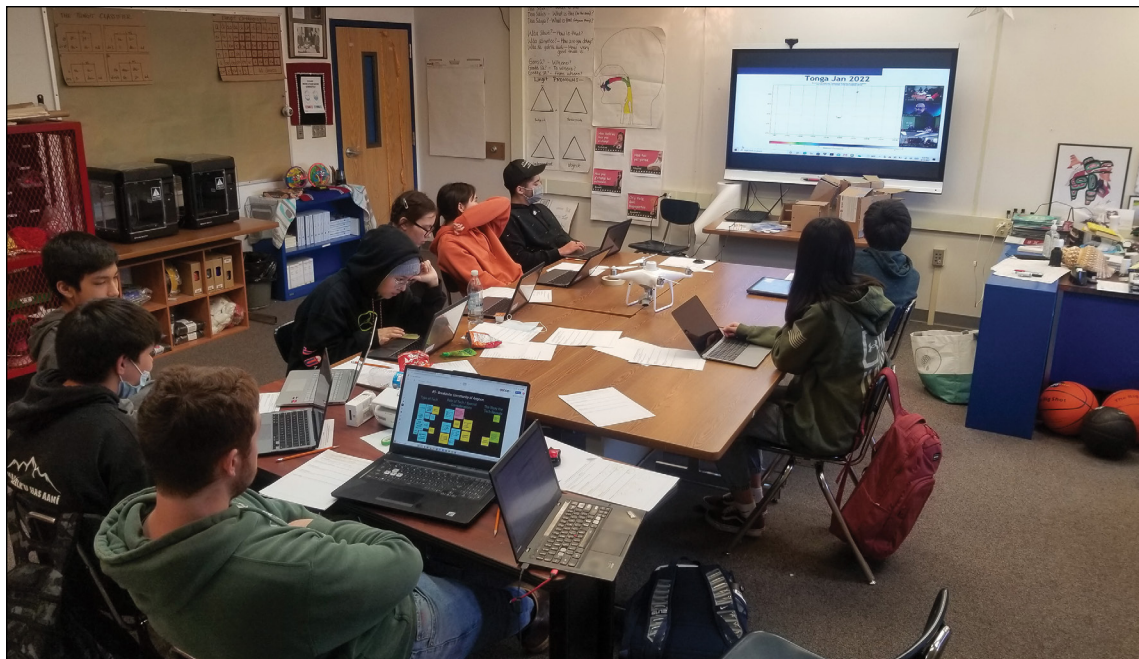


# Alaska Space Grant News

Newsletter of the Alaska Space Grant Program • Fall 2022

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

## A Community-Based, Problem-Solving Course as a Pre-college STEM Springboard *by Kim Morris*



UAS environmental studies senior, Sam Nielsen (foreground), leads the Angoon community team on a collaborative “jam-board” brainstorm session on local water-resource issues while networking remotely with NASA-JPL remote sensing specialist Dr. Jorge Vazquez and UAF CenterICE innovation leader Peter Webley.

Opportunities to learn about science, technology, engineering, and mathematics (STEM) careers are scarce for students in Alaska’s underserved communities. The poor success rate of students who move from high school to college or university reflects this lack of opportunity—Alaska ranks last nationwide. Students who do attend university are disproportionately from high-population areas, leaving Alaska Native and rural communities behind.

Dr. Sanjay Pyare at the University of Alaska Southeast (UAS Juneau) developed and implemented an earth-observation, hybridized short course called Community Engagement and Resource Challenge in Local Environments.

This course brought together 11th and 12th grade students, UAS undergraduate mentors, local organizations, traditional knowledge experts, and UA and NASA professionals for a series of brainstorming and problem-solving activities.

The 10-week course used active-mode team learning, an adaptive curriculum, and emerging technology to explore local environmental problems. The students collaborated with community members and incorporated local knowledge and personal experience into their discussions. The communities of Yakutat and Angoon participated in the pilot project. Seventeen pre-college students, three

*Continued on page 13*

### NASA / ALASKA SPACE GRANT PROGRAM

#### Lead Institution

University of Alaska Fairbanks

#### Web

[spacegrant.alaska.edu](http://spacegrant.alaska.edu)

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#### Prince William Sound College

Steve Johnson

#### Challenger Learning Center of Alaska

Marnie Olcott

Courtesy of Dr. Sanjay Pyare.



# A Multi-Year Apprenticeship Program Provides Valuable Experience for Engineering Students *by Kim Morris*



SSEP Team over the summer of 2022.

The University of Alaska Fairbanks Space Systems Engineering Program (SSEP) provides hands-on experience in all aspects of space systems engineering — propose, design, build, and launch — to interdisciplinary engineering and science students. The students move from novices to leaders in this apprenticeship-style program. As they progress through SSEP, students are trained in basic lab processes and design software, take on more responsibility and specialized tasks, and become trainers and mentors.

SSEP activities have the same multi-year design cycle as real world engineering projects. Students build and test almost everything — circuit boards, metal satellite structures, and software — in the lab. They also participate in design-review presentations with industry professionals.

SSEP currently has three active CubeSat missions. The CubeSat Communications Platform's (CCP) has two student designed payloads that maximize information throughput while reducing the size, weight, and power required. CCP is part of the Air Force Research Laboratory University Nanosat Program.

The Alaska Research CubeSat (ARC-2) is an undergraduate student-led engineering project. ARC-2 is powered up during launch and records high-resolution measurements of the launch vehicle's vibrations and temperature, data crucial for future designs. ARC-2 also takes pictures of the Polar Regions and transmits them back to the surface over a novel communications subsystem.

The Alaska CubeSat Aurora Plasma Spectrometer (ACAPS) is a small instrument that measures the high-energy electrons that cause the Aurora. ACAPS fits into a small space imposing



Graduate Student Quetzal Luebke-Laroque explaining part of his thesis design, a tiny high voltage supply, for ACAPS.

minimal design restrictions on its host CubeSat. This project is partially funded through a NASA ROSES proposal.

During 2022, 10+ undergraduate and six graduate students participated in the SSEP. The undergraduates joined the program to improve their academic performance, develop technical skills, and gain experience that would prepare them for their careers. Through their SSEP participation, they also hone their communication and teamwork skills.

SSEP reaches beyond the university. Since January 2022, approximately 86 elementary and middle school students have participated in a variety of outreach activities. Some of these young people built and launched paper rockets; others went on radio fox hunts, using radio direction finding techniques to locate hidden radio transmitters. These engaging activities were designed to inspire the next generation of engineers and scientists. ●



# Engagement and Innovation in Online, Guided Inquiry Projects in Chemistry *by Kim Morris*

Undergraduate science, technology, engineering, and mathematics (STEM) courses can be challenging, especially for Alaskan minorities. To provide a more learner-friendly experience, Dr. Dee Barker completely changed the methods and practices of teaching three undergraduate courses offered at Alaska Pacific University. She employed a presentation format; the course content emphasized how chemistry relates to current societal issues. Online activities (20 per course) supplemented these presentations.

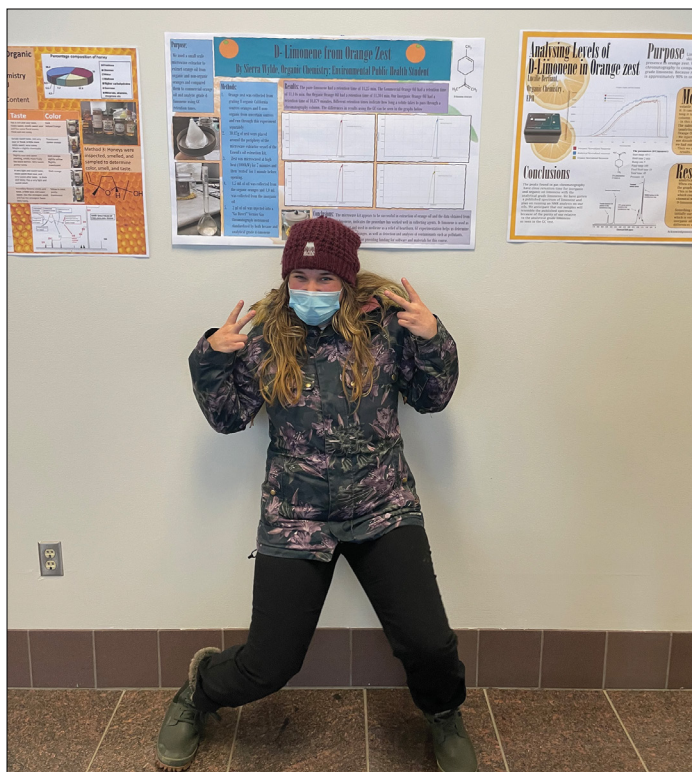
Barker's guided inquiry-learning activities addressed aspects of medicine, environmental chemistry, agriculture, and nutrition. Simulators, 3D software, and real-world data collection and analysis facilitated the students' understanding of abstract concepts and made the research more engaging. The activities were either face-to-face classroom, real-time online, or blended (hybrid) experiences. Dee will use successful activities as templates in future courses.

The students learned about science by being scientists. They developed a scientific approach to current global environmental and health issues by researching answers to

pressing societal-level questions. By the end of each activity, students had completed a mini-project based on a chemistry concept or skill related to their two chosen fields of science.

They used the knowledge, skills, and data sets they developed during the activities as building blocks to answer a research question related to current issues relevant to them and their communities. They created posters summarizing their research — the chemical processes observed in the two fields of science of interest and how they related to broader global issues and dynamic processes. The students presented their results during the end-of-semester campus-wide Biannual Scientific Poster session.

The course evaluations indicated that the students benefited from the new course pedagogy. Many students enjoyed leading the class explorations, with the professor participating as a fellow researcher and advisor. Comparisons between nuclear magnetic resonance measurements and the simulations stimulated lively discussions. The presentation by a speaker from a local medicinal chemistry business was considered rewarding and informative. Several students expressed an interest in taking more chemistry-related courses. One student is continuing their project as a senior project; another wants to turn their project into a business. Overall, these courses increased the participants' interest in and appreciation of STEM. ●



Sierra Wyld in front of her poster, "D- Limonene from Orange Zest" at the Alaska Pacific University's Biannual Scientific Poster Session.



Lucille Berliant presenting her poster to an audience at the Biannual Science Poster session at APU. Her poster was on a comparison of the gas chromatograms of organic orange peel oil versus non-organic orange oil extract.

Courtesy of Dr. Dee Barker.

Courtesy of Dr. Dee Barker.

# Robots, Rockets, and Drones: An Applied Physics Bootcamp for K-12 Teachers *by Kim Morris*

Alaska minorities perform poorly in science, technology, engineering, and mathematics (STEM) disciplines; much of this lack of success is attributable to the way STEM courses are taught to these students.

Most Alaskan teachers are from out-of-state and have little knowledge of local cultures or communities, especially in rural or predominantly Alaska Native districts. In small and rural schools, educators must teach outside their area of expertise due to limited staffing. These instructors use the Western Science framework and are unfamiliar with land-related, place-based Indigenous knowledge and science, creating a disconnection between teaching and learning styles. These working conditions and knowledge gaps lead to high teacher turnover resulting in an unstable learning environment.

Dr. Steven Johnson of Prince William Sound College created Robots, Rockets, and Drones to bridge K-12 teachers' science and cultural knowledge gaps. The course targeted K-12 teachers from high-needs rural school districts dominated by Alaska Native and low-income students. These teachers usually had limited STEM and physics backgrounds and were not originally from their school district. The course goal was to make STEM careers attractive to minority students by training their teachers to deliver more engaging and culturally sympathetic STEM instruction.

The Robots, Rockets, and Drones course comprised an onsite boot camp and follow-up curriculum development support. During a one-week boot camp, teachers learned some basic principles of applied physics, programming, and engineering by exploring the movements of robots, rockets, and drones. This exploration included place-based, hands-on activities aligned with Alaska science standards.

The teachers also discussed using place-based education and strategies to incorporate Indigenous Science and Indigenous knowledge into their lesson plans. By the end of the boot camp, the teachers were ready to design and deliver



April Dunham and Rose Ann Viray adding rubber bands to the wheels of their Vex robots for better tread.



All of the teachers who participated in the Rocket Launch at the Robots, Rockets and Drones summer boot camp.

to their students a STEM-related lesson based on their new knowledge of robots, rockets, or drones.

The quality of the proposed lesson plans, the success of the place-based classroom activities, and the teachers' reflections determined the program's effectiveness. ●



## STUDENT HIGHLIGHTS

### Students Learn New, Valuable Skills during Summer Internship

by Jeremia Schrock

During the 2021 summer, two UAA students had the chance to work for one of Alaska's most exciting scientific development firms: The Launch Company. For Tadeusz Martynowicz and Brad Choi, their internship may have been challenging, but it was confidence- and skill-building, too.

"It was very stressful at first," wrote Martynowicz, an engineering student who goes by "Tad". At the time of writing, he was finishing his M.S. in Mechanical Engineering at UAA with a graduation slated for 2022. "Tad" had a challenging first few weeks at TLC and had to think on his feet. He also learned a new language.

Martynowicz's assignment was something he had no experience doing: coding in Python. The programming language is one of the most versatile and he used it to conduct an analysis of a rocket fuel heating circuit. While others would have balked, Martynowicz got to work.

"After opening my thermodynamics and calculus textbooks...I was able to complete the task." It's an understatement that belies that intensity of his research. He also studied Python Tutorials online. Martynowicz later used his new-found programming skill on other internship projects.

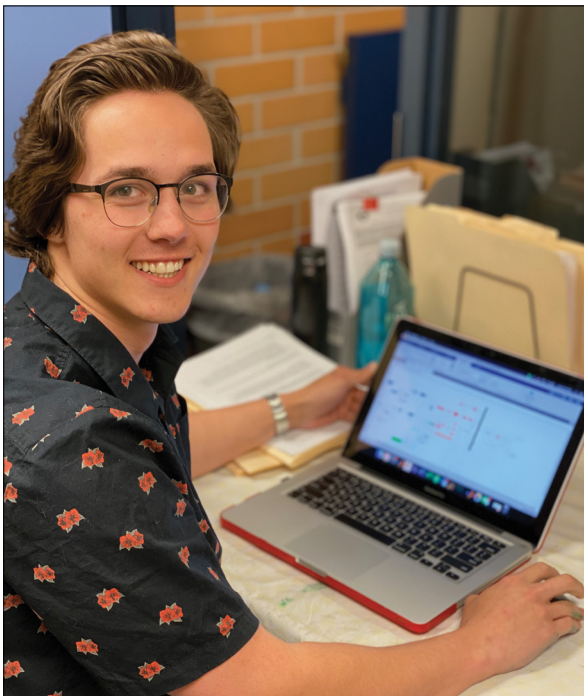
"I'm very thankful for this opportunity and I am grateful that this program exists," he wrote. "It allows Alaskan students to have industry experience when they graduate."

From the beginning, undergraduate Brad Choi knew why he wanted to intern with TLC. "I find their mission to be important and relevant to my career goals," he said. Choi is a former Alaska Aerospace Corporation intern and is passionate about engineering.

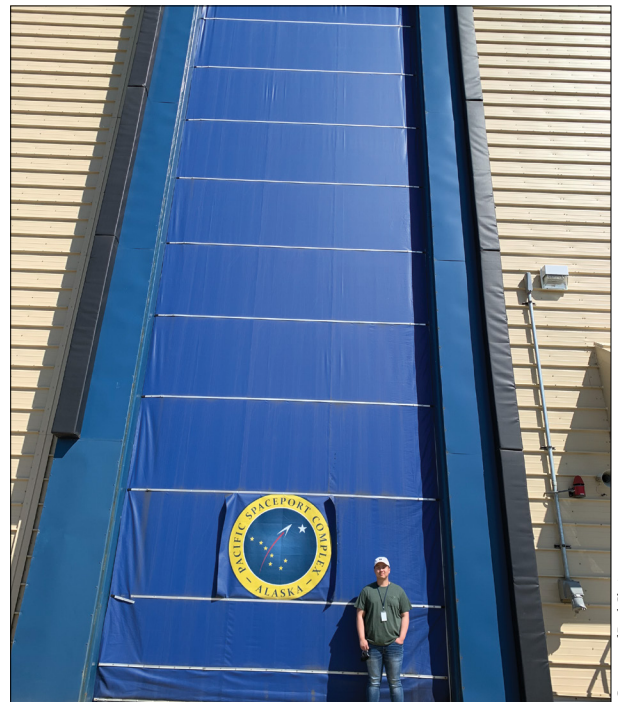
While studying for his B.S. in Electrical Engineering at UAA, Choi's goal is to work in the aerospace or automotive industries. During his time at TLC he worked on two projects. The first gave him hands-on experience assembling a jet-fuel container and the other the opportunity to learn the craft of technical writing.

"It was a really good experience," wrote Choi, "and I found it to be valuable in developing my electrical and mechanical engineering [skills]."

TLC is an Anchorage-based organization founded in 2015 by former UAF alumus and SpaceX engineer Ben Kellie. They specialize in "everything you need to launch something to the edge of space and beyond." The firm develops standardized hardware, ground support equipment, and launch processes. ●



Courtesy of Tadeusz Martynowicz.



Courtesy of Brad Choi.

Brad Choi in front of the Pacific Spaceport Complex's bay door.

## STUDENT HIGHLIGHTS

### Studying Corrosion in Cold Arctic Climate *by Jeremia Schrock*

Scientists can never have enough data, especially when the data available is next to nothing. For UAA graduate student Tyler Cushman and his advisor Raghu Srinivasan, understanding corrosion in the world's colder climates is a problem worth tackling.

Corrosion is a well-known problem inherent to life on or near the sea due to the presence of aerosol chlorides in humid environments. However, it is a topic little understood in cold, coastal regions like those found in Alaska. It's shocking since at almost 34,000 miles Alaska has more coastline than any other state in the nation.

"Corrosion is a slow, silent killer," wrote Cushman, a mechanical engineering master's student. A 2016 survey found that corrosion globally costs more than \$2.3T annually. Corrosion also impacts numerous industries across Alaska, including aerospace, transportation, and oil and gas.

As part of a multi-phase project, Cushman has developed and installed specialized, multi-angled racks to study atmospheric corrosion. These racks, located at different sites throughout Alaska, will provide valuable atmospheric corrosion data and show how weather parameters influence corrosion.

"Not only is this a direct coastal problem, as salts from the

sea travel inland further than you would expect, but de-icing salts from roads and aircraft also play a large role," Cushman said. These inland concerns are why Cushman installed a rack in Fairbanks, in addition to a pair in Anchorage and another in Kodiak.

While Cushman's stations are still collecting data, some conclusions can be drawn. The samples in Kodiak, for example, experienced ten-times as much corrosion compared to any other sites. Cushman points the finger squarely at the higher moisture content and proximity to the ocean. There was also a notable difference between Anchorage's inland and waterfront stations.

Cushman's racks will continue to collect data into early summer. Afterwards, he will process and compare the data with results from similar corrosion monitoring stations in the US; most notably at the Kennedy Space Center in Florida. Finally, they will develop a model to help other scientists better predict corrosion rates.

Moving forward, Cushman and Srinivasan hope to install more permanent racks at a wider range of sites statewide. When it comes to science, the more data the merrier. ●



Tyler Cushman, next to the corrosion rack he designed.



## STUDENT HIGHLIGHTS

### Fox Sees Glaciers as Template for Extraterrestrial Life *by Jeremia Schrock*

It's a scientific maxim that where there's water there's life. This understanding supports the idea that if life can thrive in Earth's icy places, like glaciers, it can dwell elsewhere in the cosmos. In a sense, the key to understanding extraterrestrial life begins on Earth.

"Earth is the best model we have for life because, well, it's our only model," said Tyler Fox, a masters student at UAA. Since last year, Fox has researched microbial life in Alaska's glaciers.

"Icy worlds have garnered particular interest because of their potential to support life," he said. These worlds contain water and essential elements living organisms need. As part of his research, Fox took samples from five Alaska glaciers: Exit, Castner, Worthington, Byron, and Gulkana.

Previously considered inhospitable, new research shows that diverse microbial communities can live, quite literally, where the sun doesn't shine. These glacial-dwelling microbes are isolated from the sun for thousands of years and rely on energy harvested from the oxidation of organic and inorganic detritus.

While successful, Fox found some glaciers more forthcoming than others. "Some glaciers were definitely harder to extract [microbial] DNA from," he said. "I don't think I would say that the quality or the viability differed for each, but there were definitely issues with getting enough biomass to extract."

Despite nature's reticence, Fox sequenced entire metagenomes for Byron and Worthington. This means he has a complete understanding of both glaciers' microbial communities, similar to how a census provides a demographic snapshot of a city. Fox also secured samples from the other glaciers and has a good idea of their microbial groups too.

While Fox wished Castner, Gulkana, and Exit had been

more forthcoming, there's no denying that he pulled back the curtain on what makes some of Alaska's microbial life tick. "I'm hoping that the geochemical data [and] the metabolic function of the two samples I managed to sequence will come together to tell a good story."

A good story in a new field of study. Fox has given science a better understanding of Earth's own icy places and, just maybe, a glimpse into understanding life outside of Earth. ●



Tyler Fox collecting microbial samples using a 0.22 um filter.

Courtesy of Tyler Fox.

## STUDENT HIGHLIGHTS

### Project Monitors Beluga Whale's Habit Use Patterns

by Carol Brzozowski

As a former necropsy technician with the Alaska Veterinary Pathology Services in Anchorage where she conducted CIB necropsies, Sonia Kumar, a M.S. degree marine biology student at the University of Alaska Fairbanks, took an interest in beluga whales.

Kumar's Alaska Space Grant project entails monitoring the acoustic presence of Cook Inlet beluga whales in two rivers feeding into the Cook Inlet to determine riverine habitat use patterns in the rivers, which are heavily used by commercial, sports fishing and personal use sectors.

She deployed seven passive acoustic monitors (PAM), three in the Kasilof River and four in the Kenai River during May and June 2021.

One detector recorded anthropogenic and environmental noise. The other detects beluga echolocation.

"I had to be creative while deploying the detectors because Cook Inlet is an incredibly challenging place to work with large tidal fluctuations, silt from glacial runoff, and few structures from which to deploy the PAM devices," she says.

Kumar worked with a welder to create special housings to hold and project the devices this summer. Preliminary summer data from the significant amount collected from

the Kenai River shows belugas were detected six days earlier acoustically compared to visually

"Several overwinter deployments will hopefully provide winter usage data as well," she notes. "Shore-based visual surveys were conducted in conjunction with acoustic monitoring to compare with PAM detections between April and September 2021."

Kumar initiates a second season of field work in April.

"Conducting a pilot project during a global pandemic limited the amount of in-person guidance I've been able to have with my committee," she says. "However, that has led me to problem-solve, network within the Kenai community, and build relationships with area non-profits and seafood companies.

Kumar notes she is developing skills that will not only help her on her trajectory of being a marine biologist, but the field experience she is gaining has been of high value.

"I hope this research will have management implications, especially if there is demonstrated evidence that belugas primarily use these rivers as important foraging habitat while there is little anthropogenic activity," says Kumar. ●



Courtesy of Sonia Kumar.

Sonia Kumar holding a Passive Acoustic Monitoring buoy.



## STUDENT HIGHLIGHTS

### NASA Academy Internship Explores Wildfire Management Solutions

by Carol Brzozowski

Endeavoring to solve problems related to wildfire management was the task of University of Alaska students such as Nicole Sola, a University of Alaska Anchorage student expected to graduate in December 2021 with a Bachelor's degree in science in electrical engineering with minors in mathematics and physics.

Sola interned for 10 weeks with Dr. Elisabeth Ward during summer 2021 with the NASA Academy at the Langley Research Center.

The NASA Academy offers an intense, multi-disciplinary research program emphasizing collaboration, teamwork, leadership, innovation and creativity by experiencing research under circumstances similar to those faced by aerospace professionals.

The task: find ways to improve wildfire management using existing NASA technologies or creating something new.

Twenty-three students split into three subgroups tackling issues relating to data acquisition, communications and equipment development.

Sola worked on the communications subgroup to improve the way that wildfire personnel receive information about active fires.

"We came up with a way to improve communication between dispatch and wildlife personnel," says Sola. "We also came up with a more effective way to track active fires. We sent our technologies to some of the field personnel to get feedback on the actual usage of it all and received some great feedback so far."

Sola and other students spoke with various people about potential wildfire management improvements, including experts from CALFIRE, the U.S. Forest Service and NASA engineers and researchers.

"Various states have different protocols about fire management, so determining what technologies could help at the various levels was part of the challenge," says Sola.

"The internship was incredibly inspiring," Sola adds. "I was surrounded by a motivated and intelligent group of people.



Nicole Sola at the Langley Research Center.

Especially after a year of COVID and a lot of things being done virtually, it was a great experience to have the chance to work together in person.

"Being back in that environment surrounded by like-minded people has motivated me for my own future. I am currently working at a local electronics manufacturer — BeadedStream — that builds temperature cables and data loggers."

Sola is contemplating graduate school while keeping her option open to job opportunities, including working for NASA. ●

Courtesy of Nicole Sola.

## STUDENT HIGHLIGHTS

### UAF Duo Gain Tech Experience during Summer Internship

by Jeremia Schrock

The ideal internship is about growth; whether growth professionally or growth as an individual. Oftentimes, the two go hand-in-hand. For UAF students Luke Underwood and Uddeep Karki, their recent summer interning with Coupi, Inc. was just such an experience.

Underwood and Karki created a manual for the use of Polyphysica, simulation and modeling software currently in development at the Fairbanks-based outfit. The pair were given “free reign” over the software - meaning they could

develop and run their own simulations, testing the software in their own unique ways - allowing them to write the best possible manual they could. “We were allowed to push the software and hardware to the limit via our simulations,” Karki said.

“For Uddeep and I, this project served to improve our technical writing skills and generally help us to learn how to communicate regarding the technical aspects of the software,” Underwood added. The pair even discovered bugs during their simulations, meaning not only did they literally “write the book” on Polyphysica, but they also had a (small) hand in developing the software itself.

Another highlight of the internship was working with their mentor (and Coupi. founder) Jerome “Jerry” Johnson. Underwood and Karki were full of praise for the UAF scientist, citing him as a big reason for why their internship was successful.

“[He’s] an excellent person to have as a direct superior as he takes a personal interest in your growth as an individual and [as] an employee,” Underwood said. He “[pushes] you to expand your potential in a way that is intentional, challenging yet reasonable, and ultimately rewarding.”

Karki added that Johnson was “amazing in his ability to guide us in both technical and non-technical subjects. He helped us grow not only in proficiency [with] software and modeling, but also as professionals.”

Positions like these are internships for a reason, Underwood said. “You by no means have to be an expert in your field to do a good job, so long as you are prepared to learn.”

Underwood is a junior pursuing a degree in computer science; Karki is a senior double majoring in computer science and mathematics. ●



Courtesy of Luke Underwood.



## STUDENT HIGHLIGHTS

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### Yang Experiences “Deep Learning” during NASA Internship

by Jeremia Schrock

What scientist doesn't dream of someday working for NASA? For computer science student Theng Yang the dream became reality when he interned at the Goddard Space Flight Center in Maryland last summer. While there Yang had the chance for some deep learning, literally and figuratively.

At Goddard, Yang worked on a pair of projects concerned with deep learning, a branch of computer science that uses data and algorithms to imitate the way humans learn. A program is taught to “learn” and by doing so will gradually improve its ability to make predictions, which it is often used for.

“Deep learning has experienced great success,” Yang said. The success has ranged from a role in developing artificial intelligence and self-driving cars to detecting credit card fraud and analyzing Earth's cloud formations. It's this last use that Yang was focused on.

“My first project aimed to predict cloud fractions on the Earth's surface using a deep learning algorithm,” Yang said. A cloud fraction is the percentage of each pixel in a satellite image that is covered with clouds. Yang was mentored by Tianle Yuan, a specialist in both deep learning and cloud physics.

As part of the project Yang collected satellite images from various databases, developed a deep learning algorithm, and then ultimately trained and tested the algorithm itself. “The most significant accomplishment for this project is that I only need 220 images, which uses minimal data compared to other techniques,” he said.

His second project was the continuation of a Goddard effort aimed at better predicting hurricanes. While project members had already developed and tested the deep learning algorithm, Yang stepped in to provide some digital logistics

and algorithm retraining. Due to its architectural complexity and large quantity of data, the algorithm had to be transferred to Amazon Web Services (AWS) to be trained efficiently. That is exactly what Yang did.

After finishing his internship at Goddard, Yang had a second NASA internship; this time at the Ames Research Center. He hopes to eventually join NASA's Pathways Program. Yang is currently an undergraduate at UAF and expects to graduate this year. ●



Courtesy of Theng Yang.

## STUDENT HIGHLIGHTS

### Student Ground Station Overhauled with German Engineering

by Charles Emerson



Hans Kieninger, Alaska Satellite Facility intern, tests UAF student ground station.

Every year, Alaska Satellite Facility (ASF) and the Karlsruhe Institute of Technology (KIT) partner to have a student sent to ASF for an internship over the summer. Hans Kieninger, a German senior pursuing a Bachelor's in Electrical Engineering, arrived in Fairbanks at the end of May to begin his internship. At the time, ASF and Hans did not have a project in mind but soon stumbled across a suitable endeavor. Hans would rebuild a ground station for the Space Systems Engineering Program (SSEP), a student-led engineering lab where satellites are developed. Building a ground station is an involved process that incorporates many different fields of study: mechanical, electrical, programming, antenna and RF analysis.

For Hans, building the ground station was the “practical experience of the theoretical stuff” he learned. He took great care to plan and structure the project as he had to finish by

November. Still, there were setbacks. At one point, Hans was using a CNC to mill a custom PCB and Hans broke many end-mills tips. This set him back two weeks as he tried to find suitable alternatives for manufacturing the PCB. Being a foreign national, there were also hiccups trying to get Hans access to the ground station's final destination, the NOAA facility at Gilmore Valley.

Overall, Hans enjoyed the experience as he was able to experience Alaskan and American culture. He loved “Epic Frisbee” — Ultimate Frisbee using kayaks, and simply access to the “super good” equipment and the people at ASF and the SSEP lab.

Hans' ground station will continue to be used by the students of UAF long after he has returned to Germany where he plans to continue his education and pursue a Master's degree in Electrical Engineering at KIT. ●



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## ***Continued from page 1, “A Community-Based, Problem-Solving Course...”***

undergraduates, and six community members participated in the onsite brainstorming sessions; four UA professors and Jorge Vaquez, a NASA-JPL scientist, participated remotely. Pyare and the UAS undergraduates traveled to the two communities for onsite activities.

After introductory presentations and discussions to define the research topic, document local knowledge, and identify information gaps, the students brainstormed ideas and solutions in consultation with experts in breakout sessions. They then did further research and eventually presented and discussed their ideas. The brainstorming sessions emphasized cutting-edge questions, critical inquiry, and collaborative learning, factors likely to lead to the students’ future success.

The participating communities and school teachers expressed an interest in offering the course again. Pyare wants to expand the program to 3-5 Southeast Alaska communities. He would like to adapt the team-based model to cover community-centered STEM topics such as subsistence and food security, environmental health, energy, environmental hazard and extreme weather planning, and infrastructure engineering.

ASGP, Alaska EPSCoR, IDeA Networks of Biomedical Research Excellence, and the Association of Alaska School Boards supported the course’s development and implementation. ●

## **CALENDAR OF EVENTS 2022 - 2023**

### **November 2022**

- NASA Spring Internship Application Deadline – November 7

### **December 2022**

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

### **March 2023**

- Higher Education and Pre-College Grant Applications due – March 1
- Undergraduate Research Apprenticeship (Summer) Applications due – March 1
- Early Career Undergraduate Research Apprenticeship (Summer) Applications due – March 1
- Alaska Industry Internship Applications due – March 15
- NASA Summer Internship Applications due – March 31
- Spring National Space Grant Directors Meeting in D.C. – March 2-3

### **April 2023**

- Alaska Space Grant and NASA EPSCoR Education and Research Symposium in Anchorage – April 6-7, 2023

### **July 2023**

- Undergraduate Research Apprenticeship (Academic Year) Applications due – June 15

### **September 2023**

- STEM Education Fellowship (Fall) Applications due – September 1
- Early Career Undergraduate Research Apprenticeship (Academic Year) Applications due – September 15

The Thirteenth Annual Education and Research Symposium will take place in Anchorage, Alaska April 7, 2023

## DIRECTOR'S CORNER *Denise Thorsen*



Courtesy of Denise Thorsen.

Even though winter is coming, it almost feels like spring as we and our students burrow our way out of our COVID torpor and re-engage in creating new knowledge through our research and educational opportunities.

Last April, after a two-year hiatus, UAS hosted the Alaska Space Grant Education and Research Symposium. We were face-to-face for the first since COVID travel restrictions were put in place. We were also able to invite NASA to attend virtually, something we learned to do during the shutdown. It was very exciting to see all the students' presentations and posters. Sonia Kumar (UAF) received a travel award of \$2000

for best presentation by a graduate student. Undergraduate poster awards, \$500/each, went to Joren Bowling (UAF) for Best Engineering Poster; Gabriella Camera-Faurot and Katherine Sakeagak both from APU tied for the Best Science Poster, and Mya Schroder received Best-In-Show Poster. Congratulations to our student presentation winners!

Being released from COVID restrictions allowed us to re-engage with our students at all levels. We were able to take students back out in the field and connect them to innovative research through our multi-year projects: Eklutna Glacier (Jason Geck — APU), URISE (Erin Hicks — UAA), SSEP (Denise Thorsen — UAF), and Taku Glacier (Jason Amundson — UAS).

## UNDERGRADUATE RESEARCH APPRENTICESHIP AWARDEES

### **Trevor Abts (AY21-22)**

Natural Sciences  
University of Alaska  
Anchorage

### **Cassidy Berger (AY21-22)**

Mathematics  
University of Alaska  
Anchorage

### **Joren Bowling (AY21-22)**

Mining and Mechanical  
Engineering  
University of Alaska  
Fairbanks

### **Daniel Fabrizio (AY21-22)**

Chemistry  
University of Alaska  
Fairbanks

### **Autumn Fox (AY21-22 and Su 2022)**

Geological Science  
University of Alaska  
Anchorage

### **Corey Giddings (AY21-22)**

Electrical Engineering  
University of Alaska  
Anchorage

### **Cora Lyon (AY21-22)**

Biological and Health  
Sciences  
University of Alaska  
Anchorage

### **Michael Martinez (AY21-22)**

Chemistry  
University of Alaska  
Anchorage

### **Toshio Matsuoka (AY21-22)**

Marine and Environmental  
Sciences and Environmental  
Public Health  
Alaska Pacific University

### **Katherine Sakeagak (AY21-22)**

Mathematics and Civil  
Engineering  
University of Alaska  
Anchorage

### **Brooke Branson (Su2022)**

Biological Sciences  
University of Alaska  
Anchorage

### **Ayla Crosby (Su2022)**

Marine and Environmental  
Science  
Alaska Pacific University

### **Roger Gebauer (Su2022)**

Microbiology  
University of Alaska  
Anchorage

### **Zoe Munson (Su2022)**

Marine Biology  
Alaska Pacific University

### **Sean Weir (Su2022)**

Marine and Environmental  
Sciences  
Alaska Pacific University

### **Karense Zaccardi (Su2022)**

Marine & Environmental  
Sciences  
Alaska Pacific University

### **Ludek Wojtkowski (Su2022)**

Electrical Engineering  
University of Alaska  
Anchorage



We were also able to support several new pre-college and higher education projects. Dr. Steven Johnson at Prince William Sound College developed a weeks-long camp for K-12 teachers that combines content instruction in applied physics using the movement of robots, rockets, and drones. The course also helps teachers consider how to combine Western science with Indigenous Science and Indigenous knowledge. Dr. Sanjay Pyare at University of Alaska Southeast developed a dual-credit short course that targeted student teams in underserved communities, developing a network with local community members and professionals, to address Community Environmental Resource challenges through brainstorming and problem solving activities. Dr. Dee Barker at Alaska Pacific University revised three different Chemistry courses to include 20 online interdisciplinary, student team-based activities. These activities were conducted in real time facilitating an environment of interactive, guided inquiry

learning, emulating the practices of scientists.

Alaska Space Grant Program continues to provide our students with opportunities to “learn about science by being scientists”, learn about problem solving by solving problems, learn about engineering by doing engineering.

If you would like to contribute to the Alaska Space Grant Program educational mission, please visit our website, <https://spacegrant.alaska.edu/> and select the Donate button at the top of the page. All donations are used to provide the match required by the Space Grant program before we can spend any NASA dollars. Your donation provides funding to increase the educational opportunities for students in Alaska. ●

## EARLY CAREER APPRENTICESHIP AWARDEES

### **Brittany Gardner (AY21-22)**

Biological Sciences  
University of Alaska  
Anchorage

### **Xu Murphy (AY21-22)**

University of Alaska  
Anchorage

### **Alexis Francisco (AY21-22)**

Electrical Engineering  
University of Alaska  
Fairbanks

### **Emma Beeler (AY21-22)**

Electrical Engineering  
University of Alaska  
Fairbanks

### **Zoe Munson (AY21-22)**

Marine Biology  
Alaska Pacific University

### **Tyree Brown (AY21-22)**

Environmental Science  
Alaska Pacific University

### **Mya Schroder (AY21-22)**

Electrical Engineering  
University of Alaska  
Anchorage

### **John Egbejimba (AY21-22)**

Chemical Engineering  
University of Alaska  
Anchorage

### **Samantha Benda (Su2022)**

Natural Science  
Prince William Sound  
College

### **Audrey Bulow (Su2022)**

Environmental Science and  
Outdoor Leadership  
Prince William Sound  
College

### **Sarah McCormick (Su2022)**

Mechanical Engineering  
University of Alaska  
Anchorage



## *Alaska Space Grant Program*

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Fairbanks, Alaska 99775-5919

# ***The Thirteenth Annual***

# **Education and Research Symposium**

**Anchorage, Alaska  
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