



Research Experiences for Undergraduates (REU)

This summer, three of our Alliance institutions (MSU, UM, and WSU) are hosting, mentoring, and training Native American students from multiple universities.

Montana State University

Mariah Friedlander, Confederated Salish and Kootenai Tribes

Currently I am at Montana State University conducting research in [Dr. Eric Boyd's lab](#) to gain experience working alongside graduate students in a microbiology lab. My experiments have involved growing a thermophile using a sample that was taken from a hot spring in Yellowstone National Park. The thermophile is being grown in 4 different mineral and sulfur media. I will be observing cell growth and activity under each of these conditions.

I am very interested in graduate school. I have always wanted to gain enough knowledge or resources to help people. I am interested in pursuing a career in the sciences because I feel I can contribute to research that will encourage other indigenous people to seek careers in biomedical science and help others understand we have a place in research.

The highlights of this experience has included exposing myself to a graduate-level research environment. I am learning how to think on a graduate level, seek a project out that interests me, and learn how to formulate and ask questions that will help me along my journey toward a career in the biomedical sciences.

NIH Bridges to the Baccalaureate (“Bridges”)

Bridges is a partnership between Montana State University-Bozeman (MSU) and Montana’s seven tribal colleges. Overseen by MSU's [American Indian Research Opportunities](#) program and an advisory board of faculty/staff from the State’s seven tribal colleges, the program is funded by the National Institutes of Health (www.nih.gov). The program’s goals are to:

- Build a seamless educational experience between Montana's seven reservation-based colleges and MSU.
- Increase the number of Native American students successfully transferring from two-year tribal colleges to MSU *and* pursuing academic studies in the biomedical, behavioral health, and/or other health related sciences.

Each summer, Bridges students spend eight weeks at MSU participating in academic enrichment activities and cutting-edge research alongside faculty mentors and their lab teams. In the process, supportive communities of learners are created between students and faculty at Montana's tribal colleges and MSU faculty mentors/students.

This summer six tribal college students representing Chief Dull Knife College, Little Bighorn College, Aaniiih Nakoda College, and Fort Peck College are participating in the Bridges program.

Two students' experiences are highlighted below:

Teeah Roberts (Gros Ventre) from Hays, MT:

I currently attend Aaniiih Nakoda College and plan to transfer into the College of Nursing at MSU-Bozeman. I love learning about the brain; it has always been one of my interests. I am currently working in [Dr. Steve Stowers' Cell Biology and Neuroscience lab](#) on the MiMic project. After this research experience, I plan on completing my nursing degree and making neurology my primary focus. My interests in pursuing a professional degree have been furthered by all I am learning this summer about human anatomy and the brain. I have always wanted the opportunity to work in a cell biology/neuroscience lab. I have now adopted my lab's saying, "Science doesn't have a timeframe or a holiday."

Kylee Rose Azure (Sisseton Wahpeton Oyate Sioux, Enemy Swim District) from Fort Belknap, MT:

I am majoring in Plant Biology/Pathology at Aaniiih Nakoda College and aspire to obtain a graduate degree in botany/ethnobotany and teach about traditional plants. Knowledge of traditional plants is being lost and I can't sit back and watch that happen; something needs to be done. I chose to work in [Dr. Martin Lawrence's lab](#) in the Department of Chemistry/Biochemistry in order to become more comfortable with chemistry as well as being on the campus of my future university. As part of my research, I am cloning open reading frames in the SSV9 virus. I am really enjoying working in a real chemistry lab and living in this beautiful town.

University of Montana

REU Montana (REUM): Environmental Chemistry for Indigenous Students

Professors Aaron M. Thomas and Earle R. Adams from the Department of Chemistry at the University of Montana lead a summer REU (#1359440) program, which is built around environmental chemistry with a primary objective of recruiting Native American students in the physical sciences and providing them with a relevant research experience. The program is designed to include a writing experience, an industrial overview of a green industry, and personalized, well-focused research experiences that will broaden their depth of understanding in a STEM field.

Laura Arthur

I am Northern Arapaho and I live in Ashland, MT. I am an undergraduate in Chemistry with a minor in Statistics. I chose this REU as it gives me exposure to applying Chemistry to real world things; recently, I have been working on synthesizing compounds in the lab. Attending this REU made me interested in graduate school because I was working in the lab and I could see the purpose of the projects going on there; I see that they try to help solve big issues. My experience has been great, I learned how to use the NMR (nuclear magnetic resonance); using the Biotage for the compounds seemed intimidating at first, but I came to a better understanding that it's liquid chromatography, it separates it to get a closer look into the purification process.

Kimberly Stewart

I am Yakama, and I live in Toppenish, WA. I am an undergraduate in Environmental Science. I chose this REU because of its focus is environmental. Currently, I have been collecting water samples on the Blackfeet reservation to analyze for radioactive waste. After attending the REU, I'm very interested in graduate school because I see my mentor (an enrolled member) is making a positive lasting impact on her community. The highlight of the experience has been to be able to mix traditional ecological science with scientific ecological science.

Lisa Spang

I am Northern Cheyenne/Blackfeet and I live in Lame Deer, MT. I am an undergraduate in Parks, Tourism, Recreation and Management with a minor in Wildlife Biology. I chose this REU because it seemed like a great opportunity to get some real hands-on experience of working in the lab. I have been working on confirmational bias in the denatured state endamble of UBa(1) linked to cytochrome- c' at the N-terminus as a scaffold and used mutagenesis to synthesize in our histidines at accessible surface residues and pre-formed experiments like pH titration, Guanidine Hydrochloric melt and stopped-flow for kinetics to find out where confirmational bias is occurring in the folding of the protein. I am interested in graduate school and the most contributing factor has to be that I love science and studying how science and nature go hand in hand. I would like to stay in a field of study where I don't have to give that up. Some of my highlights of this experience have to be all the new things I've learned just working on my project alone, like all the instruments used to perform the experiments on my mutants, and learning about protein folding and residual structure. Also the new friends and memories I have made here.

Curtis Williamson

I am Blackfeet and I live in Heart Butte, MT. I am an undergraduate in an Associate of Arts program. I chose this program because of the feeling behind the program that you got when looking through their website and then meeting and talking with the people in charge of the program; they make you feel welcome and at home. Also, the feeling of culture and pride in the program. I have been working on a low cost internet enabled PM 2.5 sensor that picks up dust, smoke and among other things in the air to see how healthy the air we are breathing in everyday is. I am interested in going to graduate school after working in the organic chemistry lab and

seeing all the time and hard work that goes into their research. It gives me a good feeling working alongside some of the most passionate people who are always willing to teach you about their work, and seeing how their research can help others. One day my own research can help others too. The highlight would be working with some great mentors, seeing the great impact they bring to your life through teaching and research, and also building a good friendship with them. The people I met in the program and friendships I'm building will last a lifetime. I've learned about both the challenges and rewards of doing research.

Washington State University

Skyar Lynch, Cherokee



Originally from Denver, Colorado and currently attending Bard College at Simon's Rock in Massachusetts, Skylar is double majoring in Biotechnology and Ecology. With mentor Seanna Hewitt she has been researching the effects of ripening compound 1-MCP in an effort to determine how Anjou pears (*Pyrus communis*) can overcome its negative effects, ripen at the desired time, and reduce postharvest losses.

I have very much enjoyed my work here in the lab. I have learned a lot from my wonderful mentor, Seanna Hewitt! She has helped me learn protocols for RNA extraction, and has allowed me to work with her on her main project that will be her doctoral dissertation. She has trusted me to have the freedom to take the project in a couple of different directions, and to add my own ideas to the process.



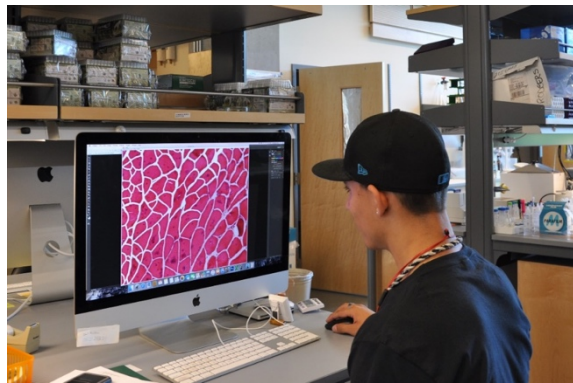
Jay-J Jones, Nez Perce



From Federal Way, WA, Jay-J is a rising senior studying Kinesiology at WSU and has been busy researching the physiological differences between wild-type male and female mice (C57BI-6 strain); specifically, by measuring their respiratory function when they exercise. Through his research, with the guidance of his mentor Bert Tanner, he has gained a better understanding of basal metabolic rate, exercise metabolic rate, and muscle function and how each may play a factor in discovering cures for degenerative diseases

such as heart disease, osteoporosis, and muscular dystrophy.

After he graduates in the spring of 2018, Jay-J definitely sees graduate school in his future so that he can research cardiac muscle and skeletal muscle and their interactions with calcium. He also hopes to have the opportunity to work with baseball players to discover a way to prevent UCL (Ulnar collateral ligament) injuries. Being a player himself, he possesses a strong passion to make sure that those like him maintain their ability to play out on the field.



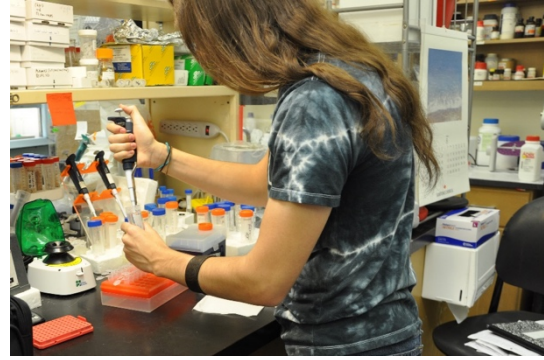
Hunter Sagaskie, Cree and Ojibway



Cree and Ojibway from Memphis, Michigan, Hunter Sagaskie is studying Biochemistry, Sociology, and American Indian Studies at Central Michigan University. Alongside his mentor Matthew Marcec, he has spent the majority of his summer uncovering the mechanisms behind calcium signaling in plant innate immunity. Which plant you ask? Hunter is examining the mutant *Arabidopsis* (*silent knight 1*, aka, *silk1*) and its inability to produce calcium and reactive oxygen species (ROS) in response to stimuli such as bacterial

and fungal pathogens.

Some of the highlights of this program would be the ability to travel, the ability to work in labs at the head of their fields of study, the connections that can be built professionally and socially, and the ability to meet different Native American peoples that I am not used to. I didn't know much about the peoples in this area, and I feel like this opportunity has allowed me to gain a better understanding of the local peoples and cultures.



Photos courtesy of Cherrise Reyes.