



# The Aurora

Spring Semester 2005

## North Dakota Space Grant Consortium

University of North Dakota  
North Dakota State University  
• • • • •

Dickinson State University  
Mayville State University  
Minot State University  
Valley City University  
• • • • •

Candeska Cikana Community College  
Fort Berthold Community College  
Sitting Bull Community College  
Turtle Mountain Community College  
United Tribes Technical College  
• • • • •

Bismarck State College  
Lake Region State College  
Minot State University -- Bottineau  
North Dakota State College of Science  
Williston State College  
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Grand Forks Herald  
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## Consortium Reinvigorated

Dear Friends of NDSGC,

We are delighted to present to you the third issue of *The Aurora*. Within these pages we chronicle yet another great year for our Consortium. The NDSGC is thriving and serving NASA and North Dakota to the fullest extent through creative programming that impacts all areas of our constituencies.

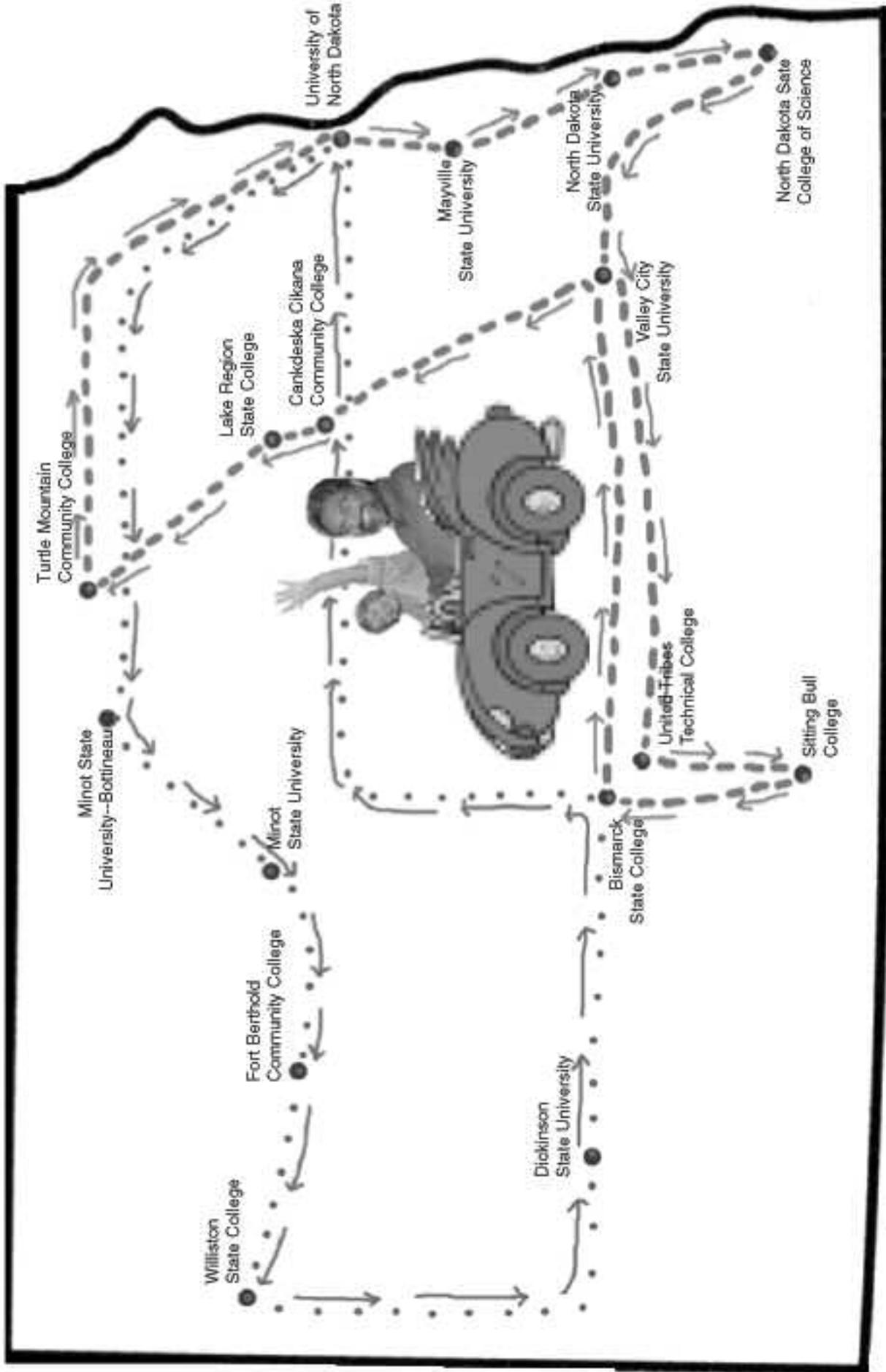
As you will see our portfolio of activities remains broad and contains many highlights of which we can only show a few. We continue to build the NASA and aerospace pipeline through fellowship/scholarship programs and workforce development initiatives that impact college students across the state. We have put considerable efforts into successfully placing students as research interns at NASA Centers during the past year and this will pay dividends going forward. Support for student research and design projects include the national champion NDSU Moonbuggy team, the UND Solar/Fuel Cell Car, the KC-135 Project, the Rocketry Challenge and FIRST robotics teams. In partnership with NASA ND EPSCoR we continue to build the NASA relevant research infrastructure in North Dakota.

Attendees at The Space on the Prairie 2004 conference witnessed many of the outcomes of these efforts first hand. This conference built on the success of the previous year with strong support from local, state and federal legislators and academic leaders. For more details of that event and other NDSGC activities please check our website at <http://www.space.edu/spacegrant/>.

This year has not been without its challenges, however. Responding to a directive to show more Consortium identity our mantra has quite simply been "inclusion, communication, and involvement." We completed a *Priscilla: Queen of the Desert* tour of the state (see map on page 2) visiting our affiliates. That was a great experience and it has really invigorated the Consortium. Our advisory board has been reconstituted and a strategic plan developed; this was ratified at our first annual affiliate meeting just recently. It truly has been a great year getting to know the affiliate representatives and developing a collective vision.

The old adage that out of challenge comes opportunity has never been more true. The future for our Consortium looks bright and we are moving forward with optimism.

# North Dakota Space Grant Consortium



# Unique Space Grant Internships



**David Bullock**  
Graduate Student  
Space Studies Department--UND

## David Bullock

Space Grant Journalism Internship at Grand Forks Herald—Spring 2005

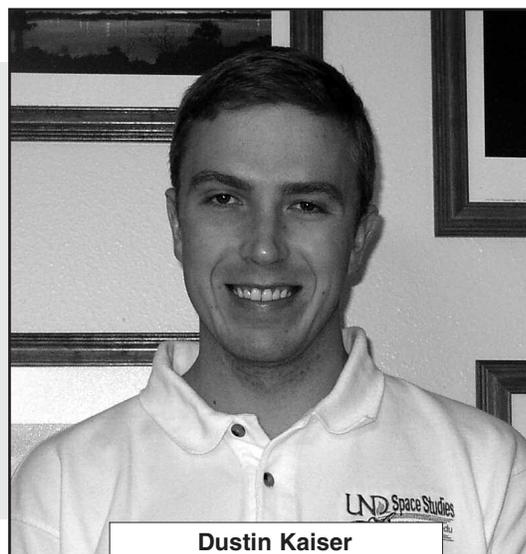
*"The North Dakota Space Grant Consortium has only been a benefit to my life and my career. The internship they provided for me, in partnership with the Grand Forks Herald, allowed me to follow my dreams of chasing space issues and science. I learned the struggles involved in following a beat, making contacts, working with scientists and interviewing the public—all under a deadline pressure.*

*It may seem like a lot of work, but I enjoy it. The contacts and published work that I have written will help me for future positions in creating science and academic written works for either public relations or the news. Although soon the internship will be over, I have been following freelance offers through the National Association of Science Writers and keeping a strong relationship with the UND's media relations department."*

## Dustin Kaiser

Student Internship Program at Goddard Space Flight Center—Summer 2004

*"In the summer of 2004, I attended the Student Internship Program (SIP) at NASA's Goddard Space Flight Center, where I worked with the GOES/POES program management office. The GOES/POES satellites provide NOAA with orbital weather monitoring capability. Working with Dr. Steve Benner, instrument manager for GOES N-P satellites, I completed several projects including a trial knowledge management system for the GOES/POES program. In addition to the day-to-day activities on site at Goddard, I was given the opportunity to travel across the country to visit various subcontractors involved with the project. Overall, my experiences during this internship provided me with valuable insights into program and project management which I plan to put to good use in a space related career."*



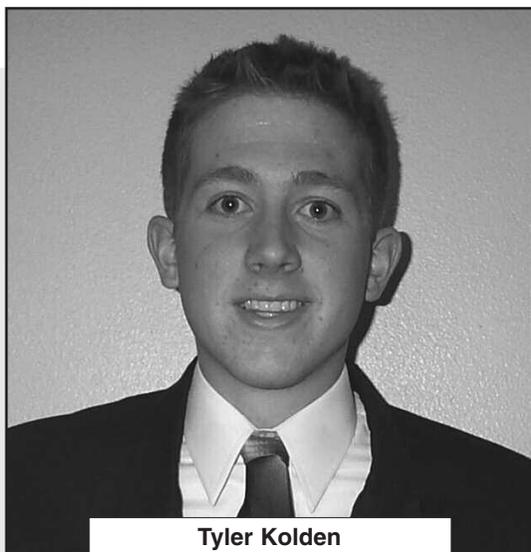
**Dustin Kaiser**  
Graduate Student  
Space Studies Department--UND

## Tyler Kolden

Space Grant Summer Internship at Jet Propulsion Laboratory—Summer 2004

*"During the summer months of 2004 I had the amazing opportunity to work as an intern at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, CA. This experience was incredible to say the least. I worked in a division that specialized in spacecraft avionics and, with the assistance of my mentor, was exposed to a very diverse group of remarkable people with great talents. Through formal presentations by experts every Monday and Friday, I learned about the breadth and depth of projects at JPL and where NASA is heading in the future.*

*There was a number of great opportunities to see what NASA, Los Angeles, and California have to offer. The program managers at the California Institute of Technology set up numerous field trips to off site locations such as the Goldstone Telescope, home of the Deep Space Network, and Palomar which is home to the world's second largest telescope. Many weekends were spent with other interns enjoying the wonderful California summer at the beach, taking in a show or festival, and sometimes even spotting a movie star."*



**Tyler Kolden**  
Undergraduate Student  
Electrical Engineering Department--UND



# NDSGC Fellowships and Scholarships

## NDSGC Research Fellowships

The NDSGC research fellowships are given on a competitive basis to undergraduate and graduate students at UND and NDSU who are interested in doing serious supervised science research in a variety of disciplines. Fellowships are also given to graduate and undergraduate students who are involved in research projects that are of particular interest to NASA such as the NDSU Moonbuggy, the KC-135 Project and UND Solar/Fuel Cell Car. Each student is allowed a maximum of two semesters worth of fellowship money.

### ND STaR 2003 Continuing Undergraduate Fellowships for Spring 2004

**Nathan Grenz**  
Electrical Engineering  
at NDSU  
*"Estimating Cardiac  
Viscoelastic Properties"*

**Jonathan Renner**  
Chemical Engineering  
at UND  
*"Silicon Carbide Armor  
Applications"*

**Kevin Zimmermann**  
Undecided Major at UND  
*"Aerobic Waste Treatment  
System"*

**Scott Backman**  
Physics at UND  
*"Light Pollution Study of Grand  
Forks"*

### NDSGC Undergraduate Fellowship for Summer 2004

**Eric Torkelson**  
Mechanical Engineering  
at NDSU  
*"Low Velocity Impact of Sandwich Composites"*

### NDSGC Undergraduate Fellowships for Spring 2005

**Lisa Benko**  
Animal Science  
at NDSU  
*"Oral Nucleotides Enhance  
Immune Function of  
New Born Calf"*

**Bret Enderson**  
Mechanical Engineering  
at NDSU  
*"Use of Electrochemical  
Techniques to  
Investigate Coatings"*

**Andrew Podoll**  
Geology  
at NDSU  
*"Optical Dating Properties of  
Kiesserte—An Important  
Accessory Mineral in  
Martian Sediments"*

**Paul Haugen**  
Electrical Engineering  
and Mathematics  
at NDSU  
*"Elastance Catheter"*

**Troy Warner**  
Electrical Engineering  
at UND  
*"Engineering Analysis of  
UND's Polarimetric  
Weather Radar"*

**Julie Nicole Renner**  
Chemical Engineering  
at UND  
*"Remediation of  
Z<sub>6</sub>-Dinitrotoluene from  
Building Materials"*

## NDSGC Scholarships

NDSGC scholarships are given annually to each of the four-year, two-year and tribal colleges in North Dakota. These scholarships are given to those students who have displayed a particular interest or ability in an area of science or mathematics, who have at least a 3.00 grade average and who are American citizens. A faculty committee at each institution chooses the respective scholarship recipients. By recognizing the students' potential in science, it is hoped that they will be encouraged to continue to take science classes during their final two years of college.

### NDSGC Scholarships for 2004-05

#### Dickinson State University

Jennifer Robinette  
Keith Zimmerman

#### Minot State University -- Bottineau

Brady Michel  
Black Schaan

#### Bismarck State College

Brian Gross  
Sarah Perius

#### Minot State University

Jamie Neft  
Drew Lynne  
Christopher Aaron

#### Valley City State University

Thomas Milbrandt  
Bridget O'Brien  
Chad Worrel

#### Lake Region State College

Suzanne Hoey  
Aaron Fisk  
Krista Beausateil

#### United Tribes Technical College

Bree Zitzman  
Jessica Wiest  
Anna Buechler

#### Mayville State University

Jamie Bauer  
Jessica Davey  
Aaron Mehus  
Derek Aus  
Joseph Mehus  
Jeremy Tallum

#### North Dakota State College of Science

Catherine Geer  
Adam Wahler  
Chris Vetter

#### Williston State College

Kevin Watson  
Carter (Tony) Breeding II  
Joseph Magnan

#### Fort Berthold Community College

Christopher McLaughlin  
Ronald Stiffarm  
Tanya Driver

#### Cankdeska Cikana Community College

Elisa Lawrence  
Lacey McKay  
Dacia Tollefson

## The NASA Vision

To improve life here.  
To extend life to there.  
To find life beyond.





## NDSGC 2004 Workforce Development Grant

In 2004, NASA Headquarters awarded the North Dakota Space Grant Consortium (NDSGC) a workforce development grant of \$94,000 to provide summer research fellowships at North Dakota State University (NDSU) and the University of North Dakota (UND). This program, North Dakota Space Training and Research (ND STaR 2004), was designed to improve the pipeline of higher education graduates and faculty who are interested in doing NASA-related research.

These summer fellowships were made available by the NDSGC on a competitive basis to undergraduate students at the two-year, four-year and tribal colleges in the state. Eleven students were chosen; they were from Lake Region State College, NDSU, Turtle Mountain Community College, Mayville State University and UND.

A special aspect of ND STaR 2004 was that each recipient and his/her supervisor visited an appropriate NASA Space Center to talk to scientists that were

involved in similar research projects.

In August of last year, the NDSGC sponsored a conference called Space on the Prairie at which the ND STaR 2004 recipients presented the results of their summer research. Faculty from NDSU and UND who had received NASA ND EPSCoR grants also gave poster demonstrations at the conference.

During fiscal year 2004, Space Grant funded a variety of high school and college technology projects. Students/faculty representing the NDSU Moonbuggy, FIRST Robotics, UND Solar/Fuel Cell Car, KC-135 Project, High Altitude Balloon Project and the Rocketry Challenge gave demonstrations of their technology at Space on the Prairie.

Special guests at the conference included: Jack Dalrymple, Lt. Governor of North Dakota; Dr. Brad Weiner, Director of the Division of Higher Education at NASA Headquarters; and Dr. Gregg Buckingham, University Affairs Officer at Kennedy Space Center.

*"The ND STaR program was an experience that changed my life. Going to Houston to present my research in front of scores of NASA officials made me more confident of my abilities and of my future with NASA. The skills I learned last summer were useful in helping me to choose a career in research. Overall, ND STaR 2004 brought a new direction to my educational plans."*

*Chris Sanders*

## ND STaR 2004 Summer Research Fellowships

### **Matt Buisker**

Undergraduate student at UND—Mechanical Engineering  
Research done at UND with Dr. Will Semke in Mechanical Engineering  
"Remote Sensing Platform Development and Enhancement"

### **John Totenhagen**

Undergraduate student at NDSU—Electrical Engineering  
Research done at NDSU with Dr. Dan Ewert in Electrical Engineering  
"Estimating Mechanical Properties of the Heart During Simulated Microgravity"

### **Chris Sanders**

Undergraduate student at UND—Geography  
Research done at UND with Dr. Brad Rundquist in Geography  
"NASA Native View Connections Program: Remote Sensing and GIS Training"

### **Carson Lee**

Undergraduate student at UND—Air Traffic Control  
Research done at UND with Dr. Tim Young in Physics  
"Solar and Extrasolar Transiting Planets"

### **Bret Enderson**

Graduate of North Dakota State College of Science—Liberal Arts  
Undergraduate student at NDSU—Coatings and Polymeric Materials  
Research done at NDSU with Dr. Victoria Johnston-Gelling in Coatings and Polymeric Materials  
"Corrosion Studies of Potential NASA Launch Pad Coatings in Artificial Seawater"

### **Troy Warner**

Undergraduate student at UND—Electrical Engineering  
Research done at UND with Dr. Paul Kucera in Atmospheric Sciences  
"Engineering Analysis of the UND Polarimetric Weather Radar"

### **Andy Burckhard**

Graduate of Lake Region State College in 2004—Biology  
Undergraduate student at UND—Biology  
Research done at UND with Dr. Peter Meberg in Biology  
"Function of Actin Depolymerizing Factor (ADF) in Neurons"

### **Brandon Pulst**

Graduate of Lake Region State College in 2004—Liberal Arts  
Undergraduate student at UND—Mechanical Engineering  
Research Done at NDSU with Dr. Mohammad Mahinfalah in Mechanical Engineering

### **Carl Jungberg**

Undergraduate student at Mayville State University—Chemistry  
Research done at UND with Dr. Dan Stepan and Dr. Lisa Botnen at the EERC  
"Freeze-Thaw Treatment of Wastewaters"

### **Sheldon Martin**

Undergraduate student at Turtle Mountain Community College in 2004 and 2005—  
Pre-engineering  
Research done at UND with Dr. Dan Stepan and Dr. Richard Shockey at EERC  
"Anaerobic Digestion of Coal Gasification Stripped Gas Liquor"

### **John Hamling**

Graduate of Williston State College in 2004—Pre-engineering  
Undergraduate student at UND—Mechanical Engineering  
Research done at UND with Dr. John Hurley at EERC  
"Thin Silicon Carbide Composites for Meteoroid Shielding"



## NDSGC 2005 Workforce Development Grant College Students to Build Prototype Spacesuit for Mars

A NASA Aerospace Workforce Development grant of \$100,000 has been awarded to the North Dakota Space Grant Consortium (NDSGC) to design and build a prototype Mars planetary suit. This will be a year long project involving multiple universities and colleges around North Dakota that will culminate in the production of the spacesuit in March 2006. This project evolved from a collaborative effort between NASA EPSCoR, NASA Space Grant and the UND Aerospace Foundation to develop a focus on spacesuit and extravehicular activities research at the University of North Dakota. The impact of this project is statewide and serves the goals of the Red River Valley Research Corridor.

The proposal generated a lot of excitement. Diane DeTroye, manager of Space Grant at NASA Headquarters, said in the letter of notification: "The panel gave high praise for this innovative, consortium-wide initiative." Although 50 proposals were submitted by state consortia, only 32 were partially or fully funded. North Dakota's proposal ranked in the top three submitted to NASA Headquarters.



Sarah Kavli

The purposes of this project are to develop a top-level design by college students for a planetary spacesuit for Mars exploration, to train students in space life support systems and to do this through a cooperative effort of teams located at the public two-year, four-year and tribal colleges in the state. Shande Silva, director of the NDSGC, said, "What can be more exciting than this. It gets students and colleges across North Dakota involved in cutting-edge research with an economic development potential." College teams from around the state will address such issues as mobility, telecommunications, biomedical sensors, thermal control, dexterity (glove mobility), kinematics of walking on Mars, design of an enclosed life support system (ELSS), helmet design, power sources, etc.

Pablo de Leon of the Department of Space Studies at UND will be the project manager and technical assistance will be provided by Hamilton Sundstrand (which manufactures the Space Shuttle spacesuit) and the NASA Extravehicular Activities Office at Johnson Space Center. de Leon said, "This innovative project supports the new NASA Vision by encouraging students to think about planetary exploration while providing extensive hands-on experience otherwise unavailable in this particular aspect of human space flight." See our website at [www.human.space.edu](http://www.human.space.edu)

### Sarah Kavli

UND—Mechanical Engineering  
ND STaR 2004 Workforce Development  
Scholarship—Summer 2004

*"Last summer, I had the opportunity to participate in a Space Grant sponsored internship program called the NASA Academy. The NASA Academy is an intensive leadership internship focused on developing research skills and cultivating leadership abilities.*

*The research that I performed was with NASA Goddard Spaceflight Center's nanotechnology branch, in Greenbelt, Maryland on a new type of material called carbon nanotube composites. The importance of developing this revolutionary material processing technique lies in the film's countless beneficial applications. A human may someday be able to live on Mars without the fear of radiation, a police officer will be able to walk down the street with the protection of a bullet proof t-shirt, electronics such as computers, diabetes insulin pumps, and hearing aids will be smaller, lighter and more convenient than ever before because of the enhanced strength-to-weight ratio of this composite and its multifunctionality.*

*The NASA Academy experience was priceless not only to my education but also to me, personally, because the classroom can only give you the tools to succeed but experience gives you the vital passion required to thrive."*

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# Into the Air with Amelia Earhart

## Famed Aviatrix Speaks in Three North Dakota Cities

Amelia Earhart “appeared” six times in North Dakota in early April 2004. Sponsored by the North Dakota Space Grant Consortium (NDSGC), Earhart flew across the state stopping in Grand Forks, Bismarck and Williston to talk to middle and high school students about her fascinating life. In reality, Earhart was Dr. Ann Birney, a historian with her Ph.D. in American history, who does Chautauqua-style presentations of Earhart.

“Birney was the ideal choice,” said NDSGC Assistant Director Suezette Rene Bieri. “She is an Earhart scholar, a fine actress, and a native of Kansas just like Earhart. Plus she looks like her.” Earhart spoke from the year 1937, just before her attempted around the world flight.

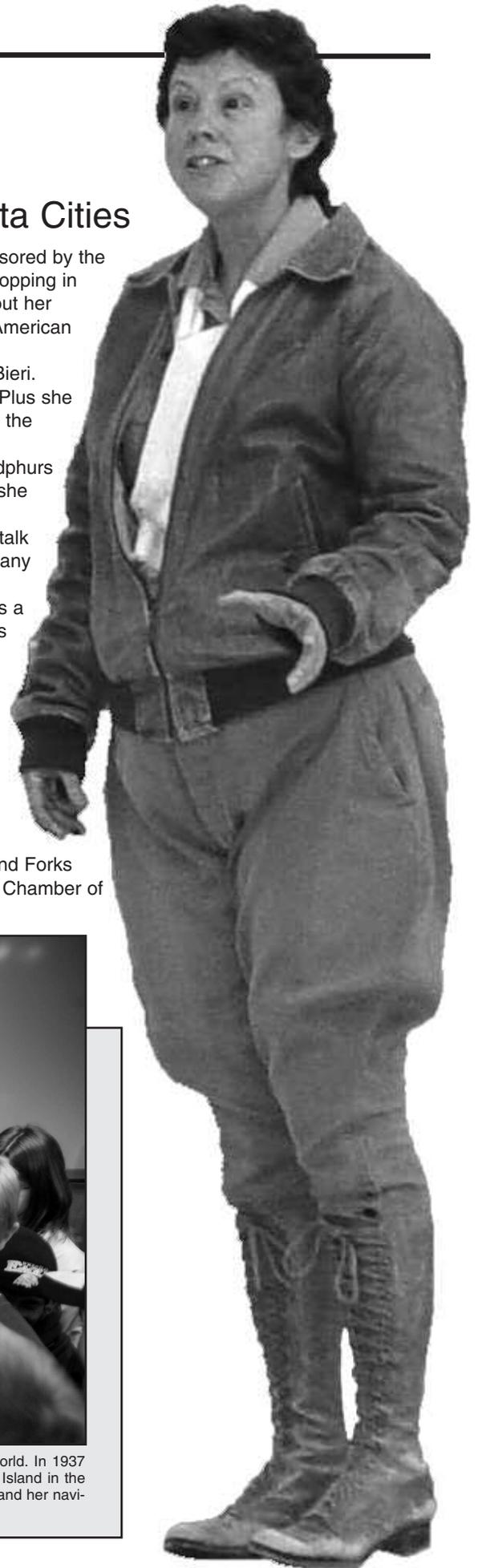
Over 1300 students attended the events. Earhart, wearing a bomber jacket, jodphurs and authentic boots from that time period, enthralled the students as, in character, she discussed the series of “firsts” that made her famous.

Two student pilots from the University North Dakota (UND) were also along to talk about careers in aviation. Jennifer Zawislak and Justin Place told students of the many possibilities for young people who wish to work in the aviation industry.

As Bieri explained, “We are an aerospace program and since North Dakota has a global reputation in aviation, we are trying to do more aviation related events. It was a perfect fit for us. We recognize that space travel would not have been possible without air travel. Sending Earhart around the state to talk to people is a reflection of this.”

The Earhart program was made possible by the assistance and generosity of Dr. Bruce Smith, Dean of the School of Aerospace Sciences at UND. He provided a six passenger plane and two pilots so that Space Grant could fly Earhart and the two UND students from city to city.

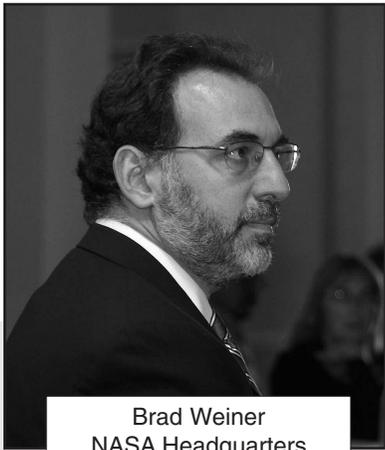
Other sponsors were the Departments of Aviation and Space Studies at UND, the NASA Regional Educator Resource Center and the Association of Air Transport Professionals in Training also at UND, NASA Langley Space Flight Center, the Grand Forks Herald, the North Dakota Heritage Center, Williston State College and the Williston Chamber of Commerce.



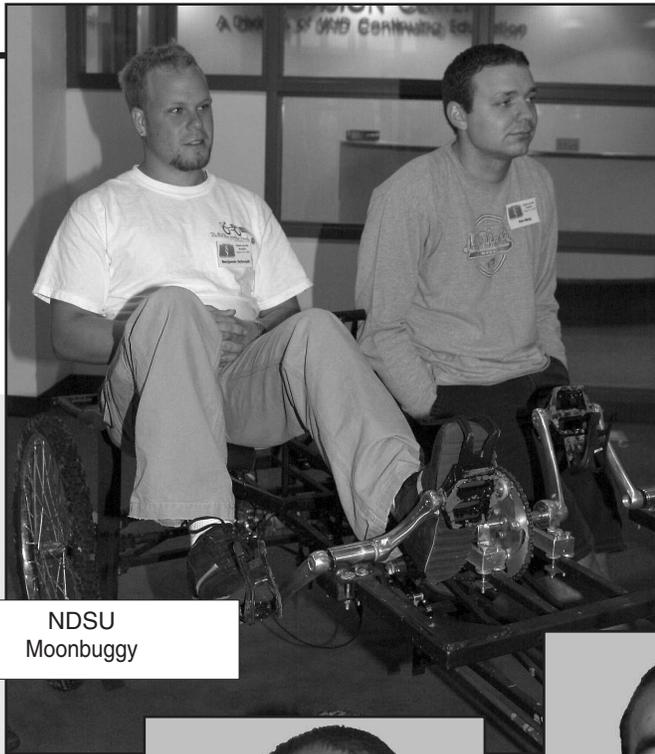
Amelia Earhart, aka Dr. Ann Birney, uses a globe to show students her planned flight around the world. In 1937 Earhart took off from the United States going East. She made it to within 35-100 miles of Howland Island in the Pacific. Her plane apparently went down in that area after running low on fuel; the bodies of Earhart and her navigator were never recovered nor was the wreckage of her plane found.

# Space On The

Hilton Garden Inn  
Rural Technology Center  
Grand Forks,  
August 8 and 9



Brad Weiner  
NASA Headquarters



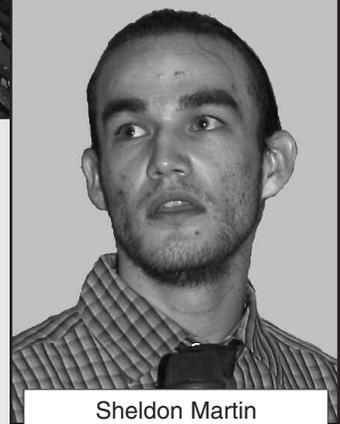
NDSU  
Moonbuggy



Carl Jungberg  
ND STaR Recipient



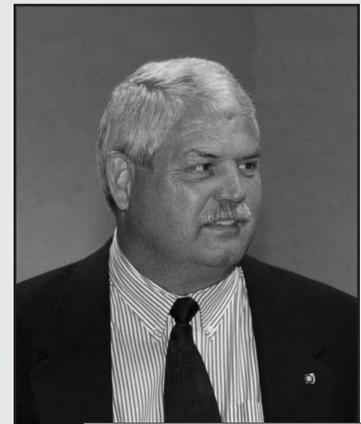
Carson Lee  
ND STaR Recipient



Sheldon Martin  
ND STaR Recipient



John Totenhagen  
ND STaR Recipient



Bruce Smith  
UND Aerospace



Chris Sanders, ND STaR Recipient and  
Xiquan Dong, UND Atmospheric Sciences



Victoria Johnston Gelling  
NDSU Coatings and  
Polymeric Materials



Bret E.  
ND STaR

# the Prairie—2004



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North Dakota  
and 9, 2004



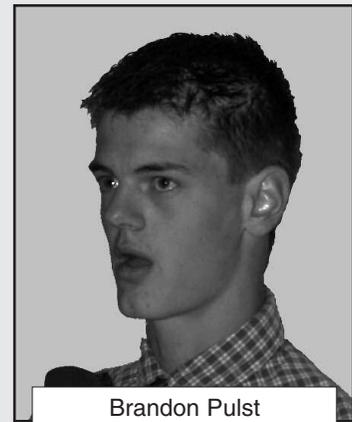
Fairmount High School  
Robotics Team



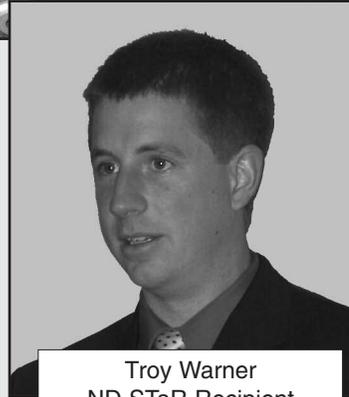
Josh Hamling  
ND STaR Recipient



Lt. Governor Jack Dalrymple and  
Mohammad Mahinfalah, NDSU  
Mechanical Engineering



Brandon Pulst  
ND STaR Recipient



Troy Warner  
ND STaR Recipient



Anderson  
R Recipient



Andy Burckhard  
ND STaR Recipient



Lt. Governor  
Jack Dalrymple

Shan de Silva  
NDSGC



Matt Buisker  
ND STaR Recipient



Will Semke  
UND Mechanical Engineering

# FIRST Robotics

*"The Alexander Robotics Team had a very successful 2004 season. All members were in agreement that "Raising the Bar" was our toughest challenge yet. We spent six grueling weeks building a robot that met the challenge FIRST presented to us. We went through multiple designs and built and rebuilt many features. Ultimately, we ended up with awesome ball handling capabilities, fantastic ball grabbing capacity, and a 12 foot grabbing arm that allowed our fondly named robot, X-Evil, to rise while hanging from the 10 foot bar. The 19-member team and four mentors, now called Pitch Black, traveled via plane to Orlando, Florida for our first competition. Little did we know that the 33 Florida teams had already competed to reach this regional competition. Days of competition, hours of tweaking and rounds of winning gave our team an experience that we won't forget. The competition was fierce, our toughest to date; as FIRST raised the bar so did the competing teams. As a reward for hard work, Pitch Black treated themselves to a day at the Kennedy Space Center and their first sight of and swim in the Atlantic Ocean. The North Dakota NASA Space Grant Consortium, generous community sponsors and dedicated mentors made all of these experiences possible. This was an opportunity of a lifetime and the Alexander Robotics Team seized the opportunity!"*

*Cassandra Gentry  
 Faculty Advisor/Team Mentor*

## N.D. FIRST Robotics Teams

**Alexander High School**  
 Team #874

Advisor: Cassandra Gentry

**Hatton High School**  
 Team #875

Advisor: Dave Hedland

**Northwood High School**  
 Team #876

Advisor: Mike Voglewede

**Cando High School**  
 Team #877

Advisor: David Krack

**Rugby High School**  
 Team #878

Advisor: Jan Hagen

**New Town High School**  
 Team #879

Advisor: Trudy Ruland

**Fairmount High School**  
 Team #880

Advisor: Yolanda Luick

**MayPort-Clifford-Galesburg High School**  
 Team #1106

Advisor: Bill Bohnsack

**Surrey High School**  
 Team #1101

Advisor: Byron Borgen



**Alexander Robotics Team:** Back row, left to right: Adam Wilson; Casey Hystad; Louis Hermanson; Sheldon Wahlstrom; Bo James; and Josh Fixen. Middle row: Kelly Mrachek; Kris Mrachek; Cameron Wahlstrom; Rachel Forthun; Holly Gullickson; and Jeff Evanson. Front row: Ben Novak; Tate Mrachek; Scott Anderson; Jamie Wahlstrom; Tyler Fixen; Aaron Weber; and Jerry Sorrells.



**Cando High School Robotics Team.** Left to right standing: Darren Weippert; Chad Weippert; Dustin Larson; Nathan Gibbons; Randy Hunt; and Josh Haugen. Kneeling on floor from left: Coach David Krack; and Bobby Wolsky.



**Fairmount High School Robotics Team**

Left to right: Meghan Krause; Laura Luick; Landon Luick; Larry Luick; and Yolanda Luick. Kneeling: David Reinig.

Rachel Gorren, Lucas Johnson, Carl Armstrong, Sean Zimprich, Kristy Hagen, Ryan Hillesland, Denny McVeigh, Alicia Busch, Carl Schram, Robbie Lukens, Matt Wallace, JoAnne Uglem, Gerry Uglem, Kirsti Lukens, Justin Nygaard, Katie Holte, Ross Uglem, Amy Johnson, Janice Cox, and Mike Voglewede were all involved with the **Northwood High School Robotics Team**.



## and Rockets, too!



**Wilton High School Rocket Team**

Left to right: Travis Davenport; Craig Holden; and Mike Gregoryk.



## NDSU Moonbuggy Races to First Place--Again

NDSU took first place at the 11th annual "Great Moonbuggy Race" April 3, 2004 in Huntsville, Alabama. This is the second year in a row that a NDSU team has won the college division, which this year included 26 other racers from colleges and universities in 13 states and Puerto Rico.

"I am really proud of our students. They learned that they can compete with anybody," said Mohammad Mahinfalah, the team adviser and associate professor of Mechanical Engineering. "This is a testimony to the quality of our students and the dedication of our faculty for excellence. We are the only university to win the race twice."

Vehicles powered by two-member teams raced one at a time over a half-mile obstacle course of simulated moonscape terrain at the U.S. Space and Rocket Center. The NDSU team's winning time was 3:46.

The event is inspired by the actual lunar roving vehicle project, which was successfully developed by NASA's Marshall Space Flight Center during the 1960s and 1970s. The race challenges students to design and build a human-powered vehicle to learn how to deal with real-world engineering problems.

Mahinfalah said of the competing teams, only 11 finished the race. NDSU's two teams took the title and 11th place.



**NDSU Moonbuggy Team.** Left to right: Dr. Mohammed Mahinfalah; Danielle Baumann; Joe Koehler; Justin Pavlish; Nate Keim; Jed Falck; and Aaron Ryan.

## Bison Fly High in KC-135 Project



**KC-135 Team** from NDSU. Team members shown: Reese Weber; Corey Schwartz; Elizabeth (Beth) Quistad; and Jeff Wandler. Not pictured is Dr. Dan Ewert, advisor and chair of Electrical Engineering.



Corey Schwartz and Reese Weber of NDSU in microgravity.



Left to right: Michelle Sterle; Andrew Hexum; Chip Willcutt; Steve Donaldson; and Anna Voagerau. They are shown at UND in front of the **Solar Car** which has been retired in favor of a **Fuel Cell Car**.

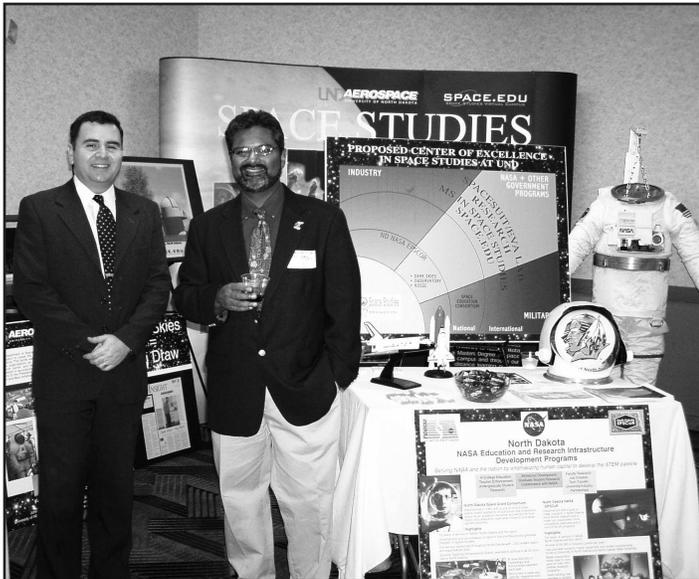
## Fuel Cell Car Ready to Rumble Solar Car Rides No More

UND's Solar Car research has been phased out; in its place is exciting new research for a Fuel Cell Car. The Society for Energy Alternatives (SEA) at UND has spent the past two years in transition as students began designing the new vehicle and did fund raising. Plans are to have the Fuel Cell Car ready to race in the spring of 2005. Student leaders in the project are: Joshua Howland; Jared Johnson; Michelle Sterle; Anna Vasgarau; Keith Severson; Andrew Hexum; and Steve Donaldson. The advisor for SEA is Scott Tolbert, Assistant Professor of the Department of Mechanical Engineering. The North Dakota Space Grant Consortium is pleased to have provided funding for both past and present projects.

# NDSGC Briefs

## Space Grant Shows Off

Shan de Silva, Suzette Rene Bieri and Pablo de Leon (research associate at UND) participated in the Bismarck Showcase in January of 2005. Their booth (the largest and most impressive of all!) represented both the Department of Space Studies and the North Dakota Space Grant Consortium. The training Space Shuttle spacesuit they displayed was a magnet for the legislators and state officials who attended the event.



Pablo de Leon and Shan de Silva at Bismarck Showcase.



## Spot Light on Native Connection GIS/Remote Sensing

With high interests and a well-equipped GIS/remote sensing lab, Turtle Mountain Community College magnified its role as a part of the North Dakota Space Grant Consortium Native Connections program. Located on the Turtle Mountain Band of Chippewa Reservation in Belcourt, North Dakota, the tribal college sought to educate its students and faculty about the value of remote sensing. All GIS work planned at Turtle Mountain is pertinent to the college and the reservation surrounding it.

Remote sensing and GIS fulfilled many areas of concern on the reservation. One such concern was the Belcourt Lake drainage area.

Another area of interest was economic development. The tribal council expressed a need to better attract industry through the use of remote sensing and GIS data for site location.

Finally, there was a general expression of interest in collecting natural resource information for the tribe's educational, environmental and political use.

## Travel

The North Dakota Space Grant Consortium provided partial funding for Michael Gerszewski to attend the Lunar and Planetary Conference in Houston in March of 2004. Gerszewski, a masters student in the Department of Space Studies at UND, graduated in August of 2004.

## More Travel

The North Dakota Space Grant Consortium provided funding for Dr. Victoria Johnston Gelling to attend the Women in Science 2004 Conference in Oklahoma City. The conference was sponsored by the Oklahoma NSF EPSCoR. Dr. Johnston Gelling is a research assistant professor in the Department of Coatings and Polymeric Materials at NDSU.

## Faculty Fellowship

The North Dakota Space Grant Consortium provided a Summer Research Faculty Fellowship to Virginia Makepeace of North Dakota State College of Science to develop an astronomy course to be offered at the undergraduate level.

## Regional Educator Resource Center

The NDSGC worked closely this past year with the NASA Regional Educator Resource Center which is located in the Department of Space Studies at UND. Space Grant provided support in terms of logistics and finances. That made it possible for the NDSGC to provide space science materials to teachers around the state. Some of those materials were distributed through in-service workshops while others were provided via the mail.

## Pre-Service Workshops

Space Grant worked very hard to develop relationships with the Departments of Education at five of the universities in the state. Preservice workshops were held each semester at the University of North Dakota, North Dakota State University, Mayville State University, Valley City State University and Jamestown College.

## K-12

Presentations on space science, sponsored by the NDSGC, were made in K-12 classrooms using the faculty and graduate students of the Department of Space Studies at UND.

## ND Students Study "Night Lights"

One of the best things North Dakota is known for is the Aurora Borealis. It is one of only a few places in the continental United States where one can see this visual anomaly. To get a more intimate view of these bright lights, North Dakota students are using NASA's THEMIS satellites from a program funded in part by the North Dakota Space Grant Consortium.

During Fort Yates' 21st Century Learning Grant "Night Lights," and throughout the school day for the Fort Yates Public School District #4/Standing Rock Community School Joint Powers School System, St. Bernard Mission School and Sitting Bull College, North Dakotans will get a deeper understanding of their own sight spectacular. Teachers and students can use each school's magnetometers, along with transmitted THEMIS data, to learn more about the Aurora and Auroral substorms. Five THEMIS satellites, with the farthest orbiting over 75,000 miles above the Earth, are involved in the project.



# Science Teaching Enhancement Grants

Each year the North Dakota Space Grant Consortium (NDSGC), a NASA sponsored project to improve science awareness, offers Science Teaching Enhancement Grants (STEG) of \$250 to encourage North Dakota teachers to: upgrade demonstration or lab equipment; buy science software or books; build telescopes; take students on scientific field trips; or do any special

science project that will be exciting for students. The goal of this program is to allow teachers in grades K-12 to try projects that are beyond the scope of current budgets. The STEG can not be used for salaries or administrative costs. The money must be used by teachers for the students in their classrooms. In the spring of 2005, the NDSGC awarded 25 STEG to teachers in North Dakota.

## STEG Grant Recipients

### Fred Thomasson

Park River High School  
Grades 7-12  
Field Trip to the Plant  
Research Department at  
NDSU

### Kathy Mita

Grade 8  
Circle of Nations School in  
Wahpeton  
Purchase Materials for Unit  
on Rocketry

### Cy Kotaska

Grades 7-12  
Sawyer High School  
Purchased Marine Aquarium

### Pam Hintz

Grades 9-12  
Grant County High School  
in Elgin  
Purchased Materials for  
Unit on Robotics

### Karen Brodehl

Grade 8  
Park River School District  
Purchased Materials for  
Unit on Rocketry

### Jean Peterson

Grade 5  
Kindred Public School  
Purchased Materials for  
Advanced Unit on Rocketry

### Lori Hare

Grade 3  
Gussner Elementary School  
in Jamestown  
Purchased a Mobile  
Grow-Light Garden Lab

### Arlene Hondl

Grade 4  
Trinity Elementary East School  
in Dickinson  
Purchased Material for Unit  
on Engineering and  
Construction

### Jennifer Fremstad/ Dorothy Stearns-Larson

Grades 9-12  
Wyndmere High School  
Purchased TV Monitor,  
DVD Player and Hook Up  
for Microphones

### Rita Seiler

Grades 1-6  
Washburn Public School  
Purchased Non-Fiction Books  
at Different Reading Levels

### Sister Julie Brandt

Grades 1-6  
Saint Bernard Mission School  
in Fort Yates  
Purchased Material for a Unit  
on Flight

### Patsy Schlosser

Grades 9-12  
Egeley High School  
Purchased Materials for Unit  
on Physics

### Jacklyne J. Lippert

Grades 7-12  
Flasher Public School  
Purchased Materials for Unit  
on Physics

### Jody Johnson

Grade 4  
Oriska Elementary School  
Purchased Adventures in  
Science Kits

### Carmen Shannon

Grade 4  
St. John's Academy in  
Jamestown  
Purchased Materials for a  
Rock and Mineral Unit

### Mike Walz/Julie Fleck

Grades 9-12  
Mandan Public Schools  
Purchased Materials for Unit  
on Rocketry

### Shirley Lisko

Kindergarten  
Trinity Elementary East School  
in Dickinson  
Purchased Materials for a  
Weather Unit

### Marilyn Very

Grades 9-12  
South Central High School  
in Bismarck  
Purchased Human Skeleton  
and Ten-Part Human Body  
Torso

### Kathy Lenz

Grade 5  
Washington Elementary  
School in Valley City  
Purchased Materials for Unit  
on Wind Energy

### John Hendrickson

Grades 7-12  
North Central School District  
in Rock Lake  
Field Trip to the State Crime  
Lab in Bismarck

### Mary Lewis

Grades K-12  
Anne Carlsen Center for  
Children in Jamestown  
Purchased Materials for  
Garden Area Which is  
Accessible to the Disabled  
and Allows Students to  
Learn Using a Multi-Sensory  
Approach

### Loretta Monson

Grades 7-12  
Edinburg Public School  
Purchased Materials for  
Hands-on Science Activities

### Shannon Bushnell

Grades 8-12  
Berthold Public School  
Purchased Materials for Six  
Different Areas of Science

### Sally Brovold/Tammy Strobel

Grades 1 and 2  
Kulm Public School  
Field Trip to Bismarck Zoo

### Susie Maendel

Grades K-9  
Forest River School in Fordville  
Purchased Materials for Units  
on Life and Earth Science

*"With a rocket club being a new entity at Mandan High, there was little more than an entrance fee to TARC 2005 with which to work. Our first rockets were produced with nothing more than scraps and imagination. We rolled our own body tubes, nosecones, and couplers using tag board, and fashioned motor mounts using old shotgun shells and paperclips. Although the students learned a lot about building rockets, and both stages of each rocket ignited properly, the practice rockets would never have been able to compete with the top national teams.*

*We desperately needed supplies, and all the school's science fund raising was already scheduled for other events. Late in January, we first heard of the STEGs from the NDSGC. Although we are getting a late start on making our rockets, our students are motivated and excited to do a great job! Thanks to you we have the right fuel to boost us into competition and hopefully into the TARC 2005 finals."*

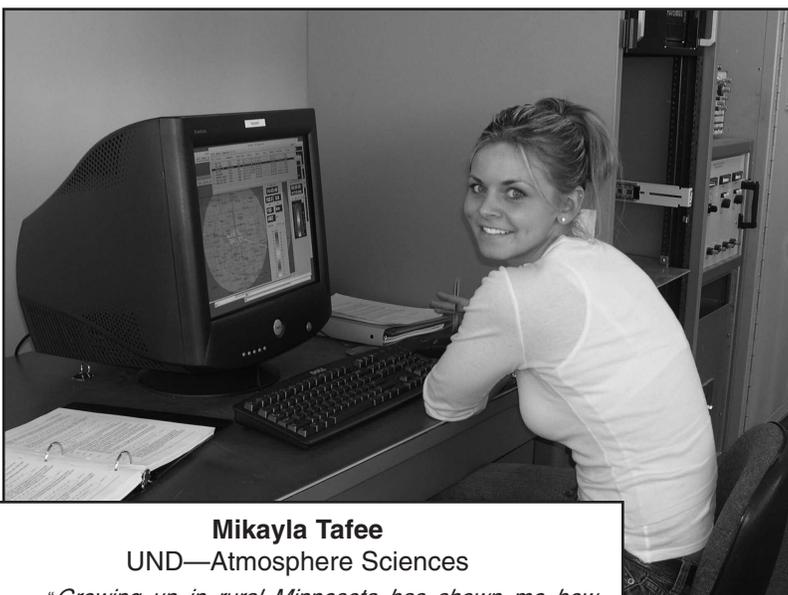
Mike Walz, Julie Fleck and the  
Mandan Public Schools Rocket Team

*"Thank you so much for the Science Teaching Enhancement Grant. My students and I are excited to have new tools to use and explore in the areas of motion and bridge building. The items that this grant has enabled me to obtain are items that I would not have felt comfortable requisitioning due to budget concerns at school. This new equipment will allow me to help my students explore areas in physics with actual models/demonstrations/lab activities rather than just reading these concepts from the text. Thanks again!!"*

Patsy Schlosser  
Edgeley High School

*"This grant is very important to the first and second grade classes because without it, most of them have not been able to experience some of the great wonders of our own state. Without the grant, our students would miss out on getting to go on a field trip to Bismarck and what an exciting memory for each of them to have."*

Tammy Strobel  
Kulm Public School



**Mikayla Tafée**

UND—Atmosphere Sciences

*“Growing up in rural Minnesota has shown me how important the weather is in our everyday lives. Nearly every aspect of our lives is influenced by the weather. As a farmer, my father has always been interested in what was occurring in the skies above; as a young girl, I remember watching thunderstorms with him, and I remember feeling amazed by what was occurring right before my eyes. Attempting to understand the weather has caused me to become excited and interested with the atmosphere’s potential. Many times I feel overcome with adrenaline as storms begin forming when I’m able to witness them from beginning to end.”*

## Pearl I. Young Scholarship 2005 at UND

Pearl I. Young graduated from UND in 1919 as a Phi Beta Kappa with a triple major in Physics, Mathematics and Chemistry.

After graduation she taught physics at UND for two years. She then accepted an appointment at the Langley Memorial Aeronautical Laboratory in Hampton, Virginia. She was the first woman hired as a scientist (physicist) of the National Advisory Committee for Aeronautics (NACA); that agency later became the National Aeronautics and Space Administration (NASA).

## Pearl I. Young Scholarship 2004 at UND

**Candyce Hecker**

UND—Mathematics

**Lisa Marie Geschwill**

UND—Mechanical Engineering

## Lillian Goettler Space Grant Scholarship 2005 at NDSU

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.

## Lillian Goettler Space Grant Scholarship 2004 at NDSU

**Jennie Fries**

NDSU—Mathematics



**Sarah Panzer**

NDSU—Electrical Engineering

*“I decided to go into the field of engineering because I love science and math and wanted to continue working with both. I wanted a career where my field was constantly changing, so I could continue to learn when even out of college.”*



## Looking at More than just Dark Skies

The North Dakota Space Grant Consortium looks not only forward, but upward, to its precious state resources, like a growing tourism market and its great dark skies. NDSGC Director Shan de Silva hopes the state can market itself to travelers as a destination point where they could learn more about astronomy both physically and historically. The state's skies are an ideal resource where serious research can be done in astronomy or where curious tourists can have a never before experienced opportunity. With the state's rich history, in which the skies had an integral role, with its development and culture, North Dakota seems a bit more starry-eyed than usual.

Teaming up with International Dark Sky Association representative and colleague Paul Hardersen, de Silva hopes to bring visitors to the state through a proposed UND Observatory. Planned to be located in Emerado, North Dakota, the astronomical look-out post will allow people from urban areas to see a once in a lifetime personal tour of the skies through the Observatory's telescope. "People from large cities, like New York, would see something they may never have seen before," said de Silva, "The concept is to take North Dakota features—the heritage, the big dark skies, and the Aurora—and market it as a destination."

The Observatory is only one part of the picture. de Silva hopes to draw in references to Lewis and Clark's expedition through the state and play on the fact that the two used celestial navigation to determine their route to the West Coast and back. de Silva also points to Valley City where its Medicine Wheel has spokes that are oriented to the rising and setting of the Sun and the Moon. Native cultures of the Great Plains used the skies for time-keeping and storytelling. An emphasis on North Dakota's sky-based history means it could be a great sell for the tourism industry here.

It would be a distinction of which all North Dakotans could be proud: North Dakota—the Dark Sky State. For more information about the program contact Paul Hardersen at: [hardersen@volcano.space.edu](mailto:hardersen@volcano.space.edu)

**The Mission of the NDSGC:  
To raise the level of science, technology, engineering, and math (STEM) research and education in North Dakota to make it more NASA relevant.**

### Members of the Advisory Committee of the North Dakota Space Grant Consortium

- |  |   |
|--|---|
| <p><b>Suzette Rene Bieri</b><br/>University of North Dakota<br/>Department of Space Studies<br/>Assistant Director of NDSGC</p>    | <p><b>Ray Holmberg</b><br/>North Dakota Legislature<br/>State Senator from<br/>Grand Forks (District 17)<br/>Chair, Senate Appropriations<br/>Committee</p> |
| <p><b>Carol Davis</b><br/>Turtle Mountain Community<br/>College<br/>Interim President</p>  | <p><b>Michael Jacobs</b><br/>Grand Forks Herald<br/>Publisher/Editor</p>  |
| <p><b>Shan de Silva</b><br/>University of North Dakota<br/>Chair, Department of Space<br/>Studies<br/>Director of NDSGC</p>        | <p><b>Corrinne Krauss</b><br/>Dickinson State University<br/>Faculty, Department of<br/>Physics and Astronomy</p>   |
| <p><b>Dan Ewert</b><br/>North Dakota State University<br/>Chair, Department of<br/>Electrical Engineering</p>                      | <p><b>Ron Rauschenberger</b><br/>Governor's Office—<br/>State Capital<br/>Deputy Chief of Staff</p>   |
| <p><b>Les Fetter</b><br/>Boeing Corporation<br/>(Houston, Texas)<br/>International Space Station<br/>Safety Engineer/Scientist</p> | <p><b>Joe Stickler</b><br/>Valley City State University<br/>Chair, Division of Mathematics,<br/>Science Health and Physical<br/>Education</p>               |
| <p><b>David Gipp</b><br/>United Tribes Technical<br/>College<br/>President</p>   | <p>The Advisory Committee met in<br/>Bismarck in January of 2005 to<br/>develop the strategic plan for the<br/>NDSGC.</p>                                   |



The North Dakota Space Grant Consortium (NDSGC) is currently underwriting the StarDate programs on the North Dakota Public Radio Network (NDPR) as part of its public outreach goals. StarDate is broadcast each morning, Monday through Friday, shortly after the 7:30am (CT) newscast. That is when the woman with the lovely voice says, "This broadcast is made possible by the North Dakota Space Grant Consortium, a NASA sponsored program whose mission is the enhancement of the NASA related research and education infrastructure in North Dakota. See our web site at [www.space.edu/spacegrant](http://www.space.edu/spacegrant)"

NDPR has eight full power transmitter stations and eleven translator stations which combine to reach more than 250,000 listeners a week. The underwriting by NDSGC covers the acquisition, production and distribution fees for the StarDate programs to all 20 stations involved.