
Panel Session 3: Supporting Women of Color in Tech Throughout their Careers

Native American Women & Indigenous Models for Success

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Degrees Conferred to Native Americans by Degree Level, Discipline & Gender, 2015

	Total (All / Women)		Science & Engineering (All / Women)		Computer Science (All / Women)	
Bachelor's Degree	9,697	5,841	3,930	2,413	281	62*
Master's Degree	3,116	2,006	795	523	53	13
Doctoral Degree	130	72	70	40	1	0
Source: National Science Foundation (2017)						
*Represents 0.1% of total C.S.						

Underrepresentation of Native women in Tech

Key Factors

- Financial aid
 - Highest poverty & unemployment rates in U.S. (U.S Census Bureau, 2012)
 - Predictor of college student success (e.g. Cabrera et al., 1992; Museus, 2010)
- Major health challenges
 - Highest rates of poor health, including rates of diabetes, substance abuse, suicide (e.g. Kaiser Family Foundation, 2013; National Drug Intelligence Center, 2008)
- Challenging coursework
 - Less resourced schools, often led to inadequate academic preparation (e.g. McDonough, 1997; Perna & Jones, 2013)
- Feelings of self-doubt
 - Psychological factors such as self-concept and self-efficacy are connected to STEM success (e.g. Hurtado et al., 2007; Leslie, McClure, & Oaxaca, 1998).

Success of Native Women in Tech

Key Factors

- Family
 - Benjamin, Chambers, & Reiterman, 2010; Guillory & Wolverton, 2008; HeavyRunner & DeCelles, 2002
- Strong Internal Motivation
 - Psychological factors such as self-concept, self-efficacy, interest/commitment to STEM, & aspiration & expectations to earn STEM degree are connected to STEM success (e.g. Chang et al., 2008; Gloria & Kurpius, 2001).
- Interactions with Native support programs
 - Museus & Ravello, 2010; Palmer & Gasman, 2008; Pascarella & Terenzini, 2005; Solorzano, Ceja, & Yosso, 2000
- Participation in STEM-specific opportunity and support programs
 - Bridge, mentoring, AISES, research, coop work experience (e.g. Hrabowski & Maton, 2009; Hurtado et al., 2007)
- Connection between cultural identity and ongoing work
 - Larimore & McClellan, 2005; Lee et al., 2010

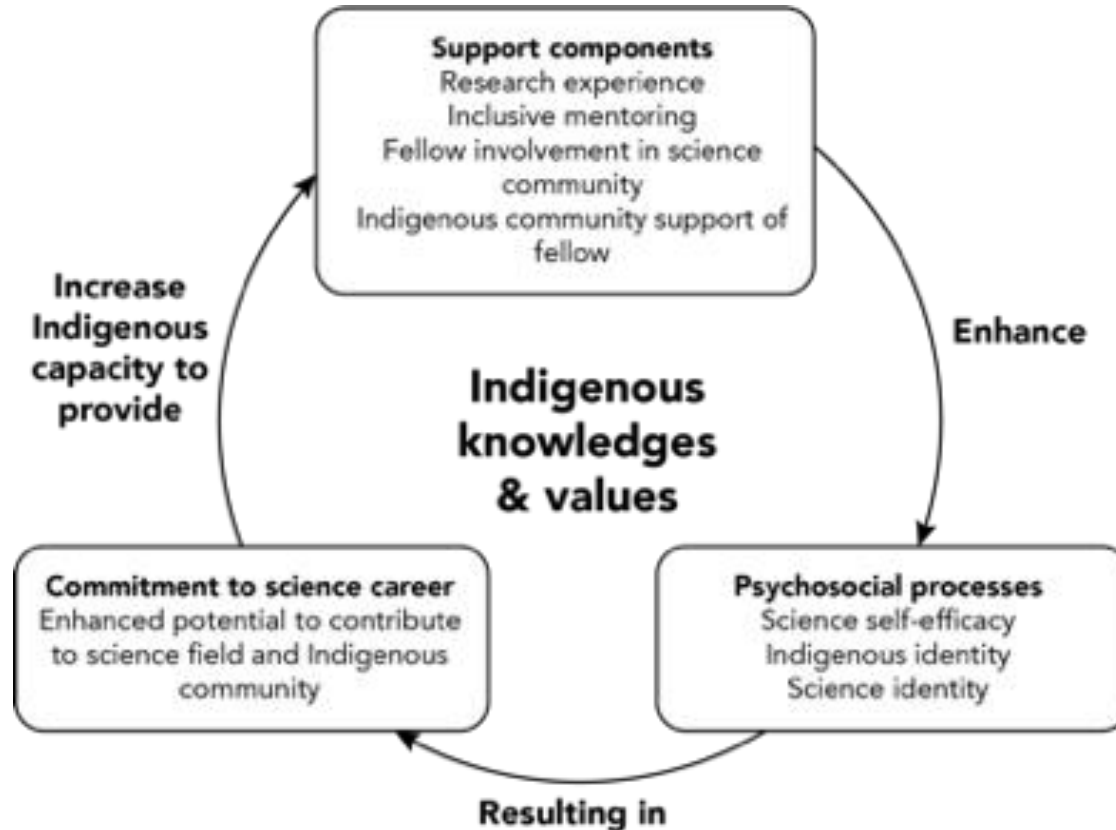
How can institutions, government agencies and non-governmental organizations contribute to the success of Native women in tech?



Support Native Women in Tech by:

- Fund culturally-tailored/Indigenous-centered programs along the K-12 through professional trajectory
- Encourage/provide programmatic and mentoring guidelines
 - Indigenous STEMM Internship Model
 - Guidelines for supportive mentors of Native mentees (Chow-Garcia et al., 2020)

Indigenous STEMM Internship Model (ISIM)



Culturally-Tailored Research Programs:

Methods used by each program for mentor pairing, professional/ social networking, & cultural inclusivity

	NARI	UNM CURE/UPN*	NIH/NINDS
Mentor Pairing	Eight weeks prior. To arrival, the participants were provided information about each of the research mentors and corresponding research project and ranks their top five. Program Administrator interviews each accepted applicant to ensure good placement.	Program Administrators identified available mentors in the UNM School of Medicine, Cancer Center, and main campus. Lab mentors selected applicants based on their research interests, availability, and qualifications.	Participants were encouraged to identify research mentors from the NIH websites. Program Administrators identified qualified NIH mentors and placed interns based on applicant's interests.
Professional Networking	Laboratory-specific activities that vary across the campus; interactions with AIAN community and tribal leaders through the Utah Division of Indian Affairs	Weekly luncheons with AIAN professionals from UNM and outside organizations in the NM area	Laboratory-specific activities; visits to the CNAY; luncheons with senior AIAN professionals outside of NIH; local AISES chapter events; SACNAS potluck during NIH "Native Visit Week"; HHMI 3-day phage program at UMD
Social Networking	Visits with the local Urban Indian Center of Salt Lake's Summer Youth program	Weekend trips	Laboratory-specific activities; weekend trips to Smithsonian museums; BBQ with local AIAN professionals
Cultural Inclusivity	Traditional blessing from the Confederated Tribes of Goshute's spiritual elder; students and program administrators participate in various national conferences and organizations throughout the year. SACNAS, AISES, American Diabetes Association: Scientific Sessions (ADA), Native Research Network (NRN), Association of American Indian Physicians (AAIP), National Congress of American Indians, International Meeting on Indigenous Child Health, American Academy of Pediatrics	Calendar projects that includes the interns' research in relation to their communities- calendars are provided to the students at the end of the summer; sponsorship to present their summer research at AISES or SACNAS in the fall	Journal club that includes literature related to AIAN health disparities; end-of-summer dinner with traditional foods prepared by the students; traditional blessings from the students in their Native Language.

*AIAN students participated in the same activities as the CURE students; Other UPN activities were not provided by the program coordinator.

For additional information, please contact the individual program coordinators via the contact information online.

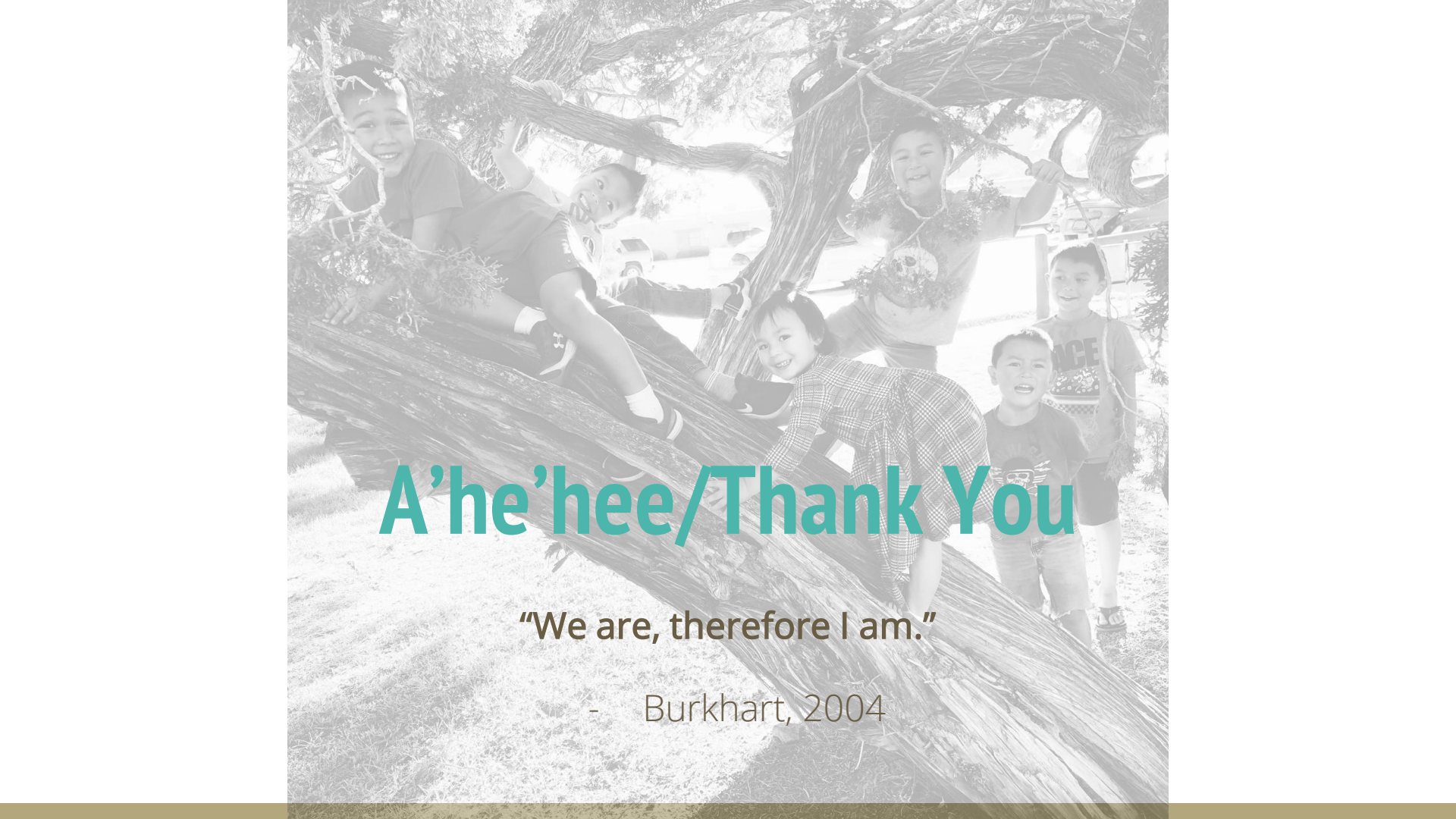
Guidelines for supportive mentors of Native mentees

<i>Guidelines</i>	<i>Practical examples</i>
1. Engage mentees in active, hands-on science	• Lead with the purpose or goal, rather than background reading. • Build mentee laboratory skills quickly to ensure participation in laboratory activities.
2. Identify mentee potential and develop it	• Show interest in mentee's reasons for pursuing STEM. • Share the purpose and implications of the research so that the mentee can decide if they find it interesting. • Ask mentees for their own thoughts and interpretations.
3. Develop relationships and sense of belonging with mentees	• Show interest and care about their development • Share examples of your own failures and uncertainties about your career path, and model how to learn from failed attempts.
4. Support diversity in general and Indigenous identity in particular	• Encourage mentee participation in their own cultural norms and traditions, even if it means time away from the lab. • Encourage mentees to share—if they feel comfortable doing so—the sources of their interest in STEM, as these are often intertwined with Indigenous identity. • Many Indigenous mentees wish to return and serve their communities. Be supportive of their choices.
5. Recognize the significance of Indigenous mentorship and strive to provide this support for mentees	• Encourage mentees to interact with other AIAN STEM professionals, both locally and at AIAN-focused conferences. • Talk to mentees about their futures as mentors.

On being a Native female scientist...

Naomi Lee (Seneca), Ph.D.
Assistant Professor, NAU





A'he'hee/Thank You

"We are, therefore I am."

- Burkhart, 2004

References

- Benjamin, D.P., Chambers, S., & Reiterman, G. (2010). A focus on American Indian college persistence. *Journal of American Indian Education*, 32(2), 24-40.
- Cabrera, A. F., Nora, A., & Castañeda, M. B. (1992). The role of finances in the persistence process: A structural model. *Research in Higher Education*, 33(5), 571–593.
- Chang, M. J., Cerna, O., Han, J., & Sàenz, V. (2008). The contradictory roles of institutional status in retaining underrepresented minorities in biomedical and behavioral science majors. *Review of Higher Education*, 31(4), 433–464.
- Chow-Garcia, N., Lee, N., Svihla, V., Glaser, C., Willie, S., Holsti, M., & Wandinger-Ness, A. (2020). Cultural identity central to Native American persistence in science. Manuscript submitted for publication.
- Gloria, A. M., & Robinson Kurpius, S. E. (2001). Influences of self-beliefs, social support, and comfort in the university environment on the academic nonpersistence decisions of American Indian undergraduates. *Cultural Diversity and Ethnic Minority Psychology*, 7(1), 88.
- Guillory, R.M., & Wolverton, M. (2008). It's about family: Native American student persistence in higher education. *The Journal of Higher Education*, 79(1), 58-87.
- HeavyRunner, I., & DeCelles, R. (2002). Family education model: Meeting the student retention challenge. *Journal of American Indian Education*, 41(2), 29-37.

Hurtado, S. (1992). The campus racial climate: Contexts and conflict. *Journal of Higher Education*, 63(5), 539–567.

Hurtado, S., Han, J.C., Sáenz, V.B., Espinosa, L.L., Cabrera, N.L. & Cerna, O.S. (2007). Predicting transition and adjustment to college: Biomedical and behavioral science aspirants' and minority students' first year of college. *Research in Higher Education*, 48(7), 841–887.

Hrabowski III, F. A., & Maton, K. I. (2009). Change institutional culture, and you change who goes into science. *Academe*, 95(3), 11-15.

Kaiser Family Foundation. (2013). Health coverage and care for American Indians and Alaska Natives. Retrieved from <http://kff.org/disparities-policy/issue-brief/healthcoverage-and-care-for-american-indians-and-alaska-natives/>

Larimore, J.A., & McClellan, G.S. (2005). Native American student retention in U.S. postsecondary education. *New Directions for Student Services*, 109, 17-32.

Lee, J., Donlan, W., & Brown, E. F. (2010). American Indian/Alaskan Native undergraduate retention at predominantly White institutions: An elaboration of Tinto's theory of college student departure. *Journal of College Student Retention: Research, Theory and Practice*, 12(3), 257-276.

Leslie, L. L., McClure, G. T., & Oaxaca, R. L. (1998). Women and minorities in science and engineering: A life sequence analysis. *Journal of Higher Education*, 69(3), 239–276.

McDonough, P.M. (1997). *Choosing colleges: How social class and schools structure opportunity*. New York, NY: State University of New York Press.

Museus, S. D. (2010). Understanding racial differences in the effects of loans on degree attainment: A path analysis. *Journal of College Student Retention: Research, Theory & Practice*, 11(4), 499–527.

Museus, S.D. & Ravello, J.N. (2010). Characteristics of academic advising that contribute to racial and ethnic minority student success at predominantly white institutions. *NACADA Journal*, 30(1), 47-58.

National Drug Intelligence Center. (2008). Key findings- Indian country drug threat assessment 2008. Retrieved from <https://www.justice.gov/archive/ndic/>

National Science Foundation. (2017). Science and engineering degrees by race/ethnicity/gender. Retrieved May 31, 2020, from <https://ncesdata.nsf.gov/sere/2015/>

Palmer, R. T., & Gasman, M. (2008). 'It takes a village to raise a child': The role of social capital in promoting academic success for Black men at a Black college. *Journal of College Student Development* 49(1), 52–70.

Pascarella, E. T., & Terenzini, P. T. (2005). *How college affects students: A third decade of research*. San Francisco, CA: Jossey-Bass.

Perna, L.W., & Jones, A.P. (2013). The state of college access and completion: Improving college success for students from underrepresented groups. New York, NY: Routledge.

Solórzano, D. G., Ceja, M., & Yosso, T. (2000). Critical race theory, racial microaggressions, and campus racial climate: The experiences of African American college students. *Journal of Negro Education*, 69(1/2), 60–73.

U.S. Census Bureau. (2012a). American Community Survey. Washington, DC: U.S. Government Printing Office.