



# *The* **Aurora**

Autumn 2012





# Notes from the Director

## North Dakota Space Grant Consortium

- University of North Dakota
- North Dakota State University
- Dickinson State University
- Mayville State University
- Minot State University
- Valley City State University
- Cankdeska Cikana Community College
- Fort Berthold Community College
- Sitting Bull College
- Turtle Mountain Community College
- United Tribes Technical College
- Bismarck State College
- Lake Region State College
- Dakota College at Bottineau
- North Dakota State College of Science
- Williston State College
- Grand Forks Herald
- North Dakota Heritage Center
- Gateway to Science Center

### Contact Information:

*Mailing Address:*  
 University of North Dakota  
 Department of Space Studies  
 4149 University Avenue  
 513 Clifford Hall  
 Grand Forks, ND  
 58202-9008

*Director:*  
 Santhosh Seelan  
 seelan@space.edu  
 701-777-4896 701-777-3711 (fax)

*Deputy Director:*  
 Suezette Rene Bieri  
 bieri@space.edu  
 701-777-4856 701-777-3711 (fax)

*Website:*  
<http://ndspacegrant.und.edu/>

Dear Colleagues,

I would like to dedicate this issue of Aurora to Suezette Rene Bieri, Deputy Director, North Dakota Space Grant Consortium, who is retiring on March 15, 2013, after more than twenty one years of service to the consortium. While the program saw many new directors and consortium member contacts over the years, Suezette has been one constant force ensuring continuity and stability to the program. Over the years, Suezette made several key contributions to the consortium's progress including well-run pre-service teacher training workshops, flawless annual reporting, and support to the numerous STEM initiatives across the state. With graduate degrees in Counseling & Guidance, and Space Studies, Suezette was ideally suited to mentoring and motivating students to get engaged in STEM areas. Her contributions to the program are many, but if I have to pick one, it will be her excellent rapport with people she worked with, particularly our consortium members and state legislators, which was instrumental in securing state match funding for the consortium. I am personally indebted to her for all the support she provided to me as I settled into my role as the Director of the North Dakota Space Grant Consortium. I will certainly miss her experience, knowledge and insights as well as her great sense of humor! On behalf of the Space Grant community, I wish her well in her retirement.



Suezette Rene Bieri

I would also like to take this opportunity to welcome Caitlin Nolby who will be our new coordinator for North Dakota Space Grant Consortium. She will also play an additional role as coordinator of ND NASA EPSCoR. Caitlin is a recent graduate of UND, having completed her Master's degree in Space Studies. She is passionate about promoting STEM education and is excited to be a part of Space Grant and its programs. Caitlin joined us recently and will have about a month's overlap with Suezette, learning the key aspects of the program from her.



Caitlin Nolby

Besides the personnel changes, the past year has been very busy for the North Dakota Space Grant Consortium. This issue of Aurora highlights some of our exciting activities. The near space balloon payload competition for schools (run by UND Space Studies graduate students) is a new project and has caught the imagination of school children in the region. The program is poised to expand in its second year with more schools participating. On the funding side, though federal augmentation funds are not forthcoming, we were very happy to receive the base federal funding for FY 12 & 13. Non availability of augmentation funds even more strongly underlines the importance of the state match funding (thanks Suezette!), which enables us to run the program without too many cuts.

Santhosh Seelan

**Cover Photo:** Terri Moser, a graduate of Lake Region State College and now a student at Mayville State University, worked with elementary school children during her summer research experience at Sully's Hill National Game Preserve near Devils Lake, ND. She developed lesson plans for the Preserve's outreach program. Space Grant partnered with U.S. Fish and Wildlife to offer her the research fellowship.

# Up, Up and Away



L to R: Tim Holland; Jeremy Holter; Marissa Saad; Joshua Nelson; John Nordlie (holding balloon); Ron Fevig; Annie Wargetz; Jonathan Schiralli; and Katrina Jackson.

## High Altitude Ballooning Group (HABG)

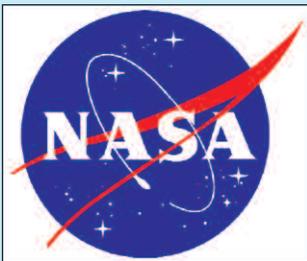
The North Dakota Space Grant Consortium supports an active high altitude ballooning program at UND. Undergraduate and graduate students develop small payloads and launch them using helium balloons. The balloons have tracking equipment on them so that students can follow the path of the balloons and retrieve the payloads. The data is then analyzed. The balloons can reach an altitude of 90,000 feet resulting in some spectacular pictures of the Earth's curvature from the payload cameras. Faculty and student from several departments are involved with HABG.

## High Altitude Student Platform (HASP)

UND collaborates with the University of Northern Florida on the HASP project. In HASP, payloads are flown on a platform (gondola) that is kept aloft for at least 24 hours. Shown here are Wade Snarr, an undergraduate student in electrical engineering at UND (in blue jeans), with Dr. Nirmal Patel and a student in mechanical engineering both from UNF. The picture was taken in Palestine, Texas in 2012 where the UND/UNF payload was tested in a thermal vacuum chamber and then integrated onto the top of the gondola. The actual payload is the tall, white enclosure directly behind Snarr. NASA pays testing, integration, launch and retrieval costs for HASP.



## Background of the National Space Grant College and Fellowship Program



NASA initiated the National Space Grant College and Fellowship Program, also known as Space Grant, in 1989. Space Grant is a national network of colleges and universities. These institutions are working to expand opportunities for Americans to understand and participate in NASA's aeronautics and space projects by supporting and enhancing science and engineering education, research and public outreach efforts. The Space Grant national network includes over 850 affiliates from universities, colleges, industry, museums, science centers and state and local agencies. These affiliates belong to one of 52 consortia in all 50 states, the District of Columbia and the Commonwealth of Puerto Rico.

The 52 consortia fund fellowships and scholarships for students pursuing careers in science, mathematics, engineering and technology, or STEM, as well as curriculum enhancements and faculty development. Member colleges and universities also administer pre-college and public service education projects in their respective states.



# Lillian Goettler Scholarship Recipient



**Katie Scholl**  
Industrial Engineering  
at North Dakota State University

## Who was Lillian Goettler?

Lillian L. Goettler was a distinguished NDSU professor. Awarded a doctorate in Mechanical Engineering from the University of Massachusetts-Amherst, she came to NDSU with her husband in 1978.

Lillian Goettler became a trailblazer for women in science by being a role model for girls and young women. Her Ph.D. in Mechanical Engineering was unusual for a woman at that time. In addition, she had an intense interest in involving females in science throughout her career. Lillian Goettler died August 14, 1983.

This scholarship is given each year to a female undergraduate student in engineering at NDSU who best exemplifies the academic and leadership qualities of Dr. Goettler and who shows the potential for a promising career in engineering. Recipients must be American citizens and have a minimum of a 3.5 grade point average.

*“One of the greatest things about mathematics is that there are problems for which there are solutions. I hope to someday enter the field of Industrial Engineering, specifically specializing in health systems. There I would be able to apply and use these solutions to improve current systems, which would be very rewarding because these systems directly touch so many lives in my community.”*

*Katie Scholl*



## Desert Research

In 2012 Space Grant was invited to bring the NDX-1, the prototype Mars spacesuit designed and built at UND, to the Mars Desert Research Station in Utah for testing. The suit testing allowed the scientists at MDRS to experience what it would be like to complete geology experiments inside a spacesuit while UND developed procedures for improving the spacesuit.

Shown here are (L to R) Pablo de Leon, Tim Holland and Annie Wargetz at the Mars Desert Research Station where they tested the NDX-1 prototype space suit in 2012. Wargetz is currently a graduate student in Space Studies. Holland is a recent graduate, working as biomedical flight controller for Wyle at Johnson Space Center in Houston. Pablo de Leon is the Director of the Human Space Flight Laboratory. All are from UND.

# Travel Stipends



The North Dakota Space Grant Consortium provides travel stipends to North Dakota college students whose papers or posters have been accepted at regional or national conferences. In most cases their research has been funded by Space Grant and is of interest to NASA. These research projects are part of the plan to develop the nation's science, technology, engineering and mathematics workforce. The presentations are a means of showing the national academic community the types of research that are occurring in North Dakota.



**Stephanie Finnvik**  
 Space Studies—UND  
 219th American  
 Astronomical Society  
 Austin, Texas  
*Comparative Study of Outer  
 Halos of Planetary Nebula  
 NGC 246, NGC 1501 and  
 NGC 2022 Measurements*



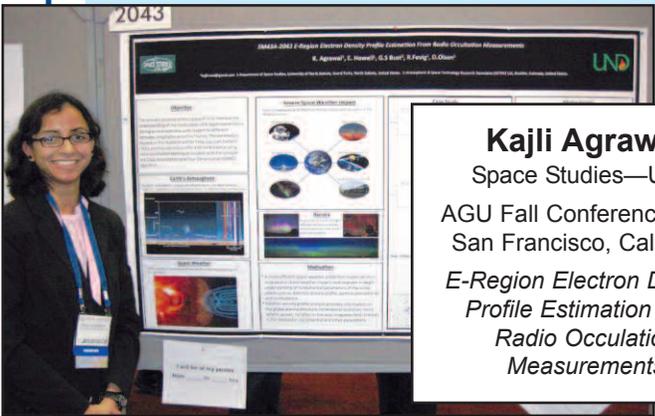
**Katrina Jackson**  
 Space Studies—UND  
 Academic High Altitude  
 Conference  
 Nashville, Tennessee  
*North Dakota High Altitude  
 Balloon Student Payload  
 Competition*



**Brad Traeger**  
 Mechanical Engineering—NDSU  
 Society of Cardiovascular  
 Computed Tomography Meeting  
 Baltimore, Maryland  
*Non-invasive Assessment of  
 Systolic Left Ventricular  
 Hemodynamics by 320-slice CT*



**Caitlin Nolby**  
 Space Studies—UND  
 Communicating Science—  
 A National Conference on  
 Science Education and  
 Public Outreach  
 Tucson, Arizona  
*Introducing Astronomy into  
 High School Physics  
 Curriculum through the Use  
 of the University of North  
 Dakota Observatory*



**Kajli Agrawal**  
 Space Studies—UND  
 AGU Fall Conference 2012  
 San Francisco, California  
*E-Region Electron Density  
 Profile Estimation from  
 Radio Occultation  
 Measurements*



# NDSGC Scholarships

Every academic year, Space Grant provides each of the affiliate two year, tribal and four year colleges with a set amount of funding for scholarships. Each college chooses its Space Grant scholarship recipients and the amount of money that each scholarship is worth.

## **Cankdeska Cikana Community College**

(Little Hoop Community College)

Ryan Brown  
Craig Brown, Jr.  
Madeline Harrison  
Magdeline Harrison  
Dara Charboneau  
Lisa Georgeson  
Demi Butts  
Rodney Aguilar  
Hailey Crosswhite  
Free Dubois  
Shayna Sherman  
Megan Charboneau  
Jonell Charboneau  
Duane Mudgett  
Mariah Peltier  
Waynita Chaske  
Carmita St. Pierre  
Darlys Teel  
Leah Demarce  
Sam Merrick, Jr.  
Chelsea Young  
Allura LaRoque  
DoLan Herald  
Alexa DeMarce  
Leonard Fox  
Cassandra Cloud

## **Turtle Mountain Community College**

David Grandbois  
Dillon Allery  
Jenna Desjarlais  
James Stogner  
Cole Schroeder  
Terry Poitra

## **United Tribes Technical College**

Genevieve Bullhead  
Nicholas Gladue  
Pizi Lee  
Alvin Jeremy McLeon  
Andrew Montriel  
Elizabeth Sam  
Claudette Zephier

## **Minot State University**

MacKenzie Fisher  
Justin Ziegler  
Laura Bakke  
Josh Beaudoin  
Johannah Miller

## **Valley City State University**

Aaron Burgad  
Wayne Engelhard  
Ashley Hinrichs  
Brian Chepulis  
Kyle Ketterling  
Amy Field  
Ben Haugeberg  
Cody Hoggarth  
Bryce Brady  
Christina Jahner  
Brittany Lehner  
Lisa Jensen  
Kinsly Tarmann  
Brittany Kockelmann  
Amy Doll  
Katie Marshall  
Garret Hecker  
Matthew Kietzman  
Tyler Bryant

## **Lake Region State College**

Janie Chepulis  
Quinn Dalziel  
David Kim  
Lincoln Larson  
Talon Mack  
Kelley Olson  
Molly Nienhuis  
Sharis Yri

## **Williston State College**

Gage Shae  
Jeffrey Purslow

## **Bismarck State College**

Steven Schild  
Danielle Bailly  
Cole Miller  
Lelan Bosch  
Aaron Moultrie  
Austin Nodland  
Chris Gorrie  
Dominic Marks  
Eli Severson

## **Dickinson State University**

Allison Sadowsky  
Brandi Herauf  
Allson Bebee  
Michelle Decker  
Stephen Engebretson  
Justin Herner  
Ben Montgomery

# NDSGC Scholarships



Mamie Kieson  
Alicia Marsh  
Kale Frederick  
Daniel Mehrer  
Kelly O'Connor  
Catherine Hahn  
Derek Jacobs  
Sarah Thompson  
Jane Wallace  
Susan Indvik

## **Mayville State University**

Allison Aaland  
Joe Biggane  
Beth Cakebread  
Jim Coran  
Whitney Federenko  
Liza Hoglo  
Katie Kolness  
Laura Kolness  
Hannah Ness

Ryan Ness  
Rachel Sanders  
Raven Smith  
Tyler Vincent

## **Fort Berthold Community College**

Lisa DeVille  
Michael DeVille  
Joseph Dickens  
Tanya Driver  
Geneva Good Bear  
Shelby Lego  
Sasha Silitti  
Jennifer White Bear

## **North Dakota State College of Science**

Korre Spidahl  
Riley McMahon  
Richard Juelfs

Paul Mitchell  
Benjamin Isaacson  
Dustin Thompson  
Michael Schmitt  
Krista Erdahl  
Morgan Burrer  
Austin Schultz  
Clarence Cleveland, Jr.

## **Sitting Bull State College**

Ann Solano  
Sunshine Claymore  
Amber Gill  
Elsa Archambault



Shown here are Dustin Thompson and Michael Tolbert being awarded 2011 Space Grant Scholarships by Shannon King, associate professor (far left), and Katie Nettel, director of financial aid (far right), at North Dakota State College of Science.



# Focus Research Areas

*The North Dakota Space Grant Consortium provides funding at its affiliate colleges and universities for research projects that are of particular interest of NASA and that provide opportunities for undergraduate and graduate students to consider careers in science, technology engineering and mathematics. Projects are currently being funded at UND, NDSU and Fort Berthold Community College.*



Alex Nikel (left) and Charles Tyler prepare the CropCam UAV for a flight over a farmer's field.

## CropCam

UND — Dr. Santhosh Seelan

Crop Cam was initiated in an effort to provide farmers with aerial imagery of their fields in both the visible and infrared spectrum through the use of an Unmanned Aerial Vehicle (UAV). This imagery can be used to assess the health condition of the vegetation. Once this data is analyzed, the concept of precision

agriculture is incorporated by varying the chemical treatments applied throughout the field.

Dr. Santhosh Seelan, John Nordlie and Alex Nikel flew four times at each of the chosen sites during the summer of 2012. Much was learned by both the farmers and the researchers.

## An Intelligent Composite Material System for Real-time Stress Alleviation in Aircraft Structures

NDSU — Dr. Jimmy Kim

Stress-control in aircrafts is one of the primary considerations to improve the sustainability of aircraft structures. Hysteretic stresses in the vicinity of empennage and wings of an aircraft are a critical factor affecting the behavior of structural components. Effective management of stresses in aircraft members can reduce long-term expenses associated with maintenance, repair and replacement.

Composite materials are widely accepted by the aircraft community because of their favorable weight-to-strength ratio. Despite such benefit, composite elements need particular attention because delamination and local failure usually govern their service life. Therefore, a positive means to control applied stresses is required.

# Focus Research Areas



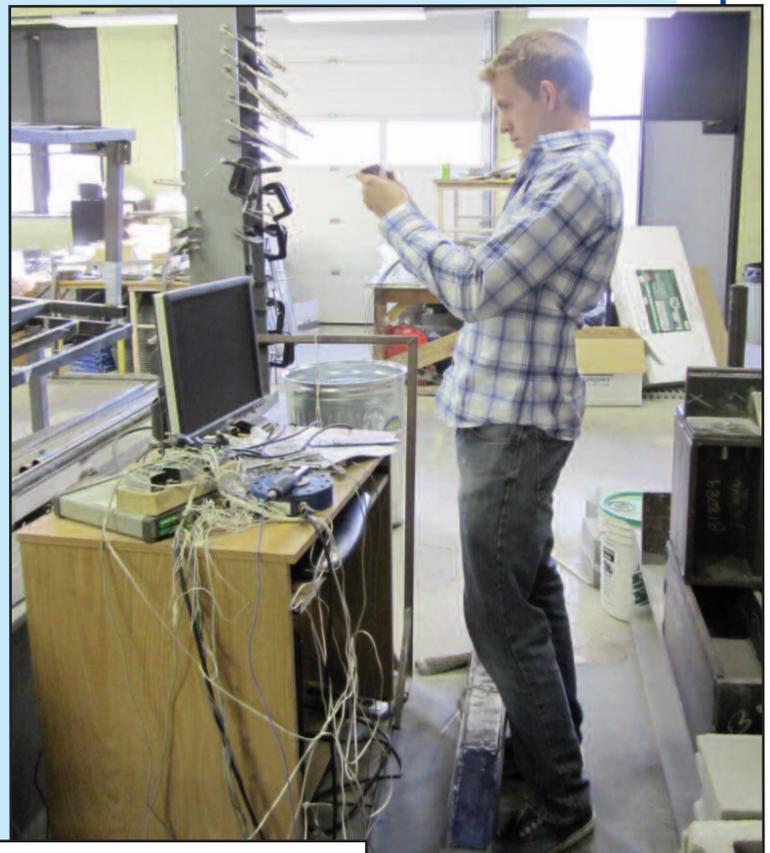
Michael Telste, a graduate student at NDSU, checks aerospace composite samples in Dr. Mijia Yang's civil engineering lab.

## Real Time In-situ Impact and Damage Identification in Aerospace Materials and Structures through Fiber Optic Sensors

NDSU — Dr. Mijia Yang

Structural health monitoring (SHM) is one of the most important tools to maintain integrity of aerospace structural systems and promote safety in air traveling, since undetected or untreated damage may grow and lead to structural catastrophic failure. The core of SHM is to find an accurate and robust nondestructive damage identification and assessment methodology.

Polymeric and ceramic-matrix composites have been increasingly used for aerospace structures. These materials are lightweight with high stiffness and strength. However, they are easily damaged by the impact of flying objects due to their layered configuration. It is necessary to develop a damage locating and growth monitoring system which will be capable of acquiring and analyzing data in real-time in-situ fashion.



Taylor Bruhschwein, a graduate student at NDSU, works with aerospace materials in Dr. Mijia Yang's civil engineering lab.



# Focus Research Areas



Michael Morningstar, engineering major, (left) works with Dr. Kerry Hartman, chair of science at FBCC, doing field work to gather in-situ data for their research project.

## Utilizing Remote Sensing to Investigate the Surface Impacts of Oil Development on the Fort Berthold Indian Reservation

Fort Berthold — Dr. Kerry Hartman

Students from Fort Berthold Community College and staff of the USGS at the EROS Data Center are creating a baseline of information regarding the environmental impacts of surface activities of oil development on the Fort Berthold Indian Reservation.

## Exploring New Technology Tools to Enhance Astronomy Teaching and Learning in Grades 3-8 Classrooms

UND — Dr. Mark Guy and Dr. Tim Young

## CubeSat

UND — Dr. Ron Fevig

## Quantifying Dark Energy Using Galaxy Clusters

UND — Dr. Wayne Barkhouse

## Human Powered Vehicle (Moonbuggy)

NDSU — Dr. Karami Ghodrat

# Transit of Venus



On June 5, 2012, the UND Observatory hosted more than 300 people from Grand Forks and surrounding communities to witness the passage of Venus across the disk of the Sun. Families and individuals descended on the observatory to witness this once-in-a-lifetime event. During the warm months of the year the Observatory hosts monthly “Star Parties” when the public can come and look at the sky through a variety of telescopes. At those events hands on astronomy activities are provided for children of all ages.



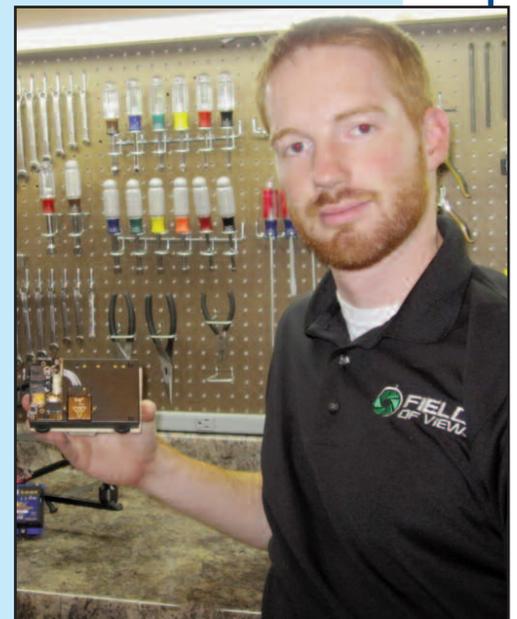
# National Space Grant Conferences



John Boucha (left) and John Dvorak each gave presentations last year at National Space Grant Meetings on their research which was funded by the North Dakota Space Grant Consortium.

Boucha’s presentation, given in Green Bay, Wisconsin, was on the “app” he developed for the Ipad about the history of space, rocketry, astronomy and space science. That “app” can be downloaded for free.

Dvorak’s presentation, given in Washington, D.C., was on Field of View, a private company he established as a result of his Space Grant research. Field of View uses small unmanned aircraft systems for agricultural remote sensing application.





# Art on the Prairie



## History of Space Exploration at Lake Region State College

During spring semester 2012, Lake Region State College held a week long "History of Space Exploration" program that involved more than 100 students in art, history and biology. As part of that program the students designed

and completed a mural depicting some of the high lights of space exploration. Pictured below is an image of students actually painting the mural. At the top of this and the next page is an image of the finished mural.



# Art on the Prairie



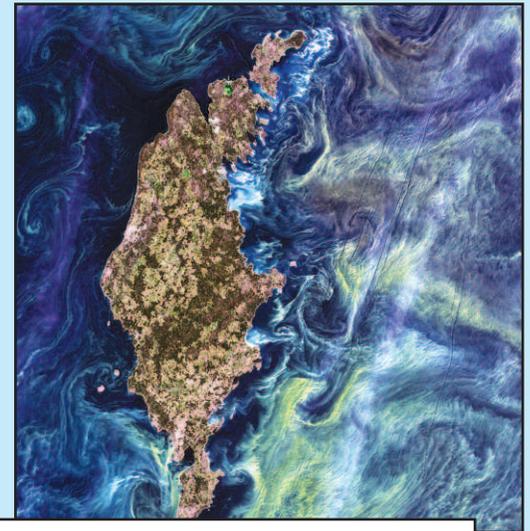
## Earth as Art III →

In 2012, Dakota College at Bottineau, Fort Berthold Community College and the University of North Dakota sponsored Earth as Art III exhibits in their respective communities. Shown on this page are two examples of scenes from Earth as Art III.

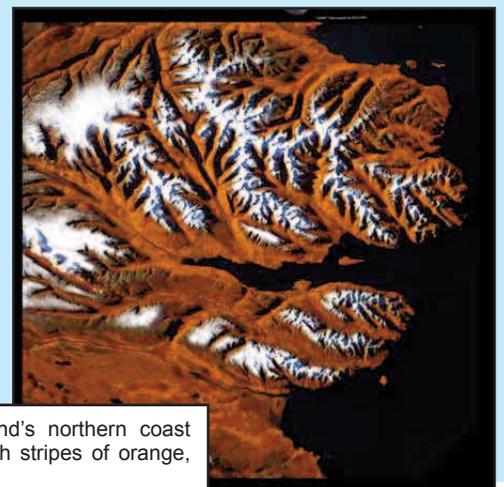
Earth as Art III is a collection of Landsat 5 and 7 scenes created for aesthetic purposes rather than scientific interpretation. The art exhibit provides fresh and inspiring glimpses of different parts of our planet's complex surface. Instead of paint, the medium for these works of art is light. But the Landsat satellites don't see light as the human eyes do; instead, they see radiant energy reflected from the Earth's surface in certain wavelengths or bands. When these different bands are combined into a single image, remarkable patterns, colors and shapes emerge.

The Landsat Program is a series of Earth-observing satellite missions jointly managed by NASA and the U.S. Geological Survey. The satellites orbit the Earth at an altitude of about 438 miles. Since 1972, Landsat satellites have collected information about Earth from space. This science, known as remote sensing, has matured with the Landsat Program.

The exhibit has 40 scenes and is available at no cost except for one-way shipping from the EROS Data Center in Sioux Falls, South Dakota. Each scene is 28' x28" and is on stretched canvas with no glass.



Van Gogh from Space—In the style of “Starry Night,” massive congregations of greenish phytoplankton swirl in the dark water around Gotland, a Swedish island in the Baltic Sea.



Icelandic Tiger—This stretch of Iceland's northern coast resembles a tiger's head complete with stripes of orange, black and white.

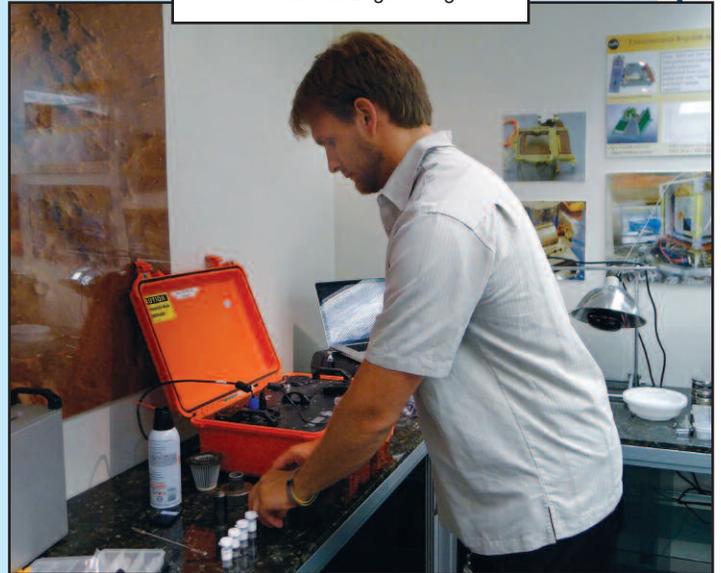


# Space Center Internships

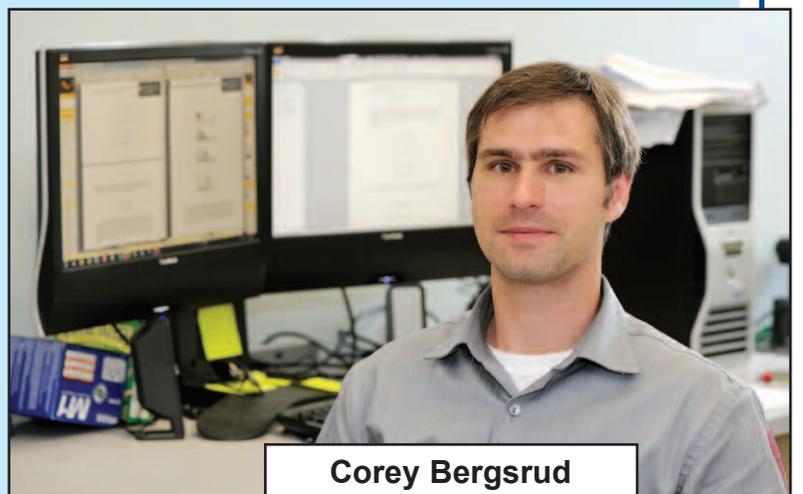


**Anoklase Jean Luc Ayitou**  
Goddard Space Flight Center  
North Dakota State University  
Chemistry

**Joshua Borchardt**  
Ames Research Center  
North Dakota State University  
Mechanical Engineering



**Brad Schanche**  
Jet Propulsion Laboratory  
University of North Dakota  
Space Studies



**Corey Bergsrud**  
Langley Research Center  
University of North Dakota  
Electrical Engineering

# Space Center Internships

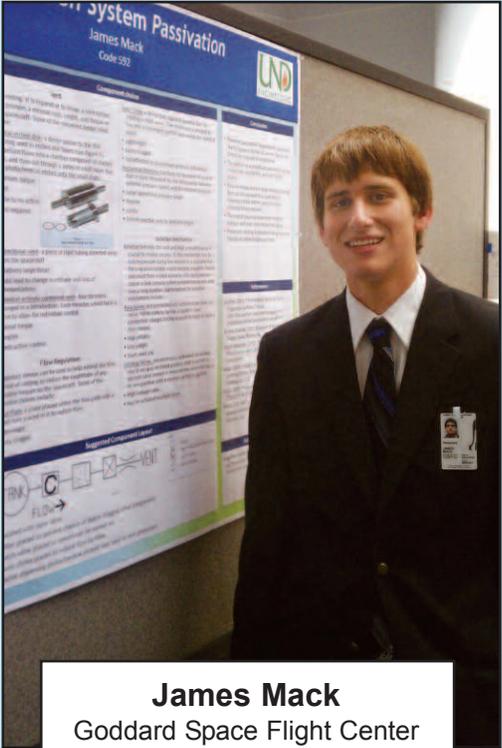


**Andrew Gleich**  
Kennedy Space Center  
University of North Dakota  
Chemical Engineering

**David Grandbois**  
Johnson Space Center  
Turtle Mountain Community College  
Engineering



**Katrina Jackson**  
Goddard Space Flight Center  
University of North Dakota  
Space Studies



**James Mack**  
Goddard Space Flight Center  
University of North Dakota  
Mechanical Engineering



# Space Center Internships

**Jonathan Schiralli**

Helio Research Observatory  
University of North Dakota  
Space Studies



**Timothy Holland**

Marshall Space Flight Center Academy  
University of North Dakota  
Space Studies



**Joshua Berk**

NASA Headquarters  
University of North Dakota  
Space Studies



**Paul Johnson**

Jet Propulsion Laboratory  
University of North Dakota  
Mechanical Engineering



**Nicole Thom**

Goddard Space Flight Center Academy  
University of North Dakota  
Space Studies



# Meet an Affiliate



## Shaun Prince of Lake Region State College

Shaun Prince has been a science faculty member at Lake Region State College for the past 12 years. She received her AA Degree from that institution in 1994 and her BS in Biology, with a minor in Environmental Science, from St. Cloud State University. Shaun completed her MS in Environmental Science, with a minor in Ecology, from Bemidji State University.

Shaun is a representative for Lake Region State College serving on the North Dakota Space Grant Consortium committee. She is also one of the campus advisors for CRU. With the assistance of NASA Space Grant Scholarship money, Shaun has developed an integrated scholarship opportunity for students on her campus. This allows students to volunteer in STEM areas to get an introduction and “hands-on” work experience in their career pathway. She also collaborates with other academic programs, like Art and History, to design and offer cohesive experiences for students to show how all general education courses can be studied and learned together. Shaun also enjoys volunteering at the local elementary schools to encourage the love of science at an early age.

Shaun is married to her husband, Brian, and lives in a rural setting outside of Devils Lake. They have three daughters, and are in the process of adopting their first son.

Shaun loves the NASA Space Grant Consortium because she has seen what a difference these experiences have made in the lives and futures of her students. “I feel it is a vital piece to the success of our North Dakota students as they strive for things they felt were ‘out of this world!’ They have now found them to be within reach and attainable!”



LRSC offers 42 programs. Some examples of those programs are Accounting, Farm Management, Peace Officer Training, Social Work, and Wind Energy Technician. Students enrolled at the college can earn bachelors degrees in Business Administration and Elementary Education through an agreement with Mayville State College and a MBA through an agreement with the University of North Dakota.

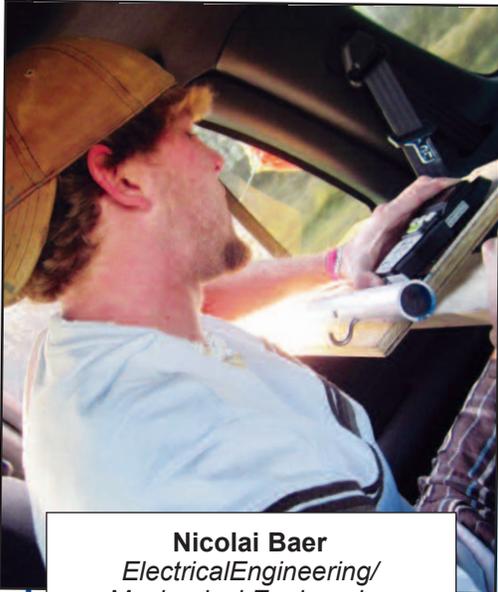


L to R: Kory Boehmer, Associate Professor; Steven Oliver; Shaun Prince, Associate Professor; and Lexi Erickson. Oliver and Erickson were recipients of the Space Grant Integration Scholarships at Lake Region State College last year.



# Research Fellowships

The NDSGC research fellowships are given on a competitive basis to undergraduate and graduate students at affiliate colleges who are doing research that is of particular interest to NASA.

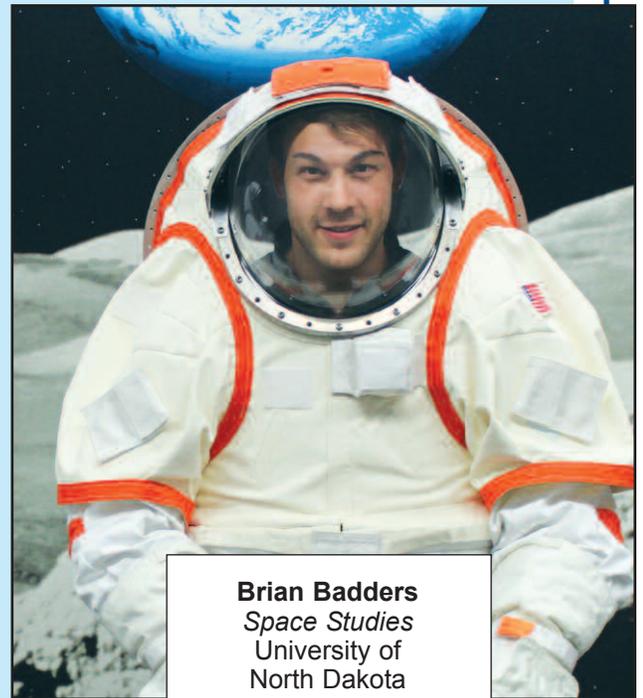


**Nicolai Baer**  
*Electrical Engineering/  
Mechanical Engineering*  
University of North Dakota

**Darren Grau**  
*Space Studies*  
University of North Dakota

**Korey Southerland**  
*Environmental Geography*  
University of North Dakota

**John Boucha**  
*Space Studies*  
University of  
North Dakota



**Brian Badders**  
*Space Studies*  
University of  
North Dakota



**Annie Wargetz**  
*Space Studies*  
University of  
North Dakota

**Corey Bergsrud**  
*Electrical  
Engineering*  
University of  
North Dakota

**Zachary Wygant**  
*Electrical Engineering*  
University of North Dakota



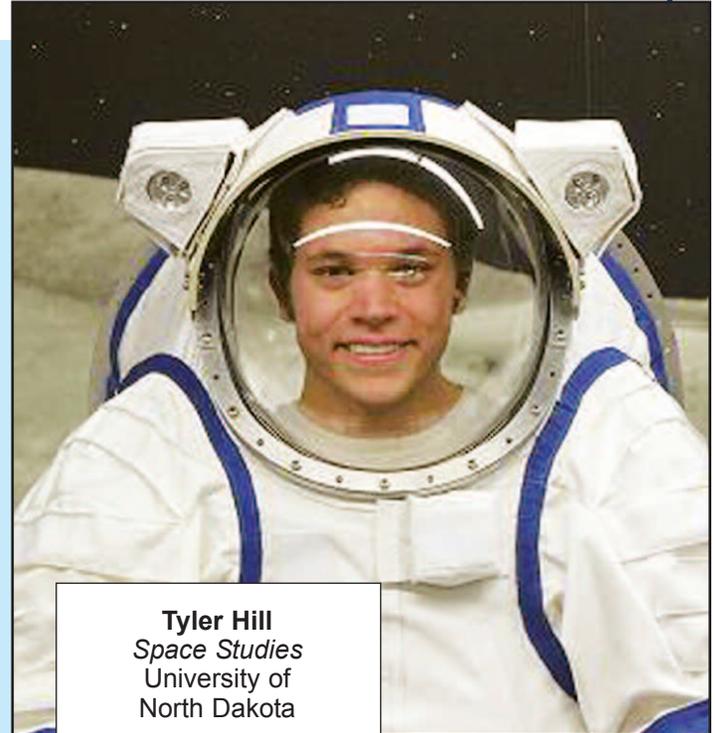
# Research Fellowships



**Katrina Jackson**  
*Space Studies*  
University of  
North Dakota

**Lane Azure**  
*Education*  
*Doctoral student*  
North Dakota State  
University

**Terry Moser**  
*Elementary Education*  
Lake Region State  
College/Mayville State  
University



**Tyler Hill**  
*Space Studies*  
University of  
North Dakota



**Britt Helten**  
*Pre-engineering*  
Lake Region State College  
and North Dakota  
State University

**Alisa Fairweather**  
*Chemistry/Biochemistry*  
North Dakota State University

**Nathan Froelich**  
*Biochemistry and  
Molecular Biology*  
North Dakota  
State University

**Zachary Hamarin**  
*Mechanical Engineering*  
University of North Dakota



**Michael  
Kalinosky**  
*Biochemistry*  
North Dakota  
State University

# In Our Backyard



These lovely images of the aurora borealis were taken in September of 2012 near Grand Forks by Jonathan Schiralli. He is a graduate student in the Department of Space Studies at UND. An aurora is a natural light display in the sky particularly in the high latitude regions. Auroras are associated with the solar wind, a flow of ions continuously flowing outward from the Sun. The Earth's magnetic field traps these particles, many of which travel toward the poles. Collisions between these ions and atmospheric atoms and molecules cause energy releases in the form of auroras. Auroras are more frequent and brighter during the intense phase of the solar cycle when coronal mass ejections increase the intensity of the solar wind. In the northern latitudes the effect is known as the aurora borealis named after the Roman goddess of dawn, Aurora, and the Greek name for the north wind, Boreas. Its southern counterpart, the aurora australis, has almost identical features to the aurora borealis and changes simultaneously with changes in the northern auroral zone. Aurorae occur on other planets as well.

# Trip to Washington, D.C.



During Spring Break 2012, a group of 17 undergraduate and graduate students, led by Dr. Paul Hardersen, traveled to Washington, DC, for a week-long exploration of the science and politics of the U.S. space program. During the week, the group visited NASA Headquarters, the NASA Goddard Space Flight Center, the Johns Hopkins Applied Physics Laboratory, the U.S. Capitol and the North Dakota congressional delegation and the Smithsonian Air and Space Museum.

## FIRST Robotics



The North Dakota Space Grant Consortium sponsored two FIRST Robotics teams last year. On the left is the team from North Star Public School in Cando and on the right is the team from Northwood/Hatton High Schools. These schools have participated in FIRST Robotics for many, many years and have built very credible, impressive robotics programs.

Cando  
Robotics Team

Northwood  
Robotics Team



## Lunabotics

A multidisciplinary senior design team of UND students from electrical engineering, mechanical engineering, computer science and aerospace science competed in the Lunabotics Mining Competition last year. The team was required to build a robot that autonomously collected regolith, a very fine sand that covers the surface of the Moon. The competition took place at Kennedy Space Center and involved a total of 52 teams.



Some of the 2012 UND Lunabotics team with their advisors Dr. Naima Kaabouch (on the right) and Dr. Jeremiah Neubert (on the left). [http://und.edu/org/lunabotics/html/team\\_members.2010\\_2011.html](http://und.edu/org/lunabotics/html/team_members.2010_2011.html)



# Summer Faculty Fellowships

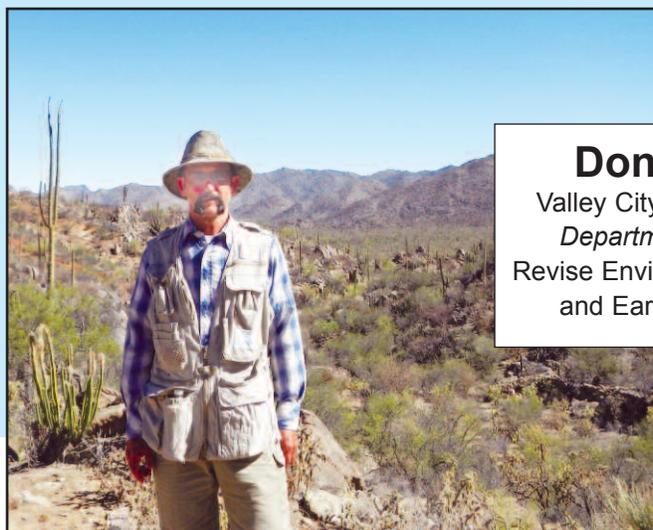
The North Dakota Space Grant Consortium provides summer faculty fellowships so that the teaching of science, technology, engineering and mathematics can be enhanced at North Dakota colleges and universities. New courses can be developed or existing courses can be upgraded to include more space science material. Faculty at all of Space Grant's affiliate institution of higher education are eligible to apply for these fellowships.



**Jeff Seig**  
Mayville State University  
*Department of  
Elementary Education*  
Revise EDUC 484—Secondary  
Methods for Science



**William Shay**  
North Dakota State  
College of Science  
Department of Chemistry  
Revise Chem 115L, 116L,  
Chem 121L, 122L and  
Chem 241L and 242L



**Donald Hoff**  
Valley City State University  
*Department of Science*  
Revise Environmental Geology  
and Earth Science 300

# Student Ballooning Competition



## North Dakota Near-Space Balloon Competition Coming in 2013

In 2012 Space Grant sponsored the North Dakota High Altitude Balloon Student Payload Competition for grades 6-12 in North Dakota. Space Grant provided up to \$250 per team for material and supplies. Monetary prizes were also given in four categories plus a grand prize category. Part of the grand prize was a trip to UND Aerospace to tour the aviation and space facilities.

Four teams competed with the launch being held in early May. The helium filled balloon carried the student payloads to at least 67,000 feet. Following the launch the balloon was tracked for about two hours after which it descended and the payloads were retrieved so that students could take them back to their respective classrooms to analyze the data. Teams competed from Cavalier, Northwood, Bismarck and Mandan.

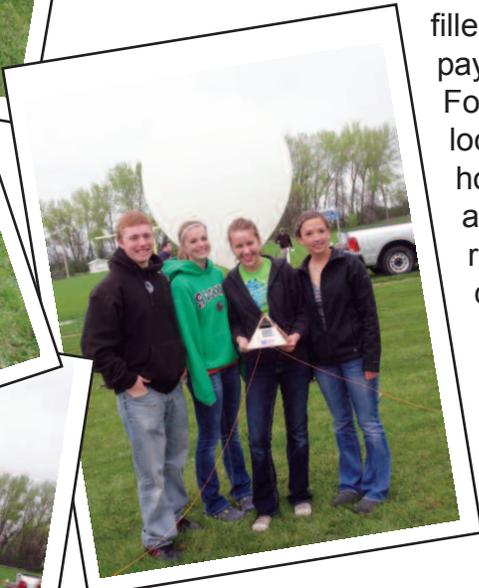
Cavalier—testing the effects of the upper atmosphere on eggs and measuring radiation levels—winner in “Best Lessons Learned” category

Mandan—comparing the effectiveness of solar panels in the upper atmosphere and on the Earth—winner in “Best Craftsmanship” category

Bismarck—obtaining live video footage from the air—winner in “Best Innovation” category

Northwood—measuring the temperature, relative humidity, solar panel voltage and dew point at different altitudes and taking pictures—winner in “Best Report” category

Northwood was also the grand prize winner.





Bismarck State College



Cankdeska Cikana Community College



Dakota College at Bottineau



Dickinson State University



Fort Berthold Community College



Gateway to Science Center



Grand Forks Herald



Lake Region State College



Mayville State University



Minot State University



North Dakota State College of Science



North Dakota State University



Sitting Bull College



State Historical Society of North Dakota



Turtle Mountain Community College



United Tribes Technical College



University of North Dakota



Valley City State University



Williston State College