Accomplishments

* What are the major goals of the project?
The major goal of this project is to increase the representation of American Indians, Alaskan Natives, and Native Hawaiians in STEM faculty positions across the country. Key objectives of the project include: 1) achieve student persistence in STEM degree programs and high rates of degree attainment; 2) assist Scholars to develop a strong set of qualifications (e.g., research experience, portfolio building) to advance to the next level; 3) achieve high rates of student advancement to the next academic/career rank; 4) increase Scholars’ understanding of academic careers (e.g., what is required to become and to succeed as a professor in a STEM field); 5) increase Scholars’ understanding of the 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; and 7) by the end of the fifth year, publish results of an externally-conducted evaluation of this pilot to assess the value of this experience for the Scholars and its impact on their academic and professional paths. These findings will serve as a guide for future, expanded-scale projects and will also inform application to other underrepresented groups.

* What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?

**Major Activities:**

We conducted twelve professional development webinars. Three webinars focused directly on NSF opportunities including GRFP, DDIG, Post Doctoral Fellowships, and REUs. Two webinars introduced the cohort two mentors, providing the Lighting the Pathway (LTP) scholars with the opportunity to engage with faculty and learn about their experiences on the academic career track. Two webinars discussed various scholarship, fellowship, and internship opportunities outside the NSF. One webinar focused on developing high quality personal statements for all levels of applicants. Two webinars focused on the faculty interview process and details of faculty life. The last webinar on July 14, 2016 will cover tips and tricks for writing scientific journal articles. All of the webinars focused on increasing awareness of the requirements and skills necessary to be competitive at various levels of the academic career path.

We held two in-person events, the AISES National Conference and the AISES Leadership Summit. At both of these events the Program Director conducted programming specifically for the scholars and faculty mentors in the LTP program. In-person event activities included: 1) networking with faculty mentors, peers, and other scholars; 2) informational talks on funding, fellowships, and research opportunities; 3) career exploration; 4) academic career track guidance; and 5) cultural activities and discussions about Native identity and STEM research and careers.

Monthly mentor-mentee meetings are a major activity of this program. These meetings help the students to persist in their degree programs, complete degrees, and advance to the next level, while increasing understanding of academic careers, and integrating native culture and traditions within an academic STEM career.

**Specific Objectives:**

Key objectives of the project include: 1) achieve student persistence in STEM degree programs and high rates of degree attainment; 2) assist Scholars to develop a strong set of qualifications (e.g., research experience, portfolio building) to advance to the next level; 3) achieve high rates of student advancement to the next academic/career rank; 4) increase Scholars’ understanding of academic careers (e.g., what is required to become and to succeed as a professor in a STEM field); 5) increase Scholars’ understanding of the 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; and 7) by the end of the fifth year, publish results of an externally-conducted evaluation of this pilot to assess the value of this experience for the Scholars and its impact on their academic and professional paths. These findings will serve as a guide for future, expanded-scale projects and will also inform application to other underrepresented groups.

**Significant Results:**

Based on surveys conducted by the project’s independent evaluator the following are some significant results from the second year of this project:

1) The vast majority of scholars report high to moderate satisfaction with their mentor (80% of 2015 cohort and 62% of the 2014 cohort);
2) Scholars report strong and relatively stable intentions to pursue a STEM career;

3) Most program components decreased in importance (research experience & working with faculty) while financial support increased; and

4) 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.

In terms of predicting persistence, the data shows two interesting relationships:

1. The more students endorsed scientific community values at baseline, the stronger their intentions were to pursue a STEM related career at 18 months for the 2014 Cohort ($r=.45$, $p<.05$) and 6 months for the 2015 Cohort ($r=.62$, $p<.01$).

2. For science students, higher reported Scientific Identity, the more strongly students were to have an intention to pursue a STEM related career for the 2014 Cohort ($r=.76$, $p<.01$) and the 2015 Cohort ($r=.68$, $p<.01$).

The following relationship analysis is from the longitudinal data for the 2014 Cohort from the Fall 2014 to Spring 2016.

- Quality of mentorship seems to be related to current intentions to pursue science careers. Scholars reports of experiencing more satisfactory quality of mentorship is significantly related to endorsement of the values of the scientific community ($r=.53$, $p<.01$) which is in turn positively related to intentions to persist ($r=.45$, $p<.05$).

- Students who report higher quality of mentorship also report a higher scientific identity ($r=.55$, $p<.01$), higher intentions to persist ($r=.55$, $p<.01$), and lower stress levels ($r=-.40$, $p<.01$) for the 2014 cohort.

In conclusion, the Lighting the Pathway program has shown strong retentions of the scholars, continued engagement with mentors, and is providing really unique findings about why program elements have an impact.

Key outcomes or Other achievements:

Key outcomes in the previous year for undergraduate students in the program include: 1) at least 3 students participating in NSF REU programs; 2) a number of others are participating in other summer research programs; 3) at least two students presented their research at a professional conference; and 4) 1 of 2 seniors is moving on to graduate degree programs and the other senior will begin medical school in the fall, with a continued interest in research.

Key outcomes in the last six months for graduate students in the program include: 1) 16 have publications either ready to submit, submitted, in review, or published; 2) at least 24 students have presented their research; 3) one PhD candidate received an NSF DDIG, another received a Ford Foundation Dissertation Fellowship; 4) 3 graduate students received an NSF GRF and 2 more received an EPA STAR Graduate Fellowship; 5) one post doctoral fellow received an NSF post doctoral fellowship and another PhD candidate received an post doctoral fellowship from Northeastern University; 6) most students have applied for and received other sources of funding; and 7) one post doctoral fellow recently received a faculty job offer and is negotiating.

Overall, students have reported satisfaction with the program. For example, a number of students gave testimonials on the unique opportunity this program provided them to connect with other STEM students and with a network of Native STEM faculty. Students have also reported satisfaction with the webinars given thus far and with the activities at the AISES National Conferences and Leadership Summit where students were able to discuss and express their Native cultures and identities with their peers and mentors.

* What opportunities for training and professional development has the project provided?

Undergraduate students received assistance applying for and securing REU positions. Through faculty mentor connections a number of undergraduate students were able to secure summer research positions. LTP scholars receive significant professional development through webinars and in-person events, as described above, students learned about portfolio building
fellowships and funding opportunities as information from faculty mentors in the program that enhance their understanding of and ability to navigate the academic career track. Additionally, this year’s webinars have specifically focused on providing skill development content, specifically pertaining to writing.

* How have the results been disseminated to communities of interest?

So far these results have been presented to the NSF, NIH, and the Howard Hughes Medical Institute, all in year one. In year two co-PIs Dr. Mary Jo Ondrechen and Dr. Chris Cornelius both presented on the LTP project at professional society meetings and to the NSF. Program Directo, Dr. Kathy DeerInWater recently presented on the project at the National Congress of the American Indian (NCAI) mid-year research summit.

* What do you plan to do during the next reporting period to accomplish the goals?

The Program Director plans to continue to coordinate and conduct more webinars, provide mentor-mentee training, facilitate small peer working groups that will focus on publication and grant writing, create and update a program specific webpage/blog to share information, students’ success stories, and resources, and prepare students for the next season of applications (i.e. fellowship, graduate school, and post-doc applications). AISES will continue to have its in-person events and the LTP program will hold program specific activities. Mentors and mentees will continue to meet and peer mentoring will also continue.

Supporting Files

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<td>Sarah Echohawk</td>
<td>07/08/2016</td>
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Products

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**Book Chapters**
Nothing to report.

**Inventions**
Nothing to report.

**Journals or Juried Conference Papers**
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**Licenses**
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**Other Conference Presentations / Papers**
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**Other Products**
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**Other Publications**
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**Patents**
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**Technologies or Techniques**
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**Thesis/Dissertations**
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**Websites**
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**Participants/Organizations**

**What individuals have worked on the project?**

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**Full details of individuals who have worked on the project:**

- **Sarah Echohawk**
  - Email: sechohawk@aises.org
  - Most Senior Project Role: PD/PI
  - Nearest Person Month Worked: 1

  **Contribution to the Project:** Oversees operation of the program and grant budget.

  **Funding Support:** None

  **International Collaboration:** No

  **International Travel:** No

- **Chris J Cornelius**
  - Email: ccornelius2@unl.edu
  - Most Senior Project Role: Co PD/PI
  - Nearest Person Month Worked: 0

  **Contribution to the Project:** Co-PI and Faculty Mentor

  **Funding Support:** None

  **International Collaboration:** No

  **International Travel:** No

- **Melinda McClanahan**
  - Email: melindamcclanahan@gmail.com
  - Most Senior Project Role: Co PD/PI
  - Nearest Person Month Worked: 0

  **Contribution to the Project:** Co-PI

  **Funding Support:** None

  **International Collaboration:** No

  **International Travel:** No

- **Robert E Megginson**
  - Email: meggin@umich.edu
  - Most Senior Project Role: Co PD/PI
  - Nearest Person Month Worked: 0

  **Contribution to the Project:** Co-PI and Faculty Mentor

  **Funding Support:** None
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<td>George Alverson</td>
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Funding Support: None
International Collaboration: No
International Travel: No

Karletta Chief
Email: kchief23@gmail.com
Most Senior Project Role: Faculty
Nearest Person Month Worked: 0

Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No

Otakuye Conroy-Ben
Email: Otakuye.Conroy@asu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 0

Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No

Ryan Emanuel
Email: ryan_emanuel@ncsu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 0

Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No

Daniel Howard
Email: Daniel.Howard@unh.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 0

Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No
Jani Ingram
Email: jani.ingram@nau.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 0
Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No

Robin Kimmerer
Email: rkimmer@esf.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 0
Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No

Adrienne Minerick
Email: minerick@mtu.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 0
Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No

William Ohley
Email: ohley@ele.uri.edu
Most Senior Project Role: Faculty
Nearest Person Month Worked: 0
Contribution to the Project: Mentor
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International Collaboration: No
International Travel: No

Scot Ouellette
Email: scot.ouellette@usd.edu
Most Senior Project Role: Faculty
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<td>No</td>
</tr>
<tr>
<td>Paul Shipman</td>
<td><a href="mailto:passbi@rit.edu">passbi@rit.edu</a></td>
<td>Faculty</td>
<td>0</td>
<td>Mentor</td>
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<tr>
<td>James Smay</td>
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<td>Faculty</td>
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<td>Mentor</td>
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Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No

Eric Sorensen
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Most Senior Project Role: Faculty
Nearest Person Month Worked: 0
Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No

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Most Senior Project Role: Faculty
Nearest Person Month Worked: 0
Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0
Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0
Contribution to the Project: Mentor
Funding Support: None
International Collaboration: No
International Travel: No
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Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)  
Nearest Person Month Worked: 0  
Contribution to the Project: Scholar  
Funding Support: None  
International Collaboration: No  
International Travel: No

Katrina Claw  
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Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)  
Nearest Person Month Worked: 0  
Contribution to the Project: Scholar  
Funding Support: None  
International Collaboration: No  
International Travel: No

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Nearest Person Month Worked: 0  
Contribution to the Project: Scholar  
Funding Support: None  
International Collaboration: No  
International Travel: No

Naomi Lee  
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Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)  
Nearest Person Month Worked: 0  
Contribution to the Project: Scholar  
Funding Support: None  
International Collaboration: No  
International Travel: No

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Most Senior Project Role: Postdoctoral (scholar, fellow or other postdoctoral position)  
Nearest Person Month Worked: 0  
Contribution to the Project: Scholar  
Funding Support: None
Kathy DeerInWater
Email: kdeerinwater@aises.org
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 6

Contribution to the Project: Serves as the program director. The program director develops, plans, and coordinates all Pathway activities, facilitates interactions between mentors and students in the program, manages the grant budget and oversees the ultimate success of the Pathway program.

Funding Support: None

Rene Begay
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Nearest Person Month Worked: 0

Contribution to the Project: Scholar

Funding Support: None

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar

Funding Support: None

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar

Funding Support: None

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None

International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None

International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None

International Collaboration: No
International Travel: No

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Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None

International Collaboration: No
International Travel: No

Ciarra Greene
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Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
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<tr>
<th>Name</th>
<th>Email</th>
<th>Most Senior Project Role</th>
<th>Nearest Person Month Worked</th>
<th>Contribution to the Project</th>
<th>Funding Support</th>
<th>International Collaboration</th>
<th>International Travel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Candice Guy</td>
<td><a href="mailto:crguy@ucdavis.edu">crguy@ucdavis.edu</a></td>
<td>Graduate Student (research assistant)</td>
<td>0</td>
<td>Scholar</td>
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<tr>
<td>Kelsea Hosoda</td>
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<td>Graduate Student (research assistant)</td>
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<td>Scholar</td>
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<tr>
<td>Carrie Joseph</td>
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<td>Scholar</td>
<td>None</td>
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<tr>
<td>Sandra Kjono</td>
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<td>Graduate Student (research assistant)</td>
<td>0</td>
<td>Scholar</td>
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<tr>
<td>Janie Locklear</td>
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<td>Graduate Student (research assistant)</td>
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<td>Scholar</td>
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Contribution to the Project: Scholar

Funding Support: None

International Collaboration: No
International Travel: No

Kristen Lycett
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Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 0

Contribution to the Project: Scholar

Funding Support: None

International Collaboration: No
International Travel: No

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Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 0

Contribution to the Project: Scholar

Funding Support: None

International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar

Funding Support: None

International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar

Funding Support: None

International Collaboration: No
International Travel: No
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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Most Senior Project Role: Graduate Student (research assistant)
Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

https://reporting.research.gov/rppr-web/rppr?execution=e1s7
Contribution to the Project: Scholar

Funding Support: None

International Collaboration: No
International Travel: No

Nicole Kenote
Email: nkenote@gmail.com
Most Senior Project Role: Non-Student Research Assistant
Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Most Senior Project Role: Undergraduate Student
Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Most Senior Project Role: Undergraduate Student
Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Most Senior Project Role: Undergraduate Student
Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No
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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

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Most Senior Project Role: Undergraduate Student
Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
**International Collaboration:** No  
**International Travel:** No

---

**Jack Martin**
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**Most Senior Project Role:** Undergraduate Student  
**Nearest Person Month Worked:** 0

**Contribution to the Project:** Scholar  
**Funding Support:** None  
**International Collaboration:** No  
**International Travel:** No

---

**Alexander McGirt**
**Email:** alexandermcgirt@yahoo.com  
**Most Senior Project Role:** Undergraduate Student  
**Nearest Person Month Worked:** 0

**Contribution to the Project:** Scholar  
**Funding Support:** None  
**International Collaboration:** No  
**International Travel:** No

---

**Na'ta'ne Miles**
**Email:** nmiles@stu.nwic.edu  
**Most Senior Project Role:** Undergraduate Student  
**Nearest Person Month Worked:** 0

**Contribution to the Project:** Scholar  
**Funding Support:** None  
**International Collaboration:** No  
**International Travel:** No

---

**Jocelyn Painter**
**Email:** jrpainte@ncsu.edu  
**Most Senior Project Role:** Undergraduate Student  
**Nearest Person Month Worked:** 0

**Contribution to the Project:** Scholar  
**Funding Support:** None  
**International Collaboration:** No  
**International Travel:** No

---

**Ulali Phillip**
**Email:** ulaliphillip@outlook.com  
**Most Senior Project Role:** Undergraduate Student  
**Nearest Person Month Worked:** 0

**Contribution to the Project:** Scholar  
**Funding Support:** None  
**International Collaboration:** No  
**International Travel:** No
Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

Biidaaban Reinhardt
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Most Senior Project Role: Undergraduate Student
Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

Scott Tan
Email: scotttan808@gmail.com
Most Senior Project Role: Undergraduate Student
Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

Joshua Thomas
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Most Senior Project Role: Undergraduate Student
Nearest Person Month Worked: 0

Contribution to the Project: Scholar
Funding Support: None
International Collaboration: No
International Travel: No

What other organizations have been involved as partners?
Nothing to report.

What other collaborators or contacts have been involved?
Nothing to report

Impacts

What is the impact on the development of the principal discipline(s) of the project?
This project has already had an impact on the development of best practices for meeting the key objectives of this project. A majority of students report being very satisfied with their mentor, and our analyses show that quality of mentorship is positively correlated with the scholars’ intentions to persist in STEM. We think this is in large part due to our ability to connect students with a mentor that either identifies as Native American or exhibits cultural sensitivity and is well matched with a student based on STEM research interests. Based on student feedback, the project’s focus on integrating Native culture and identity and STEM careers and research is a unique component of the program that students have not been able to receive from other sources. Our findings so far indicate that students in the program appreciate the ability to interact with other Native American students, post doctoral fellows, and faculty, creating a full circle network of support. This is an important insight that impacts our understanding of the needs of Native American students.

What is the impact on other disciplines?
Nothing to report.

What is the impact on the development of human resources?
This program improved the performance, skills, and attitudes of Native American students by improving their persistence, degree attainment, and advancement to the next level. Students also increased their understanding of the academic career track and received professional development aimed at securing fellowship, funding, and research opportunities. These objectives were met through participation in program activities such as in-person AISES events, webinars, monthly mentor meetings, and developing a full circle network of support among program participants.

What is the impact on physical resources that form infrastructure?
Nothing to report.

What is the impact on institutional resources that form infrastructure?
Nothing to report.

What is the impact on information resources that form infrastructure?
Nothing to report.

What is the impact on technology transfer?
Nothing to report.

What is the impact on society beyond science and technology?
Results from this project inform best practices for increasing the representation of Native Americans specifically and underrepresented minorities in general in STEM fields within academia. What we have found so far is the importance of developing a sense of community, access to faculty and peer mentors that are culturally aware and sensitive, and the integration of culture and multiple identities into discussions of STEM research and careers.

Changes/Problems

Changes in approach and reason for change
Nothing to report.

Actual or Anticipated problems or delays and actions or plans to resolve them
Nothing to report.

Changes that have a significant impact on expenditures
Nothing to report.

Significant changes in use or care of human subjects
Nothing to report.

Significant changes in use or care of vertebrate animals
Nothing to report.

Significant changes in use or care of biohazards
Nothing to report.