



Ilisagvik College Research and Education for Undergraduates and Dual Credit Students

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**January 19, 2023
Toolik Field Station
All Scientists Meeting**



ALASKA'S ONLY TRIBAL COLLEGE

ILISAGVIK.EDU

Utqiagvik (formerly known as Barrow), Alaska



40% Alaska small, rural, and isolated communities

- 25 – 5000 residents predominantly AN
- 6 distinct regions & languages
- Over 70% practice traditional subsistence
 - plants, berries, fish, caribou, moose, walrus, whales

Knowledge of land, oceans, rivers, and ice passed down from Elders

The North Slope Borough

- 89,000 sq. mi.
- eight villages
- population of ~10,000
- ~77 % Iñupiat



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Research Activities and Education

- **Snow Chemistry: Researching Apun**

- NSF-IUSE Grant, Collaboration with the University of Michigan
- Courses
 - *Basic Chemistry*
 - *Climate Change*
 - *Indigenous Science and Traditional Ecological Knowledge (TEK)*



- **Arctic Microbe Project**

- NSF-TCUP Grant
- Courses
 - *Indigenous Science and TEK*
 - *Microbiology*
 - *Summer Camps*



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Researching Apun

Haley Fischer (completed L.A. degree)

Joyce Stotts (undergraduate Allied Health)

Arctic Microbes

(previous dual credit students)

Daphne Muller, Ana Stringer

Middle School to Giving Back to Her Community

Samantha Wade



Researching Apun: A culturally responsive chemistry research unit for college students in Arctic Alaska

<https://doi.org/10.1021/acs.jchemed.1c00480>

Students Draw on Local, Traditional, and Scientific Resources



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Researching Apun: A culturally responsive chemistry research unit for college students in Arctic Alaska

Haley Fischer: Caribou Migration in Utqiagvik

Elder talk

Caribou dig through layers of snow to find water

Connections

Personal experience with hunting

Research Question

What are the differences in chloride concentration based on proximity to caribou herds and snow depth?



Joyce Stotts Iḷisaḡvik College Student

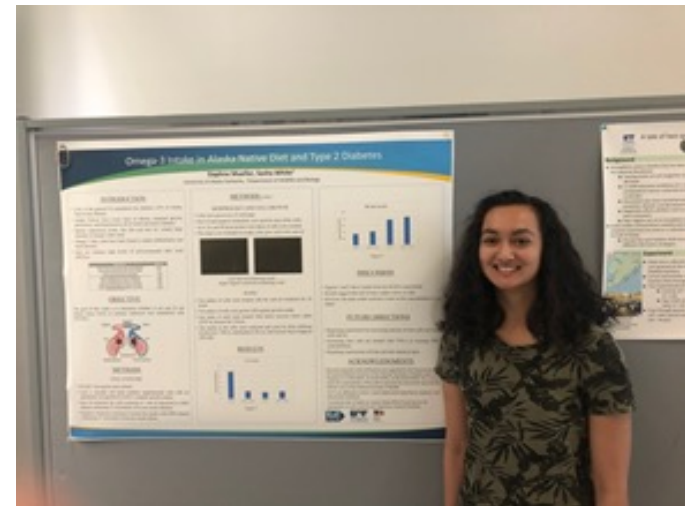
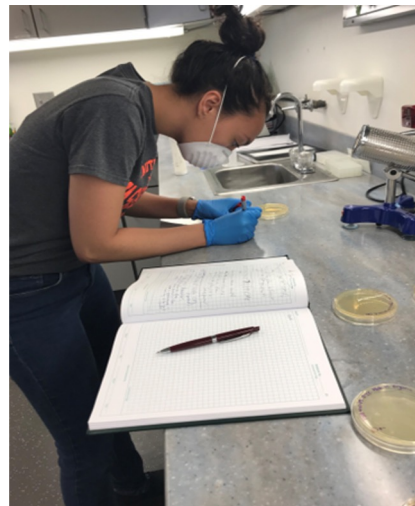
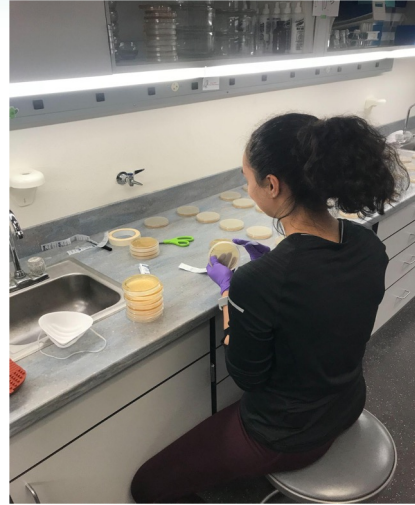
- Born in Anchorage and raised in Utqiaḡvik
- Introduced to research in basic chemistry class
- Summer work with the National Ecological Observatory Network (NEON)
 - Trapping mosquitos and beetles
 - Plant observations
 - Photos for area leaf index
- Chemical analysis of snow
 - Spring 2022 and Fall 2022
- Lab manager with UIC Science, Utqiaḡvik
 - Current



Daphne Mueller

Arctic Microbes: Easing Into Research During High School

- Lab Skills
 - ✓ Culturing
 - ✓ Technological trainings
 - ✓ Pipetting
 - ✓ Nanopore sequencing
- Mentorship
- Communication
- Scientific jargon



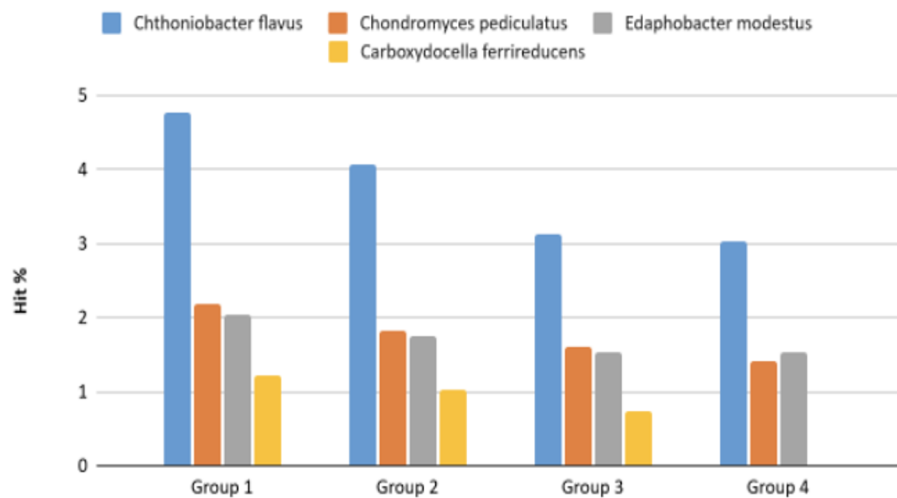
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Arctic Microbes: What was found.

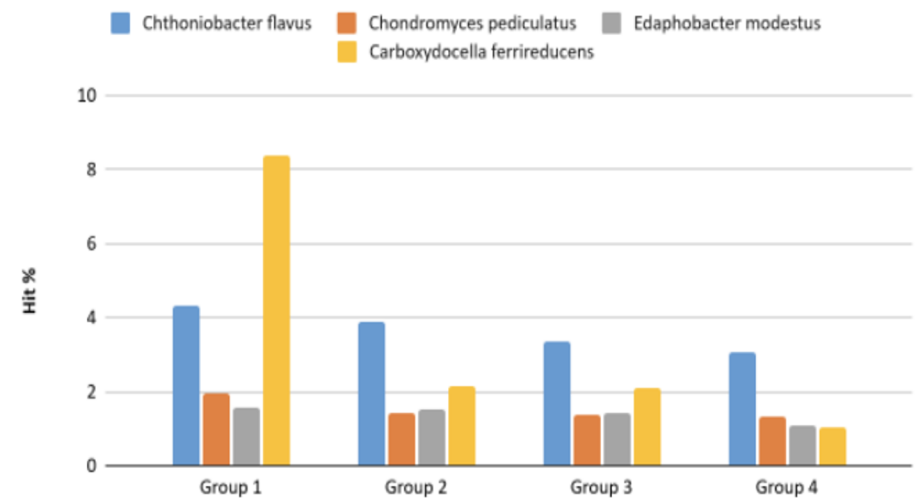
Chthoniobacter flavus (blue bars) consistent across all layers: contributes to release of CO₂ from soil
Mycobacterium simulans (green bars) dominated permafrost: causes pulmonary disease

Organic Layer



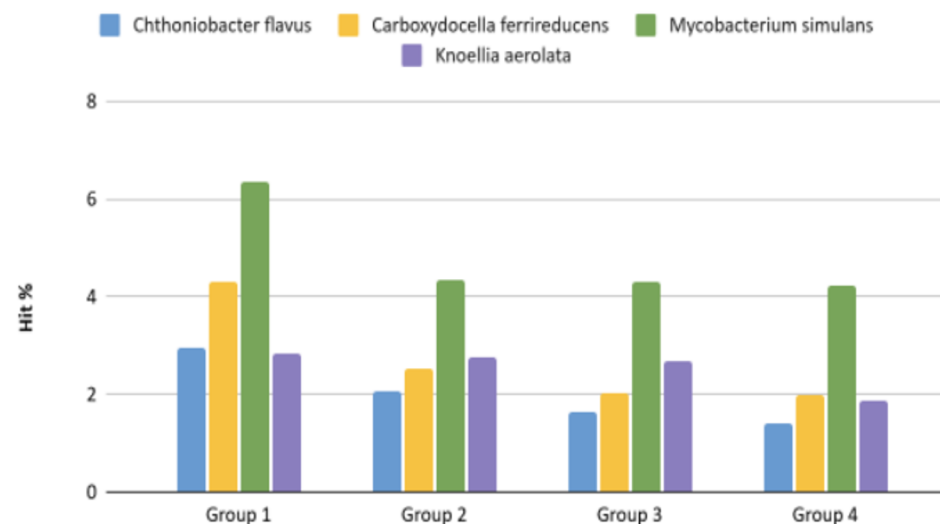
Top 4 Species by Descending Group Number

Topsoil Layer



Top 4 Species by Descending Group Number

Permafrost Layer



Top 4 Species by Descending Group Number

2019 American Society of Microbiology San Francisco, CA June 19 - 24



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- Graduated Fall 2022
- Continue studies in microbiology



Ana Stringer - Graduated with A.A. before HS

U.S. President Scholar



- Enrolled in Iḷisaḡvik's dual-credit program in 2015 & graduated with A.A. in Liberal Arts in 2018
- Conducted research at Iḷisaḡvik on Arctic Microbes from 2017-18 and first authored a paper published in the Native Science Report
- Graduated from Vanderbilt University in May 2022 with Bachelor's in Environmental Science & Environmental Sociology
- Attending University of Washington pursuing her master's in Marine Affairs this fall



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Samantha Wade – Middle School to Medical School

Samantha is from the small village of Wainwright on the North Slope

Goals met:

- 1) conduct research
- 2) attend medical school

Future goals:

- 1) combine her knowledge of climate change and how it relates to human health
- 2) return home to service the Native communities residing on the North Slope





<https://blastak.com/> **February 2022**

Scientist of the Month

UAF
COLLEGE OF NATURAL SCIENCE & MATHEMATICS
University of Alaska Fairbanks

Samantha Wade

Samantha Wade, who is of Inupiat descent, is a senior pursuing a B.S. in Biological Sciences with a concentration in physiology. Wade is a fourth-year BLaST Scholar and holds an officer title in the UAF Pre-Medical Society. Wade was born and raised in Wainwright, Alaska, and attended Mt. Edgecumbe High School in Sitka, where she was valedictorian for the class of 2018. She is a first-generation college student and plans to graduate by end of April 2022. She is interested in climate change and how it affects the Arctic and the One-Health issues that arise from it. Wade plans to attend medical school to become a physician to give back to rural communities in Alaska.

Research

Wade first started her research journey in 2012 when she attended the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) conference after attending the Climate Change summer camp led by Dr. Linda Nicholas-Figueroa. She joined Nicholas-Figueroa's lab at UAF in 2019 where she sequenced the genome of an oil-degrading bacterium from the Arctic Ocean. Wade also worked in the medical lab in the summer of 2021 where she utilized her laboratory skills to analyze medical samples, premiered the use of a new Polymerase Chain Reaction (PCR) machine to analyze local COVID samples and assisted with their phlebotomy department. Wade presented at the 2019 NIH Diversity Program Consortium (DPC) Conference, the 2019 American Society for Microbiology (ASM) Conference, and at several Undergraduate Research and Scholarly Activity (URSA) UAF research day events.

Mentoring

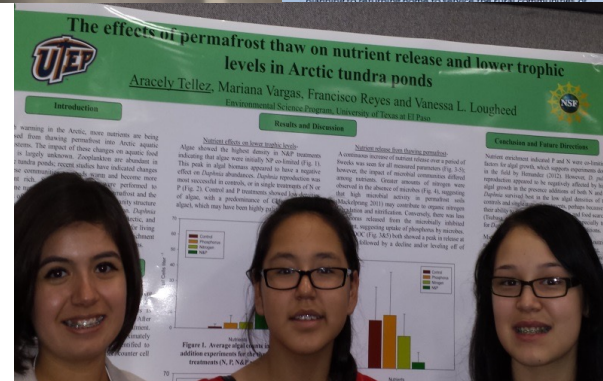
Wade would like to thank Dr. Mary Beth Leigh and Dr. Linda Nicholas-Figueroa for guiding her through her research journey. "I first met Dr. Linda Nicholas-Figueroa when I attended a summer camp, where she taught on climate change in 2012. Attending summer camps is where my passion for science truly grew. It is now 10 years later where I was able to present research at conferences through her guidance. I am grateful to have met such a wonderful friend, teacher, and mentor." Dr. Nicholas-Figueroa shares, "Samantha has never backed away from a challenge and has held true to her word of pursuing a M.D. degree and then returning to our native home to service the rural communities of Alaska."



Below left: BLaST Scholar Samantha Wade (middle right) with BLaST Scholar Garrett Taylor (left), Dr. Nicholas-Figueroa (middle-left), and BLaST Scholar Daphne Mueller (far right) at the 2019 ASM Conference (Photo credit: Wade)
Right-top: Join of microbe samples from the tundra of the Arctic
Right-bottom: Wade in Mary Beth Leigh's Lab (2021) (Photo credit: A. Toplak)

of the NIH Director with the Biosketch award: TL6GM130992
Primary employer and educational institution:
Wade, blastak@uaf.edu





Samantha Wade
(right)
SACNAS 2013



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First Summer Climate Change Camp 2011



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Quyanakpak



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