Alaska Space Grant News

Newsletter of the Alaska Space Grant Program • Fall 2016

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

Trailblazing UAF First Nations Launch Team Surmounts Challenges, Glimpses Future

By Ana Nelson Shaw

Jesstin Patterson's pilot dad provided him all kinds of flying toys: remote-controlled air blimps, rubber band-propelled balsa wood airplanes, and toy rockets powered by pressurized water. In those days Patterson worried most about keeping his playthings away from his neighbor's sled dogs. This year, preparing an entry for the First Nations Launch competition in Wisconsin, the problems got more technical--and more satisfying to solve.

Patterson and teammates Lonny Trunk, Trevor Creed and Adam Paskvan learned about the Space Grant-sponsored First Nations Launch through Olga Skinner, the staff advisor for the UAF chapter of the American Indian Science and Engineering Society (AISES). With support from the Alaska Space Grant Program (ASGP), Skinner had traveled to Wisconsin for last year's launch to gather information for UAF students.

"I was really impressed with the inclusiveness of First Nations Launch," Skinner said. "It's not just for engineering students. One of the most challenging rockets I saw was built by three students in business and environmental science. There were supportive people there, and good energy."

The team faced technical hills to climb, having never entered a rocket launch competition before. They prepared their entry during a regular, busy semester.

Courtesy of Wisconsin Space Grant Consortium

"Fortunately for us, we had full access to the ASGP Space Systems Engineering Program Laboratory centered in the first floor of our engineering building," Patterson said. "Any questions or concerns we encountered were promptly and kindly addressed by Denise Thorsen, Alaska Space Grant Director, and her team."

ASGP staff engineer, Jesse Frey, who already had rocket experience, helped the students regularly, as well, and accompanied them to the launch in Wisconsin.

Challenges included laborious hand calculations by Patterson and a lost payload that sent all six team members on a fruitless, day-long search in the Wisconsin woods. But Skinner said the team rose to the occasion.

"It inspired me, the way they met their challenges," she said. "Listening to the students before the event, I heard ambivalence, but after they came back, they spoke with fluency."

Team members reported on their experience at the year's final AISES meeting.

"It was pretty quiet in there," Skinner said. "Everybody wanted to hear their stories."

"As AISES students, we all aim to further our educations and bring back what has been accomplished to better the lives of our people," Patterson observed. "We motivate each other, support each other, and build upon each other.

"I firmly believe that giving young minds the opportunity to participate in something like the First Nations Launch can only benefit the nation," Patterson continued. "It is absolutely imperative that programs like this continue to exist to propel imaginations and intellects to the realization of limitless success."

NASA/Alaska Space Grant Program

Lead Institution:
University of Alaska Fairbanks

Web: **spacegrant.alaska.edu**

Support Alaskan Students! Donate to ASGP:
spacegrant.alaska.edu/About/Support

Affiliates:

Alaska Pacific University: Jason Geck

University of Alaska Anchorage: Utpal Dutta (CoEng), Erin Hicks (CAS)

Kenai Peninsula College: Marion Yapuncich

University of Alaska Fairbanks: Chung-Sang Ng (CNSM),

UAF College of Rural and Community Development: Peter Pinney

University of Alaska Southeast: Jason Amundson

Challenger Learning Center of Alaska: Marnie Olcott

Juneau Economic Development Corp.: Rebecca Soza

From the Director

Denise Thorsen

For the Alaska Space Grant Program, hands-on learning is an obsession. Knowledge building through hands-on, minds-on activities connect students' past knowledge and experiences with new concepts. Students are more engaged, becoming active collaborators in their own education. The students' knowledge creation feeds back to educate the educator creating an unbroken circle which ultimately feeds forward to the next generation of students. Alaska Pacific University shares this obsession with hands-on learning through its field courses. This year's topic was the Ninilchik razor clam population decline. Working with Alaska Department of Fish and Game, APU students developed their skills in field techniques and learned about potential environmental factors impacting razor clam populations. Fish and Game benefited from the increased data collected and analyzed by APU students. The Challenger Learning Center also shares this obsession with hands-on learning. Challenger educator, Bowen visited Shaktoolik to provide hands-on learning experiences for K12 students learning about climate impacts on geese, glaciers, and erosion. In turn, Bowen, learned about local climate change from the people of Shaktoolik making the visits a true exchange of knowledge.

Creating knowledge is not always a linear process like reading a book. Thomas Edison is supposed to have said "I have not failed. I've just found 10,000 ways that won't work." That is what the Space Systems Engineering students told themselves as they ran against one roadblock after another before successfully delivering the first satellite designed and built by engineering and science students from the University of Alaska Fairbanks (UAF). The UAF AISES team also had to overcome significant technical and financial challenges to participate in Wisconsin Space Grant's First Nations Launch. The UAA Rocketry Team actively seeks out challenges to overcome. They are currently looking to set the amateur rocket altitude record through the development of a liquid sounding rocket. The thrill of victory and the agony of defeat followed again by the thrill of victory is the connecting thread that forms the stories of these students' experiences. The educational value in working on these types of projects that synthesize course content and force students to work through real obstacles is immeasurable. The real world is not well reflected in homework problems.

One of the goals of Alaska Space Grant Program is to support educational opportunities that are relevant to NASA's mission and the state's needs. Whether those opportunities are sponsoring NASA internships to solve the mystery of the lost strut fairings function, develop UAV's for search and rescue, design state of the art Ka-band exciter, or explore potential rotor designs for a Mars helicopter; or graduate research on the tectonic activity of Alaska mountain ranges. Ultimately, Alaska Space Grants seeks to provide students with educational experiences that challenge them, thereby creating a knowledgeable, flexible, and resilient future workforce. George Tilton once said "Success is never final and failure never fatal. It's courage that counts." Alaska students have shown themselves to be highly courageous!

Higher Education

APU Field Course Investigates Ninilchik Razor Clam Populations

by Ana Nelson Shaw

When an area of Ninilchik Beach closed to clamming because of low numbers of razor clams in 2014, nobody felt particularly happy about it. Razor clams have historically been important as a food source, a cultural activity, and even a claim to fame for the area.

Three Alaska Pacific University professors, however, saw an opportunity in the closure to teach and learn—and to help find out why the clams might be struggling there.

Razor clams need a sandy substrate to live in. That habitat can be easily disturbed by waves. Large storms can wash an entire clam population ashore. Small changes in temperature—a degree or two from climate change, for example—can affect the timing of the clams' spawning. If they spawn too early, it might affect their entire life cycle.

This sensitive part of the coastal system merited close inspection and offered an opportunity.

Brad Harris, who runs the fisheries program at APU, was already working with the Alaska Department of Fish and Game monitoring the razor clams. Harris and his colleagues Amanda King and Jason Geck saw the situation as a real-life problem well suited to help their students learn important science skills.

"The razor clam decline is a pretty broad environmental problem," explained King, a geologist. "The cause could be related to a whole suite of environmental factors—freshwater input, water quality, underlying geology and geochemistry, coastal erosion, climate change, habitat degradation, predation by sea otters, and maybe also human predation. Many of those variables are well suited for collection of both qualitative and quantitative data. These field techniques are great for students to have in their toolbox as they move forward in their science careers."

Space Grant funding helped the course go forward. Collaborating with the Fish and Game, APU students spent eight days surveying beaches and counting clams. Although the logistics of tides and weather sometimes proved challenging, especially in concert with a limited academic schedule, the three professors used careful plans and flexible backup plans to ensure success. King learned to have something students could do each day to continue learning and being productive, even if conditions didn't cooperate.

"The students loved the field work and data collection process—not so much the analysis and write-up phase back on campus," she recalled. "Welcome to science."

"ADF&G really appreciated the help," King added. "We were able to collect a lot more data than would have been possible otherwise with their limited budget."

As with all good science, the group's study of razor clams in Ninilchik brought up lots more questions to study. King has obtained additional funding to use stable isotope analysis to try to learn more about how different water sources may affect clams.

The APU students who experienced the course get to carry →

Left: UAF photo by Todd Paris. Opposite, top: Jeremia Schrock; bottom: courtesy of Amanda King

Challenger Center Educator Visits Shaktoolik to Teach and Learn About Climate Change

by Ana Nelson Shaw

Arin Bowen paid attention when she started hearing reports about how climate change was affecting the village of Shaktoolik, where about 250 people live along Norton Sound near Nome. Bowen had taught three villages up the coast, in the same school district (the Bering Strait School District, or BSSD) before she landed at the Challenger Learning Center of Alaska as Curriculum Director.

"Shaktoolik's current principal was the principal at my school when I lived in Golovin, and I knew many of the people from Shaktoolik from my days coaching girls' basketball in Golovin," Bowen said. "I knew, from first hand accounts and news articles, that they had a lot of physical land and ocean change happening in their village due to climate change."

With Alaska Space Grant support, Bowen visited Shaktoolik three times over the course of a year to provide hands-on learning experiences for students learning about climate impacts on geese, glaciers, and erosion. The school in Shaktoolik also invited Bowen to participate in their Regional Family Science Night, a program of the BSSD district-wide science fair. She presented an engineering activity building towers out of household materials.

Teaching science concepts in a remote location had its challenges. Once she arrived in Shaktoolik, Bowen found it unexpectedly difficult to obtain the supplies she needed — empty two-liter bottles and tiny plants, for example.

"I knew a lot of the people in the village by then," Bowen said, "so I asked around for help finding those items." The community pulled together to make sure the kids could receive the hands-on instruction Bowen came to deliver.

They also delivered praise once Bowen completed her project.

"More than one elder or public person not connected with the school told me, "These kids need this kind of hands-on climate change education!"" she recalled. She also found that Shaktoolik kids had a lot of fun with her lessons, and teachers appreciated seeing new ways to explain concepts.

Adapting her methods to resonate with the community of Shaktoolik yielded the best results. "The more I can incorporate their ways of life — hunting, fishing, and subsisting — the more my activities will sink in and have lasting effects," Bowen said. She also plans to seek more input from community members in the future to make sure her pre- and post-tests for measuring the effectiveness of her lessons connect better with the students.

Bowen's visits also afforded her an important opportunity to listen and gain climate change knowledge from the people of Shaktoolik.

"All ages in the village told me they had never seen a winter with so little sea ice, and that scared a lot of them because that was how they went ice fishing for tomcods and set their crab pots for king crab," she said.

The project that set out to transfer knowledge in one direction definitely became an exchange.

"The elders are probably the most important sources of past knowledge when it comes to climate and weather in the Inupiaq culture," she explained." Before weather forecasting, their experiences outside served as tools to tell the weather and what was coming next. By listening to what they have to say, we can tell how much the earth really is changing, especially in the arctic."

→ forward their robust field data-gathering skills along with their diligent analysis and write-up experience—plus first-hand knowledge of how scientific curiosity can apply to real-world problems.

That's important for the razor clams, which so far do not seem to have recovered—the clamming ban has continued through 2016. More scientific inquiry might help find out why.

Fellowship and Scholarship Recipients

Fellowship Recipients

Katherine Aikens (Summer '16)
Mechanical Engineering
University of Alaska Fairbanks

John Berg (Summer '15)
Mechanical Engineering
University of Alaska Anchorage

Amanda Bowman (Summer '16)
Mechanical Engineering
University of Alaska Anchorage

Jesse Brady (AY15-16)
Mechanical Engineering
University of Alaska Anchorage

Aven Bross (AY15-16)
Computer Science
University of Alaska Fairbanks

Brandon Burgett (Summer '15)
Electrical Engineering
University of Alaska Fairbanks

Liam Cassell (Summer '16)
Electrical Engineering
University of Alaska Fairbanks

Samuel Cragle (AY15-16)
Electrical Engineering
University of Alaska Anchorage

Katrina Dowell (AY15-16)
Biological Sciences
University of Alaska Fairbanks

Brandon Grimshaw (AY15-16)
Mechanical Engineering
University of Alaska Anchorage

John Harriss (AY15-16)
Electrical Engineering
University of Alaska Anchorage

Max Hesser-Knoll (AY15-16)
Mathematics
University of Alaska Fairbanks

Kahn Howe (AY15-16)
Physics
University of Alaska Fairbanks

Matthew Keith (Summer '16)
Mechanical Engineering
University of Alaska Fairbanks

Ana Lambrano (AY15-16)
Mechanical Engineering
University of Alaska Anchorage

Eugene May (AY15-16)
Electrical Engineering
University of Alaska Anchorage

Robert Miller (Summer '16)
Mechanical Engineering
University of Alaska Fairbanks

Blair Munro (Summer '16)
Electrical Engineering
University of Alaska Anchorage

Tequila Nunley (Summer '16)
Mechanical Engineering
University of Alaska Anchorage

Kyleigh Pelton (AY15-16)
Electrical Engineering
University of Alaska Fairbanks

Alexandra Petrison (AY15-16)
Environmental Science
Alaska Pacific University

Patrick Pope (Summer '16)
Geoinformatic Systems
University of Alaska Anchorage

Rocky Powers (Summer '15)
Mechanical Engineering
University of Alaska Fairbanks

Jessica Putkamint (AY15-16)
Biology
University of Alaska Anchorage

John Sassman (Summer '15)
Education
University of Alaska Fairbanks

Jason Sebring (Summer '15)
Mechanical Engineering
University of Alaska Fairbanks

Jason Slats (Summer '15)
Mechanical Engineering
University of Alaska Fairbanks

Brendan Stassel (Summer '16)
Computer Science
University of Alaska Anchorage

Daniel Talbot (Summer '16)
Electrical Engineering
University of Alaska Fairbanks

Scholarship Recipients

Alexandra Busk (AY15-16)
Geological Sciences
University of Alaska Anchorage

Raina Douglass (AY15-16)
Computer Engineering
University of Alaska Fairbanks

Catherine Dunleavy (AY15-16)
Civil Engineering
University of Alaska Anchorage

Claire Ellis (AY15-16)
Civil Engineering
University of Alaska Anchorage

Joshua Guerrer (AY15-16)
Computer Science
University of Alaska Fairbanks

Michelle Guzman (AY15-16)
General Studies
University of Alaska Anchorage

Carlton Hautala (AY15-16)
Fisheries
University of Alaska Fairbanks

Kendrick Hautala (AY15-16)
Biological Science
University of Alaska Fairbanks

Tyler Hendricksen (AY15-16)
Mechanical Engineering
University of Alaska Anchorage

Kaylee Ige (AY15-16)
Health Sciences
University of Alaska Anchorage

Nicholas Jenkins (AY15-16)
Aviation Management
University of Alaska Anchorage

Phillip Jenkins (AY15-16)
Civil Engineering
University of Alaska Anchorage

Sarah Johns (AY15-16)
Electrical Engineering
University of Alaska Anchorage

Ian Minnock (AY15-16)
Geology
University of Alaska Anchorage

Alicia Oscar (AY15-16)
Elementary Education
University of Alaska Southeast

Tanner Penrod (AY15-16)
Mechanical Engineering
University of Alaska Anchorage

Kendra Robbins (AY15-16)
Engineering
University of Alaska Anchorage

Madeline Wenzlick (AY15-16)
Biological Science
University of Alaska Fairbanks

Tamija Woods (AY15-16)
Mechanical Engineering
University of Alaska Anchorage

Jesse Brady of University of Alaska Anchorage

by Jeremia Schrock

"Researching with the Langley Aeronautics Academy was the best summer of my life," said Jesse Brady, a senior in mechanical engineering at UAA. Brady spent summer of 2014 in Virginia studying with some of the world's top scientists. He added that the experience ultimately proved not only be the best summer of his life, but also one of the most academically inspirational.

When offered the chance to intern at NASA, Brady jumped at the chance. "I have always loved flying and exploring," he said. When he was younger, he used to dream of exploring space as an astronaut or working as a scientist or engineer with NASA.

"It sounded like such a fun, amazing, once in a lifetime experience and I knew that this was the opportunity that I had always wanted," he said. During the internship, Brady toured numerous NASA facilities from wind tunnels to state-of-the-art flight simulators. He also had the opportunity to tour several other NASA centers including NASA Headquarters, the Goddard Space Flight Center, and the Wallops Flight Facility.

While he was at Langley, Brady helped with designing, building, and test-flying a small dual-use Unmanned Aerial Vehicle for use in both search and rescue missions and precision agriculture applications. He managed flight test logistics and had the opportunity to serve as the testing engineer and work with the UAV pilot during test flights. As part of the project, Brady spent time analyzing the growth and development of the emerging UAV industry.

Brady was also shown the applications of engineering outside of NASA. He had the chance to meet with F-22 fighter pilots and toured a nuclear submarine. These real world engineering applications proved inspirational and he was impressed by the people who work at Langley. "It was great to intern in an environment where I was constantly surrounded by some of the world's leading scientists and engineers," he said.

Everyone at Langley was passionate about their projects and had an obvious excitement for life and learning. Brady was able to meet with several senior researchers and was "overwhelmed" by their kindness to not only pause their work, but to take time to get to know him and offer academic advice.

The most important thing Brady learned was to pursue what excites you. "Everyone at Langley had a contagious love for life and learning," he said. The researchers taught that a scientist is at their most effective and at their happiest when researching or working on what they are most passionate about.

"I highly recommend to any students who are passionate about science and exploration to look into interning with NASA," he said.

Jesse is now working as a civil servant with the controls and dynamics branch at NASA Armstrong Flight Research Center.

Jason Slats of University of Alaska Fairbanks

by Jeremia Schrock

"I can't believe I'm going to work at NASA!" That was the thought Jason Slats had every morning during his ten week internship at the Ames Research Center.

Slats, a senior in mechanical engineering at the University of Alaska Fairbanks, considers himself a non-traditional student. Before he returned to school in the fall of 2013, he worked as a pipefitter and truck driver in both the mining and the oil and gas industry.

"Most of the jobs I was a part of were designed and often overseen by mechanical engineers," he said. After spending most of 2012 away from home he decided it was time for a career change. Working alongside mechanical engineers on the Trans-Alaska Pipeline gave him the push he needed.

During his internship, Slats worked on two research projects over the course of the summer: an individual and a group project.

His individual research involved analyzing test flight data accumulated during the XV-15 Tilt Rotor Research Aircraft program. The XV-15 was an experimental Vertical Take-Off and Landing (VTOL) aircraft first tested in 1977. Since the program only ended in 2003, the volume of data obtained was large. Since looking at individual data points was out of the question, Slats took a crack at writing code in Python to help sort and organize the data.

"I hadn't been exposed to writing in Python before this, but my introductory computer programming course at UAF prepared me sufficiently to dive into Python and figure out how to get it to do what I needed it to," he said.

Slats' group project investigated possible rotor designs to be used on a planned Mars helicopter slated for use during the next Mars mission. The Mars helicopter, if implemented, would work as an advance scout for a Mars rover; it would fly ahead of the rover, seeking points of interests while helping scientists on earth plan the best driving route.

A major takeaway from his internship was the commonality amongst the interns and scientists. "I was expecting to see a bunch of Big Bang Theory Sheldon's," he said. On the sitcom The Big Bang Theory, the character Sheldon Cooper is a genius physicist who also happens to be incredibly antisocial.

"I went down to the Ames expecting everyone to be a super genius." To his surprise, most people were just like him. They weren't super geniuses, just hard workers. "That was a huge confidence booster," he added.

Slats said he would "totally recommend" the internship to any student who is offered the opportunity to work at a place like that. "It will completely change your outlook on things."

Left: courtesy of Jesse Brady. Right: courtesy of Jason Slats

John Berg of University of Alaska Anchorage

by Jeremia Schrock

Engineering, in its simplest form, is about creation. To some extent, it is the combination of that which is known to create something which is entirely new.

It makes sense that John Berg, a mechanical engineering student at UAA, would be interested in engineering. "I've always been curious about science, space, and knowing how things work," Berg said. "Engineering fits all these interests quite well." It does, both figuratively and literally.

During the summer of 2015, Berg interned for the Aeromechanics branch of the NASA Ames Research Center in Mountain View, California. While there, he focused on a specific project: restoring the automatic-rotation of the strut fairings in the 7 by 10 Foot Wind Tunnel.

A strut fairing is an airfoil-shaped structure that surround a model-support strut. The model-support struts are rods or bars which support an aircraft model during wind-tunnel testing. Strut fairings, in turn, are structures whose function is to smooth the airflow and reduce drag around the struts they are mounted to. However, Berg's seemingly low-intensity project took on an air of mystery.

The strut fairings Berg worked on originally rotated automatically. But by the time it became Berg's project, they didn't. It was a functionality, it turns out. that was lost decades ago along with the knowledge of how the system operated. After researching the fairings and how they interacted with the various parts around them, Berg was able to reverse-engineer how all the parts worked together.

"I identified the missing components and designed replacement parts that would restore [their functionality]" he said. Solving a decades-old conundrum for NASA? Not a bad way to spend an internship.

Strut fairings aside, Berg stated that he had so many exciting experiences during his internship that it would be difficult to choose a standout moment. That said, one event that Berg remembers fondly was his chance to visit Ames' massive wind tunnel. A wind tunnel which has the distinction of being the largest one in the world. It was an awe-inspiring experience, he said.

The takeaway for Berg was how truly incredible it was to intern at NASA. "Not only was the internship a valuable experience, but I was also given the opportunity to meet a lot of really smart people and see some amazing things," he said.

"I never imagined my summer would be as incredible as it turned out to be."

Rocky Powers of University of Alaska Fairbanks

by Jeremia Schrock

Rocky Powers is no stranger to obsession.

As a child of the '90s, Powers remembers when rockets like Pegasus, Atlas, and Discovery were frequently launched into space. "I was always interested in rocket launches," he said, "so when I had a chance to work at a spaceport, I had to do it."

Before studying mechanical engineering at UAF, Powers spent eight years with the United States Air Force. "It's impossible to work around F-16s and F-22s without becoming obsessed," he said. As an avionics specialist Powers worked on fighter aircraft and it was this role that sparked his interest in engineering.

Powers spent much of this past summer as an intern studying with NASA. He spent two weeks at the Alaska Aerospace Corporation in Anchorage and eight weeks at the Pacific Spaceport Complex-Alaska (PSCA). Powers spent his internship working as an Aerospace Operations engineer and got a feel for a variety of jobs within the aerospace industry.

The Alaska Aerospace Corporation was developed by the State of Alaska and provides access to planetary orbital space for commercial and government interests.

As part of his internship, Powers assisted in setting up a launch site, facilitating liquid oxygen storage, and creating operational procedures for a launch customer. He also learned about launch vehicle telemetry and Autonomous Flight Safety Systems, both essential in putting satellites into orbit. While interning, he even had the opportunity to model a potential future satellite constellation.

One particular moment that stands out for Powers was reviewing the data from a successful pathfinder mission. Despite the mission being "only" a test to determine if an actual launch was logistically possible, Powers said it was nice to know that had a launch actually been scheduled that day that it would have happened.

Interestingly, after ten weeks with AAC the most important thing he learned has less to do with space and more to do with speech. "I discovered during my internship is that you should really pay attention in speech and economics courses," he said. Powers added that solving equations for hours is much easier than a making proposals and presentations to your superiors!

Powers was complimentary of the internship, adding that he gained experience in areas that aren't usually the focus in engineering school. He learned more about business and economics, topics which are not often emphasized in STEM majors.

"It was a great learning experience and I can't think of a better location to spend eight weeks than Kodiak," he said.

Left: courtesy of John Berg. Right: courtesy of Rocky Powers

Brandon Burgett of University of Alaska Fairbanks

by Jeremia Schrock

Brandon Burgett likes to know how things work.

"We always buy these high-tech electronics that appear to be magic black boxes that just do what they are supposed to," Burgett said. "I wanted to know what was in these black boxes and how to make them myself!" It's that curiosity that pushed him to pursue a masters in electrical engineering at UAF.

During the summer of 2015, Burgett interned at Jet Propulsion Laboratory (JPL) in Pasadena, California. "I've always been obsessed with space since I was a little kid," Burgett said. When he heard about the opportunity to intern at JPL, a place that regularly sends things into space, he knew he had to be a part of it.

During his internship, Burgett focused on designing a Ka-Band exciter. An exciter is the part of communication system that generates the carrier frequency and modulates the data onto it. Burgett's exciter was designed specifically for use in a CubeSat communication system.

"The Ka-Band is a frequency that - to my knowledge - has not been implemented in CubeSat's yet," Burgett said.

While at JPL, Burgett designed and manufactured two exciter boards. The test board was fabricated during his internship and he was able to test it out himself to see if it worked. Luckily, the board worked as expected!

"One of the most important things I learned during my time at JPL was how many considerations go into a single board design," he said. As an example he discussed the incredible level of attention required to pick just the exciter's components. Burgett had to consider thermal and electrical characteristics, power levels, if components were impedance matched, physical size and a multitude of other concerns. That list doesn't even including putting the pieces together!

However, Burgett did put all the pieces together. On his final day at JPL, he gave a presentation on his project. "I finally got to the slide that had all the board designs and one of the people in the room exclaimed 'Wow, you really got all that done in 10 weeks?' I realized then that I had somewhat lost track of how much I had actually gotten done," he said. "It was reassuring that I had actually done something that a place like JPL could use to build off of."

JPL were so impressed with Burgett's work that they invited him back for summer 2016. Not as an intern, but as an actual employee. With any luck, Burgett said, he'll be invited back after he graduates to begin his career there.

"It was a great experience in a great area," he said. "I would recommend an internship at JPL to anyone."

Demi Mixon of University of Alaska Fairbanks

by Jeremia Schrock

When it comes to studying plate tectonics, Alaska is one of the best locations in the world. With more than 1,000 earthquakes a month, Alaska accounts for more than 11 percent of the world's earthquakes. Because of Alaska's predilection for tremors, it's no surprise that the state is home to unusual formations.

Case in point: the Talkeetna Mountains.

"Alaska is geologically complex and not everything is entirely understood yet," said Demi Mixon, a masters student studying geology at UAF. Mixon has spent the past two years studying the Talkeetna Mountains in south-central Alaska, focusing on neotectonics, geomorphology and structure.

Mixon's research has been on the positioning of the Talkeetna Mountains, what has tectonically influenced their uplift and deformation, and if the range is tectonically active. Her project will help researchers understand the consequences of both flat-slab subduction and transpression. Subduction occurs when one tectonic plate moves under another, while transpression occurs when plates slide against each other.

A better understanding of the Talkeetna Mountains tectonic activity is important due to its housing several towns, a major transportation corridor, and a proposed hydroelectric dam site along the Susitna River.

During summer 2014, Mixon spent time in the Northwest Talkeetna Mountains doing field work. "I had an amazing time doing field work and collecting samples," she said. Despite being rained-out for the majority of her time in the mountains, she noted that "it was still a great experience."

While Mixon intends for her project to contribute to understanding plate tectonics, she also recognizes her research adds to scientist's knowledge of the range themselves. "The Talkeetna Mountains haven't had too many detailed studies conducted [on them] and haven't been explicitly explored in this context so I will be introducing new ideas," Mixon said.

"Conducting research can be fun and interesting as much as it can [be] frustrating," she said. "It's important to keep looking at things from different perspectives to help keep your eyes fresh and to work through those problems."

Left: courtesy of Brandon Burgett. Right: courtesy of Demi Mixon

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Calendar of Events 2017

SEPTEMBER

- Undergraduate Fellowship/Scholarship applications due
- Fall National Space Grant Directors Meeting in Grand Forks, ND September 14-16, 2017

DECEMBER

- Graduate Research Fellowships due

JANUARY

- NASA Summer Internships through SOLAR due

MARCH

- Spring National Space Grant Directors Meeting in Washington DC March 2-4, 2017
- ASGP Project Proposals due

APRIL

- Alaska Space Grant Symposium in Fairbanks, Alaska April 13, 2017

The seventh annual

Education and Research Symposium

will take place in Fairbanks, Alaska April 13, 2017