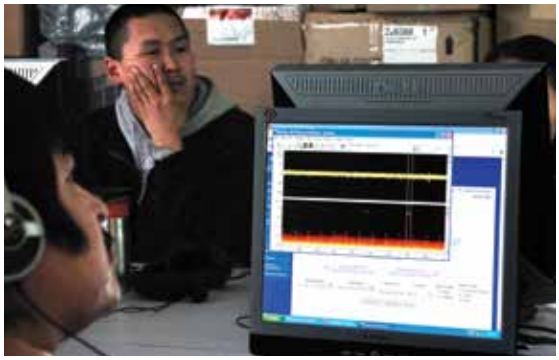
Alaska Space Grant News

Newsletter of the Alaska Space Grant Program • Fall 2012

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

Ocean scientist brings Outer Space closer to home

By Jeremia Schrock and Hector Douglas



Cindy Andrecheck

Both space and the deep ocean have something in common according to Hector Douglas, assistant professor of biology at the UAF Kuskokwim campus. "They're both relatively inaccessible," he said.

But what does the ocean have to do with space? The best analogy for space that scientists have on earth is the deep ocean, Douglas said. "We can't necessarily simulate for students exactly what it would be like to try and do space exploration," he said.

Instead, Douglas and the Alaska Space Grant Program have to approach the study of space in a different way. A way that some students may find abstract. The trick was to turn something inaccessible (space) into something closer to home and more familiar (the ocean).

For the past year, Douglas has overseen a project that allows rural students to participate in simulated research and exploration of the deep ocean. The students – all at the undergraduate level – spent part of their semester analyzing underwater recordings of whales. The methods Douglas' students used are similar to the methods scientists use in studying signals from space.

In the summer of 2011, Douglas placed an underwater recording device on the ocean bottom in several thousand feet of water near the Andreanof Islands in the central Aleutians. Between June and September, the device recorded the clicks of sperm whales hunting their quarry of giant squid. Students have also found the calls of orcas and minke whales as well as some mystery sounds. Included in the recordings are ambient ocean sounds and the noise of human activity including seismic air guns, ship noises and the operations of fishing vessels. The device was leased from Cornell University.

The overall goal of the project was to make science and mathematics interesting and relevant to rural stu dents. For Douglas, it comes down to developing skills and building confidence with fundamentals that underlie many of the sciences and doing that early in a college education. This includes learning about the physics and math of waveform analysis and applying that learning to explore questions about the marine environment. Douglas integrates the math and science into activities that students find interesting.

Douglas' students learned to perform randomized research analysis to explore questions about how the activity of whales varies with tides. Students learned to use state of the art software for detection and analysis of sound. They compared sounds that they found in the more than 70 days of continuous recordings to online libraries of natural sounds. These activities are part of a one credit science applications course that will be offered each semester on a continuing basis, and the recordings are also used as lab activities in some science courses. Douglas has also used the recordings for outreach with science classes in rural schools.

While the program has been a success, Douglas isn't expecting every student that takes the class will become a scientist. "My hope, though, is that at least students gain a greater appreciation for what is involved in doing science and a foundation for future studies," he said.

NASA/Alaska Space Grant Program

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University of Alaska Fairbanks

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University of Alaska Anchorage: Sam Siewert

Alaska Pacific University: Rusty Myers

Anchorage Museum: Monica Garcia

Challenger Learning Center of Alaska: Marnie Olcott

College of Rural and Community Development (CRCD): Peter Pinney

Juneau Economic Development Corp.: Robert Vieth

UAF photo by Todd Paris

From the Director

Denise Thorsen

Our year started at the end of August, 2011, when we hosted the Western Region Space Grant Directors meeting in Fairbanks. Fairbanks had beautiful weather for our lower 48 visitors. The Sandhill Cranes were even in town visiting. We had 73 participants representing most of the states west of the Mississippi, with representatives from six NASA centers (Ames, Dryden, Goddard, JPL, JSC, Goddard). Taking advantage of our NASA visitors, we hosted a pre-conference meeting with UAF faculty to discuss potential collaborations. Over 50 UAF faculty were in attendance.

Following the Western Region meeting, the Goddard representative, Jeff Volosin, remained in Fairbanks to conduct the critical design review for the Alaska Research CubeSat (ARC) project. About ten UAF engineering and computer science students presented to eight NASA engineers via teleconference over about six hours. The result: "The general feedback from the CDR team members was that the UAF ARC Team is doing a great job in designing this spacecraft and it seemed that the design has matured significantly since the PDR. The ARC team was incredibly professional in the way that they presented the CDR material - and - the material was very well done and showed a significant level of design maturity. A number of team members commented that this review was as good as or better than the reviews they have participated in for NASA missions." I would specifically like to thank Alaska Aerospace Corporation for their continued sponsorship of this program.

This was also a very exciting year for projects which supported after-school programs in Fairbanks and Juneau, new course development at APU, and the UAF Kuskokwim and Fairbanks campuses, included a pilot blended engineering course delivered face-to-face in Fairbanks with distance Juneau students. We again supported student participation in the Juneau Icefield Program and other extracurricular projects such as the NASA USLI competition. Last year we were also able to fund a number of research projects with faculty at UAA, UAF, and the Kuskokwim campus. You will find stories on most of these projects in this newsletter.

Finally, we ended the year with our Annual Education and Research Symposium in Fairbanks last May. This completes the three year cycle of moving the Symposium to Juneau, Anchorage, and Fairbanks. Next year we will be back in Juneau and looking forward to hearing about this year's projects!

Water in Antarctica may hold key to Martian discoveries

By Jeremia Schrock and Liliya Vugmeyster

The landscapes of Mars and Antarctica have more in common than one might think. Despite being (literally) worlds apart, both locations are cold, arid and have ice under surface. In Antarctica's Dry Valleys, ice has been crucial in shaping the areas geology. A geology which bears a striking resemblance to that found on Mars.

Another potential similarity between Antarctica and Mars is the possibility of water. In the Dry Valleys, unfrozen water has been found to exist inside frozen soil. For the past two years, Liliya Vugmeyster – a UAA and Alaska Space Grant scientist – and her collaborator Birgit Hagedorn from Environment and Natural Resources Institute (ENRI) have been interested into what makes that possible.

Antarctic soils have served as a testing ground to develop models for ice and liquid water formation, as well as to answer how they survive surrounded by frozen material. Both subsurface ice and salt are very common in the soils of the Dry Valley. If they exist on earth, they could very well exist on Mars.

With the help of grants from the Alaska Space Grant Program and ENRI at UAA, Vugmeyster has developed a method of determining unfrozen water contents, as well as its dynamic characteristics.

"We have also discovered several physical characteristics in which unfrozen water is different from the rest of water that is frozen," Vugmeyster said. Several of these characteristics include a variation in viscosity and dynamics (i.e., movements inside the pores), as compared to 'regular' water.

Dr. Riqiang Fu

To discover what secrets Antarctica's soils may hold, Vugmeyster used nuclear magnetic resonance spectroscopy (NMR). One benefit is that the process is non-invasive. "It allows for studies of intact soil samples, thus the integrity of the soil composition and properties remains unchanged," Vugmeyster said.

Another benefit of using NMR spectroscopy was that it allowed undergraduate students who worked with Vugmeyster to use state-of-the-art equipment that was not available to them in Alaska. According to Vugmeyster, the students who worked with her at the National High Field Magnetic Laboratory in Tallahassee, Florida gained a more broad and multidisciplinary education.

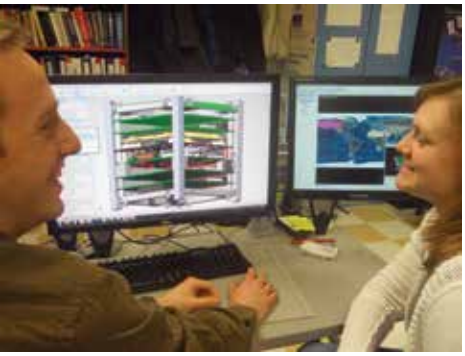
What makes the study of unfrozen water so important, is that it plays a potential role in the formation and survival of biological life. "Antarctic soils serve as testing grounds for Martian surfaces," Vugmeyster said. "[It can] provide opportunities to indirectly assess a potential for biological life on this planet."

ASGP satellite will put Alaska on the map

By Jeremia Schrock

While Denise Thorsen is an engineer and director of the Alaska Space Grant Program, she's also something of an architect. Instead of building bridges or homes, she puts together teams of students and develops scientific projects. Her latest project – in development since 2009 – has been overseeing the construction of Alaska's first-ever satellite. The satellite will be tested this summer and is expected to be launched by NASA in 2013.

The satellite is being designed and built entirely by undergraduate and graduate students at the University of Alaska Fairbanks (UAF). More than a dozen students are actively involved in the project, overseeing the conceptualization of the satellite, as well as its physical construction. The finished satellite will be a CubeSat, a small (10 cm) cube designed specifically for science missions.



Denise Thorsen

The satellite will fulfill three scientific missions. The first two will monitor the environment of a satellite launch and explore what kind of technology will be needed for future space-based research projects. The third mission will determine the amount of data a CubeSat can acquire and the speed at which the data can be transferred to earth. The *National Oceanic and Atmospheric Administration* (NOAA) hosts the UAF student ground station which tracks satellites and receives any data the satellites sends back.

Monitoring the launch environment of a satellite is something NASA – and every other satellite designer – is interested in, said Thorsen. While most satellites sit in the protected nosecone of a rocket during launch, UAF's satellite will be place close to the motor and firing nozzle. "Were not even riding coach class," said Thorsen. "We're riding steerage."

However, this placement allows for a unique research opportunity. There is a noted lack of good engineering data about what satellites need to do to survive such odd placement, said Thorsen. This means that the project will have the chance to provide much needed information about the vibration and thermal environment of the ride. In short, how much shaking and heat can the average satellite endure before it makes it to space?

The educational aspect of the project is also important, said Thorsen. Students get to practice being engineers before they hold their first post-graduate job. It's hands-on engineering experience while in school, as opposed to the academic experience offered in the classroom. "This is really what it's all about," Thorsen said.

While ASGP is sponsoring the project, financial support has come from two donors: Alaska Aerospace Corp. (AAC) and NASA. AAC donates fellowship funds to support 4-5 students working on the project, said Thorsen. That amount is matched by NASA. Over 90 percent of the funding is directed at students (as either fellowships or ASGP employees), with the remainder being used for project supplies.

"Basically I'm paying kids to go to school," Thorsen said. "And in their spare time they help build a satellite."

APU students study radiation with homemade telescopes

By Jeremia Schrock and Rusty Myers

Rusty Myers wants his students to better understand the earth's atmosphere. One path to a better understanding of earth's environment is by studying radiation. The second is by studying the ozone layer.

While ozone is only found in trace amounts throughout the earth's atmosphere, it has an important role in sustaining life on earth. Ozone absorbs ultraviolet radiation from the sun, which can be harmful to planetary life. Since the 1970s, ozone levels in the earth's atmosphere have dropped noticeably; a drop which has been correlated to increases in skin cancer, eye cataracts, and DNA damage to plant and marine life.

As part of Myers environmental physics class, which is taught at the Alaska Pacific University, students built small radiometers to observe background radiation. The radiometers were built using over-the-counter materials. Students had to build power supplies, solder them to satellite detectors, which served, as a detector, and then connect to a satellite dish. They also used a satellite dish connected to an ozone spectrometer provided by Haystack Observatory at MIT to measure ozone in the mesosphere.

A spectrometer is an instrument designed to measure the properties of light over a portion of the electromagnetic spectrum.

The idea for a class that focused on studying radiation and the ozone came mostly from a meeting a scientist from MIT. The scientists said that there were no institutions in the "northern latitudes" that were part of the global network of telescopes/spectrometers. It was an opportunity for Alaskan scientists to shine.

"I thought it would be a good experience for both my students and me," Myers said." I wanted students to get involved in a project that involved other institutions of higher education to see the global nature of science."

The spectrometers that Myers' students used are now connected with others around the globe. That connection allowed his students to compare the measurements they took with readings


Rusty Myers

taken at other locations. Afterward, the students would analyze their data, formulate scientific hypotheses, and then design their own experiments.

The class is important because it stresses the physical sciences, said Myers. "The project required them to actively engage with the subject matter and allow them the opportunity to do an activity and develop skills that they don't get in other courses," he said.

One activity that the students participated in was detecting background radiation using the radiometers they built themselves. Students calibrated their IBT's (itty bitty telescopes, as Myers calls them) to blank sky and adjusting their instruments as required to correspond to the 3 K background radiation. They then turned their IBTs toward the ground to calibrate at approximately 290 K.

The part that students enjoyed more than others was in getting their hands dirty. "The actual building of the instrument and getting it to work was what students enjoyed the most," Myers said. "Students seem to always prefer the more active parts of the course where they are directly involved," he added.

One student who took pride in her work was Becky Yates. Yates worked with Myers for all four years that she attended APU and used the spectrometer she built in his class for a senior project.

What struck her most about studying with Myers was his dedication to learning. "He learns alongside his students, and encourages his students to ask more questions, look deeper and make connections," she said. Yates graduated from APU this past spring.

"The class was very successful in having students build the telescopes (radiometers) and actually use them," he said. Myers added that the students took the radiometers back to their dorms to show them off to fellow students. "There was a pride in actually building a basic scientific instrument and then using this instrument to make measurements," Myers said.

Science education made possible by ASGP funding

By Jeremia Schrock and Cathy Connor

While the Alaska Space Grant Program (ASGP) is dedicated to broadening our understanding of space, it is also dedicated to bettering our understanding of Alaska. As part of the programs continual investment in the Last Frontier, ASGP awarded funding to several earth sciences-based research projects throughout the state.

One project is the Juneau Icefield Research Program (JIRP) field course. As part of the course, over thirty students and faculty from across the United States met on the many glaciers that dot southeast Alaska. The students spent almost their entire eight weeks course on the ice.

The project provided "meaningful, on-ice, glaciological research experiences for undergraduates in the physical sciences who are seeking careers in the earth, environmental and climate sciences," according to the projects final report penned by Dr. Cathy Connor. Students traveled across numerous Juneau Icefield glaciers, including the Ptarmigan, Lemon Creek, Taku and Llewellyn Glaciers. All of the glaciers were located between Juneau, Alaska and Atlin, British Columbia.

ASGP also provided additional funding for seven UAS undergraduates and a faculty member to travel to Juneau, Ketchikan and Prince of Wales Island to participate in research with the Friends of the Pleistocene (FOP). The event was sponsored by the Alaska Quaternary Center at UAF.

In addition, ASGP provided travel funds to enable two students and a program director to participate in the annual Alaska Space Grant Symposium in May 2012. All three attendees were flown from Juneau to Fairbanks.

All three programs were funded because of their important role in NASA's continued interest in studying climate variability at the global level. Current research is focused on providing information about oceans and the cryosphere, and their interactions with the entire earth system. Information from a NASA Earth Science Data Center (located at the Alaska Satellite Facility at UAF) has already provided invaluable information for previous JIRP studies.

Yet another benefit of ASGP funding was the publishing and presentation opportunities undergraduate students received. Several students presented their research findings at national conferences, including the national meeting of the Geological Society of America during 2011. Other students had the chance to co-write scientific articles that were both peer-reviewed and published. Having the chance to write and publish a scientific paper as undergraduates will give University Alaska Southeast students a head start with pursuing their graduate school aspirations, and careers in science.


Patty Burns

Heavens Bound Halibut: Adaptability is key

by Jeremia Shrock

When people think of halibut, they don't often think of rocketry. For students Andrew Paxson and Wyatt Rehder, however, the bottom-feeding flat fish and the ability to go into space are linked. Both Paxson and Rehder are from the fishing-heavy Kenai Peninsula and both are rocket scientists.

Since last summer, Paxson and Rehder have been developing a way to send a rocket precisely one mile into the atmosphere. As team-leaders of the University of Alaska Heaven Bound Halibut rocket team, consisting of roughly a dozen students, the one-mile mark is significant.

Their project is part of the NASA Undergraduate Student Launch Initiative, a nationwide competition that will bring together 42 teams of student scientists whose goal is to design and launch the best rocket. The team whose rocket is closest to the one-mile mark will received a $5,000 cash prize and, of course, bragging rights.

After over a semester of work, the project is nearing completion. By April, the Heaven Bound Halibut team will have constructed a 55 pound rocket that will be roughly 11 feet long, but only 6 inches wide.

"It's obscenely long for most rockets," Paxson said. The rocket will also be used to test a CubeSat (a miniature satellite) other students in the Alaska Space Grant Program are building.

The rocket will be guided by an Attitude Control and Determination System (ACDS), designed and built by Rehder. There are only a few examples of amateurs building such a system and even fewer which were successful, he said. The system will be controlled by a LINUX computer. "You could watch videos on it if you wanted to," Rehder said.

Their rocket is unique in the competition for two reasons: it's the largest (by six inches) and it has the biggest motor. The motor is so huge, in fact, that Rehder estimates it could easily move a vehicle. At 550 horsepower, it has the thrust of a car built for street racing. However, cars are usually several thousand pounds whereas the Heaven Bound Halibut rocket is just over 50 pounds. "This thing really books it," Paxson said.

In March, the team will hold several test launches. In mid-April, the team will travel to Huntsville, AL – a hub for aerospace engineering – to show off their honed technical craft during the NASA competition. "I think we'll surprise them with what we're doing up here," Rehder said.

The rocket's construction has been made possible by a $5,000 fellowship Paxson received from the Alaska Space Grant Program. The team has received a small travel stipend from NASA in order to attend the competition.

Fellowship & Scholarship Recipients

Fellowship Recipients

JoAnna Carpluk (AY11-12)
Biological Science
University of Alaska Fairbanks

Amy Dethlefs (Summer '11)
Environmental Science
Alaska Pacific University

Rachel DeWilde (AY11-12)
Biological Science
University of Alaska Fairbanks

Tien Do (AY11-12)
Biochemistry
University of Alaska Anchorage

Angela Ekstrand (AY11-12)
Geophysics
University of Alaska Fairbanks

Courtney Enright* (AY11-12, Summer '11)
Mechanical Engineering
University of Alaska Fairbanks

Jesse Frey (AY11-12)
Electrical and Computer Engineering
University of Alaska Fairbanks

Morgan Johnson* (AY11-12, Summer '11)
Electrical Engineering
University of Alaska Fairbanks

Tim Johnson (AY11-12)
Environmental Science
Alaska Pacific University

Mindona Krzykowski (AY11-12)
Physics
University of Alaska Fairbanks

Taryn Lopez (AY11-12)
Environmental Chemistry
University of Alaska Fairbanks

Sam McIntosh* (AY11-12, Summer '11)
Electrical Engineering
University of Alaska Fairbanks

Victoria Norrell (AY11-12)
Environmental Science
Alaska Pacific University

Alice Orlich (AY11-12)
Natural Resources
University of Alaska Fairbanks

Andrew Paxson (AY11-12)
Mechanical Engineering
University of Alaska Fairbanks

John Perreault (AY11-12)
Geology
University of Alaska Fairbanks

Wyatt Rehder* (AY11-12, Summer '11)
Electrical Engineering
University of Alaska Fairbanks

Deanna Saltmarsh (Summer '11)
Environmental Science
Alaska Pacific University

Derek Starkenburg (AY11-12)
Atmospheric Sciences
University of Alaska Fairbanks

Joseph Stribrny* (AY11-12)
Electrical Engineering
University of Alaska Fairbanks

Samuel Vanderwaal (Summer '11)
Electrical Engineering
University of Alaska Fairbanks

Patrick Wade* (AY11-12)
Mechanical Engineering
University of Alaska Fairbanks

Scholarship Recipients

Jamie Bradshaw (AY11-12)
Environmental Science
University of Alaska Southeast

Christopher Burgess (AY11-12)
Mechanical Engineering
University of Alaska Anchorage

Jens Jensen (AY11-12)
Mechanical Engineering
University of Alaska Anchorage

Nathaniel Kugler (AY11-12)
Environmental Science
University of Alaska Southeast

Taylor Levinson (AY11-12)
Mechanical Engineering
University of Alaska Fairbanks

Jaenell Manchester (AY11-12)
Geology
University of Alaska Fairbanks

Max Martell (AY11-12)
Mathematics
University of Alaska Southeast

Evan Mathers (AY11-12)
Mechanical Engineering
University of Alaska Fairbanks

Ralph Sinnok (AY11-12)
Civil Engineering
University of Alaska Fairbanks

Rebekah Tsigonis (AY11-12)
Geology
University of Alaska Fairbanks

Clarissa Zeller (AY11-12)
Biology
University of Alaska Fairbanks

**Students sponsored by Alaska Aerospace Corporation*

LEGOs make robotics fun for Alaska youth

By Robert Parsons and Jeremia Schrock

If robots weren't fun enough already, Robert Parsons has found a way to make them even more enjoyable. As part of the Alaska Space Grant Program's pre-college project, Parsons has reached out to Alaska's youth in order to make science more fun and interesting. He does so by using a toy familiar to many children: LEGO's.

The LEGO pieces – small plastic construction blocks originally developed in the late 1940's are used to make robots. LEGO now makes a robotics kit called "Mindstorms". With the Mindstorms kits, students involved in the program learn how to build functional robots, as well as how to move and manipulate their mechanical creations through a specially designed hands-on course.

The endeavor is aimed at students of all ages, from elementary school through high school. As part of the Hunter Elementary after school program, students from the 4th to the 6th grade are taught programming skills for two months. Topics covered include if/then conditions, loops, nested statements and sensor based navigation. "A fair whack of mathematics is involved and the fun of LEGOs makes this all possible," Parsons said. The after school program is made possible thanks to ASGP, FNSBSD, ASRA and BRMI.

The Alaska Space Grant Program's pre-college project is designed to attract and retain Alaska students interested in science, technology, engineering and mathematics. Those four emphases are known collectively as "STEM" disciplines.

In Fairbanks, Parsons visits Hunter Elementary twice a week in order to help coach the FIRST Lego League (FLL) teams in the after school program. The teams include 16 students. Parsons is aided in the project by his daughter Heather (a Lathrop senior) and Keith Sheard, a UAF undergraduate in mechanical engineering. Chris Watson, a UAF physics graduate student and Aisha Peters, a UAF undergraduate in electrical engineering also assist with the FLL program.

The initial robotics program at Hunter Elementary was started by the Black Role Models Initiative (BRMI) and UAF's Alaska Summer Research Academy (ASRA) three years earlier. "ASGP is happy to assist," Parsons said.

As part of the USLI outreach, the UAF team came and launched rockets with the BGC students.

Last summer, Parsons spent several hours each day at the Boys & Girls Club (BGC) of Fairbanks. He helped students build rockets and launchers. After assembling a gaggle of brightly painted rockets, many hours of fun was spent launching them again and again. In the fall Parsons also started and coached two FLL teams at the BGC. "The students at the BGC just love those robots," Parsons said.

However, the program reaches beyond just training Fairbanks-based students. Parsons oversaw additional robotics training in Beaver and Venetie, villages located along the Yukon and Chandalar Rivers, respectively. In the winter, such rural locations can only be visited by snowmachine, dogsled or aircraft, which can make outreach difficult. Good weather and patience is the key.

When Parsons and his daughter flew to Beaver and Venetie and had more than seventy pounds worth of LEGOs in the cargo compartment. Parsons said, "If the plane goes down, we won't be bored."

Funding fuels local centers robotics program

By Jeremia Schrock

In July of 2011, the Alaska Space Grant Program awarded funds to send the Challenger Learning Center of Alaska's (CLCA) technology director, Luke Mese, to the Carnegie Mellon Robotics Academy.

While at the academy, Mese studied microcontrollers designed to run programs written in the RobotC programming language, which are miniature computers needed to run robotic units. The RobotC program is only offered by the Carnegie Mellon Robotics Academy and is designed to allow users to begin programming immediately.

The academy is located in Pittsburgh, PA.

Mese brought what he learned at the academy back to Alaska. Weeks after completing the academy, Mese instructed members of the CLCA in RobotC programming and began developing coursework for the 2011 Summer Teachers Institute for VEX Robotics Professional Development Program. Mese worked closely with both the CLCA staff he trained, as well as NASA's Goddard Space Flight Center to develop the institutes program.

"This project was successful in the sense that I completed training to allow me to further my Education [while] also allowing me to educate teachers and students in [the] field," Mese wrote in a report.

Mese also used his expertise and newly gained knowledge at an advanced robotics camp hosted by CLCA. The camp was geared toward students at the high school level. "This camp was a huge success and the students were able to get half of a high school elective credit for attending camp," Mese wrote.

Mindona Krzykowski of the University of Alaska Fairbanks

Mindona Krzykowski travelled abroad to represent Alaska at an international conference. Ms. Krzykowski is a senior physics major at the University of Alaska Fairbanks. The 62nd International Astronautical Congress was held October 3-7, 2011 in Cape Town, South Africa. This annual event is a combined effort of the International Astronautical Federation, International Academy of Astronautics and the International Institute of Space Law (IISL). Scientists, researchers, industry, agency heads and top executives of the world's space agencies attended the IAC, along with many students and young professionals.

Tamra Krzykowski

Krzykowski's talk, entitled Identifying and characterizing vxB events on the lunar surface from the Apollo 14 Suprathermal Ion Detector Experiment (SIDE), reports the work that she did during the last 2 summers at NASA's Goddard Space Flight Center (GSFC) and the intervening academic year at UAF. During this time she had many mentors and advisors for the research. William Farrell, Michael Collier, Kent Hills, and Timothy Stubbs were mentors at Goddard Space Flight Center and Channon Price was her UAF mentor. The internship at GSFC was part of the Lunar and Planetary Science Academy directed by Cynthia Cheung. These mentors and advisors are part of the growing network of scientists and professionals that will be integral in Krzykowski's next career steps.

Participating in this international Congress was a wonderful opportunity to represent UAF, Alaska and the Alaska Native population on a global stage. Krzykowski made her presentation dressed in traditional Athabascan formal wear and got to share some of her native culture with others from around the world.

Krzykowski gratefully acknowledges travel support from the Alaska Space Grant Program, the UAF Undergraduate Research and Scholarly Activity program, the Office of the UAF Provost, and the UAF Vice Chancellor of Undergraduate Research for this trip, and research support from the Lunar and Planetary Science Academy and Goddard Space Flight Center. She also recognizes support from the UAF physics department for her research, noting particularly that of Saundra Jefko, John Olson and her fellow undergraduates.

Rebecca Toussaint of Alaska Pacific University

The Alaska Space Grant Program (ASGP) funded many aspects of Rebecca Toussaint's Population Structure of Giant Pacific Octopus (*Enteroctopus dolfeini*) in South Central Alaska project. Funds provided by ASGP gave her the opportunity to take specialized classes such as population genetics and oceanography. The genetics class provided a better understanding of structuring within the octopus populations in Alaska. The funding has also provided opportunities to spend time in the USGS laboratory learning the techniques required for analyses. Oceanography classes have helped her gain a better understanding of how the currents in Alaska might be driving the distribution of octopuses during their planktonick life phase and therefore contributing to the chances for structure within these bays. In addition to some of her class work, ASGP also funded much of her fieldwork. These funds were used to complete all of the required classes, dives, and certifications to become a Scientific Diver in training. This certification has allowed her to dive throughout south central Alaska in search of octopuses. Space Grant funds were also used to buy needed supplies for sampling kits, and help pay for multiple trips to the field for sample collection.

Neal Smith

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Calendar of Events 2013

JANUARY

- NASA Summer Internships through SOLAR due

MARCH

- Spring National Space Grant Directors Meeting in Washington DC
- ASGP project proposals due
- Graduate Research Fellowships due

MAY

- Alaska Space Grant Symposium in Juneau, Alaska May 2-3, 2013.

SEPTEMBER

- Undergraduate Fellowship/Scholarship applications due

OCTOBER

- Fall National Space Grant Directors Meeting in Charleston, SC

The fourth annual

Education and Research Symposium

will take place in
Juneau, Alaska
May 2–3, 2013