabis or its derivatives if prescribed is legal in some states. However, having these drugs in your system is NOT legal at United States Federal Contractor sites and National Laboratories.

**Required Knowledge, Skills, Work Experience, and Education**

**Successful candidates will:**

- Be a current undergraduate or graduate student in computer science, or related field.

**Desired Knowledge, Skills, Work Experience, and Education**

**It is desirable for the candidate to have:**

- Experience using a Microsoft Hololens and the Unity Software, work with computer vision is a plus.

**Eligibility Requirements**

- **Citizenship:** U.S. Citizen Only
- **Degree:** Currently pursuing a Bachelor's Degree or Master's Degree.

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- **Overall GPA:** 3.00
- **Discipline(s):**
  - **Computer, Information, and Data Sciences** (16 👁)

**Affirmation** I certify that I am at least 18 years of age and a US citizen, and am currently enrolled as a student in a degree seeking undergraduate or graduate program in a STEM field at an accredited Minority Serving Institution (MSI).