International Journal *of* Designs for Learning
2018 | Volume 9, Issue 1 | Pages 88-97

REFINING A SUMMER BIOMEDICAL RESEARCH TRAINING PROGRAM FOR AMERICAN INDIAN AND ALASKA NATIVE (AIAN) STUDENTS

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Literature shows that students who enter the science, technology, engineering, mathematics, and medical-related (STEMM) pipeline at earlier stages of their career are more likely to be successful. This is especially true for under-represented and economically disadvantaged students. Despite the increasing number of students entering the pipeline, American Indian and Alaska Native (AIAN) students still have a higher attrition rate compared to other ethnic groups. Educators and government agencies have worked to improve the success rate for AIAN students across all levels and fields by developing various programs aimed at training and mentorship. In 2007, the National Institute of Neurological Disorders and Stroke (NINDS) of the National Institutes of Health (NIH) in Bethesda, MD, increased their outreach efforts for recruiting AIAN students for the summer internship program. Our goal was to develop a culturally tailored research-training program that could recruit and retain AIAN students into STEMM degrees and careers. We adapted an existing program that provides training in biomedical science and mentorship at an NINDS research laboratory. From 2007 to 2016, of the 41 AIAN interns who participated, 35 (85%) remained in STEMM fields. Five interns obtained post baccalaureate positions at NIH and four entered graduate or medical school. These successful outcomes were brought about only after navigating myriad obstacles. We identified obstacles for AIAN student participation, and made adaptations to the summer internship. We made design decisions regarding recruitment, feasibility, lab placement and mentorship, supporting research and social networking, and sustaining AIAN culture. This design case highlights the obstacles and strategies for success that we developed.

https://doi.org/10.14434/ijdl.v9i1.23049

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INTRODUCTION

We present this design case in part to offer insight for others wishing to tailor programs to American Indian and Alaska Native (AIAN) students, with a goal of decreasing attrition rates among AIAN students in science, technology, engineering, mathematics, and medical-related (STEMM) fields. This design case highlights the obstacles and successes experienced in redesigning a summer internship program to meet the needs of AIAN students. Specifically, we made design decisions regarding recruitment, feasibility, lab placement and mentorship, supporting research and social networking, and sustaining AIAN culture. The first author is from the Seneca Nation of Indians and the second author is a member of the Navajo (Diné) Nation. Our design decisions and design recommendations come from personal experiences as Native American students who previously participated in summer internships and are actively involved with the National Institute of Neurological Disorders and Stroke (NINDS) along with other summer programs.

PROBLEM CONTEXT

AIAN students have higher attrition rates among the ethnic minority groups in postsecondary education (Brayboy, Fann, Castagno, & Solyom, 2012). In 2015, AIANs accounted for

approximately 1% of the U.S. population (U.S. Census Bureau, 2016), yet the collective number of undergraduate degrees in all fields accounted for only 0.6% of total degrees earned. The percentage continues to steadily decrease for advanced degrees with only 0.2% of doctorate degrees earned by AIAN students (National Science Foundation & National Center for Education Statistics, 2017). AIAN students are even less likely to obtain a degree in a STEMM field (National Science Foundation & National Center for Science and Engineering Statistics, 2015).

Summer research programs have been shown to improve the diversity of the STEMM-PhD pipeline (Pender, Marcotte, Domingo, & Maton, 2010; Salto, Riggs, De Leon, Casiano, & De Leon, 2014; Villarejo, Barlow, Kogan, Veazey, & Sweeney, 2008), and many such programs exist in the United States (McGee Jr, Saran, & Krulwich, 2012; Rohrbaugh & Corces, 2011; Salto et al., 2014). However, such programs typically report only a small percentage of AIAN participants. One reason for low participation is that programs that target minorities are seldom culturally tailored to AIAN students.

Even programs that are culturally tailored for AIAN students can struggle to attract participants. For instance, the Native Investigator Development Program (NIDP) through the University of Colorado and Washington State University (Kabacoff, Srivastava, & Robinson, 2013; Manson, Goins, & Buchwald, 2006) trains AIAN postdoctoral and junior faculty interested in tribal health concerns. Unfortunately, one obstacle the program faces is the low numbers of eligible AIAN candidates at the postdoctoral and early-investigator level. Therefore, in order to build the pipeline to provide qualified candidates for programs such as the NIDP, we need to support more AIAN students earlier in their academic careers.

PRECEDENT: ORIGINS OF THE SUMMER INTERNSHIP PROGRAM

As with other STEMM professional organizations, the National Institutes of Health (NIH) leadership has long recognized the lack of diversity in its programs, including its summer internship program (Ginther et al., 2011; Tabak & Collins, 2011). NINDS is one of the NIH research institutes that offers internships for qualified high school and college students. The summer internship began over thirty years ago when Dr. Joe Gibbs, a tenured faculty member at NINDS, trained students during the summer. Once formalized into an official program, the purpose of the summer internship each year was to provide 65-80 outstanding students with research experience in biomedical sciences, particularly in basic and clinical neuroscience. In addition to research, participants are required to attend an institute-sponsored career symposium, an NIH-sponsored poster day, and a NINDS internship awards ceremony. NINDS staff members, internship program alumni, and prominent members of the neuroscience field speak and network with interns at the career symposium. The poster day provides an opportunity for the interns to communicate their research to fellow internship participants and NIH researchers. A panel of NIH postdoctoral fellows and researchers judge the posters and the interns are honored at NINDS internship awards ceremony. The winners receive an award certificate for their outstanding achievements during the internship.

The internship model, including a desire to use the internship to increase diversity, spread to other institutes at the NIH. Although the program sought to increase the diversity of the field, there was initially no tracking of interns, and the number of AIAN interns was unknown, but clearly not high. It was not until 2007 that Dr. Henry McFarland initiated the recruitment of AIAN students to the summer internship program. Dr. McFarland, NINDS Clinical Director at the time, is originally from Arizona, a state with a population of approximately 4% AIAN. He noticed the underrepresentation of AIAN interns at NINDS and was adamant that there were well-qualified AIAN students who should be recruited for the NINDS internship program. The charge to recruit AIAN students was given to Dr. Rita Devine when she became the summer internship program coordinator in 2007. This design case focuses on the internship from 2007-2016 under Dr. Devine's oversight, detailing the design decisions that made the summer internship appealing to and supportive of AIAN students. We recount her story of the design process, then our own, as we joined the effort to refine the internship program. We describe how we designed recruitment strategies, enhanced the feasibility through financial means, health insurance, and housing supports, created additional social and professional networking opportunities, supported research training and mentorship activities, and promoted culturally-sustaining practices. This comprehensive design successfully attracts new and returning AIAN students to the internship each year.

DESIGN PROCESS & PRODUCT

Recruiting AIAN Students

Dr. Devine began recruiting AIAN students by contacting schools, but initially the schools did not trust her; despite contacting multiple schools, she received no applications. She tried visiting one of these reservations, but found tribal leaders reluctant to talk to her. She learned this reluctance stemmed from the relatively recent practice of forcing AIAN children to leave their homes and attend government boarding schools far from their reservations, and the ongoing practice of removing AIAN children and placing them in non-AIAN foster homes. Thus, AIAN peoples have reason to be suspicious of government officials recruiting students for summer internships far from their home (Adams, 1995). As a white woman, Dr. Devine encountered many opportunities to learn about how each tribe differed, but also about the

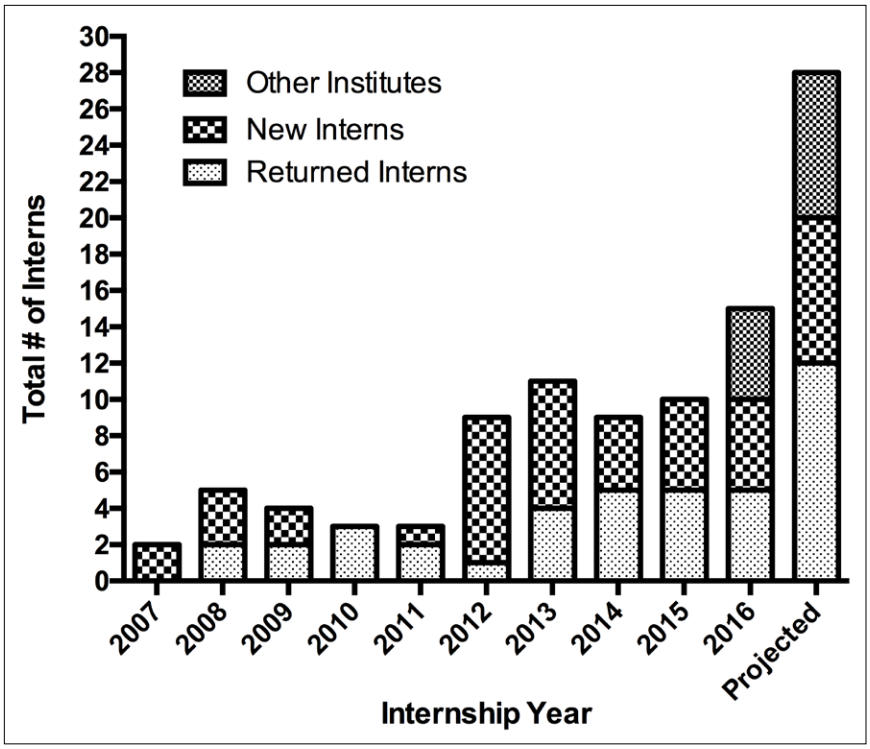

FIGURE 1. In the first five years, NINDS averaged 3-4 interns per year. After building new relationships, this number increased to 9-10 interns.

shared experience of historic trauma. She found that she needed to begin by building a relationship so she could learn from the tribe. Dr. Devine took what she learned from these initial efforts and sought to build a relationship with one tribal community, the Oglala Sioux tribal community in South Dakota. This relationship was not built on emails or phone conversations, but rather was the result of continuous effort by many individuals. Dr. Devine built personal relationships, first with non-AIAN women who had a relationship with a church on the Pine Ridge Reservation. From there, she was able to connect with a teacher from Red Cloud High School, a private Jesuit school on the reservation, and tribal leaders. On multiple occasions, she flew to South Dakota then drove 2-3 hours to the remote reservation to meet with tribal leaders and educators. Through these trips, she established personal relationships that were extremely important in rebuilding trust between tribal communities and a U.S. government organization. The first cohort of AIAN interns consisted of two high school students from Red Cloud High School ("Breaking barriers in science," 2013; Red Cloud Indian School, 2014).

As a means to increase the number of applicants, we decided to begin participating in national conferences: the Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) and American Indian Science and Engineering Society (AISES). This did not result in increased applications from AIAN students. We continue to see it as an important component of our program because it serves as a place to reconnect with interns, but do not view it as an effective recruitment tool.

Most of the interns came because of the relationship built between the Red Cloud High School on the Pine Ridge Reservation and the staff at NINDS. Because of this, we decided to work on building relationships with other tribes. We introduced Dr. Devine to other tribal schools and communities in order to assist with building relationships with new tribes. These included the Saint Michael's Indian School and the Santa Fe Indian School in New Mexico, the Seneca Nation of Indians in western NY, and the Yakama Nation in central Washington State.

From 2012-2015, the number more than doubled to 9-10 interns per year (see Figure 1). In 2016, sixteen (approximately 21%) of the interns were AIAN, and of these, nine interns were new (four from a new community). With this increased number of interns, we decided to begin placing some interns in other NIH institutes, while still including these interns in all aspects of our model. Since the initial recruitment efforts, interns have returned every summer, with a total of 73 internships completed, representing 41 different AIAN interns. Ultimately, most of the AIAN interns have been recruited through word of mouth, meaning that continued engagement between the AIAN communities and NINDS staff is critical to intern recruitment.

Making Internships Feasible: Financial Support, Health Insurance And Housing

Tribal communities have some of the highest poverty rates in the U.S. (Ross et al., 2012), and the limited financial resources were evident when Dr. Devine visited these communities. High rates of poverty translate to infrastructural limitations in rural communities. This means that many prospective interns cannot complete the web-based internship application because many of these rural communities lack internet access. To overcome this obstacle, we began providing hard copies of the application forms. Because NIH requires electronic submission of application materials, the NINDS staff input the application information for students who are unable to access the internet.

From our first recruitment efforts, the tribal leaders from Pine Ridge required that stipulations be met before allowing their youth to attend the summer internship program: full financial support, including health insurance, travel, and housing. All interns in the NINDS summer internship program receive

a stipend based on their academic standing (high school, undergraduate, or graduate status) and a stipend for local public transportation during the program. To meet the stipulations set by the tribal leaders, the AIAN interns receive additional supports.

A major financial concern is travel to and from Bethesda, MD, which is located far from interns' tribal communities. Many of the high school-aged interns had never traveled on their own, let alone by airplane, and some had never left the reservation. To overcome the travel hurdle, we implemented two strategies. First, all AIAN interns received travel support to and from the program including coordinated travel arrangements. In addition, we tried to recruit two high school interns from the same community, especially if they were the first members from their community to become interns. This allowed interns to travel with a companion and have a familiar face throughout the summer. One unexpected challenge we faced was that some AIAN interns arrived with little or no money and without basic day-to-day essentials, such as personal hygiene supplies.

Every NIH intern receives a DC metro card with credit applied to the card through the TranShare program; however, it takes 1-2 weeks for the public transportation assistance to be established for new interns. In addition, it can take 3-4 weeks for the first stipend payment to be delivered to their personal banking accounts. As a result, many of the AIAN interns are left with minimal financial support for the first few weeks of the internship. Therefore, to overcome the financial obstacle, NINDS now offers an advance payment prior to arrival. In addition, we work with the local AISES chapter to provide donated care packages containing personal hygiene supplies, snacks, and other items for each AIAN intern. The interns have been very appreciative of this gesture and it provides an excellent opportunity for them to connect with local AIAN professionals.

Most AIAN families that live on or near tribal lands do not carry health insurance because they are eligible to receive health care through the Indian Health Services. This continued following the passage of the Affordable Care Act; while AIAN peoples are exempt from the fee for not carrying health insurance and eligible to enroll in some ACA coverage (HealthCare.gov), this is sometimes at additional cost. Because there were no Indian Health Service care facilities near the NIH, we provide health insurance for the AIAN interns on top of their normal stipend. Each summer interns have used their health insurance but required guidance on coverage and locating providers, and we have learned to be cautious when providing information in order to not violate HIPAA regulations.

The tribal leaders required that NINDS provide housing to ensure their youth were cared for physically and emotionally throughout the summer. Most non-AIAN interns have a permanent residence within the Bethesda, MD area, but AIAN interns needed more than just a place to stay, such as a dormitory. We recruited families to volunteer to house AIAN interns—an easy task at the beginning when there were only a few interns, but a challenging task when this number increased. NIH lacks a resource for locating appropriate host families, and recruiting families willing to host an intern without compensation has been done by word of mouth. The host families vary in demographics from young couples with small children to retirees and other NINDS staff and fellows. These host families played a crucial role in the success of the program; without their support, we would not have been able to recruit and retain AIAN interns. Host families also provide a stable environment that allows interns to acclimate to the area and the research environment throughout the summer. Host families that are current or past STEMM professionals also act as mentors to interns during and after the summer internship program. Many interns maintain personal relationships with their host families, and returning interns usually stay with the same families. We also have discovered the importance of having staff available to build trusting relationships with interns, whom then have someone they feel comfortable coming to in the event serious or unexpected challenges arise.

But in order for the program to grow, additional host families will need to be available or other housing arranged to ensure that interns are provided with stable physical and emotional support. One alternative that we will try next summer is to have a representative—a teacher or someone otherwise involved with student programs—from a tribal community who can act as a chaperon. The goal is to rent a home or apartment that will house multiple interns from the same community with a chaperon. By overcoming the housing issue, the summer internship program will be able to continue to grow and produce many more AIAN scientists.

Placing AIAN Interns in NINDS Laboratories and Providing Mentorship

The start date for each intern is dependent on the end of their school year, with most interns arriving by the first week of June and finishing at the beginning of August after the awards ceremony. Throughout their time at NINDS, interns work alongside a NINDS mentor, such as a graduate student or postdoctoral fellow. In a few cases, advanced post-baccalaureates or the principal investigator (PI) directly supervise interns' research. Each summer, 48 to 55 laboratories host NINDS interns, and due to the variation in NINDS laboratories, interns participate in a wide range of clinical and biomedical research projects.

Mentorship at earlier stages in their career is pivotal for the success of minority students (Fore & Chaney, 1998). Therefore, one benefit of the summer internship program is that it allows interns as young as 16 years old to interact with

top scientific researchers. While NINDS offers many excellent scientific mentors, the program generally lacks senior AIAN researchers to mentor interns, a reflection of the overall lack of AIAN researchers in STEMM. Fortunately, from 2013-2015, there were four AIAN postdoctoral fellows—including the first author of this paper—within the NIH intramural programs. During that time, these postdoctoral fellows played a crucial role in mentoring the interns and provided guidance in tailoring the internship program. While there are no AIAN postdoctoral fellows at the NINDS Bethesda campus currently, the four AIAN postdoctoral fellows at NIH continue to support NINDS by staying involved through mentoring, advising, and guest lecture activities. For instance, the first author continues to recruit AIAN interns and refine the internship program. The other three former postdoctoral fellows continue to support interns through networking, recruitment, mentoring, and providing feedback.

Typically, in summer internships across the NIH institutes, PIs choose interns based on searchable characteristics in the online application system. They tend to sort prospective interns by grade point average (GPA), which means prospective AIAN interns are less likely to be selected because the average GPA for AIAN students has been comparatively low (3.2 for AIAN versus 3.8 for non-AIAN). Given the sheer number of applications, this makes it unlikely that PIs will even review AIAN student applications. To overcome this obstacle, we decided to bring AIAN applications to the attention of PIs for consideration. This also provided an opportunity, to determine whether the laboratory was a supportive environment for AIAN interns, a step that became increasingly important as the number of AIAN interns increased.

Careful vetting of laboratories hosting AIAN interns was important because many of these interns were not prepared for lab experiences compared to their non-AIAN peers. Many schools that serve AIAN students lack science laboratories, or teachers qualified to teach advanced science coursework. Therefore, we place each intern strategically, keeping in mind the NINDS fellow's mentorship capabilities and the intern's interests. When selecting a mentor for an AIAN intern, we look for patience, understanding, and a sensitivity to the culture and background of the intern. AIAN interns often seem very shy, and mentors need to be aware of some of the obstacles these interns face on a daily basis, such as limited training in STEM courses, personal and family problems that arise throughout the summer, and homesickness, especially in younger interns. Mentors need to be able to challenge the interns, but also give them the groundwork to succeed.

Mentors who have an understanding of AIAN cultures and life on the reservation are likely to improve the mentor-mentee relationship. For example, in many AIAN cultures, avoiding eye contact with an elder is a sign of respect. However, in Western society, it can be perceived as a sign of disrespect or even dishonesty. Also, the lack of questions and communication from the interns can be perceived as an unwillingness to learn. However, to the interns, it is a sign of respect, because they are not questioning elders and are simply following instructions respectfully. To address these cultural differences, NINDS continuously strives to improve understanding of cultural diversity among NINDS employees (NINDS) and encourages them to participate in multiple cultural events throughout the year, such as the annual traditional luncheon held by the NIH Native Scholars—an informal group—in November (National Institutes of Health, 2016). Thus far, even though AIAN interns have typically been placed with non-AIAN mentors, they have been able to build relationships with their mentors. In many cases, the interns have stayed in contact throughout the academic year and have been frequently invited back to the lab for more than one summer.

In addition to research mentoring, we have provided mentorship in other areas of need, such as counseling, tutoring, and guidance for college and graduate school. Mentoring consists of one-on-one meetings, monthly meetings, journal clubs, tutoring sessions with Native Scholars, and professional networking specific to AIAN interns.

In our educational experiences, we have seen few AIANs with PhDs. Dr. Lee first met an AIAN with a PhD in her junior year of college, and that experience changed the course of her career. This experience, paired with the knowledge that most of our interns wished to return to their communities or work to support the AIAN community in general, drove our commitment to providing interns with professional networking opportunities. Originally, professional networking involved interns meeting with Dr. Clifton Poodry (Seneca)—former director of diversity at NIGMS—now at Howard Hughes Medical Institute. When Dr. Poodry retired, we connected Dr. Devine to other AIAN scientists and researchers at Indian Health Services (IHS) headquarters office, National Congress of American Indians (NCAI), and other AIAN STEMM professionals.

As the program has grown, we also have promoted peer mentoring among interns. In 2016, we created informal positions to facilitate peer mentoring that also allowed returning interns the opportunity to gain leadership experience. We selected one returning intern to coordinate professional development events with NIH Native Scholars, an informal Native American group. The events included the end-of-summer poster presentations, resume workshops, and a session on improving oral presentation skills. We selected another returning intern to coordinate professional networking events.

In our discussions with interns, we didn't think they were connecting their research back to their communities. To address this, we decided to add a journal club focused on AIAN health disparities, exploring the spectrum of beneficial

to harmful research conducted in AIAN communities. In each case, we examined the researchers involved and noted that harmful research usually has been conducted by someone outside their community. We discussed that culture always influences research (NCAI Policy Research Center, 2009; Villegas, Around Him, Lucero, & Pytalski, 2016), and hence, why we need to train more AIANs in STEMM who can then go back and help their communities.

To accommodate the increasing numbers of AIAN interns, we reached out to other NIH institutes. In particular, because some interns expressed interest in areas such as community health and suicide prevention, we worked with National institute of Mental Health and National Institute of Aging. By including more institutes that accept AIAN interns—and therefore place more of them across NIH—we hope to see a long-term increase in post-baccalaureate and, eventually, postdoctoral positions filled by AIAN students. Meanwhile, a lack of AIAN mentorships continues to be of concern each summer as interns are placed in laboratories. However, the combination of formal mentoring with NINDS faculty and peer mentoring are aimed at improving the likelihood interns will stay in STEMM.

Broadening Research Networks Through Conferences And Workshops

At the end of the summer, each intern is required to give a poster presentation alongside other NIH summer interns. This requirement helps prepare interns to present at a national conference and provides a safe, first experience by ensuring they have a professional poster that can be reused. Interns often present this same poster at a national scientific meeting of their choice. In most cases, AIAN interns attend AISES and/or SACNAS due to the positive and supportive atmosphere. Additionally, several of the interns have attended workshops, such as the Dartmouth Bound program to learn about college admissions processes and college life and the Summer Internship for Indigenous peoples in Genomics workshop, which focuses on involving AIAN peoples in understanding the (mis)uses and limitations of genomics data.

As returning AIAN interns progress in their academic careers, some choose to attend much larger scientific meetings such as the American Academy of Neurology. Although many of the AIAN interns were qualified and competed for travel scholarships to national meetings, each AIAN intern receives sponsorship to attend one national meeting per year to present his or her research. We encourage interns to apply and present at national meetings that best suit their educational goals.

One of the reasons we are committed to encouraging AIAN interns to present at conferences is that it provides them with a broader view of their scientific community and expands their networks. Realistically, some of our AIAN interns who pursue graduate school will work in laboratories that are not supportive of them. We believe that connecting such students to the broader scientific community and providing them with opportunities to understand the norms of that community might help them to recognize that if placement in a lab does not work out, this does not mean they don't belong in the profession. It is our hope that such students will choose to leave a particular lab but not leave their scientific career. Because of this stance, we are adding a session on making the most out of attending a conference.

Social Networking

One of the challenges AIAN scientists face is they often are trailblazers, and in a typical STEMM major at a university, they may be the only AIAN student enrolled in classes. This can be an isolating experience. Therefore, we wanted to build a community among AIAN interns, especially since the number of AIAN interns has increased. With our interns housed across the city and across different labs, we needed to coordinate events so that all or most could attend. We selected a returning AIAN intern to assist with social networking. This intern acted as a liaison, greeting new interns as they arrived throughout the month of June. This intern organized several social events throughout the summer in the DC area and was accountable to them, providing information about event locations and resolving issues that occurred outside the NIH campus, such as getting lost on the transit system. Events included participating in local AISES chapter events, attending BBQs, and taking trips to the national museums. In 2015, interns attended First Lady Michelle Obama's speech at the White House Tribal Youth Gathering in collaboration with the United National Indian Tribal Youth organization in Washington, DC. In 2016, they went to the Native Youth Roundtable at the Center for Native American Youth and the Generation Indigenous Youth Networking event at the National Museum of the American Indian. Such experiences support the development of their identities as scientists, show the possibilities waiting for them, and help develop relationships with other Native American youth and young adults.

Sustaining AIAN Culture

As we considered the experiences our interns need, we were inspired by Native American Research Internship (NARI) at University of Utah, which is one among a few culturally-tailored AIAN summer internship programs. NARI is a 10-week paid internship that includes culturally-relevant research and community engagement (Holsti et al., 2015).

One of the challenges for programs that seek to enhance AIAN participation in STEMM fields is that AIAN peoples, especially those from rural reservation communities, may

	ALL NINDS INTERNS	CULTURALLY-TAILORED FOR AIAN INTERNS
FEASIBILITY	All interns receive a stipend based on their academic standing	AIAN interns receive funds for health insurance and travel, and are placed in a host family.
RESEARCH TRAINING	8-10 wk biomedical training in one of ~48-55 different NINDS lab Poster presentation by each student at commencement of program	1 AIAN postdoc and 2 postbacs in NINDS (2013-2016) provided additional support to carefully place interns and directly supervised 7 NIH Native Scholars assisted with poster presentations (2013-now)
MENTORING	Mentorship from laboratory and research staff that includes "senior" fellows, postbacs, graduate students, postdocs, etc.	Monthly meetings with Native Scholars group; 1-on-1 meetings with AIAN postdocs to discuss career and academic goals; journal club that focused on AIAN health disparities; tutoring sessions upon request by AIAN postdocs
PROFESSIONAL NETWORKING	Laboratory-specific activities that vary across NINDS	UNITY conference in DC; luncheon with senior AIAN professionals outside of NIH; local AISES chapter events; SACNAS potluck during NIH "Native Visit Week"
SOCIAL NETWORKING	Laboratory-specific activities that vary across NINDS	Weekend trips to Smithsonian American Indian museum and tubing/hiking on Shenandoah River; BBQ with Washington Internship for Native Students (WINS) program; group dinner for host families prepared by the interns

TABLE 1. Overview of institutional and culturally-tailored research training, mentoring, and networking.

feel a tension as they walk between two worlds. One approach taken by such programs is to explicitly teach the unwritten rules of STEMM professional fields. However, in doing so, STEMM can appear to be a culture that is largely reflective of settler/colonizer culture (Calderon, 2014; Sabzalian, 2015), and efforts to bring AIAN peoples into that culture can be assimilative or oppressive (Brayboy, 2005), sometimes sending the message to AIAN students that they must shed aspects of their identities in order to fit into STEMM fields. Complicating this, many depictions of AIAN peoples present a single homogenous culture, rather than myriad dynamic cultures with variability even within cultures (Castagno & Brayboy, 2008). And because AIAN peoples are so sparsely represented in STEMM, they can feel like they carry a great responsibility—or burden—to represent all AIAN peoples. We saw this reflected in videos the American Society of Biochemistry and Molecular Biology (ASBMB) created with some of the AIAN interns (Hopp, 2016). In these, three young interns talked about their excitement, how much they learned, how curious they were about making discoveries and learning about the unknown, but also about the need to represent AIAN people generally. For example, one of the interns in the video, Marilyn Frank, explained that her mother always impressed upon her that she must be "very respectable… anytime we are representing our people or anytime we are essentially in the spotlight to represent" them. Similarly, Randall Hughes Jr. explained that they were representing "Native people as a whole" and trying to figure out "how we best can serve ourselves and our community" and trying to make sense of what the internship means as "part of your identity." Cole "Sonny" Dittentholer explained that he enjoyed being able to network with other AIAN interns and discuss the "need to keep our tradition alive and how most of the people in the internship, they wanna go back to their reservation and inform everyone also that they could be—like—scientists and doctors."

As we consider the identity work the AIAN interns are doing, we have sought ways to support them so that they see themselves as scientists and researchers. We were inspired by crystalized identity (Forin, Adams, & Hatten, 2012; Tracy & Trethewey, 2005)—the notion that every individual has multiple facets to their identities. Rather than engage in practices that encourage AIAN peoples to shed, hide, or replace certain facets of their identity, we sought to design practices that can support them and add new facets while sustaining existing ones. This aligns to what some have described as culturally sustaining pedagogy—approaches that seek to sustain "linguistic, literate, and cultural pluralism" (Paris, 2012; Paris & Alim, 2014). We instantiated these ideas into the internship in a few ways. We require interns prepare a meal for their host families. For some interns, this meant communicating with their families in order to obtain recipes they have enjoyed often but never prepared themselves. We

also encourage AIAN interns to express their cultural practices at work and with their host families. For instance, we encourage them to speak in their native languages and to teach us words, including burning sage and offering prayers at social gatherings. In addition, a number of students have returned home to participate in their cultural ceremonies such as Sundance using funds they saved from the summer internship stipend. Due to these unique cultural practices, we informed mentors prior to the start of summer that AIAN interns would participate in cultural activities both on and off the NIH campus.

As the program expands and we include more tribal communities, we want to anticipate activities that could conflict with cultural values. For example, interns may have the opportunity to witness autopsies, work with human biological samples, and conduct animal studies. However, in certain tribal communities, members are not allowed to be in the presence of a deceased body without conducting ceremonial practices. Therefore, we are reaching out to tribal leaders and elders for advice about what the community will allow interns to do for research, given that interns themselves may not be able to lead certain ceremonial practices. In endorsing tribal sovereignty, we also have sought advice from tribal elders and leaders about research priorities for the communities. Our goal is to train interns in biomedical research that interests them and benefits their community, especially given that most interns wish to return and serve their communities.

DESIGN FOR EXPANDING THE INTERNSHIP TO NEW TRIBES

As we continue to expand the internship, we have employed a set of strategies developed iteratively over the past few years. Table 1 highlights the design decisions we made to provide a culturally-tailored summer internship experience.

First, when reaching out to new communities, we conduct a meeting with tribal representatives, including leaders, educators, and elders. This shows that we recognize and respect the community as a sovereign nation. In these meetings, we discuss the logistics of running the program, our vision for AIAN STEMM professionals (e.g., increasing participation and ensuring that they are ready to meet the needs of their community), the challenges and successes we have faced, and the concerns of tribal representatives. We also discuss the past history with government organizations and emphasize our efforts to keep the interns safe throughout the entirety of the internship. We work to broaden our understanding of their cultural practices.

Once tribal representatives state their interest in sending students to the internship, we ask them to find students that meet the eligibility criteria and who are interested in STEMM. After compiling a list of interested students, we begin reaching out to the students and their families, especially for those under 18 years old. Keeping in mind that prospective interns might not have internet access, email is not the best form of communication. We therefore telephone students and families and review the same topics discussed with tribal representatives. Talking to students and families helps us form an impression of the students as well and get a sense of their interests. Typically, we find many more interested and eligible students than we can place. In such cases, we ask the tribal representatives to narrow the list of prospective students to 2-4. We then try to place at least two students from a new community.

After narrowing the student pool, we return to the community to meet with tribal representatives, selected students, and their families. At this meeting, we discuss details about travel and the laboratory where interns will work and address concerns anyone may have. We provide detailed information on housing, especially safety measures taken while students are in the program. In many cases, students are interested, but for their families ensuring safety in an unfamiliar urban environment is a primary concern.

When we are recruiting students from a tribal college, we can sometimes invite students to visit and tour the NIH over a 1-2 day period. During these visits, we conduct introductory sessions to discuss the research being conducted, tour the NIH campus, and invite Native Scholars to meet with prospective interns. The sponsoring colleges will have funded travel for these visits.

As mentioned previously, housing is one of our main limiting factors. While we will continue to place interns in host families, we also work with new communities to identify a chaperon who can stay in a rented house or apartment with a few interns. The chaperon likely will be a tribal educator who also will conduct research in one of the NINDS laboratories. The chaperon also will assist NINDS staff with activities outside the laboratory related to the AIAN summer interns. Our hope is that the tribal community or college will cover the cost of housing in this case, since NIH is unable to provide a stipend for housing.

In the fall, following the internship, we reconnect with the interns at a national conference such as AISES or SACNAS. Because we sponsor our interns, we expect the interns to present their summer research. Typically, we also have one large group meal, but throughout most of the conference the interns socialize together and with NINDS representatives.

Finally, we continue to maintain relationships with the AIAN community after the internship ends. Typically, we have done this via phone conversations, and in some cases email. We ask tribal representatives to maintain contact with their students and inform us of any concerns. Once the application process opens (mid-November), we repeat the process.

In certain cases we need to return to the community at least once, especially if our original community contact changed.

CONCLUDING THOUGHTS

Increasing the diversity of STEMM professionals is a critical strategy for addressing grand challenges, as well as for meeting the needs of diverse communities. Approaches such as ours aim to contribute to diversity by working to meet the needs of AIAN students and make their entry into STEMM feasible and culturally-sustaining. Overall 85% (35/41) of the AIAN interns to date remain in STEMM fields, which includes academic stages between high school and medical/graduate school, as well as STEMM careers. This represents an attrition rate that is much lower than national averages (Garrison, 2013). And we hope that this approach will create a self-sustaining pipeline, creating increased numbers of AIAN mentors for the AIAN interns.

As we work to expand the internship opportunities for AIAN students, we also acknowledge the limits to expansion. Identifying sufficient numbers of suitable host families is challenging, but recruiting chaperons from tribal communities can help ease this burden. Further, this strategy could also serve as a way to affirm commitments to supporting tribal sovereignty and AIAN intern STEMM identity development without compromising their identities as AIAN peoples.

However, the clearest constraint to expansion is building and maintaining trusting relationships with tribal communities, as this requires effort and time. While we hoped that including an AIAN postdoctoral fellow as part of the team might facilitate this process, as a representative of the government, even this AIAN postdoctoral fellow had to work hard to build and maintain trust with tribal communities. Thus, the effort required to build and maintain such relationships will likely be a limiting factor to expansion.

ACKNOWLEDGMENTS

This manuscript and the participants in the program were supported by the Division of Intramural Research and the Office of the Director at the National Institute of Neurological Disorders and Stroke (NINDS). We thank Dr. Henry McFarland for recognizing the need to increase the number of AIAN fellows at NINDS. We especially thank all of those involved in advancing the training and education of AIAN students in STEMM, in particular the current and past NIH Native Scholars, the many research mentors, Dr. Katherine Roche (NINDS Training Director), and all the staff for the NINDS summer internship program (Dr. Rita Devine, Ms. Mary Kiganda, Ms. Vivian Yang, Mr. Chris Patterson). Finally, we want to express our gratitude to Dr. Walter Koroshetz, Director of NINDS, for his continuous efforts to promote diversity. His active involvement left a lasting impression on the AIAN interns.

Funding for this manuscript was supported by the NIH grant 5K12GM088021-08 at the University of New Mexico.

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