AISES, Supporting Native STEM Researchers

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AISES is a national, nonprofit organization founded in 1977 by a small group of American Indian scientists and engineers.  

• Only organization specifically supporting Native students and professionals in science, technology, engineering, and mathematics (STEM) fields.
The mission of AISES is to substantially increasing the representation of American Indians, Alaska Natives, Native Hawaiians, Pacific Islanders, First Nations, and other indigenous peoples of North America in science, technology, engineering and math (STEM) studies and careers.
A multitude of challenges face Native American students, resulting in lower performance in mathematics and reading between Native and non-Native students.

National Assessment of Educational Progress (NAEP), National Indian Education Study data:
• Native students typically do not have access to the full range of math and science courses available at the high school level.
• Only 1 in 4 Native students who take the American College Test (ACT) score at the college ready level in math.
• 37% of AI/AN students do not receive high school level Algebra.
• Only 5% of AI/AN students take calculus, a strong indicator of success and persistence in engineering at the college level.
Starting Early: AISES Pre-College Programs

- National American Indian Virtual Science and Engineering Fair
- Energy Challenge
- Power Up Workshops
NAIVSEF

- Society for Science and the Public (SPP) affiliated fair and part of the SSP fair network
- Virtual fair
- Winner sent to the Intel International Science and Engineering Fair
- Registration and competition begins in late January
  - Senior Division: High School
  - Junior Division: Grades 5-8
Student Research Projects:

• Anna Quinlan – Cherokee Nation of Oklahoma
  - A Ketone Detecting Patch to Detect Type I Diabetes
  - 9th grade

• Tyra Nicolay - Navajo
  - Field Testing and Water Quality Analysis of the Navajo Nation and San Juan County Rivers: Before, During and After the Gold King Mine Spill
  - 11th grade
Energy Challenge

Grant from the Office of the Assistant Secretary of Indian Affairs, Indian Energy and Economic Development, Division of Energy and Mineral Development

Program:

• Energy focused science/engineering fair
• Energy related project
• Virtual competition
• Grand Prize: trip to Washington DC to present to the Assistant Secretary
Student Research Projects

• Holly Ka’apu – Native Hawaiian
  - Use of Peltier Energy Harvesting as an Alternative Energy Source on the Hawaiian Islands
  - 12th grade

• Katelyn Meylor – Cherokee and Osage
  - An Integrated Device for Monitoring Water Quality of Streams Used for Hydroelectric Power
  - 11th grade
College & STEM Statistics

• Only 39% of AI/AN students complete bachelor’s degrees compared to 62% of white students

• 66.7% of white freshmen intended to major in S&E fields compared to only 2.5% of AI/AN students

• In 2012, only 3,445 S&E degrees awarded to AI/AN whereas 338,461 S&E degrees were awarded to white students

National Science Foundation (2012 & 2013)
College Programs:

• Scholarships

• AISES National Conference and Leadership Summit
  - Leadership and Professional Development

• Research Opportunities

• College Chapters

• Special Projects
Lighting the Pathway to Faculty Careers for Natives in STEM

Break cycle of underrepresentation:

• 0.4% of graduate students in S&E fields are AI/AN (NSF 2013)
• Only 103 of 33,000 (0.3%) doctoral degrees awarded to AI/ANs in S&E fields in 2010 (NSF 2013)
• In 2007 only 38 AI/ANs were tenured or tenure track faculty at the top 100 research institutions (Nelson et al 2007)
Goal: to increase the number of AI/AN faculty members in STEM disciplines through the establishment of programs and best practices to guide and assist students at each academic and career stage, helping them to succeed and advance to the next stage.
Objectives:
1) Student persistence and degree attainment
2) Develop student qualifications (e.g., research experience, portfolio building)
3) Student advancement to the next academic/career rank
4) Increase understanding of academic careers
5) Integration of Native culture and traditions within an academic STEM career
6) Increase the number of AI/ANs in STEM faculty positions in the long-term
7) Publish results of an externally-conducted evaluation to assess the value of this experience for the Scholars and its impact on their academic and professional paths
Cohorts 1 and 2:
• 50 undergraduate and graduate students and post-doctoral fellows
• All identify as American Indian, Alaska Native, or Native Hawaiian
• Colleges and universities across the country
• Ages 19 to 42
• Traditional and non-traditional students
• All identify as in a STEM field, not including health science
Program Methods:

• **Mentorship**: participants are matched by field of interest with tenured, Native faculty members (25 mentors)

• **Community Building and Networking** → Collaboration

• Professional Development, Skill Building

• Travel Assistance

• Stipend
Over 73% of the scholars are highly satisfied with their mentors.

There is high and growing intention to pursue a STEM career.

Most program components were ranked high when scholars began and have stayed stable.

The more students endorsed scientific community values upon entering the program, the stronger their intentions were to pursue a STEM related career 6 months later.

The vast majority of scholars report high to moderate satisfaction with their mentor (80% of 2015 cohort and 62% of 2014 Cohort).

Scholars report strong and relatively stable intentions to pursue a STEM career.

Most program components decreased in importance (research experience & working w/ faculty) while financial support increased.

The more students endorsed scientific community values upon entry into the program, the stronger their intentions were to pursue a STEM related career at year 2.
Why is this important? Why STEM?

The U.S. is losing its competitive edge
- The U.S. is ranked 48th among 40 countries and regions, based on 16 indicators of innovation and competitiveness.
- The prestigious World Economic Forum ranks the U.S. as No. 48 in quality of math and science education.

STEM is where the jobs are
- STEM employment is expected to grow 17% between 2008 and 2018, faster than the 10% growth projected for overall employment.

60% of new jobs
- 60% of the new jobs that will open in the 21st century will require skills possessed by only 20% of the current workforce.
- The U.S. may be short as many as 3 million high-skilld workers by 2018.
- Worldwide, the United States ranks 17th in the number of science degrees it awards.

STEM workers earn higher salaries
- College graduates overall make 84% more over a lifetime than those with only high school diplomas.
- The average wage for all STEM occupations is $85,570, nearly double the average for all occupations ($47,230).

84% $87,570
STEM degrees and research → STEM Infrastructure:

• Fundamental to proactive management of tribal land and resources
  • For example, an estimated 25% of all US energy related natural resources are on tribal land

• Economic success

• Health

• Culture and language preservation
  • Plant/medicine knowledge
  • TEK

• Within community resources