



Engaging MSI Students to Enhance Power Engineering Research and Education Towards Sustainable Energy Workforce: Sandia Laboratories' Experience

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SANDIA HAS FIVE MAJOR PROGRAM PORTFOLIOS



MSIPP Mission and Requirements

Mission:

1. *Create and foster a sustainable STEM-pipeline that prepares a diverse workforce of world class talent through strategic partnerships between Minority Serving Institutions and the DOE/NNSA Enterprise.*
2. *Execute this mission, MSIPP builds a network of NSE ready students through enrichment activities from K-20 to post-doctoral level.*
3. *Through university-lab consortia partnerships students are exposed to cutting-edge research and activities in their relevant fields.*

Requirements:

*A Consortium includes (at a minimum) two or more four-year Minority Serving Institutions and a DOE/NNSA National Laboratory, Plant, or Site. **The maximum number of university partners per topic area must not exceed 4 institutions** (one Lead college/university partner and up to a maximum of three sub-awardees) **and the maximum number of industry partners should not exceed 2-3 DOE/NNSA National Laboratories/Sites.***

DOE/NNSA MINORITY SERVING INSTITUTIONS PROGRAMS

Fostering a sustainable STEM-pipeline that prepares a diverse workforce of world class talent

- Strategic partnerships between MSIs and the DOE/NNSA Enterprise.
 - Minority Serving Institutions Partnership Program (MSIPP)
 - Minority Serving Institution Internship Program (MSIIP)
 - MSIPP Tribal Education Partnership Program (TEPP)
- Strengthen and expand MSI STEM capacity and research experience in NNSA/DOE mission areas of interest.
- Grow the number of minority students who graduate with STEM degrees.
- Grow the number of minority graduates and post-doctoral students hired in to DOE/NNSA's STEM workforce.
- Through university-lab consortia partnerships, students are exposed to cutting-edge research and activities in their relevant fields.
- Network of national security enterprise (NSE)-ready students through enrichment activities from K-20 to post-doctoral level to prepare NNSA's next-generation technical workforce.



MSIPP
MSIIP
TEPP

MSI intern programs with NNSA

MSIPP/TEPP and MSIIP are both managed and funded by the Learning and Career Management organization at NNSA

MSIIP Goals and Objectives:

1. offers talented **undergraduate and graduate students** of many disciplines (policy, business, STEM etc.) internship positions within the Nuclear Security Enterprise (NSE).
2. **Internships** include student stipends, housing and commuting stipend supplements, and inbound/outbound transportation allowance.
3. **Students** receive an intensive one-year or 12-week assignment to "jump-start" their careers and develop their potential for future opportunities within the federal government.
4. **Students** will be mentored by leading scientists, engineers, and other top professionals to develop professional skills and enhance leadership capabilities.
5. **Student application** based

MSIPP/TEPP Goals and Objectives:

1. Strengthen the research and education capabilities of **Minority Serving Institutions** in NSE related topic areas.
2. Encourage underrepresented minority students to excel in science, technology, engineering, and math by providing them with practical experience and training through applicable research projects capacity building and experiential learning.
3. Enlarge the scientific and technical knowledge and resource base in the topic areas at **Minority Serving Institutions**.
4. Funding Opportunity Announcement is released and is led by **institution**



Starting a MSIPP

PROPOSAL PHASE

DECEMBER- FEBRUARY

AWARD PHASE

Summer

EXECUTION PHASE

TYPICALLY STARTS IN NEW FY



Interested PIs explore opportunities and submit Letters of Collaboration to lead university to be attached to DOE/NNSA Proposal

Points of Contact: Academic Programs Office & Integrated Partnerships Office



Proposals are reviewed and PIs are notified of negotiation awards

Points of Contact: Academic Programs & Integrated Partnerships Office



Funding Arrives, Project begins and funding is distributed

Points of Contact: Academic Programs Office, Student Intern Programs & NDPMO

Sandia MSIPP Participation: Past/Inactive Consortia

1. **CECOR**: The Consortium Enabling Cybersecurity Opportunities & Research (formerly known as the [Whitehouse Cyber Initiative](#))

Norfolk State University

Clark Atlanta University

Paine College

Bowie State University

*North Carolina A&T State University

Allen University

Benedict College

Claflin University

Denmark Technical College

Morris College

South Carolina State University

Voorhees College

Charleston County School District

University of the Virgin Islands

Lawrence Livermore National Laboratory

2. **CIESESE**: Consortium for Integrating Energy Systems in Engineering and Science Education

Universidad Ana G. Mendez

University of Texas El Paso

University New Mexico

University Puerto Rico Mayaguez

Miami Dade College

National Energy Technology Laboratory

3. **AMNI**: Advanced Manufacturing Network Initiative

Navajo Technical University

Bay Mills Community College (BMCC)

Cankdeska Cikana Community College(CCCC)

Salish Kooteani College (SKC)

Turtle Mountain Community College

United Tribes Technical College

"CECOR's main focus is to establish a world-class workforce development, education and research program that combines the strengths of Historically Black Colleges and Universities (HBCUs) and Sandia Labs to develop a K-20 pathway for students to participate in cybersecurity and other STEM fields. CIESESE provides opportunities for students from Hispanic Serving Institutions (HSI) to pursue studies and careers in energy systems R&D. AMNI's goal is to establish a network of Tribal Colleges and Universities (TCUs) with essential advanced manufacturing facilities, associated training and education programs, and private and federal agency partnerships to both prepare a workforce and create economic and employment opportunities within tribal communities through design and manufacture of high quality parts."

Sandia MSIIP Participation: Current/Active Consortia

- 1. CREPES:** Consortium for Research and Education in Power and Energy Systems
Florida International University
University of Texas El Paso
Alabama A&M University
- 2. STEP2NL:** Successful Training and Effective Pipelines to National Laboratories
New Mexico State University
University of New Mexico
Central New Mexico College
- 3. CHRES:** Consortium for Hybrid Resilient Energy Systems
Universidad Ana G. Mendez
University of Texas El Paso
University New Mexico
University Puerto Rico Mayaguez
- 4. CONCISE:** Consortium on National Critical Infrastructure Security
University of Texas San Antonio
North Carolina A&T State University
University of Nevada Las Vegas
Savannah State University
- 5. GSC:** Growing Stems Consortium
Texas Tech University
New Mexico Institute of Mining and Technology
Amarillo College
- 6. NSAM-ML:** Nuclear Security Advanced Manufacturing Enhanced by Machine Learning
North Carolina Central University
Southern University at Baton Rouge
Elizabeth City State University
- 7. TCU:** Tribal Colleges and University Consortiums
ASPIRE: Advanced Synergistic Program for Indigenous Research in Engineering
Turtle Mountain Community College
United Tribes Technical College
PAMER: Partnership for Advanced Manufacturing Education and Research
Navajo Technical University
Nebraska Indian Community College
University of Texas El-Paso
Southwestern Indian Polytechnic Institute
IMPACT: Indigenous Mutual Partnership to Advanced Cybersecurity Technology

Sandia Newest Participation

8. Grand CARES: The Rio Grande Consortium for Advanced Research on Exascale Simulation

University of New Mexico

University of Texas at El Paso

New Mexico State University

New Mexico Institute of Mining and Technology

9. TCU ENRGE: Enabling Native Researchers and Graduate Education Systems

Navajo Tech University

10. E3C: Consortium for Education and Research in Electronics for Extreme Environments

University of Texas El Paso

North Carolina A&T State University

University of New Mexico

11. UC-Sandia Partnership: Microelectronics & Materials Engineering Education for Nuclear and Cyber Security

University of California Riverside

12. Consortium on Sensing: Energy-efficient Electronics and Photonics with 2D Materials and Integrated Systems for Training the Next-Generation DOE-NNSA STEM Workforce

University of North Texas

University of Texas at Arlington,

University of Arkansas at Pine Bluff

ANL

13. MATE: MSIPP Gulf Coast A&M Consortium: Materials-At-The-Extreme-Material Science for Extreme Environment

Florida A&M University

Prairie View A&M University

LANL

FY23 Start
Date

Tribal Colleges and Universities (TCU) Summer Camps, Sandia Tours, & SME Lectures



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Consortium for Research and Education in Power and Energy Systems (CREPES)

- Establish a pipeline of diverse qualified students in Power and Energy Systems from Hispanic-Serving Institutions (HIS) and Historical Black Colleges and Universities (HBCU)
- Sandia to hire ~11 funded MSIPP interns each summer for three years (2022-2024) from three specific universities, paid mostly by the CREPES program

- **Our team:**

- *University Partners:*
 - ***Florida International University (FIU) Lead***
 - ***University of Texas at El Paso (UTEP)***
 - ***Alabama A&M University (AAMU)***
- *DOE/NNSA partners:*
 - ***Sandia National Laboratories***
 - ***Lawrence Livermore National Laboratory***



FIU held the first annual workshop

Consortium for Research and Education in Power and Energy Systems (CREPES)

- **Opportunities for the Students**

- Mentorship (partnered with at least one staff member)
- Hands on R&D experience
- Hands on Laboratory experience
- Tours of state of the art facilities
- Seminar invites to Subject Matter Experts distinguished talks



Sandia
National
Laboratories



Lawrence Livermore
National Laboratory

- **Success Stories**

- 19 interns hired so far (projected 30 by end of program)
- 4 interns converted to year-round internships
- 2 interns accepted to very competitive programs to have Sandia pay for their Masters degrees
- 2 interns hired as full time staff.

Year	Undergrad Interns	Graduate Interns	Converted to Year-round Interns	Converted to Staff
Summer 2022	8	2	2	2
Summer 2023	5	4	2	
Summer 2024 Projected	8	3		

Academic Programs

Stimulate innovation through strategic academic relationships while growing the talent pipeline and increasing workforce development opportunities to help the line accomplish their mission objectives.

Diversity Partnerships
Coordinating Sandia's engagements with DOE's Minority Serving Institutions (MSI) Programs.



Postdoctoral Program Office

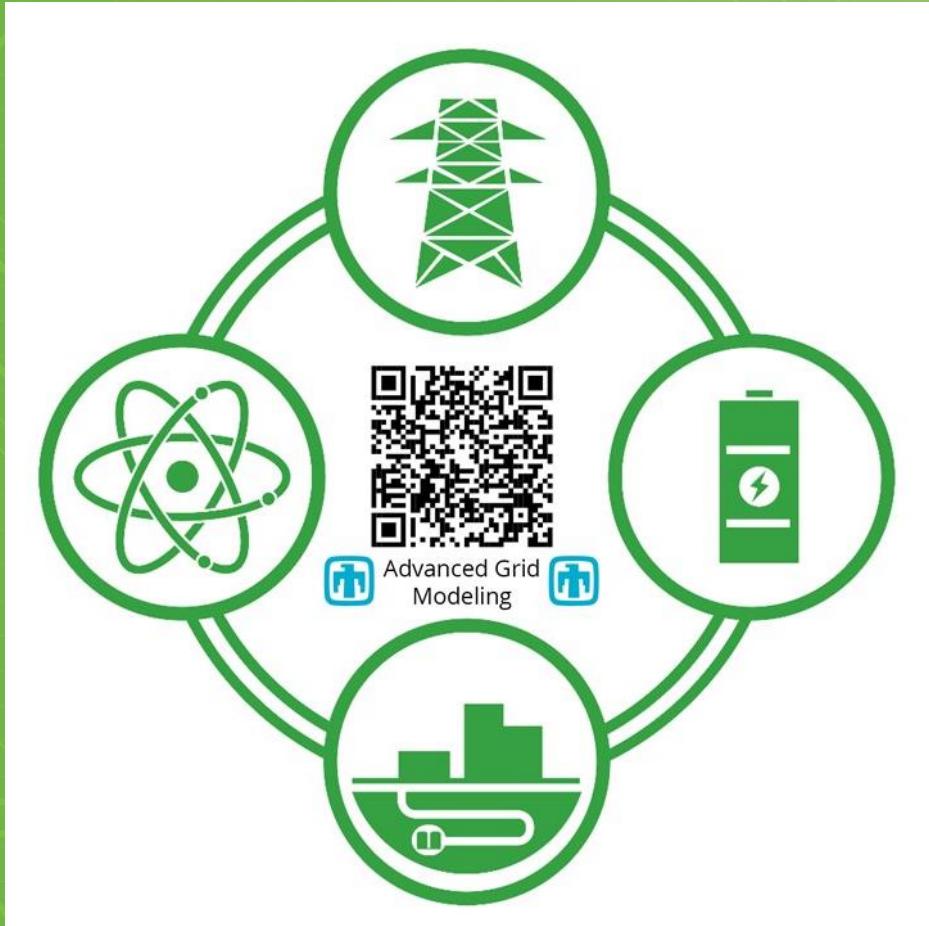
Ensuring Sandia and its postdoctoral researchers obtain the highest level of benefit from the Postdoctoral Program.

University Partnerships Network

Advancing capabilities and enhancing workforce development, attraction, and retention through our academic partnerships.

Faculty Loan Program

Enhancing workforce development, attraction, and retention through the Faculty Loan Program.



Thank you

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