Alaska Space Grant News

Newsletter of the Alaska Space Grant Program • Summer 2026

Promoting Earth and Space Science and Technology and other NASA relevant teaching, research, and public service throughout Alaska.

UAF student helps relaunch an Alaska workhorse

by Kim Morris



Photo courtesy of Helio Alaska.

Caden DeKruif and the in-progress prototype fuselage of the revived Helio Courier.

The Helio Courier is a short takeoff and landing airplane designed in 1949. Approximately 500 planes were manufactured between 1954 and 1974. This fixed-wing, single engine aircraft was designed to carry cargo rather than passengers and was used extensively around the world. It has a storied history in Alaska. Wright Air used Helio Couriers to take hunters, prospectors, and rafters into the back country and to fly men and equipment to different construction sites along the Trans-Alaska Pipeline. After the completion of the pipeline, Helio Couriers were used to survey the entire pipeline daily. Talkeetna Air Taxi flew climbers in and out of the Alaska Range in a ski-equipped Helio Courier for many years. Today, Icefield Discovery uses two Couriers on skis to support mountaineers and scientists in Northern Canada. Of the 120 Couriers currently registered in North America, 37 operate in Alaska.

Helio Alaska, located in Chugiak, Alaska, is a startup aerospace company working to restart production of the Helio Courier. During the summer of 2025, Caden Dekruif, an undergraduate in the Mechanical Engineering program at the University of Alaska Fairbanks, worked at Helio Alaska through an Alaska *...continued on page 7*

NASA / ALASKA SPACE GRANT PROGRAM

Lead Institution

University of Alaska Fairbanks

Web

spacegrant.alaska.edu

Support Alaskan Students!

Visit *give.alaska.edu* and designate your donation to "Alaska Space Grant Program Support"

AFFILIATES

Alaska Pacific University

Jason Geck

University of Alaska Anchorage

Raghu Srinivasan (CoEng)

Erin Hicks (CAS)

University of Alaska Fairbanks

Chung-Sang Ng (CNSM)

Denise Thorsen (CEM)

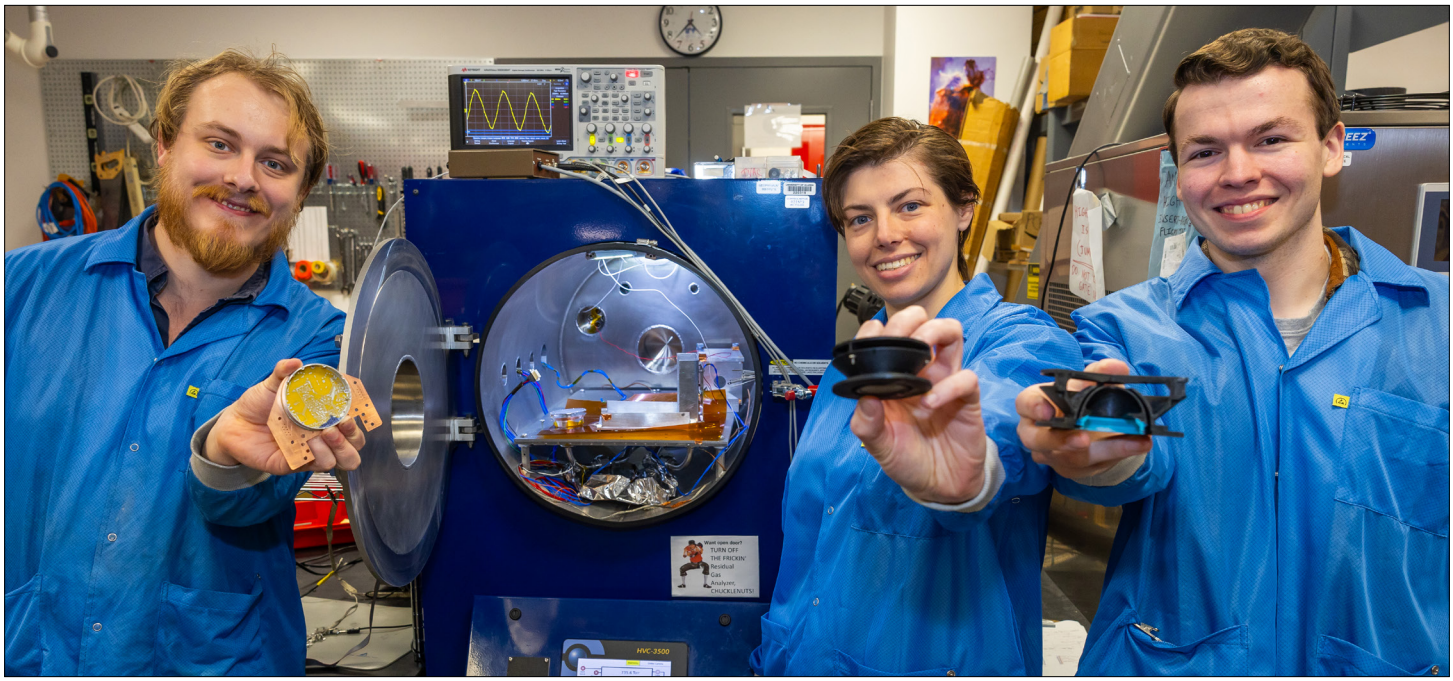
University of Alaska Southeast

Jason Amundson

UAA Matanuska-Susitna College

Daniel Nichols

The UAF Space Program provides opportunities for research and careers *by Kim Morris*



UAF photo by Eric Engman.

Quetzal Larrick, Mary Bolling, and Bruce Smith in the UAF College of Engineering and Mines Space Systems Engineering Program laboratory showing components of the AMPPS payload.

The Space Systems Engineering Program (SSEP) at the University of Alaska Fairbanks (UAF) provides engineering and science students with hands-on experience with design, construction, testing and launch of complex systems from balloons, rocket payloads, and miniature satellites (CubeSats). Students develop low-cost spacecraft payloads to investigate high-latitude geophysical phenomena and improve radio communication technologies.

One of SSEP's recent projects is the Additively Manufactured Plastic Plasma Spectrometer (AMPPS), supervised by Quetzal Larrick. AMPPS is a charged particle spectrometer that measures the energy and direction of electrons. It is the first plasma science instrument made entirely of 3D-printed plastic, rather than metal. Its mission is to fly through the Earth's ionosphere and magnetosphere and record the rapidly changing flux of electrons and ions responsible for the aurora and other space weather.

SSEP began developing AMPPS in Summer 2018 under the guidance of Don Hampton, a UAF Geophysical Institute (GI) physicist, and Craig Pollock, a retired NASA physicist. Originally designed as a CubeSat collaboration, the platform changed in September 2025 to a sub-orbital sounding rocket. The team reconfigured AMPPS from a long-duration satellite instrument into a high-intensity, short-flight experiment designed to withstand the extreme vibration, spin, and timing demands of a sounding rocket. They rebuilt power systems, redesigned error-handling, and optimized every component for rapid-fire data return. The new AMPPS launched on the NASA Black And Diffuse Auroral Science Surveyor sounding rocket from Poker Flat Rocket Range in February 2025. Data analysis is ongoing.

The AMPPS project has been the subject of three master's degree projects, three senior undergraduate design projects, and involved three high school aged students, one of whom will attend Massachusetts Institute of Technology in the fall. Quetzal has been part of the AMPPS program from the beginning. He designed and manufactured the AMPPS high voltage power supply for his master's degree in electrical engineering. Now, he not only manages the SSEP lab but is developing the GI's ability to load sounding rockets with vapor tracer payloads and manages his own NASA Research Initiation Award grant. Quetzal is an example of SSEP's success at engaging and retaining space engineering talent.

Undergraduates monitor the glacial and hydrological changes in the Eklutna watershed *by Kim Morris*



Photo courtesy of Dr. Jason Geck.

Recent APU graduate Aubrey Palmer measures streamflow at the West Fork Eklutna River — a key site in the long-term monitoring of glacier-fed water supply for Anchorage. Palmer earned two apprenticeships over one year of fieldwork supporting the Eklutna.

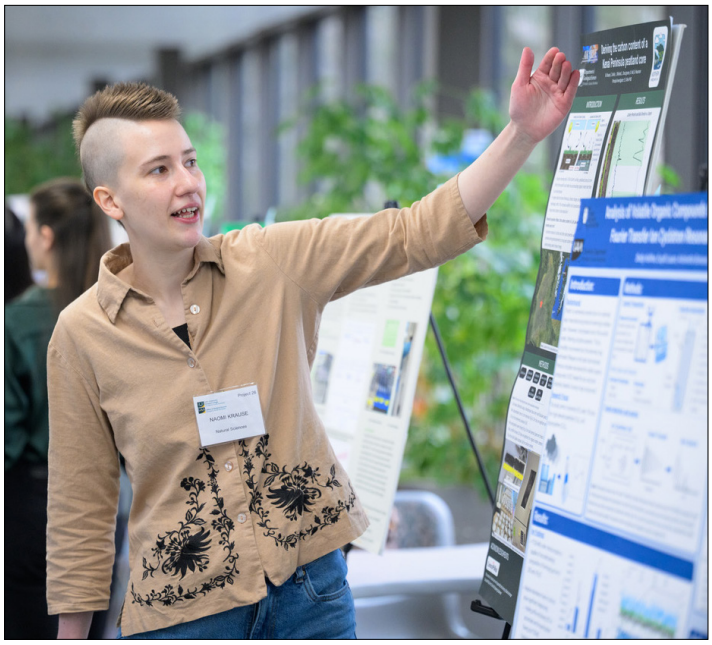
Learning by doing is an education theory that emphasizes student engagement and hands-on, task-oriented experiences. In 2008, Alaska Pacific University (APU) faculty and students started a research program aimed at understanding the Eklutna watershed which provides 80% of Anchorage's drinking water and 10-15% of its hydropower. This project was designed to integrate data collection and analysis into the curriculum of APU undergraduate courses and independent student projects (senior projects and junior practicums). Students were introduced to glaciology, meteorology, hydrology, and geospatial technologies (Global Positioning System (GPS), Geographic Information System (GIS), and Remote Sensing) via fieldwork, data collection, and data analysis.

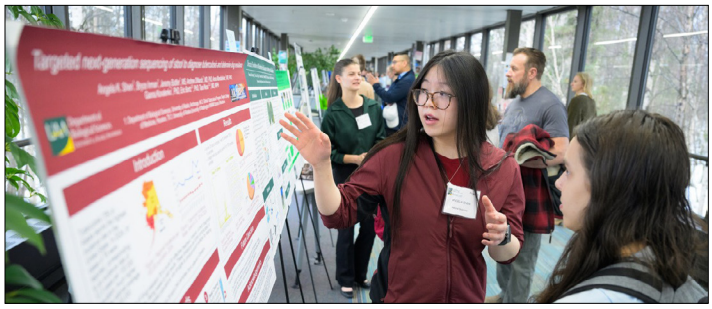
Now in its eighteenth year, the program is led by Dr. Jason Geck, a professor in APU's Marine and Environmental Science Department. The current program has three goals: 1) Calculating the mass balance of Eklutna Glacier, the difference between the annual gain (snow accumulation) and loss (ablation or snow melt) in the glacier system; 2) Monitoring the fluvial discharge of both channels of the Eklutna River. The volume of water traveling past a given point in the streambed was measured during the summer melt-season, the peak period of the river's contribution to Eklutna Lake's water budget; and 3) Mapping the geometry of the Eklutna Glacier, which changes over time in response to snow accumulation and snow and ice ablation. Photographs taken in the Fall using a fixed-wing plane were processed using photogrammetry methods to build digital elevation models.

Several senior projects and master theses used data collected during this multi-year program. One student received an apprenticeship to collect river velocity data for discharge calculations and used them and weather data to model river flow. Other students have also obtained salaried apprenticeships. A few APU students have even (co)authored peer-reviewed papers.

The NASA Science Mission Directorate encourages the study of Earth as a complex, interconnected system. This program gives undergraduates hands-on opportunities to observe, document, and analyze phenomena across many disciplines and build an integrated understanding of a dynamic environment. It contributes to building a scientifically literate workforce.

Alaska URISE provides NASA-oriented research opportunities for undergraduates *by Kim Morris*







Photos by James Evans.

Alaska Undergraduate Research and Interdisciplinary Science Exploration (AK URISE) students Naomi Krause (left), Angela Shen (above), and Logan Conary (right) present research at the UAA Student Research & Creative Scholarship Showcase April 17, 2026.

Alaska Undergraduate Research and Interdisciplinary Science Exploration (AK URISE) is a University of Alaska Anchorage (UAA) program managed by Dr. Erin Hicks, a professor of Physics & Astronomy. The two-year program aims to create "a diverse community of UAA students eager to learn more about research in the natural sciences." It achieves this goal by providing students with opportunities to participate in faculty-mentored research through paid research positions, as well as peer mentoring, professional networking, and career skill development. Through these efforts, the program addresses many of the barriers that can discourage students from staying in science, technology, engineering, and mathematics (STEM) fields, including loss of confidence, intimidation, inadequate advising, and a lack of a sense of belonging. AK URISE is especially committed to supporting students from groups historically underrepresented in STEM, including women, Alaska Natives, African Americans, Latinos, LGBTQ+ students, and first-generation college students. By fostering an inclusive and supportive community, the program strengthens student recruitment, retention, and success in entering the STEM workforce.

The 25 AK URISE students learn research techniques and apply them to research projects conducted with UAA faculty in astronomy, biology, chemistry, geology, and physics. These projects involve using cutting-edge research facilities and data and are connected to topics and themes in the current NASA Strategic Plan. Students analyze astronomical images obtained with the Hubble Space Telescope, work with a Helicon plasma source in the UAA Plasma Lab or develop an understanding of how microbes respond to extreme environmental conditions.

They also gain broad research skills (science communication, presentations, and interpretation of research in professional manuscripts) and explore professional development issues (resumé/CV development, networking etiquette, impostor syndrome, and career paths). Informal activities are held throughout the year to foster a sense of community. Workshop sessions guide students through grant proposal writing and completing program applications. They are encouraged to participate in public outreach activities such as UAA STEM Day.

AK URISE provides students with opportunities to engage in authentic NASA-related mission-based research activities. It directs students toward a wide range of future careers in STEM, with particular emphasis on careers in the NASA workforce.

STEM Education dives under the waves and flies into the sky

by Kim Morris



Photo courtesy of Dr. Sanjay Pyare, APU.

High school student Kurt Foxglove (right) from the community of Angoon Alaska, enrolled in the UAS dual-credit course Yéil Waaḵshiyee (Raven Eye), explores drone imagery acquisition with teacher Seth Bader (left).

Drs. Sanjay Pyare and Michael Navarro, professors at the University of Alaska Southeast (UAS), have created a dive-based underwater science and unmanned aerial vehicle (UAV) remote sensing program to engage pre-college, incoming, and first-year students in Science, Technology, Engineering and Mathematics (STEM) and promote their retention in UAS marine and environmental sciences programs. In 2025, they recruited 12 students from UAS and Southeast Alaska's coastal communities through school counselors, and tribal and local municipal offices. These students became certified scientific divers and/or remote pilots, gateways to completing STEM degrees. Their program is housed in the Áak'w Tá Hít (Tlingit for "House at the Head of the Bay") Integrated Science Building at UAS and includes a foundational coursework and guest speaker seminar series.

Scientific divers are an important part of Alaska's blue economy that includes fisheries and marine habitat management, and solving challenges caused by marine debris. Dive into Stem offers a series of stepwise dive certifications that lead to American Academy of Underwater Sciences (AAUS) certification. Students who complete their AAUS certification have access to upper-division subtidal research including autonomous and semi-autonomous environmental sensors.

Drone-mapping and remote sensing is revolutionizing local information acquisition and visualization for assessment and planning decision making. Fly into STEM provides UAV-based, remote-sensing technology courses. The program uses the Drone Lab in Áak'w Tá Hít to demonstrate the use of drone sensors and a cluster of High-Power Computing workstations and a visualization studio to display the data. Students took an introductory course, Yéil Waaḵshiyee (Tlingit for "Raven Eye") and completed FAA-based remote pilot certification. Students learned technical aspects of UAV mapping and applied geospatial skills to culturally aligned projects in their communities.

Dive into STEM and Fly into STEM meet the NASA Science Mission Directorate's Employ and Educate strategic goals by giving undergraduates studying Earth Sciences hands-on educational opportunities with real-world applications. The students' training includes collecting coastal environmental datasets for NASA scientists to couple with satellite datasets. These programs expand the STEM workforce and may lead to some students pursuing higher level scientific education and research.



Photo courtesy of Dr. Sanjay Pyare, APU.

Kurt Foxglove and the resulting 3D model created with photogrammetry.

Developing innovative technologies to address Alaska's construction challenges *by Kim Morris*







Jillian Muni (left), Andrew Zachry (above), and Madelyn Guffey (right).

Photos courtesy of Jillian Muni, Andrew Zachry, and Madelyn Guffey.

In Summer 2025, the John and Jane Aspnes Polymath Fund supported three J2 Scholarships for Polymaths and Creative Leaders. These scholarships provide funds to University of Alaska Fairbanks students who use interdisciplinary approaches to solving societal and environmental issues. The recipients were Madelyn Guffey (Junior, B.F.A. Art with a Painting and Drawing Concentration), Jillian Muni (Junior, B.A. Art with a Ceramics Concentration), and Andrew Zachry (Junior, Accelerated B.S./M.S. Program, Civil Engineering). They worked on the 3-D Printed Ceramic Kiln Project for the UAF Automated Construction and Advanced Materials Lab (ACAM). Their goal was to find a way to 3D print a kiln using a local geopolymer concrete.

Since childhood, Madelyn has been involved with sculpture and construction. Among other things, she cleaned up and managed the outdoor kiln site in preparation for construction and worked with her peers to create and model a design for the project (mockups, computer modeling, and drafting). The most interesting part to her was researching kilns. She has "reconsidered the impact scientific or engineering fields could have on my work, both through inspiration and collaboration."

Jillian's father taught her about materials science and how to draft when she was young. For this project, she researched kiln design and building specifications and learned 3D AutoCAD programming, which she found "fun and challenging." Jillian thinks that the AutoCAD skills and what she learned about kiln construction and combustion and the material science of bentonite clay, and silica, materials she uses in her ceramics, will serve her well in future projects.

Andrew has worked in the ACAM lab for three years. He concentrated on the geopolymer concrete design for the kiln. He helped make the material 3D printable and tested its structural integrity in extreme temperatures. He enjoyed "learning more about the research process and how to develop an experimental plan." This experience strengthened his commitment to his current career path.

The 3-D Printed Ceramic Kiln Project gave Madelyn, Jillian, and Andrew the opportunity to develop communication and team skills while learning to work outside their comfort zones. Their diverse backgrounds meant that they brought different ideas and expertise to the table to solve a challenging problem.

Arctic ground squirrels point the way to sustainable deep space travel *by Kim Morris*

Many aspects of Arctic ground squirrels' (AGS) hibernation are understood, but the underlying neural mechanisms are still largely unknown. These squirrels exist in three steady states: euthermia, the animal's 'summer' active state; torpor, characterized by extremely reduced body temperature and lowered metabolism; and interbout arousals (IBA), brief, temporary returns to normal body temperature and metabolic activity during torpor. AGS hibernate for about 8 months, surviving at body temperatures as low as -3°C, without eating food or drinking water. AGS are obligate hibernators, meaning they follow a circannual rhythm which occurs regardless of food availability or environmental temperature. AGS require a pre-hibernation preparation, and it is assumed that there are distinct neural circuits driving entrance into and emergence from hibernation.

Nicholas Clark, a PhD candidate in Biochemistry and Neuroscience at the University of Alaska Fairbanks, is investigating the underlying neural circuitry that regulates torpor in AGS. Using custom-engineered behavioral monitoring systems and advanced computational pipelines, Clark is characterizing the precise physiological transitions that occur during the hibernation cycle. His research leverages sophisticated machine learning architectures to analyze datasets, allowing for the high-resolution identification of distinct metabolic states. This integrative approach provides the necessary precision for identifying the primary neural drivers responsible for coordinating long-term hibernation

This research supports the NASA Space Operations Directorate's mission of sustaining human presence in space. According to Clark, "this research could help astronauts enter a low-metabolic state for extended periods, potentially reducing the damaging effects of radiation on astronauts during deep-space missions, significantly reducing the need for supplies (food, water, and oxygen) by minimizing metabolic demands, and mitigating mental health challenges by allowing astronauts to remain in torpor for the duration of prolonged and isolated space travel, enhancing their resilience and readiness for mission objectives when they are revived."



Photo courtesy of Nick Clark.

UAF PhD student Nick Clark placing an Arctic ground squirrel into the data collection cage for a video capture experiment.

Continued from "UAF student helps relaunch an Alaska workhorse" on page 1

Industry Internship Application supported by the Alaska Space Grant Program. He assisted in the construction

and assembly of prototype parts to verify fit, function, and order of operations. He helped build tail cones, the tapered, aerodynamic section at the very rear of the fuselage that minimizes drag by smoothing out airflow after it passes the main body and a light and strong fiberglass skin around a prototype.

Caden "loved the work environment and the guys [he] worked with. They were very like-minded, and it felt like a close-knit team." He found the work environment very flexible and believes the relative freedom helped him do his best work. His internship reinforced his interest in the nuts-and-bolts side of aerospace engineering, allowing him to design, model, and build plane components. He recommends this internship to anyone with a creative bend who likes working with their hands.

A Kenai Peninsula burn site sheds light on fire carbon emissions

by Kim Morris



Photo courtesy of Cameron Kuhle.

Cameron Kuhle (center), with advisor Dr. Eric Klein (left) and fellow graduate student Leah Boccignone (right), extracting a peat sediment core from a Kenai Peninsula peatland for analyses of carbon content and its loss during fire.

Peatlands are soil carbon (C) reservoirs. Today, they are increasingly vulnerable to drying and vegetative succession, shifting them from net C sinks to sources of atmospheric C. In Alaska, peatlands are prone to thawing permafrost, extreme temperatures, plant community migration, and rapid erosion. Most current research focuses on the gradual, long-term impacts of melting permafrost on C dynamics rather than the massive C emissions of wildfires.

Cameron Kuhle, a Ph.D. student in Geosciences at the University of Alaska Fairbanks, is using remote sensing and field sampling methods to identify the peatland characteristics that predict fire outcomes and quantify peat C emissions. His study area is nearly 700 square kilometers of land next to and within the peatlands of the Kenai National Wildlife Refuge (KNWR). This area burned in 2019 during the Swan Lake fire.

Cameron is using remotely sensed data (e.g., Synthetic Aperture Radar or SAR) and field methods for pre- and post- wildfire analysis of KNWR peatlands to understand the factors driving fire vulnerability and the consequences to their C storage capacity. Field data were collected at three burned and five unburned peatland sites. He used high-resolution unmanned aerial system optical and multispectral imagery to map surface features, ground-penetrating radar to measure subsurface horizons, and peat core samples to characterize the soil. Water level loggers and weather sensors were installed at each site. He will use SAR satellite data from Sentinel-1 and the NASA-ISRO SAR Mission, with ground calibration data, to understand changes in surface water, vegetation, and soil moisture, key factors in peatland stability. Collectively, these data are being used to differentiate the near-surface parameters that predict fire response, characterize the post-fire peat environment, and quantify near-surface peat C mass lost in the fire.

This research addresses NASA Earth Science Division issues: the impact of environmental disturbance on global climate change; changes in global land cover and use, their causes, and impacts ecosystems and society; and changes in water cycle dynamics. The pre- and post-fire soil moisture maps; interferograms quantifying small scale surface level changes; time-series of surface water flux; and change detection mapping will be publicly available.

Comparing critical habitat areas of Alaska's Cook Inlet beluga whales

by Kim Morris



Photo by Deborah Boege Tobin.

Kenai Peninsula College Semester by the Bay student interns assisting Sara Wilhelm (center) with eDNA and water quality sampling on the Kenai River. From left to right: Nyla Klein, Prairie Sievers, Sara Wilhelm, Siobhan Duffy.

The Cook Inlet beluga whales (CIBW) are an endangered and isolated population segment with approximately 331 individuals left. Sara Wilhelm, a recent master's graduate at the University of Alaska Anchorage, compared two critical CIBW habitat areas, the Kenai River and Kachemak Bay, and assessed the whales' current and historical presence in them. She also determined the presence of known or possible CIBW prey species through environmental DNA (eDNA) analysis.

Wilhelm collected water samples at two sites in Kachemak Bay and three on the Kenai River. She determined the water quality at these sampling areas by measuring the temperature, pH, dissolved oxygen, salinity, conductivity, and turbidity of the surface water. These data provided insight into the overall health of the two areas and are a baseline for future conservation efforts.

Water samples were collected at the surface at all sample sites and at 9.1-meter water depth in Kachemak Bay sites. Traces of an organism, including shed skin cells or bodily excretions, found in the water column when an organism occupies that space are referred to as eDNA. The eDNA samples underwent a metabarcoding analysis and were matched to a taxonomic identification from a database to determine what species were present around the time of sampling. This eDNA analysis allowed Wilhelm to infer the species composition and biodiversity of each site at the time of sampling.

Historic records of CIBW observations in Kachemak Bay and Kenai River were compiled from published databases, population studies, and public observation records and analyzed. Correlations between prey presence and CIBW presence were explored in the Kenai River. Differences in Kenai River and Kachemak Bay species observations were compared to explore hypotheses about CIBW habitat use.

This project aligns with NASA's Science Mission Directorate goal of protecting and improving life on Earth and in space. An assessment of the CIBW habitat use affords a better understanding of how this endangered population segment uses southcentral Alaska's waterways and what impacts water quality has on it. This knowledge can be applied to future conservation and sustainability efforts of CIBW and other beluga whale populations.

Alaska Aerospace internship gives UAF student a lesson in space operations, logistics

by Jeremia Schrock



Photo courtesy of Mathias Speer.

Mathias Speer and his faculty advisor, Mike Hatfield (UAF), visiting the Pacific Spaceport Complex-Alaska.

Sometimes an internship is on familiar ground, but sometimes it's in completely new territory. For Mathias Speer, a UAF undergrad seeking a degree in aerospace engineering, his summer internship with Kodiak-based Alaska Aerospace took him into parts unknown.

"The internship was unlike [anything] I have ever done before," he said, "with no previous experience or skills to help in my given task." Speer's task was to explain how Fairbanks' Poker Flats launch site could be modified to handle orbital launches. The site currently only handles launches that are sub-orbital.

To tackle such a project, Speer created an "overarching document." That document detailed what staff would be required on-site, what FAA regulations would need to be followed, and what would be necessary to see the Poker Flats' team successfully trained. "It was really difficult to begin," Speer said, "as I had no idea where to start."

After talking with Mike Hatfield, his advisor, Speer began with NASA. He researched what personnel and training NASA's Wallops launch site in Virginia used before expanding to private companies like Blue Origin and SpaceX. Speer decided to organize the roles by a timeline. For example, the *...continued on page 15*

Potential career paths revealed through internships

by Kim Morris



Photo courtesy of Reese Gilbert.

Reece Gilbert taking gravity readings in the rain with Logic Geophysics, Greater Fairbanks Area.

In 2025, two University of Alaska undergraduates had Alaska Industry internships at Logic Geophysics & Analytics LLC, a small business that "specializes in geophysical surveys in remote environments with limited resources and complicated logistics."

Boths students are working towards a Bachelor of Science in Geosciences with a geophysics concentration. Reece Gilbert had only completed one semester of his degree when he began the internship. By contrast, Willa Kleiner expects to finish her undergraduate studies in Fall 2026.

During their internships, Reece and Willa took part in extensive mineral exploration fieldwork around Alaska, that benefits mining corporations and the state. They completed polarization, magnetic, and gravity surveys; used Global Navigation Satellite System equipment for precisely locating points of interest; and helped with evening data uploads for post-processing. Because of the remote location of the fieldwork: transportation was limited to trucks, utility task vehicles, or walking; large equipment loads were slung under a helicopter; radios were the primary mode of communication; and bear encounters (deterred by air *...continued on page 15*

UAF student learns to “Be Cool” during summer science internship

by Jeremia Schrock



Photo courtesy of Kay Quintana-Torres.

Kay Quintana-Torres conducting a post-mortem tissue collection on a rat specimen.

It was summer in Fairbanks, but Jhelyn 'Kay' Quintana-Torres was focused on cooler things. Her 2025 internship with Be Cool Pharmaceutics gave her plenty of lab time and helped with both her communication and problem-solving skills. “I also developed an interest in surgery because of the lab experience I gained,” she said.

Her internship, sponsored by the Alaska Space Grant Program, had her working on Be Cool’s Cooling Cage Project whose goal is to induce a torpor-like state in rats. Torpor is like a smartphone’s ‘power save mode’; it’s a low-energy state which sees animals slow their metabolic rate and drop their body temperature in order to survive harsh conditions.

The human implications of torpor research are many. If a torpor-like state can be induced in humans it could increase the likelihood of surviving a major medical emergency (like a heart attack) or aiding in space exploration. What sounds like speculative fiction could one day be scientific fact — and Quintana-Torres and the Be Cool team could be part of it.

As part of the Cooling Cage Project, Quintana-Torres experimented with different cooling methods, operated the cooling cage setup, and collected respiratory data from Arctic ground squirrels. But surgery piqued her interest the most. “The most interesting and rewarding part of my internship was shadowing rodent surgeries,” she said. The experience sparked an interest in surgical practice and deepened her appreciation for anatomy.

Quintana-Torres especially enjoyed learning to identify different muscle groups, adding that it helped her understand how structure relates to function in a real biological system (versus reading a standard textbook). “This exposure was transformational for me,” she said. “It confirmed my passion for medicine and strengthened my determination to pursue a career as a physician-scientist, combining clinical care with research.”

She strongly recommends this internship because it provided her with valuable hands-on experience, exposure to real research techniques, and the opportunity to explore career paths in science and medicine.

Quintana-Torres is a USDA NexGen scholar and anticipates graduating from UAF in Spring 2027. Because of her internship experience she intends to pursue a master's in the medical sciences.

A NASA internship rekindles an interest in aerospace engineering

by Kim Morris



Photo courtesy of Ayman Eltahir.

Ayman Eltahir at NASA Langley Research Center.

In 2024, Ayman Eltahir, an undergraduate student in Mechanical Engineering at the University of Alaska Fairbanks, took part in the ASGP Research Apprentice Program where he honed his soldering and computer-aided design skills. These skills came in handy during the summer of 2025 when he was an intern at NASA Langley Research Center.

He worked on the Unmanned Aircraft System Operations Office project called Situational Telemetry and Optimized Routing, Mesh-Broadcasted for Hurricane Relief Drones (STORMBHRD). This research project involves using unmanned aircraft systems (UAS) for hurricane relief efforts.

Ayman was a part of a three-person team that assembled the hardware for the STORMBHRD Meshtastic Network. A Meshtastic node is a low-cost, low-power device that uses LoRa radio to form an open-source, off-grid mesh network for long-range communication without the internet. He says that "the Meshatastic nodes send location information along with temperature and humidity data. In emergency situations, rescue personnel can use the location information to rescue stranded people."

In addition to building the hardware, his team planned and executed the validation tests for the Meshtastic network and the crash-landing algorithm by mounting the nodes on *...continued on page 15*

JPL Intern ENGAGE'd in NASA Research

by Jeremia Schrock

It's one thing to read about NASA, but it's another to work for them. During her recent internship, UAF undergraduate Ashley Schultz had the opportunity to intern at NASA's Jet Propulsion Laboratory (JPL) in Los Angeles. Prior to her internship, Schultz has taken two early career internships with the Space Systems Engineering Program at UAF which helped her develop the skills she would use during the internship.

While at JPL, Schultz worked on a project called ENGAGE. The project's goal was to create the "ground data systems necessary for a technology demonstration of a new microcontroller SoC for a lander sensor," Schultz explained. An "SoC" is short for "system on chip", a type of integrated circuit that consolidates separate functionalities onto a single microchip. An SoC can include a CPU, a GPU, data storage, and even allow for Wi-Fi connectivity. In essence, an SoC is a big thing in a small package.

"I found the most interesting part of the internship was learning about the process of working on an official NASA space mission as a programmer," Schultz said. As part of the project, Schultz worked with the ENGAGE team on hardware testing, studied with software engineers, coded scripts in Python, and worked with an open-source analytics and visualization platform called Grafana. "Another interesting aspect," she said, "was getting to know the perspectives of major NASA scientists and their experiences working on big NASA projects." *...continued on page 15*



Photo courtesy of Ashley Schultz.

Ashley Schultz at NASA Jet Propulsion Laboratory.

DIRECTOR'S CORNER *Denise Thorsen*



Photo courtesy of Denise Thorsen.

As I look over the incredible student achievements highlighted this year, I am reminded of the immense talent, resilience, and curiosity driving Alaska's future STEM workforce. Our programs continue to excel at providing authentic, "learning by doing" opportunities that align directly with NASA's core mission goals.

This newsletter shows the extraordinary breadth of research and hands-on education across our partner institutions. In higher education, UAF's Space Systems Engineering Program (SSEP) celebrated the successful sub-orbital launch of the 3D-printed AMPPS instrument from Poker Flat Rocket Range. At APU, undergraduates are marking the eighteenth year of monitoring glacial changes in the Eklutna watershed, while UAA's AK URISE program expands NASA-oriented research opportunities to build an inclusive scientific community. Meanwhile, UAS is paving pathways into the blue economy with its innovative Dive into STEM and Fly into STEM scientific diving and drone-mapping initiatives.

Our industry and NASA internships also continue to shape vital career trajectories. Students tackled rigorous mineral exploration fieldwork with Logic Geophysics, analyzed orbital launch logistics with Alaska Aerospace, and explored medical boundaries with Be Cool Pharmaceutics. We are also proud to highlight Caden Dekruif's work with Helio Alaska helping to restart production of a classic Alaskan aircraft, alongside Ayman Eltahir's hurricane relief drone research at NASA Langley. Furthermore, our graduate researchers are pushing boundaries by utilizing machine learning to map ground squirrel torpor for deep space travel, evaluating Kenai Peninsula burn sites, and using eDNA to protect Cook Inlet beluga whales.

Amidst these celebrations, it is with a heavy heart that we share the passing of one of our bright stars this spring, Ashley Schultz. Ashley was an exceptional UAF computer science student and a deeply valued part of our space grant community. She brought her talents to early career internships with SSEP before earning a prestigious internship at NASA's Jet Propulsion Laboratory, where she successfully developed ground data systems for the ENGAGE project. Though she initially faced imposter syndrome, Ashley grew to confidently share her passion alongside major NASA scientists. Her dedication, intelligence, and vibrant spirit left an enduring mark on everyone who worked with her. We extend our deepest condolences to her family, friends, and colleagues; she is profoundly missed.

As we honor Ashley's memory, we remain firmly dedicated to fostering the passions, dreams, and discoveries of all our students. Thank you to the faculty mentors, industry partners, and community members who guide and champion these students at every stage of their journeys.

The Seventeenth Annual

Education and Research Symposium

Fairbank, Alaska April 1–2, 2027

spacegrant.alaska.edu/symposium

UNDERGRADUATE RESEARCH APPRENTICESHIP AWARDEES

Madelyn Brennan
(AY 25-26)
Chemistry and Biology – UAF
Investigating Mechanisms of Mitochondrial SDH Suppression in Hibernating Black Bears: Insights into Metabolic Suppression for Long-Duration Spaceflight

William Caldwell
(AY 25-26)
Electrical Engineering – UAF
Building and Testing the Timing Subsystem for a Droneborne Lidar System

Joshua Carlson
(AY 25-26, Su 26)
Mechanical Engineering – UAA
Radio Frequency Plasma Generation for Electric Propulsion Diagnostics (Su 26) Krypton Plasma Generation and Collisional Radiative Modeling for Electric Propulsion Diagnostics

Dexter Delaney
(Su 26)
Chemistry - UAF

Determining the Timing of Sympathetic Activation During Hibernation

Elijah Clark
(Su 26)
Marine and Environmental Sciences – APU
Do Temperature Inversions Occur in the Eklutna Watershed? Characterizing Elevation-Dependent Temperature Lapse Rates on an Alaskan Glacier System

Noah Crawford
(AY 25-26)
Mechanical Engineering – UAA
Optical Emission Spectroscopy and an Argon Collisional-Radiative Model for Hall Thruster Diagnostics

Addison Elsik
(AY 25-26)
Biological Sciences and Natural Sciences – UAA
Baseline Expression of Nitric Oxide Synthase Isoforms in Euthermic Arctic Ground Squirrels: Implications for Hypoxia Tolerance and Oxidative Stress Regulation

Nadezhda Finley
(AY 25-26)
Electrical Engineering – UAF
Energy Deposited by Specularly Reflected Whistlers in the Magnetosphere

Nike McCampbell
(AY 25-26)
Marine and Environmental Sciences – APU
Microplastic Deposition and Accumulation in Water and Soil

Stella Organek
(Su 26)
Biology – UAF
Understanding body composition dynamics during a Mount Denali climb: The use of a novel biomarker of amino acid catabolism

Rushyll Pacoy
(Su 26)
Marine and Environmental Sciences – APU
Assessing the Influence of Recreational Activity on Microplastic Contamination in Anchorage Lakes

Aubrey Palmer
(AY 25-26)
Marine and Environmental Sciences – APU
Quantifying Snowmelt Contributions within the East Fork of Eklutna Basin to Eklutna Lake Anchorage, Alaska

Athena Turner (Su 26)
Geological Sciences – UAA
Geomorphic Mapping of the Tintina Fault

Heidi Ritzinger
(AY 25-26)
Associates of Science – UAA
The Impacts of Gas Outflow from the Vicinity of Growing Black Holes on their Host Galaxies

Teegan Silva (AY 25-26)
Geoscience – UAF
Spatial Variability in Seasonal Velocity Drivers at Sermeq Kujalleq, Greenland

Aaron Tanner (Su 26)
Mechanical Engineering – UAA
Refined Diagnostic and Spectroscopic Techniques for RF-Driven Plasma Discharges in Helium and Other Noble Gases

Evelyn TeKrony (Su 26)
Marine Natural Resources Technician – UAA Prince William Sound College
Farm vs. Wild Sugar Kelp Microbiomes in Prince William Sound, Alaska: 16S eDNA Baseline With Water Context, Environmental Covariates, and Open Data Products

Jacqui Wendler (Su 26)
Biological Sciences – UAF
Understanding How CHA Alters Glucose Regulation During Induced Metabolic Suppression

EARLY CAREER RESEARCH APPRENTICESHIP AWARDEES

Sam Fendt
(AY 25-26)
Pre-Medical Studies (Post-Bacc) – UAA
Plasma Source and Diagnostics Integration for Hall Thruster-like Plasma Emulation

Andrew Jahn
(Su 26)
Electrical Engineering – UAA
Double Langmuir Probe Installation and Commissioning in an RF Plasma Environment

Hannah Hausmann
(AY 25-26)
Biochemistry – UAF
Early-Career Training in Synthetic Torpor and Hibernation Biology for Space Medicine

Jet Nguyen
(AY 25-26)
Biological Sciences – UAF
Early-Career Training in Synthetic Torpor and Hibernation Biology for Space Medicine

Ryan Roy
(AY 25-26)
Mechanical Engineering – UAA
Automotive Corrosion Damage Studies due to De-icing Salt-Induced Stone Impingement

Aaron Tanner
(AY 25-26)
Mechanical Engineering – UAA
Plasma Source and Diagnostics Integration for Hall Thruster-like Plasma Emulation

Pauline Xu
(AY 25-26)
High School-Dual Enrolled – UAF
Spacecraft Electron Spectrometer Testing, Flight, and Design Improvements

Continued from "Alaska Aerospace internship gives UAF student a lesson in space operations, logistics " on page 10

launch complex would eventually need a countdown technician. However, that role would only be necessary when a rocket was ready to fly. That meant that said role could be filled later. "I got to learn a lot of the ins and outs for operations at an orbital launch site," he added. So much digging into launch site logistics actually increased Speer's interest in space operations. Enough so that he is now "excited for future opportunities" in that sphere. Not only would he recommend an internship with Alaska Aerospace, he would also love to work more with them in the future. Speer expects to finish his degree in aerospace engineering sometime in 2027.

Continued from"Potential career paths revealed through internships" on page 10

horns and bear spray) were a constant concern. Both students found the work physically and mentally rigorous: the survey equipment was heavy; the terrain could be difficult to traverse; the surveys were often 90-degree grids rather than convenient contour line-based routes; and some workdays were exceedingly long.

Continued from "A NASA internship rekindles an interest in aerospace engineering" on page 12

radio-controlled cars. They wrote the Operations Readiness Review needed to extend their research to drones.

Ayman thinks the internship "was an invaluable experience for an engineer." He enjoyed being part of a team that included students from diverse backgrounds, majors, and skills. He says, "learning to work well with others is a skill that all engineers should have."

Continued from "JPL Intern ENGAGE'd in NASA Research" on page 12

According to Schultz, the experience was not at all like what she expected — and in the best possible way. "I initially had imposter syndrome and was worried that I would not be able to fulfill my mentor's expectations," she said. But eventually she grew used to working at JPL and grew more confident in the work she was doing. "It was a wonderful learning experience," she added, "and a chance to meet smart people who share your interests and passion."

Alaska Space Grant Program
University of Alaska Fairbanks
P.O. Box 755919
138 JUB Building
Fairbanks, Alaska 99775-5919

Calendar of Events 2026

August *2026*

- **August 1**– Undergraduate Research Apprenticeships (Summer) Applications due

September *2026*

- **September 15** – Early Career Undergraduate Apprenticeships (Academic Year) Applications due
- **September 15** – STEM Education Fellowships (Fall) Applications due

December *2026*

- **December 1** – Graduate Research Grant Applications due
- **December 1** – STEM Education Fellowships (Spring) Applications due

February *2027*

- **February 1 – Alaska Industry Internship Applications due**
- **February 27 11:59 ET – NASA Summer Internship Application Deadline**

March *2027*

- **March 1 – Pre-College Grant Applications due**
- **March 1 – Undergraduate Research Apprenticeships (Summer) Applications due**
- **March 15 – Early Career Undergraduate Apprenticeships (Summer) Applications due**
- **March 1 – Last day to request ASGP Sponsorship for a NASA Summer Internship**

THE SEVENTEENTH ANNUAL EDUCATION AND RESEARCH SYMPOSIUM WILL TAKE PLACE IN FAIRBANKS, ALASKA APRIL 1–2, 2027.

The University of Alaska (http://www.alaska.edu/alaska) is an equal opportunity/equal access employer and educational institution. The university is committed to a policy of nondiscrimination (http://www.alaska.edu/nondiscrimination) against individuals on the basis of any legally protected status.
This material is based in part upon work supported by NASA through the Alaska Space Grant Program (80NSSC20M0070).