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Journal of American Indian Education, Volume 61, Number 3, Fall 2022, pp. 62-88 (Article)

Published by University of Minnesota Press
DOI: https://doi.org/10.1353/jaie.2022.a912063

Lived Experiences of Native American STEM Faculty in Academia: Our Stories, Insights, and Advice

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Native American faculty in science, technology, engineering, and mathematics (NAF-STEM) are severely under-represented. NAF-STEM often have greater responsibilities and challenges in academia leading to lower retention and promotion rates, which can also have an impact on career satisfaction and individual success. A group of Native scholars and diverse scholars at two tribal colleges and one state university collaborated on a culturally grounded project with NAF-STEM in higher education to examine their collective lived experiences in academia. Qualitative analyses were guided by Indigenous Research Methodologies using a collaborative autoethnography approach. The results of these shared experiences are intended to aid in the creation and maintenance of equitable and successful models to recruit and retain NAF-STEM. Advice aimed at guiding educational equity for Indigenous scholars is shared.

Implementing self-determined education has been a goal since the passage of the Indian Education Act in 1972. However, American Indian students remain significantly under-represented and underserved in higher education and in the U.S. workforce, particularly in science, technology, engineering, and math (STEM). Access to rigorous mathematics and science courses in high school for American Indians and Alaska Natives (AI/AN)[1] and for other racial and ethnic minority groups, such as African American and Latinx students, is itself an area of disparity (U.S. Department of Education, 2018), as only 47% of AI/AN students attended public high schools that offered a full range of math and science courses. AI/AN students have the highest high school dropout rate (National Center for Education Statistics [NCES], 2020) and lowest graduation rate among all racial and ethnic minority groups

(NCES, 2016–2017). AI/AN students are less likely to be enrolled in higher education and complete a four-year degree than members of other groups: 24% of AI/AN students between the ages of 18 and 24 are enrolled in college, compared to 41% of the overall U.S. population, and the six-year completion rate of first-time/full-time AI/AN students attending four-year institutions is 41% compared to 63% for all students (Postsecondary National Policy Institute, 2022).

Such disparities continue in faculty populations in the United States. AI/AN are 2% of the overall population in the United States but represent only 0.5% of STEM faculty in institutions of higher education (U.S. Census Bureau, 2012; Walters et al., 2019). In the fall of 2020, of the 1.5 million faculty in degree-granting postsecondary institutions, those who were AI/AN made up one percent or less of full-time faculty (NCES, 2022). Native mentors and role models at mainstream institutions are therefore significantly lacking, and this can impede or limit the potential for success of AI/AN in academia (Gervais et al., 2017). The focus of this project was to provide a unique attempt to understand the lived experiences of NAF-STEM to explore and identify areas of challenge and strength for this underserved and under-represented group of scholars.

This project is rooted in Indigenous Research Methodologies (Brayboy et al., 2012; Chilisa, 2019; Kovach, 2021; Smith, 2012; Windchief & San Pedro, 2019) and the four guiding principles of Indigenous research: respect, reciprocity, relevance, and responsibility (Kirkness & Barnhardt, 1991; Tsosie et al., 2022). The authors came together as participants in a National Science Foundation–funded project aimed at faculty development for Indigenous scholars in academia. The reciprocal nature of the relationships allowed a space for the participants to choose a project of their own interest. This article presents a summary of Indigenous scholars' intention to help future students considering entering academia in STEM disciplines.

NAF-STEM Faculty: Strengths and Challenges

National efforts have been made to increase institutional diversity in race and ethnicity and provide equity; however, NAF-STEM remain severely under-represented in postsecondary institutions in the United States. Challenges to the retention and success of minoritized faculty include a wide range of barriers that can occur across the academic pathway to becoming a faculty member. It is important to note that while it is beyond the scope of this article, historical sources of

inequity, impoverishment, discrimination, and historical trauma (Adelman, Taylor, & Nelson, 2013; Avalos, 2021; Brave Heart & DeBruyn, 1998; Campbell, 2008) experienced by AI/AN individuals require AI/AN scholars overcome many obstacles to successfully pursue academic careers. However, even after obtaining higher educational degrees there are obstacles to postgraduate instruction, advancement, and research (Shavers et al., 2005; Walters et al., 2019; Walters & Simoni, 2009; Zambrana et al., 2015), including barriers in becoming independent scholars (e.g., chosen to be co-investigator over principal investigator), inadequate access to culturally appropriate mentoring, disproportionate service responsibilities to communities and campuses, marginalization of their research interests, and persistent cumulative exposure to discriminatory micro-aggressions and assaults on their academic identity (Adelman et al., 2013; Brayboy, Solyom, & Castagno, 2015; Brown et al., 2022). These obstacles contribute to the commonly reported perception of being an "imposter" and being isolated in the profession (Dancy & Brown, 2011).

It is important to note that NAF-STEM share many of the same challenges to success as other minoritized colleagues. They also have assets and unique strengths as Tribal Peoples of sovereign nations with rich cultures, traditions, languages, expertise, and knowledge systems (Brayboy, Solyom, & Castagno, 2014; Lopez, 2018a; Page-Reeves et al., 2017, 2019; Reyes, 2019). This strength-based approach to understanding the NAF-STEM experience is important to developing a functional understanding of how culture and identity motivate faculty to navigate challenges and barriers to success.

For example, several research studies have shown the importance of "giving back" or desire to help community, which has deep meaning and can play a motivational role in persistence and personal success in academia for Native Americans and NAF-STEM (Brayboy et al., 2014; J. P. Guillory, 2008; R. M. Guillory & Wolverton, 2008; Lopez, 2018b; Page-Reeves et al., 2019; Reyes, 2019). Thus, serving one's community is often an expectation for AI/AN students and a goal for after graduation (Brayboy et al., 2014). Both qualitative research (J. P. Guillory, 2008; R. M. Guillory & Wolverton, 2008) and quantitative studies (Brayboy et al., 2015; Lopez, 2018b) have shown evidence that the generosity of service and scholarship reflected in the notion of "giving back" is a primary factor influencing and positively correlated with AI/AN students' persistence through college. Drywater-Whitekiller (2010) provided examples of "giving back" such as helping or addressing issues that tribes face, such as lack of high-quality teachers, mental health support, water

and other environmental pollutions. Makomenaw's (2014) study on Native students who transferred from a Tribal College and University (TCU) to a non-TCU as well as Waterman and Lindley's (2013) investigation on female Native students in higher education both indicated that AI/AN students want to "give back" because they believe that their community needs help and will benefit through their education.

Native identity was also recognized as playing an important role in the success of AI/AN scholars (Page-Reeves et al., 2017). Data analysis from Page-Reeves et al. (2017) of 40 ethnographic interviews with 21 participants revealed a number of identity-related themes. Native identity provides a source of strength, balance, and a sense of belonging, but it also contributes to feelings of conflict and tension within the STEM disciplines. Chow-Garcia et al. (2022) note that cultural identity plays a key role in Native Americans' persistence in science; identity is relational and reinforces "the concept of belonging" (562). When Native Americans entered STEM fields, their identities shifted, suggesting affective and identity related aspects of the ways Native identity must be conceptualized as foundational for NAF-STEM success (Page-Reeves et al., 2017).

Some researchers studied other factors associated with the success of NAF-STEM. Walters et al. (2019) investigated the lived experiences of AI/AN faculty at research universities and found institutional climate, mentorship, family–work balance, cultural taxation,[2] role stress, and discrimination as being important factors for navigation. Lopez (2018a) organized similar factors according to family support, institutional support, tribal community support, and academic performance. Specifically, at TCUs, faculty faced challenges of low salaries and heavy workloads; however, TCUs reported difficulty in hiring and retaining qualified faculty (Al-Asfour & Young, 2017). Al-Asfour and Young (2017) suggest ongoing professional development for faculty to address these types of challenges and provide TCU faculty with the tools they need to meet higher education standards.

Based on these studies, we formulated guiding questions that followed Walters et al.'s (2019) five themes, providing the authors who are NAF-STEM an opportunity to discuss the climate of their institution, mentorship, cultural taxation, role stress, and discrimination. We focused on the retention, career satisfaction, and the individual, self-defined success of NAF-STEM disciplines at both TCUs and a state public research university. This project examines the collective lived experiences of NAF-STEM for the purpose of providing insight into higher education through the lens of Native American faculty for

future Indigenous faculty and in helping administrators and non-Native colleagues provide enhanced opportunities for academic success for Indigenous scholars. While the four R's provided the framework for this article, a collaborative autoethnography (CAE) approach was implemented to ensure that the authors' lived experience is more accurately understood, measured, and reflected in this article.

Procedure

The CAE approach illuminates the cultural context of being NAF-STEM in higher education. "CAE privileges researchers as subjects of their own interrogations to provide critique of sociocultural phenomena" (Ngunjiri & Hernandez, 2017). "Autoethnography is an approach to research and writing that seeks to describe and systematically analyze personal experience in order to understand cultural experience . . . as a method, autoethnography is both process and product" (Ellis, Adams, & Bochner, 2010). CAE also integrates well with Indigenous Research Methodologies in the relational base among the authors in reciprocating shared experiences that are relevant in their respective settings. "Indigenous" autoethnography has also been used by some (Whitinui, 2013) in positioning autoethnography from an Indigenous perspective as a distinct method of inquiry.

Involving NAF-STEM to tell their own story began the process to form questions for an intended audience of faculty, staff, and administrators in higher education, in addition to Native students who may be considering a future academic position. The authors provided input on the questions and agreed upon the intended type of responses, the number of questions that would dictate article length, and the tone of the article. Tone is an important aspect of the questions, as the authors did not want to focus on potentially negative aspects, such as challenges and barriers, but rather on the positive aspects of being in academia. They recognized it was their choice to be where they are at, and they have compelling and important reasons for staying in their respective positions in academia.

The participants developed and answered a survey that shared their stories to both describe and explore their professional experiences as NAF-STEM at either a TCU or a state university. These narratives were gathered in order for NAF-STEM to examine and share their own experiences, for similar institutions to utilize them as an apparatus to comprehend the experiences of diverse faculty, and for future NAF-STEM to listen to the narratives of current faculty.

Table 1 Demographic Information of Participants

Participant	Tribal Affiliation	STEM Discipline	Position	Institution Type
1	Diné	Engineering	Assoc Prof*	4-year Public
2	Blackfeet/Three Affiliated Tribes	Health Sciences	Assoc Prof	4-year Public
3	Blackfeet	Natural Sciences	Assoc Prof	4-year Public
4	Hidatsa/Mandan/ Dakota/Nakota	Natural Sciences	Admin	2-year TCU
5	Salish/Navajo	Natural Sciences	Faculty	4-year TCU
6	Laguna Pueblo	Natural Sciences	Faculty	4-year TCU

Note. *Assoc Prof = Associate Professor

Participants

The authors are all participants in the National Science Foundation–funded program Willow Alliance for Graduate Education and the Professoriate (AGEP): A Model to Advance Native American STEM Faculty. AGEP exists at a number of institutions, but Willow focused specifically on the retention, career satisfaction, and the individual success of Native American faculty in the STEM disciplines. Six Native American faculty and one professional Native scholar responded to the survey that forms the basis of data for this article. All of the participants' home institutions are located in the Northern Great Plains (Montana, North Dakota, and South Dakota), but not all have tribal affiliations with Northern Great Plains tribes.

Specifically, the participants are from Northern Great Plains, Southwest, and Northwest tribal communities. Four participants are from three different tribal colleges, and three participants are from the same state institution. Two are male and five are female. Table 1 contains demographic information for each participant with additional information on their tribal affiliation, STEM discipline, position type (assistant professor, associate and full professor, administration, and faculty) and institution type (2-year, 4-year, public, and TCU).

Apparatus

The participants filled out a survey consisting of eight questions that they had worked in collaboration to create. Participants were not required to answer all of the questions, but could pass on answering some of the question(s). Responses were compiled in an online secure repository in the institution's secure Box-Cloud storage. Participants were allowed ample time to respond to the survey questions and were allowed time to add further insights after completing their survey questions. The eight questions were as follows:

1. What brings you the most satisfaction with your current position?
2. What inspired you to be within academia?
3. Benefits to community can be diverse. Examples of community are institutional community, tribal community, local community, scientific community, etc. What impact do you believe you have or want to have on your community?
4. What unique challenges as a Native faculty member are important for non-Native colleagues and administrators to understand?
5. As a Native faculty member, do you feel that your research and/or teaching approach is different and being evaluated differently compared with others (e.g., non-Native faculty) at your institution or discipline? Please elaborate.
6. What transitions have you had in your professional life? What were the circumstances that prompted these transitions?
7. What helpful advice would you give to another Native considering becoming a faculty member at an institution similar to yours? What are the strategies that you use to sustain or thrive in your daily work?
8. How often do you travel? How many classes do you teach? How many committees are you serving? (for informational purposes) Do you feel this is more, less, or on average compared with your non-Native colleagues?

Analysis

Question responses were collected and read by the authors to gain initial impressions, identify similarities and differences, gauge participant tone, and identify general themes. A more formalized process was then used to categorize the agreed-upon themes along with responses to each question. Quotations from each section were categorized into

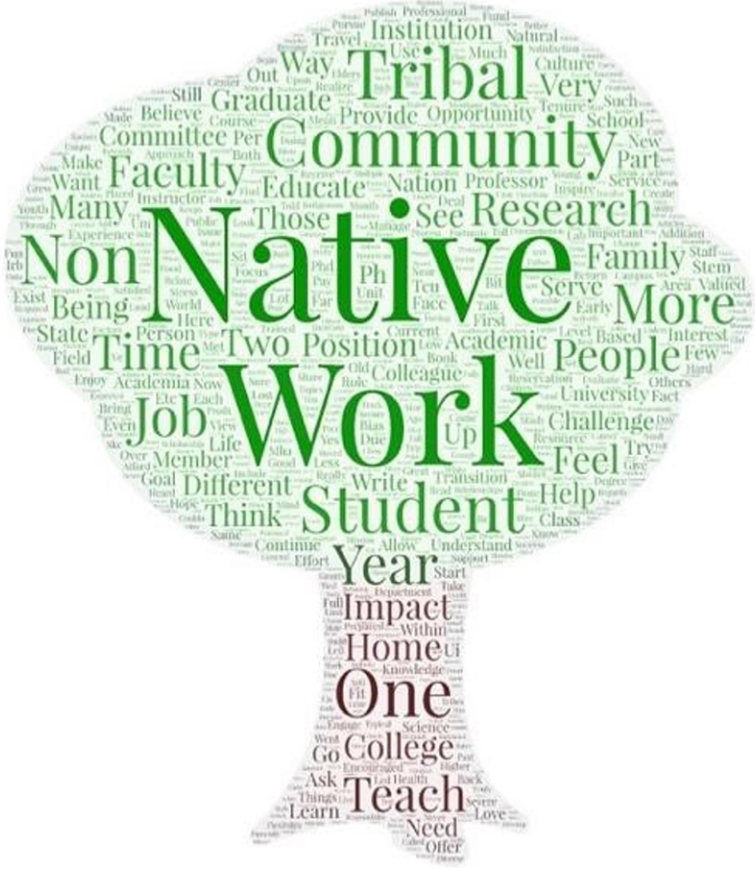

Figure 1. Word cloud developed from all seven responses from participants shows relative frequency of word choices. The term "Native" was most frequent, indicating that identity is a critical component to the experience of NAF-STEM.

various themes, first by one author and then verified by another author through discussions on placement of these quotations. For example, one author analyzed all the responses for "What brings you the most satisfaction with your current position?" and placed sections of these responses within the charted themes. Another author simultaneously analyzed the same responses to these questions and their placement in the chart and discussed any disagreements or additions until a general consensus was reached.

In addition, responses from the seven surveys were uploaded to an online word count generator, https://www.wordclouds.com. Once frequency word counts were generated for all the survey responses, and words with counts of less than 10 were eliminated, a word cloud was generated based upon the frequency of thematic topics and concepts (see Figure 1). The word cloud highlighted patterns and themes based on the frequency of words. This analysis is presented in the Reflection section, along with the voice of the respondents.

NAF-STEM Voices

Indigenous scholarship exists at the intersection of many sources of identity and strengths. Native American scholars balance intersectional identities including: gender and generation; community (urban, rural, or reservation); and professional disciplinary identities at a TCU or at a state or private university. Our findings include narrative accounts highlighting NAF-STEM efforts to navigate the complex environment of higher education and opportunities. This included sources of professional and personal inspiration that motivate and inform our works in higher education; our responsibilities to our home and Native American communities in general; and the challenges working with non-Native colleagues. These challenges include a complex constellation of factors that must be successfully balanced to addressing different expectations between Native and non-Native faculty, Native community, and service. The findings included several thematic sources of insight for key stakeholders seeking educational equity for NAF-STEM.

Relationships

Relationship was found to provide the most satisfaction to current positions and have lasting effects. Relationships were defined in inclusive ways to include both home Indigenous and academic communities. This included relationships with students and youth, relatives and Elders, and/or faculty and colleagues. Developing and maintaining good "professional relationships with people and programs across our reservation that I am able to collaborate with on various activities/events . . . is important because we are building and maximizing relationships and resources." Relationships between NAF-STEM and Native students share a positive familiarity. "One important difference in student-instructor interactions is a similarity in life circumstances. An

ability to relate to a student's strengths and weaknesses is an important ability to retain and graduate students."

Relationships inspired individuals providing important motivation as evidenced by the following responses: "My father help[ed] me understand how to be a problem solver." "Two faculty members inspired me to be in academia. . . . They encouraged me to consider pursuing a higher education and provided consistent support over the years." "Elders that I worked with encouraged me." "I was inspired . . . by a handful of my tribal college faculty instructors. . . . These instructors were encouraging and understanding of my views and aspirations."

Community

Sources of shared inspiration to work within STEM fields in higher education included Indigenous people and our communities. Some "wanted to work at a tribal college—because of the way they provide direct services to the community. Everything we do is supposed to be for [our tribal] Nation." Others feel we are "securing a future" for our people. At both the TCU and state level, the community of individuals such as family members, advisers and professors, colleagues, students, and Elders not only served as inspirations but as mentors who all contributed to our decisions to pursue STEM fields and work in academia. "My father ultimately was the personal driving force behind my chosen academic pathway. He was an incredible person with vast knowledge about culture, health, spirituality, compassion, and humor."

Teaching and learning from these communities contributed knowledge and skills to the community, including preservation of traditional values, cultural understanding, and natural resource management. "Helping bring knowledge to our Native communities is a highlight to my work." "I coordinate community activities that are centered around culture and language." "I found that I really enjoyed teaching students and helping them understand the material in class. It was originally the teaching aspect and working with students that inspired me to continue in academia."

Collaborative efforts with community brought satisfaction, gratitude for the experiences, and positive impacts. "Being in a unique position as a Native faculty in a STEM field has opened doors in Native communities that are not available to everyone." "I feel very fortunate to . . . share opportunities with tribal communities in our region and nationally."

Importance of Native Identity

All NAF-STEM have had different experiences transitioning into current positions and current institutions working within STEM fields. Some chose to return to home communities to work, whereas others chose to work in a public research university or institution that is not located in their hometowns, yet most found ways to collaborate with and/or serve communities with their scholarship. "I wanted to work for my own people at my tribal college because of the positive impact my experience at our tribal college had on my life as a student, community member, faculty, and staff person."

Some find that there is an added responsibility due to Native identity surrounding contributions in a higher education setting. "I believe that I have had some small impact on my institution in regards to cultural understanding and humility." "I hope that I provide my community with a skill set that will enhance our strengths while encouraging the application of our traditional values and virtue."

Sometimes this added responsibility can become overwhelming. "We evaluate and balance many values a lot of the time. Like balancing often conflicting spiritual /cultural values (like what's the right way to conduct and relate to other people, which can take time and effort to build meaningful relationships, etc.), modern values (keeping up with the pace and ambitious outputs of people in STEM, fast pace, quick turnaround and accomplishment/numbers orientated outcomes). We feel the weight of our people, our ancestors, our relatives and people who have fought hard for our existence in today's world."

"The level of responsibility that sits on our shoulders is and can be intense. Like you are doing "x-y-z" not only for yourself but for your family and your relatives."

Reciprocity

Feeling a sense of "responsibility to Native students . . . and to Native communities" led to desire to give back and reciprocate services to them. "Being able to make somewhat of an impact in tribal communities . . . through collaborative efforts bring great satisfaction and inspires me."

NAF-STEM participants had similar beliefs and feelings that they were working to benefit their communities as they worked within STEM fields. A commonality was an altruistic sense of responsibility to their communities and Native American people, in general. "I felt

really satisfied 'giving back' through scholarships and job opportunities" that were received in our education. "Keeping track of every dollar received in scholarship assistance contributed to the goal of giving that back to other Natives upon graduation. Within a few years I was able to accomplish that goal." "I also want to impact our tribal community in ways that preserve our traditions and help maintain our connection to our landscapes." "I am working for my people. I am helping my current students. I am preserving and perpetuating my peoples' knowledge and beliefs. With those things in mind, I am securing a future for my people. We will continue to exist."

There is also a desire among NAF-STEM to make a lasting impact with AI/AN people. "As a Native professor, teacher, researcher, and writer there are multiple layers of positive impact we have on our Native communities. The most important impact though is with the larger community that learns from my research and writing about Native people." "I know that the work I do matters to others and I am proud of the hard work I have done to try to help improve Native health. . . . I know I am truly blessed to have these opportunities and the support of my family and community."

Support

Support came from a number of sources and contributes to satisfaction felt in current positions. This support can come from those on campus and from outside of campus, allowing work in areas valued for contributions being made in those areas, and providing guidance when challenges arise. "I feel very well supported in my position so I am highly satisfied with the flexibility of my workload." "There are many factors that bring satisfaction to my life. One of the primary areas includes relationships I have with students, colleagues, and my home community. I know I am truly blessed to have these opportunities and the support of my family and community." "I enjoy the academic freedom I have. This freedom allows me to teach courses how I see fit while modifying content."

Specific relationships added to fulfillment and in some cases began with encouragement from Elders, family, and/or colleagues. "I worked with Elders for many years." "I have had a good deal of support from colleagues here and at other institutions." "My father [helped] me understand how to be a problem solver." "I feel very fortunate . . . working with other Native people and Native scientists."

Navigating Challenges

All NAF-STEM experienced challenges and barriers navigating higher education. Despite these challenges, they offered insights, advice, and suggestions for future NAF-STEM on how they may succeed in addressing some of these challenges. We examined the challenges associated with the support, or lack of support, that was experienced at some level. We also address the relationships of Native faculty with their non-Native peers and within the administration and community.

At times, such as when feeling tokenized, NAF-STEM found themselves feeling responsible for being a voice for equitable representation. "The level of responsibility that sits on our shoulders is and can be intense . . . other challenges are things like being the token Indian in a predominantly non-Native field/profession. . . . Sometimes we have to speak up to be heard and that can put us in a challenging spot to be as representative as possible."

"Other times, we have experienced lateral aggression from our home communities and non-Native colleagues." "We also can be the targets of lateral violence and aggression from both colleagues or staff on campus as well as in our home communities. These experiences can take a significant emotional toll on many Natives in academia." "Native faculty experience racism and discrimination . . . in addition to overt bias there is often jealousy over perceived special treatment. Some non-Native faculty believe that Native faculty get special treatment, such as less work, when in fact most Native faculty have more work due to added service demands."

All have had similar challenge of different expectations regarding performance and evaluation. As Native researchers, practicing inclusive research methods is valued as a way to incorporate Native perspectives in all aspects of the work, which takes more time and skills because of the importance of relationship and trust building. "I often feel that others do not have a realistic understanding of the additional time, funding, and efforts required to engage in tribal research. Using community based participatory and engaged research requires a great deal more work and consistency than more typical lab research or studies with non-Native populations. These efforts are not often recognized by the unit standards guiding promotion and tenure processes. Service is often less valued than teaching and scholarship."

The NAF-STEM agreed that representation is important but that it is equally important is to bring to light that representation is not always recognized as an additional set of tasks or expectations that is

included in evaluation. "I serve on more on-campus committees and national committees than other faculty in my unit. This is because as a Native faculty the President, Provost or Dean will ask you to sit on campus committees to add a Native voice." "Being in a unique position as a Native faculty in a STEM field has opened doors in Native communities that are not available to everyone. . . . I am often asked to be on some sort of committee, mostly to address diversity, and am one of the first people that are asked to be part of a project that has Native Americans and STEM as part of it."

Additional demands on time, expertise, and perspectives is also more complex for NAF-STEM than non-Native faculty because of intersectional identities as Native scholars who often operate in communities and systems very different from the predominantly Western higher education system. "Native faculty, who have been raised in a Native community (either urban or reservation), will have a different approach to their research and teaching that will be community and family focused. Native faculty, who have been raised within a family that practices Native religion, will have a different approach based a different world-view."

There are added challenges associated with working within research through an Indigenous Research Methodology framework. "Early on people evaluated it (my approach) with the same lens as they would evaluate Western science, now more and more people understand Indigenous Research Methodologies and approaches to solve complex problems and they realize the approach may be different than what typical scientific method involves."

Another challenge can be the disparate work duties that Native faculty face within their institution. Table 2 displays the extensive workload of this study's NAF-STEM in terms of travel time, classes taught, and committees served on. These are one form of cultural taxation that exists for NAF-STEM and reveal the differences between state institutions and TCUs.

Advice for Future NAF-STEM

The following illustrates guidance and recommendations based on the lived experiences of NAF-STEM working within STEM fields either at a TCU or public research university. The advice provided to those considering academia touches on all of the four R's—respect, reciprocity, relevance, and responsibility—and the themes of relationships, Native identity, community, support, and challenges are also discussed at some level.

Table 2 Time Commitment of the Participants

Participant	Frequency of Travel Related to Research and Service	Teaching Load	Committees Served and Comparison with non-Native Colleagues
1	Travel is increasing as career develops. About once a month. Travel is more than colleagues'.	2 classes per year due to administrative responsibilities	Also increasing more and more as career develops
2	Variable. At times very busy. Looking to decrease travel.	2 classes per year due to extramural funding and multiple guest lectures/ teaching in community.	More intensive than many other colleagues
3	Try to limit travel to academic conferences to protect research time	2 classes a semester (on average with department)	More campus and national conferences than colleagues
4	Once a month	2 classes per semester	Four Committees. The same as my non-Native colleagues
5	5 times a year	3–8 classes per quarter (on average for faculty)	2 committees (average for faculty)
6	25% of position is travel	2 guest lectures per month	Serves on at least 8 committees. This may be average compared to the non-Native colleagues

Recommendation 1: Follow Your Interests and Be Your Best Advocate "Natives interested in STEM fields should follow their interests. This might lead you to the academy but it also might lead you to working for tribal government, federal agencies or industries. If you are interested in science, work toward pursuing that interest. Sometimes though working your way through the system begins at the undergraduate level, then graduate level, then post-doc, and then being a professor. At each level there are opportunities to achieve your goals and challenges to meet those goals. Find mentors and champions. By this I mean, individuals who will be on your side when those challenges arise.

"Those people are often not Native. I have a colleague who once said that every Native PhD student and junior professor needs an 'old white man' with seniority to be their champion. At both the MA and PhD. level I found people like this who were interested in my progression as a student and in the profession. But you need to be your own advocate and your own best storyteller. If you do not believe in your research, writing, service and teaching, no one else will."

Recommendation 2: Help Your People and Travel the World "I think that becoming a Native faculty member is an incredibly important and rewarding experience. I know that the work I do matters to others and I am proud of the hard work I have done to try to help improve Native health. It is a challenging academic journey, but if I can make the journey, I know others can as well. There is so much need for brilliant Native academics and I think it is an incredible (often fun) adventure. I have been all over the Nation and even travelled internationally for my work. I know I am truly blessed to have these opportunities and the support of my family and community."

Recommendation 3: Be Prepared for Teaching at a Small College "Be prepared to do more than just teach. We are small so we are called upon to serve on multiple committees (institutional committees). There is not time built in for doing research, except maybe summer. So, if this is important to you, negotiate it in your contract. There will be no start up for a lab—unless you negotiate it, but be prepared to be told no. The majority of the administrators are non-Native. In my observation, this does result in a difference in perspectives of how the college should function. We have international faculty. This was part of the vision of the current president. There was not a well-thought-out way to use this as a learning opportunity for our people. For example, it is not clearly delineated on how having exposure to people from diverse backgrounds prepares our people/students for working elsewhere

(e.g., globally prepared—NOTE: that is a tagline the college adopted years ago but never truly developed as an initiative). If you worked at non-tribal institutions or larger institutions, be prepared for smaller class sizes. Absenteeism is an issue. We have had a trend of low enrollment. There feels like pressure from the tribal business council to increase enrollment. You may be called upon to also participate in recruitment efforts. There is not always good data management or record-keeping. This may impact you by not having access to previous syllabi. You may have to develop existing course[s] from the ground up (syllabus and readings). Talk to other faculty. Talk to students. Secure housing. Try not to commute if possible. Food is more expensive and less diverse here."

Recommendation 4: Know That Academia Is Not for Everyone "I would advise Native faculty to reconsider applying. If they were set on working at an institution like mine, I would inform them to isolate themselves from administration and focus on student engagement."

Recommendation 5: Look for the Rewards That Come With the Position "I have heard some faculty tell some not very flattering experiences about being in academia. I have also heard some students, primarily graduate students, relay stories that they have heard from faculty about being a professor. I would say, many of these stories center around tenure and being an assistant professor, and the associated stress that can go along with it. In my opinion, the tenure process is not as bad as some make it out to be. It is entirely doable, and often, is only about 5 years of your life. I think the rewards associated with being a professor that involve working with students, being able to pursue topics that interest you, and being able to make an impact where you feel most needed is realizable in academia and in few other places. There also exists flexibility in your schedule, and being at an institution does not just center around money as [in] many industry positions. There is an emphasis on learning, social issues, and ways to make society better. There is also an energy that exists on a college campus that emanates from students that you do not see in other places. As I get older, I realize more and more that I appreciate the energy and idealism that students bring, and seeing them achieve their goals and be successful is a constant encouragement to me."

Reflection

The findings in this project highlight the fact that while challenges exist and affect NAF-STEM members, as other authors have importantly

identified (Shavers et al., 2005; Walters et al., 2019; Walters & Simoni, 2009; Zambrana et al., 2015), there are also clear ways that NAF-STEM enhance the depth of knowledge and ability to effectively enhance the diversity and abilities of the higher education workforce in positive ways. Walters et al. (2019) described five domains that AI/AN faculty are required to navigate: institution, mentorship, cultural taxation, role stress, and discrimination. Findings of this study elucidated the complex and diverse pathways NAF-STEM balanced to successfully balance the domains of relationships, Native identity, reciprocity, support, community, and challenges to success.

Relationships emerged as an important theme for each of the participants. These relationships exist within multiple domains, including reciprocal relationship with communities, participation in cultural activities, mentoring students and youth, and collegial interactions. NAF-STEM faculty navigate multiple roles and contexts, and this can be a source of significant strength and motivation. Some faculty described their deep commitment to serving communities in ways that provide educational opportunity and equity to other Natives.

While such leadership is clearly a source of pride and motivation, there are also times when faculty members seek mentorship from Elders, peers, and community members. Similarly, faculty shared a desire to open opportunities to students and Native communities in academia in ways that reflected a deep connection to future generations. This is consistent with the literature on importance of "giving back" to the communities (e.g., Brayboy et al., 2014; Page-Reeves et al., 2019; Reyes, 2019). These factors contributed to the complex ways individual faculty members develop an individual identity with diverse preferences for level of independence and reciprocity in both professional and personal realms of experience. Some responses reflected the unique role Native faculty have to develop innovations in academia and the new experiences they could have and share with both students and communities. This reciprocity may reflect a more communal definition of success than is typically associated with academic success for more individualized faculty from a majority-culture backgrounds.

Similar to Walters et al. (2019), this study found that institutional climate can dramatically shape the ways NAF-STEM experience as an instructor, researcher, and a community member. Some NAF-STEM described feeling well supported by their institutions and noted that this support often led to a greater sense of accomplishment, worth, and ability to give back to communities and campus life in meaningful

ways. Others, often at smaller institutions, shared more challenges and at times felt overwhelmed by expectations with regard to teaching and service. These sources of challenges for professional development often were met with seeking mentorship. This echoed the finding of Gervais et al.'s (2017) study on the need of mentorship. Mentorship included a variety of sources and forms of support. For some, the support came primarily from family and community, while others reported a lack of mentorship support and professional isolation. Balancing family and work has become increasingly difficult, and this was revealed in clearer ways as we experienced a global pandemic.

Native faculty often have responsibilities to community and extended family beyond those that most of their non-Native colleagues have. The pressure to serve as a role model to others can add to the "typical" pressures of promotion, tenure, and success. Our study shows additional evidence on cultural taxation and role stress to the findings of Walters et al. (2019). Cultural taxation and role stress are also very tangible stressors facing Native faculty. Multiple reports of additional expectations for campus and community service highlight the ways that diverse scholars face additional stressors that can have an impact on their ability to perform as scientists, scholars, and community service providers. Finally, discrimination, both from institutional forms of racism and communal lateral violence, can create sensitive challenges unique to Black, Indigenous, and People of Color (BIPOC) scholars, including NAF-STEM.

However, the narratives of NAF-STEM are powerful as they illuminate the inspiring ways this community of scholars contributes to their respective communities, scientific fields, families, tribal nations, and students. The narratives individually and collectively reflect personally held convictions to promote the four R's: respect, reciprocity, relevance, and responsibility. Native faculty operate within multiple realities and cultures. Navigating these contexts requires adopting a respectful approach to collaborators, students, and colleagues. NAF-STEM have proven to be leaders in the promotion of scholarship that is respectful to tribal communities and collaborators, is reciprocal with regard to extramural funding and opportunities for authorship, is guided by tribal needs in education and science, and is conducted in ethically responsible ways. The unique contributions of Native faculty require innovative, sustainable efforts by TCUs and public universities that invest in academia.

Academia can invest in diversifying the voices representing STEM and beyond through thoughtful and strategic changes in the

development and support of Indigenous scholars. Advancing policies and procedures aimed at developing and actively supporting communities of NAF-STEM is critically important in effective and equitable recruitment, retention, and success strategies to advance future Native student development. Finally, it is important to situate the findings from this project to include the following limitation: these data were collected prior to the Covid-19 global pandemic. As we have all seen, AI/AN communities have been particularly affected by the pandemic due to many factors: higher rates of comorbid health conditions, crowded homes, limited access to clean water or indoor plumbing, inadequate access to healthcare, and poverty. These have all led to higher mortality rates. It is important for future studies to examine how the pandemic and the emerging national recognition of how systematic discrimination has continued to have a negative impact on all Indigenous peoples, including NAF-STEM, for the years to come.

For Prospective Native STEM Students

The responses to the questions provide Native students with some insights regarding working in academia as well as differing pathways into faculty positions. The hope is to encourage those considering academia to see themselves in these positions and identify with some of these experiences. Students should feel free to contact any or all of this article's authors to engage in further conversation. Students can work to become Native faculty, filling a dire need to make change within our institutions. Students can also advocate for increased representation for Native faculty at their institutions.

For Administrators

It is critically important that policies and directives be promoted to support diversity within university institutions. Responses from this study demonstrated that administrations at TCUs and other public and private colleges and universities are presented with unique challenges and responsibilities associated with the Native faculty on their campuses. Institutions must provide initiatives that will specifically support Native faculty so that they can be encouraged and rewarded for their efforts in recruiting and supporting Indigenous students and for engaging Native communities. Practices such as the intentional and/or focused recruitment of diverse applicants needs to be approached with caution and reflection. While such efforts in recruitment are appreciated

and, in some cases, provide unique opportunities for under-represented faculty candidates, institutions need a cohesive approach. This includes working with hiring committees and other faculty in the hiring unit to understand more deeply the intention and significance of the target hire and to provide mentorship and other support in order for Indigenous faculty to be successful.

For Fellow Native Faculty

Numerous pathways exist into and through the journey of academia, and some of our findings may resonate with or differ from other experiences. Our intent and hope in sharing this project is to show Native faculty and NAF-STEM that they are not alone. The Native American experience is diverse and filled with many exceptional sources of strength and knowledge. These foundations can provide a solid base to help strengthen community support. The authors encourage ongoing discourse to engage others in responding to the questions included in this manuscript. Together, current NAF-STEM can create pathways of inclusion that will benefit all students, faculty, and administrators in building better futures in academia.

Policy Changes

For faculty in Montana, the state's Indian Education for All (IEFA) law on K-12 and higher education has demonstrated its influence on Native American faculty and views of Indigenous STEM within academia. IEFA requires the provision of basic educational materials about the history and unique perspectives of Indigenous peoples from the region. Similar efforts are being created and pursued in other regions. In addition, land acknowledgments are important, but the community of scholars must pursue educational practices that are accessible to and inclusive of all. This is particularly true for the first inhabitants of these lands.

Some additional recommendations on institutional policies from the authors are:

- Promote stability within academic positions, such as providing tenure or tenure track positions, for both TCUs and mainstream institutions to greatly increase the sense of job security of Native faculty.
- Provide leadership opportunities for Native faculty, especially among women faculty who have traditionally been penalized for family

responsibilities or wanting to have children. This would include opportunities for them to be department chairs, college deans, president and vice presidents, principal investigators on grants, etc. Adjust position descriptions and merit/promotion review criteria to better value community-based activities, mentoring, and social justice type of work.

Gear hiring policy and search committee trainings toward more hiring of diverse candidates. Cluster hiring has proven to be a powerful strategy to recruit and hire diverse candidates for faculty positions.

For institutions in rural areas, securing housing for new faculty makes a huge difference in reducing commute times and involving new faculty in the community.

Provide professional development for faculty, staff, and administrators on best practices for mentoring diverse students, incorporating culturally relevant pedagogy into instruction, and providing learners with culturally sensitive curricula.

Develop inclusive and culturally congruent institutional environments for Native students and faculty.

Other suggestions can be found in Pete (2016).

Conclusion

An Indigenous Research Methodology aimed at establishing and promoting the four Rs—respect, responsibility, relevance, and reciprocity—within inquiry was integrated here with a CAE to highlight the lived experiences of NAF-STEM from state institutions and TCUs. The NAF-STEM authors' collaborative formation of questions that demonstrate some of the benefits and challenges of higher education, along with the responses to these questions, illustrate themes of relationship, tribal identity, reciprocity, professional independence, challenges, support, and community that the authors experienced as NAF-STEM at their respective institutions. Recommendations for students, administrators, and fellow NAF-STEM are given to provide pathways to success for Native faculty in order to increase the diversity, equity, and inclusion needed in academia.

There are unique challenges associated with being a Native American faculty member at a TCU or state institution. However, there are also unique opportunities for Native faculty to have a positive impact on higher education, Native students, tribal communities, and also non-Native peers and administrators. Slow and steady progress is

being made in educating and influencing academia in Indigenous practices; however, more Native faculty are needed, and institutions need to take more steps to advance Native STEM education.

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ACKNOWLEDGMENTS

Research reported in this publication was supported by the National Science Foundation (NSF), Directorate for Education and Human Resources (EHR), Division of Human Resource Development (HRD), and the U.S.D.A. Forest Service. This is an AGEP-T: Alliances for Graduate Education and the Professoriate–Transformation under HRD grant #1723248 (University of Montana), #1723006 (Salish Kootenai College), and #172319 (Sitting Bull College). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation or the U.S.D.A. The authors would like to acknowledge Dr. Salena Hill and Dr. Ranalda Tsosie for their generous contributions toward the development of this manuscript.

NOTES

1. Here, we use terms such as *American Indian, Alaska Native, Native American, Native,* and *Indigenous* interchangeably, rather than using terms specific to our respective tribal communities. We acknowledge the great diversity that exists within our distinct cultures, languages, and traditions. For more on accurate terminology, see, https://americanindian.si.edu/nk360/informational/impact-words-tips.

2. Padilla (1994) coined the term "cultural taxation" to describe the extra work and unique burden placed on people of color as unofficial diversity consultants for their respective institutions without compensation for these tasks.

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