

**Minority University Research and Education Programs (MUREP)  
MUREP for American Indian and Alaskan Native STEM  
Engagement (MAIANSE)  
Fiscal Year 2015 Annual Report**

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## **Activity Description**

NASA provides financial assistance (grants and cooperative agreements) to the Nation's Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Asian American and Native American Pacific Islander-Serving Institutions (AANAPISIs), Tribal Colleges and Universities (TCUs), American Indian and Alaskan Native Serving Institutions (AIANSIs), Predominantly Black Institutions (PBIs) and eligible community colleges. The Administration recognizes the valuable role that these institutions play in educating our citizens, as reflected in the five Minority-Serving Institutions (MSI) focused Executive Orders signed by the President.

NASA's Minority University Research and Education Activity (MUREP) investments enhance the research, academic, and technology capabilities of MSIs through multi-year awards. Awards assist faculty and students in research and provide authentic STEM engagement related to NASA missions. These competitive awards provide NASA specific knowledge and skills to learners who have been historically underrepresented and underserved in STEM. MUREP investments also assist NASA in meeting the goal of a diverse workforce through student participation in internships, scholarships, and fellowships at NASA Centers and JPL.

In FY14 NASA selected three (3) TCUs for awards via the Tribal College and University - Experiential Learning Opportunity (TCU-ELO). TCU-ELO was consolidated into MUREP for American Indian Alaskan Native STEM Engagement (MAIANSE) and subsequently was established to utilize NASA's unique contributions in collaboration with TCUs and tribal-serving institutions to improve the overall quality of the Nation's STEM (Science, Technology, Engineering and Mathematics) education. This project seeks to expand NASA-related education and research activities between NASA and tribal colleges and universities to increase access to NASA's unique science and exploration assets and data in the creation of experiential learning opportunities for students, faculty and staff; and high school students who are likely to matriculate to TCUs.

In FY15 MAIANSE is comprised not only of the competed awards, which totaled approximately \$810.8K during the year, but also reflected the oversight of MUREP funded TCU activities across the agency. MUREP funding of TCUs amounted to \$2.02M and represented approximately 80% of the overall NASA investment in TCUs for FY2015 being \$2.53M

## **Activity Goals**

The goals of MAIANSE are to utilize NASA's unique contributions in collaboration with tribal colleges and universities and tribal-serving institutions to improve the overall quality of the Nation's Science, Technology, Engineering and Mathematics (STEM) education.

To achieve these goals, MAIANSE seeks to:

- Increase the capacity to connect research to science, pre-engineering, and mathematics offerings through designed integration of math-science curricula in STEM
- Increase the number of students choosing STEM majors upon enrollment in the Tribal College.
- Increase the number of students choosing STEM majors and continuing in those majors upon matriculation to four-year colleges.
- Increase learners' involvement and interest in STEM, educate them on the value of STEM in their lives, and positively influence the perception of their ability to participate in STEM
- Strengthen efforts to attract and retain increased numbers of students in NASA STEM programs
- Increased student enrollment in STEM based classes.

### **Activity Benefit to FY2015 Performance Goals:**

#### **2.4.2: Continue to support STEM educators through the delivery of NASA education content and engagement in educator professional development opportunities.**

The MAIANSE project contributed to this goal by aiding High School and Undergraduate educators in the dissemination of STEM content in the classroom via pre-engineering coursework, while sharing about NASA's missions and unique assets.

By introducing STEM based curriculum in neighboring high schools to the TCU awardees, there is a greater likelihood of an "increased number of students choosing STEM majors upon enrollment in the tribal college". We hope to have better data upon the high school graduation(s) of students that participated in the MAIANSE efforts from 2015-2017.

With more than 54 high school students at Bernalillo HS selecting the new STEM curriculum implemented by SIPI, there was definitely a significant increase (in) learners' involvement and interest in STEM, designed to educate them on the value of STEM in their lives and positively influence the perception of their ability to participate in STEM. Equally exciting was the fact that summer 2015 enrollment in CADD and Engineering courses increased almost 20% per the Fall SIPI Quarterly report. This shows success in "strengthening efforts to attract and retain increased numbers of students in NASA STEM programs."

#### **2.4.5: Continue to provide opportunities for learners to engage in STEM education engagement activities that capitalize on NASA unique assets and content.**

The MAIANSE engaged students in experiential learning opportunities, where they could develop a greater understanding of what STEM looked like in their own communities. Summer

intern/externships allowed for an increase in the number of TCU and AI/AN students exposed to STEM activities.

The RockOn! workshop referenced below details how tribal college students were able to learn about rocketry in addition to gain real world experience in team building, project management and getting a payload to launch.

## **Activity FY 2015 Accomplishments**

MAIANSE sought to contribute to the Agency's efforts in broadening participation of underrepresented groups in STEM. This was accomplished through attracting and retaining tribal college students. MAIANSE programs provided mentoring support, academic development and enhancements, social and professional networks and have helped students to complete undergraduate degrees.

Activity accomplishments are representative of events that took place during the 2015 fiscal year. These accomplishments are reflected in the following highlights:

NASA MAIANSE provided support for the *American Indian Alaska Native Climate Change Working Group* (AIANCCWG). In mid-March, the group held its 17th meeting at SIPI in conjunction with the 2015 AIHEC Student Conference. This activity was organized by **Haskell Indian Nations University** as part of their recent MUREP award. More than 80 persons attended the event at the local TCU, Southwestern Indian Polytechnic Institute (SIPI) – another MAIANSE awardee. Participants discussed Earth science education at TCUs (and majority universities with high native student populations), and they discussed how climate change is impacting the communities these institutions serve. Students presented posters to discuss environmental science research that was of significance to their tribe.

NASA sponsored/participated in the *TCU Engineering Working Group* meeting, which was hosted by **Southwestern Indian Polytechnic Institute** (SIPI) – a MAIANSE awardee. The 12 member initiative of Native American higher education institutions has a mission to work together to provide all qualified and interested Native American students an opportunity to progress from any necessary pre-college preparation through an accredited pre-engineering, engineering technology, or baccalaureate engineering degree either within the TCU system or by preparing the student to transfer successfully to a partner mainstream institution.

**Chief Dull Knife College** (CDKC) in Lama Deer, Montana sent 24 students and faculty to NASA's Wallops Flight Facility in Wallops Island, Virginia, to participate in the RockOn! workshop. The teams assembled circuit boards, coded software, and created payloads for sounding rockets. The experience not only increased the self-esteem and confidence of students but staff as well. CDKC, in collaboration with NASA, is working to develop its first pre-engineering program. (<https://www.nasa.gov/press-release/nasa-hosts-rocket-week-at-wallops-flight-facility-0>).

In order to be more effective in the Native American community, NASA enhanced its engagement with AI/AN Advocacy groups by supporting the STEM conferences that specifically address the needs of this community. Two such organizations are Society for the Advancement of Chicanos/Latinos, Native Americans in Science (SACNAS) and the American Indian Science and Engineering Society (AISES). During the 2014 SACNAS Conference in Los Angeles, CA, NASA interacted with over 108 students and sponsored the Community College Day event. While in Orlando, FL, NASA sponsored a guided tour of the Kennedy Space Center (KSC) for 50 Native American students participating in the 2014 AISES Conference. AISES and NASA also partnered on a grant that aided TCU students with mentorship and leadership development by connecting several students with Native American students matriculating at four-year institutions.

### **Activity Contributions to FY 2015 Annual Performance Indicators**

MUREP Activities seek to contribute to the overall NASA Education Annual Performance Indicators (APIs). MAIANSE efforts address the following APIs:

*ED-15-1: Provide significant, direct student awards in higher education to (1) students across all institutional categories and types (as defined by the U.S. Department of Education); (2) racially or ethnically underrepresented students, (3) women, and (4) persons with disabilities at percentages that meet or exceed the national percentages for these populations, as determined by the most recent, publicly available data from the U.S. Department of Education's National Center for Education Statistics for a minimum of two of the four categories..*

MAIANSE provided significant, direct, student awards to 28 underrepresented and underserved students, including women and girls, and persons with disabilities while impacting over 97 students participating in its STEM Engagement activities focused on higher education. Based on the nature of the MAIANSE activity and its focus on students and faculty attending tribal colleges and university, NASA MAIANSE reached over 99% participation of underserved and underrepresented students in FY2015 as well as achieving over 41% participation from women.

*ED-15-2: Engage with at least 80,000 educators in NASA-supported professional development, research, and internships that use NASA-unique STEM content.*

MAIANSE continued to engage educators in the great work of utilization of NASA content and resources through the various means of STEM engagement with 26 faculty & administrative staff participating in FY2015.

## **Activity FY 2015 Improvements (e.g., activity management, cost efficiencies) made in the past year**

There was an increased focus on better and more frequent communication within the TCU community. There was a concerted effort to begin regular dialogue with awarded TCUs as well as those TCUs geographically near them. In addition, newspaper articles and increased enrollment in STEM coursework for students participating in projects were implemented. Held in conjunction with other NASA funded PIs, student presentations are held in other forums/venues.

All of the awarded TCUs agreed that better engagement was necessary with their high school faculty colleagues, in order to better implement their respective projects successfully. By fostering stronger communication with the faculty, it was felt that implementing curriculum enhancements during the school year would go much smoother and have greater participation from the high schools. Quarterly meetings were instituted to allow for adjustments and revisions when necessary. Successes were more easily charted as well as mitigating problem areas more quickly.

In order to be more efficient with travel dollars, visits to some TCUs were co-joined to conference events. While increasing the length of travel, the number of individual trips decreased. This ultimately allowed engagement with more TCU campuses throughout the fiscal year.

## **Activity Partners and their Roles in Activity Execution**

The following partners were instrumental in activity execution: The Indigenous Peoples' Climate Change Working Group (IPCCWG), The Tribal College and University Engineering Initiative/Working Group, American Indian Higher Education Consortium (AIHEC), American Indian Science and Engineering Society (AISES), Society for the Advancement of Chicanos/Latinos and Native Americans in Science (SACNAS). The groups, as shown throughout the report, found ways to partner/collaborate or engage with NASA by way of innovative activities and events.

Other STEM Federal partners, such as USGS, Department of Energy, and the National Science Foundation continued to collaborate through a working group designed to address Science Technology Engineering and Math (STEM) in Indian Country, as well as finding ways to share best practices across the federal government when working with American Indian Alaskan Native (AI/AN) communities.