

## 2016 Minority Serving Institutions Program

<b>University</b>	<b>Amount</b>	<b>Title</b>
California State Dominguez Hills	\$299,334.00	Probabilistic Risk Assessment of Robots Used In Nuclear Safety Applications
College of Menominee	\$120,800.64	Transforming the Fundamental Academic Framework to Support College-Ready Students
Fort Valley State University	\$196,359.31	Cooperative Developmental Energy Program"
Morgan State University	\$320,714.00	Power Plant Environmental Training Center: Predicting Environmental Induced Outages at Nuclear Power Plants
Nebraska Indian Community	\$71,077.05	Nebraska Indian Community College's Enhancement and Persistence into STEM program

## California State University Dominguez Hills

**Project Title:** Probabilistic Risk Assessment of Robots Used In Nuclear Safety Applications

**Principal Investigator:** Dr. Antonia Boadi, Ph.D., [aboadi@csudh.edu](mailto:aboadi@csudh.edu)

**Total Funding Requested:** \$499,334 over 5 years, 06/30/2015 through 06/29/2020

**Executive Summary:**

California State University, Dominguez Hills (CSUDH) supports the Nuclear Regulatory Commission's mission by developing the knowledge and skillsets of its students relevant to nuclear safety and security. The goal is to train students to integrate Probabilistic Risk Assessment (PRA) into the design of robots used in nuclear safety applications.

The use of robots, both autonomous and remotely-operated units, has broad application in the nuclear power industry. Highly specialized robots can perform maintenance and inspection tasks within nuclear plants where high radiation levels, humidity or heat create conditions that are unsafe for human workers. Concomitant with the use of robots in the nuclear energy domain is the potential for accidents, the inadvertent creation of hazards, and the possibility of low-probability, high consequence events.

The proposed project introduces students to methodologies that quantify and mitigate the risk associated with accidents and hazards through the integration of Probabilistic Risk Assessment (PRA) into the design process.

## College of Menominee Nations

**Project Title:** Transforming the Fundamental Academic Framework to Support College-Ready Students

**Principal Investigator (PI):** Jennifer Morris, [jmorris@menominee.edu](mailto:jmorris@menominee.edu)

**Total Funding Request:** \$399,959 for three years, 09/30/2014 through 09/29/2017

### **Executive Summary:**

This College of Menominee Nation (CMN) project focuses on transforming the fundamental academic framework to support both college-ready students and students who are not yet college ready. This will result in a comprehensive consolidated effort to ensure students have a cohesive and coherent support system as they move through CMN from assessment and placement through gateway course and emphasis course completion. Of particular note is the attention paid to high impact completion practices. The transformation will ultimately increase the recruitment of students into STEM programs, and their persistence through those programs.

The overall goal of this project is to expand the pool of college-ready and nearly college-ready students who enter the STEM pipeline, remain on track, and matriculate to advanced studies in STEM fields either at CMN or with our partner institutions. Through improved assessment, counseling, and placement, CMN will increase STEM degree-seeking student enrollment by 30%. STEM students will experience higher success rates (grade of "C" or higher) in gateway courses and improvement in first term GPAs. Course success will lead to a higher percentage of STEM students who maintain good standing and who are retained through their third term. This academic preparation, informed by Tribal cultural values, will enable these students to contribute to advancing the Nuclear Regulatory Commission's mission of nuclear safety, security, and environmental protection.

# Fort Valley State University

**Project Title:** Cooperative Developmental Energy Program"

**Principal Investigator:** Dr. Isaac J. Crumbly, Ph.D., [Crumblyi@fvsu.edu](mailto:Crumblyi@fvsu.edu)

**Total Funding Requested:** \$324,000 over 3 years, 05/10/2016 – 05/09/2019

## **Executive Summary:**

The Cooperative Developmental Energy Program (CDEP) of Fort Valley State University (FVSU) operates a twenty two-years dual degree STEM pipeline for underrepresented minorities and female students. CDEP's goal is to increase the number of minorities and women working in the energy industry and other STEM-dependent industries. This goal is accomplished by (1) forming partnerships with universities to offer dual degrees in STEM disciplines that are germane to the energy industry, namely, biology, chemistry, engineering, geology, geophysics, health physics, and mathematics; and (2) establishing partnerships with private sector energy companies and governmental agencies as sources of funding to support student scholarships and internships.

The dual degree programs work on a 3 + 2 five-year format. Students attend FVSU for three years and major in biology, chemistry, or math and then transfer to one of CDEP's partnering research universities the remaining two years to earn a second degree in engineering, geology, geophysics, or health physics. CDEP's partnering universities consist of Georgia Tech, Penn State University, University of Arkansas, University of Nevada at Las Vegas, University of Texas at Austin, and the University of Texas Pan American.

Currently, CDEP has 72 students enrolled in its collegiate part of the STEM pipeline. Fifty-nine students are enrolled at FVSU and thirteen are enrolled at the partnering universities. CDEP recruits from ten to fifteen academically talented students into the program each year. Students are competitively recruited by offering them full academic scholarships. Scholarships cover tuition, mandatory fees, room, meals and a book stipend. CDEP and its partnering universities have graduated 83 engineers, 31 geoscientists, and 8 health physicists for a total of 122 graduates. Of the 122 graduates, five have earned PhDs and fifteen have earned master's degrees.

# Morgan State University

**Project Title:** Power Plant Environmental Training Center: Predicting Environmental Induced Outages at Nuclear Power Plants

**Principal Investigator:** Dr. Kelton Clark., [Kelton.Clark@Morgan.edu](mailto:Kelton.Clark@Morgan.edu)

**Total Funding Requested:** \$466,114 over 3 years, 09/01/2015 through 8/31/2018

## **Executive Summary:**

Morgan State University proposes to create the Power Plant Environmental Training Center. Individuals with training in aquatic systems and nuclear plant operations expertise will staff the Center. These individuals will develop a general environmental systems training program for power plant staff and also work with individual nuclear power plants. They will provide the training to help plant operators understand the basics of aquatic ecosystem dynamics. This training will better enable them to predict certain kinds of biological events from the environmental data routinely collected. On a case-by-case basis, the staff from the Center will go to individual nuclear power plants to help identify the causes and find solutions of the plant's unique problems.

## **Background:**

Operations personnel at nuclear power plants are continually adjusting their operations to account for changing external environmental conditions. If this variability can be predicted then the operations of the plant may be adjusted to avert any significant impact to operations. These environmental state changes, which are a product of cyclic seasonal patterns, ecological processes, large weather events or more often a combination of factors, can reduce efficiencies, impact compliance and increase costs. On the environmental side we may see significant changes in dissolved oxygen, temperature, salinity or other factors critical to supporting local aquatic fauna and flora. Some of the impacts we see are massive fish kills or unexpected growth of undesired species that can impact normal plant operations. On the operational side, we can see a reduction in operation efficiency, damage to plant equipment or even an unplanned stoppage in electricity production all of which are additional costs to the plant's operations. Fortunately, some of these environmental impacts can be predicted and mitigated if someone is trained in looking for the triggers to these environmental events.

## Nebraska Indian Community College

**Project Title:** Nebraska Indian Community College's Enhancement and Persistence into STEM program

**Principal Investigator:** Hank Miller, [hmillier@thenicc.edu](mailto:hmillier@thenicc.edu)

**Collaborator:** Dr. Michael Oltrogge, President, [moltrogge@thenicc.edu](mailto:moltrogge@thenicc.edu)

**Total Funding Requested:** \$397,466 over 5 years, 09/30/2014 through 09/29/2019

**Executive Summary:**

The goal of the Nebraska Indian Community College's (NICC) Enhancement and Persistence into STEM fields is to 1) increase the number of students who take STEM related courses; 2) increase the number of students who persist to course completion; and 3) to increase the number STEM courses available. The benefit will be increased STEM capacity at NICC and increased student, both college and high school enrollment on the Santee Sioux and Omaha Reservations.