



## ILISAĠVIK COLLEGE RECEIVES SECOND NSF-TCUP GRANT TO STUDY MICROBES IN THE TUNDRA

Ilisaġvik College has recently received a second grant from the National Science Foundation Tribal Colleges and University Program (NSF-TCUP) for work studying microbes in the arctic tundra.

The \$200,000 two-year grant supports student research into the varieties and concentrations of microbes in the permafrost, soil, and vegetation in the nuna (tundra) around Utqiaġvik.

*Ilisaġvik College summer camp students James Toovak from Utqiaġvik, along with Tyson Phillip, Anthony Ramos, and Jamie and Trinity Albrite, all from Akiak, help Mikhail Kanevskiy of UAF drill a soil and ice sample in the tundra outside Utqiaġvik.*

Specifically, students are looking for pathogenic bacteria that may have consequences for human health as they are released by melting permafrost. Student worker Emily Weech describes it as, “hunting an animal you can’t see.”

Linda Nicholas-Figueroa, Associate Professor of Biology and Chemistry, is the Principal Investigator on the project. Apart from a year-long hiatus during the recent pandemic, the project has been ongoing for more than five years.

Students drive all aspects of the project, going out into the field throughout the year to collect soil and ice samples with a core drill. They then process the samples, isolating and culturing the bacteria, and extracting DNA. To identify the bacterial species, samples are sent out to professional biomedical labs for sequencing and analysis. Students then do further research on the properties of these bacteria.

Students are also tapped to present their findings at conferences, including the American Society of Microbiology annual meeting and the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS).

Two students, Daphne Mueller and Garrett Taylor, helped write the final report to the NSF for the first grant. Mueller and Taylor were dual credit students at Ilisaġvik, taking college courses while attending high school at Barrow High School in Utqiaġvik. Both are now undergraduate students at the University of Alaska, Fairbanks (UAF).



*Mikhail Kanevskiy of UAF discusses a piece of ice core with Iqisaqvik College summer camp students Jamie Albrite from Akiak, Violet Anniskett from Pt. Lay, and James Toovak from Utqiagvik.*

The first grant supported research into microbes that could influence plants and animals in ways that might affect the subsistence diet. Through the course of their research, students found a very direct link to health when they found *Mycobacterium simulans*. *M. simulans* is a mycobacterium that can cause symptoms that mimic tuberculosis but require a different course of treatment. The second grant continues this work, hunting for other pathogens or any changes in pathogen prevalence.

Nicholas-Figueroa emphasizes that they are still establishing a baseline and it is too soon to draw any conclusions. However, it is not too soon to see the impact the work is having on students. None of the students involved in the project had any prior research experience, but several have gone on to continued studies in biomedical research and other science-related fields. “When I was in high school, I thought research was something for these people that were mega brainiacs,” says Nicholas-Figueroa. “It’s great that students get exposed to this, and they get paid.”

Weech, who is Nicholas-Figueroa’s current student worker, recently accompanied a half-dozen high school students out into the tundra with Nicholas-Figueroa, two meteorologists, and five UAF researchers, who are also funded by the NSF, on a field trip for the Arctic Perspectives in Climate Change and Sustainability camp. The group drilled two soil and ice cores and measured carbon and methane levels and ground temperature. Those cores will go back to the -80-degree freezer that Nichols-Figueroa was able to purchase with a previous grant.

Between the two NSF-TCUP grants and an earlier BLaST (Biomedical Learning and Student Training) grant through UAF, Nicholas-Figueroa has managed to transform space in a Quonset—that didn’t have a safety shower or fire-proof benchtops when she arrived twelve years ago—into a science classroom suitable for postsecondary research and teaching. These days the lab has proper floors, benchtops, vents, and freezers, and is also equipped

with digital microscopes, culture incubators, a hand-held DNA sequencing device, and a proper core drill.

Weech, who is a first-generation college graduate, moved to Utqiagvik for the tuition waiver she was able to get at Iḷisaġvik. She graduated in April of 2022 with a Certificate in Indigenous Education and an Associate of Arts Degree in Liberal Arts and was on the President's List with a GPA of 4.0. Weech has been able to secure \$7,500 in additional grants from UAF to support her microbe research.



*Mikhail Kanevskiy of UAF discusses a piece of ice core with summer camp student Jordan Lake-Nicolai (Photo courtesy of Ben Jones)*

“I’m in love with my work,” says Weech, “Every day I’m learning something new, and I get to use my passion. It would be cool if I had a bacterium with my name on it.” She hopes that she can impart to students that no matter where they come from, they “can make it happen if [they] have the passion.”

For Nicolas-Figueroa, the best part is the “aha moment” for students. “I’m not a microbiologist,” she says, “This is something I do because I want the students to have the experience.”