Indigenous Leadership

Karletta Chief, PhD, Diné
Hometown: Black Mesa, AZ, Navajo Nation
Reported by Gilbert Lujan Rivera, Jr.

Dr. Chief in her office at the University of Arizona, Soil, Water & Environmental Sciences (Photographed by Gilbert L. Rivera Jr.)

Dr. Chief is Assistant Professor and specialist in the Department of Soil, Water, and Environmental Sciences (SWES) at the University of Arizona. She earned Bachelor of Science and Master of Science degrees in civil and environmental engineering from Stanford University and holds a PhD in hydrology and water resources with a minor in SWES from the UA. She completed a post-doctoral fellowship at the Desert Research Institute in Las Vegas, where she worked on large-weighing lysimeters. The goal of Chief's current research is to improve predictions and understanding of systems that collect, store, and release water to common outlets. She works to improve tools and environments associated with this system, as well as further understanding how natural and human disturbances may affect soil hydrology. Another aspect of Chief's research focuses on climate change and its effect on indigenous communities. By working with other hydrologists and social scientists, she works to identify and mitigate environmental risks for vulnerable populations. Chief is an advocate for indigenous communities as she works to bring relevant science to Native American communities in a culturally-sensitive manner.

Q: How did you become interested in environmental health sciences?

I became interested in engineering and environmental sciences because I grew up in a mining community. My family lives about five miles from the Black Mesa Coal Mine Complex on the Navajo Nation. Growing up, my family was directly impacted by mining through forced relocation, water contamination, and health impacts such as black lung disease and cancer. As a young adult, I translated basic information related to living in a coal mining community for my family into Navajo. I wanted to pursue environmental sciences and engineering so that I could use my knowledge to help my family and community address mining impacts to people and the environment and to help raise concerns and give a voice to the community.

I always enjoyed math and science. I remember as a third-grader I liked doing minute math. When I got to college I knew I wanted to pursue engineering or science based on my past experiences. I chose to major in civil and environmental engineering because it combined engineering and science to address environmental impacts. Studying environmental engineering made me more interested in hydrology and water resources. As a doctoral student, I decided to study groundwater and, because I wanted to connect surface water to ground water, I decided to focus on unsaturated flow of groundwater and soil physics.

Indigenous Prespectives on Sustainable Water Practices

The University of Arizona's Water Resource Research Center (WRRC) hosted its annual conference in June 2015 with the Gila River Indian Community at the Wild Horse Pass Hotel and Casino in Chandler, Arizona. The conference sought to address four main points: 1) What can be learned from Indigenous perspectives on water; 2) How can this knowledge be used to improve water management; 3) To explore water stewardship, challenges, and achievements with tribal water leaders; and 4) To reflect on Indigenous traditions in caring for agricultural lands and riparian areas as a guide to creating Arizona's water future.

Q: What advice do you have for native youth?

I encourage native youth to pursue higher education by going to college. Students interested in the STEM fields should know that it is not just purely math and science, but that there is a wider application to people and how they could use science to protect the environment, people, and animals. There are many opportunities for students to pursue higher education and to advance themselves and pursue the interests they feel passionate about.

To be prepared for college, I would advise students to pursue every opportunity that is available to them in their school systems – like academic programs, summer programs, field trips, extracurricular activities – and being proactive and well-rounded with these activities. My parents were not able to seek out those opportunities for me because they did not speak English or use computers. If parents are able to use a computer, I would advise them to help their child find these opportunities.

Q: Is there a cultural aspect to the type of work you do?

There is definitely a cultural aspect in the sense that tribes and indigenous people have a very strong connection to the natural environment. The way they view and value the environment is very unique. Indigenous cultural values should be considered in the way the environment is protected and managed and how environmental science is applied.

Q: What is the value of students returning to their hometowns or working for their nations after graduation?

For any individual, there is opportunity to help themselves and their communities, especially for Native American students. Because their culture is very connected to the environment, they can continue to practice their value of the environment through pursuing education in the sciences so that they can also have a tool to help them protect the environment and to help their people protect the environment.

Q: What are your goals and what do you hope to accomplish?

My overall goal is to bridge science with the needs of the community. To help the community, together, by identifying and prioritizing the solutions to challenges facing them so they can maximize the benefit.

Q: What does a typical day in the life of Dr. Chief look like?

I am a mother so I have to balance my two babies, three and one, with work. My day starts pretty early – I get my 3-year-old up and ready for school, then my 1-year-old gets up shortly after. Once they are situated, I get to campus and might have meetings with my collaborators, the four students I advise, my lab manager, meeting new students, committee meetings, and carving out time for my own research. This includes writing publications, working on manuscripts towards submission to journals, and writing grants. I also do some administrative stuff like checking my email – I'm always behind on my email – balance my work and family calendars. I try to be as efficient as I can with my work. I usually have to leave by four so I can pick my son up from school. I get home and make dinner, feed my family, color and read to my children. In the evening, I usually do family stuff. Once they are asleep, usually 10 p.m. I sometimes do my own work if I have pressing deadlines, staying up until 12 or 2 a.m.

My off-campus day consists of traveling. As a professor, I have extension responsibilities since I am in the College of Agriculture and Life Sciences. As a land-grant university, we have a mission to reach out to the community. I primarily reach out to tribes, but I also have non-tribal stakeholders. I work with them on different projects mostly related to water management. I present at state and national conferences sticking to my mission of bridging the science with the community. Because I am a mother with young kids, I try not to be gone for more than three days. I do travel internationally, my most recent trip was to Central Mexico with the superfund program as we're starting to work with Indigenous communities in North America on mining impacts.

Dr. Chief presenting on her current project at Northern Arizona University's 2016 Tribal Environmental Health Summit (Photographed by IngriQue Salt).