



The Aurora

Spring Semester 2006

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
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

Grand Forks Herald

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Letter from the Director

Dear Friends

Publication of the Aurora is one of those affirming events, for as the dust settles from another year we finally see the fruits of our labor. We take great pleasure in bringing you just a few of the great things that happened with the NDSGC.

One of the major events of the year for us was hosting the "Back to the Moon, On to Mars and Beyond to Dacotah" Western Region Space Grant Meeting in September 2006. It was great to finally welcome folks from fourteen western states, four NASA Space Centers and NASA HQ and to showcase NDSGC activities and people to our many friends in Space Grant. Our thoughts were with our colleagues from Texas who were under the impending threat from Hurricane Rita during the meeting. Thankfully they were spared.

Our mission building the STEM research and education infrastructure in North Dakota continues with our multifaceted program at all levels. Research is the core of our portfolio with an emphasis on technologies for human spaceflight. This program was seeded by our 2004 Workforce Development project to build a prototype planetary space suit. Five affiliates, seven faculty, and forty students were involved in this project that will culminate with testing of the space suit in May.

Our summer NASA internship program goes from strength to strength and ND participants continue to use the experience to advance along the NASA pipeline. The early stages of that pipeline remain strong with our K-12 activities. Inside you can read about the Cando Cubs and other FIRST Robotics teams, the rejuvenated BalloonSat program, and a variety of other activities. Many of these have been made possible due to the strong support from the 2005 North Dakota Legislature. Senator Ray Holmberg, who seems to have taken a special interest in us, was instrumental in arranging a two-year appropriation for the NDSGC. In recognition of this, Senator Holmberg was given the inaugural Friend of North Dakota Space Grant Award.

This Aurora will mark the last during my tenure as director. I am honored to have led the NDSGC and leave with warm memories of almost four years of wonderful opportunities to serve the state of North Dakota and to meet all the great folks that make up the NDSGC. The opportunity to work closely with our congressional and elected state representatives has been an honor and a privilege.

We have had a rapid transition from a program that was underperforming to one that is highly regarded by NASA HQ. I am particularly proud of the way we have built up our affiliate relationships and take great pleasure in the excitement and interest being shown by our affiliates. This bodes well for the future and I wish you all the very best. I will read future issues of Aurora with glee.



NDSGC Advisory Committee Meeting

The 2006 Advisory Committee meeting of the North Dakota Space Grant Consortium (NDSGC) was held on February 28 at the Ramkota Inn in Bismarck. Those in attendance were: Suzette Rene Bieri (assistant director); Carol Davis (American Indian higher education); Shan de Silva (director); Shannon Dullea (North Dakota State College of Science); Victoria Johnston Gelling (North Dakota State University); Corinne Krauss (Dickinson State University); Virginia Makepeace (Space Grant fellow); Betty Schumacher (Valley City State University); Donna Seaboy (Sitting Bull College); and Joe Stickler (Valley City State University).

Discussion included:

NASA Headquarters has made changes in the

funding structure for Space Grant. No longer are requests made for competitive workforce development grants such as ND STaR or the Mars Planetary Space Suit Project. Instead, Space Grant is given an augmentation to its regular Congressional appropriation.

Space Grant in North Dakota is currently funded as a Capability Enhancement state. The NDSGC is eligible to apply for Designated Status which would result in maximum funding. That funding level would require a commitment from the affiliates to provide part of the match for the grant. If the decision is made to "go for it" the grant will be written in mid 2007 with the funding arriving for fiscal year 2008.

The 2005 Legislature appropriated \$200,000 to the NDSGC for the 2005-2007 biennium. Senator Ray Holmberg, chair of the Senate Appropriations Committee, was most supportive of Space Grant being included in the state's budget. His efforts were much appreciated by the NDSGC. On February 27 he was honored with the first "Friend of North Dakota Space Grant Award" at a dinner and ceremony in Bismarck.

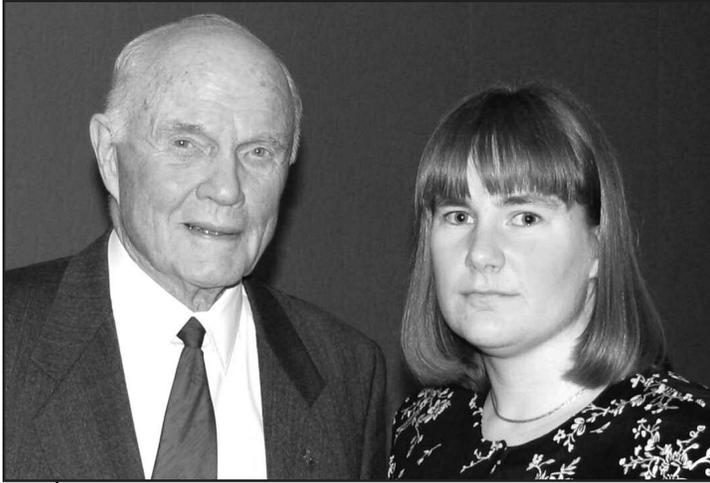


Senator Ray Holmberg

Friend of North Dakota Space Grant Award Ceremony

February 27, 2006
Bismarck, North Dakota

Ray Holmberg is a native of North Dakota. He graduated from the University of North Dakota with a Bachelor of Science degree in education (major--social studies, minor--speech) and with a Master of Arts degree in Counseling and Guidance. He worked for many years as a guidance counselor at Central High School in Grand Forks. He retired from that position in 2002. Holmberg was first elected to the state Senate in 1977. He currently serves on the Senate appropriations committee as chair. He is also on the Senate committee on committees and the Senate committee on rules. He is a member of the interim legislative committees on budget, employee benefits programs and higher education. He has two children and two grandchildren. He is the first recipient of the Friend of North Dakota Space Grant Award.



Senator John Glenn with Virginia Makepeace, March 2006

Virginia Makepeace

Space Grant Fellow

"Greetings, all! My name is Virginia Makepeace. I came up to UND's Department of Space Studies last August to work for the NDSGC. I had spent the last nine years teaching chemistry and physics at NDSCS. I love teaching, but since I was getting burned out, I was keeping my eyes open for an opportunity that would give me a break from teaching for a couple of

years. When Shan de Silva offered me a half-time job with NDSGC that would allow me to spend the other half of my time working on a research-based Space Studies degree, I jumped at the chance to come to Grand Forks. I arrived just in time to be part of the chaos leading up to the Space Grant Western Regional Conference at UND. Since then, I've been working on getting the North Dakota Dark Skies astronomy program started, doing workshops for education majors and K-12 teachers at various schools around the state, and generally trying to make myself useful around the department. I will be doing some work out at the UND Observatory now that warmer weather is finally here. I particularly like visiting classes of education majors because it gives me a chance to work with interested students without having to grade any homework. Space Grant is such a wonderful and unique program—promoting STEM education throughout North Dakota, impacting students at all levels from kindergarten to graduate school, and doing public outreach. Its great to be a part of making it happen!"

North Dakota Dark Skies

by Virginia Makepeace

North Dakota Dark Skies is a NDSGC initiative that has just recently gotten started. The idea is very simple: North Dakota has very little light pollution, making it a great place for amateur astronomy. The goal of North Dakota Dark Skies is to make telescopes and astronomy more accessible to everyone by establishing a network of telescopes at affiliate colleges around the state. Space Grant provides funds for the affiliate college to purchase a portable 10" or 12" telescope with accessories. The telescope is then used for activities involving the campus community, K-12 education,

the general public, and regional tourism. This spring, the NDSGC funded a North Dakota Dark Skies proposal from Susan Zimmerman at Williston State College for \$6127 and one from Corrine Krauss at Dickinson State University for \$6780. Both schools have many exciting plans for North Dakota Dark Skies. Our hope is to provide telescopes to one or two affiliates each year, until all the interested affiliates have them, and to eventually make the network of telescopes internet-controllable.

Prakash Ranganathan

2005 Space Grant Faculty Summer Fellowship
Engineering Instructor
Turtle Mountain Community College

"The Space Grant faculty fellowship provided a great opportunity to create the introductory level satellite communication course at Turtle Mountain Community College. Students will learn the fundamental/basic technicalities that are required to understand the satellite transmission/reception schemes. The course will be offered during Summer 2005/Fall 2006 at TMCC. Thanks to North Dakota Space Grant for giving me this opportunity!"





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. Due to an appropriation from the North Dakota Legislature in 2005, Space Grant was able to increase the STEG to \$500.

STEG Grant Recipients

Rosella Perdaems

Lincoln Elementary School
in Dickinson
Supplies for "Friday Scientists"

Michelle Bechtold/ Kayleen Marmon

Belfield School
Field Trip to Gateway to Science Center

Don Haufschild

Jamestown Senior High School
A Mobile Demonstration for Unit on the Physics and Physiology of Body Building

Genadean Holland

Menoken School
Equipment for Bird Watching

CaraLee Heiser

Hagen Junior High School in Dickinson
Field Trip to Science Museum of Minnesota

Michelle McGarry

Academy for Children in Fargo
Earth/planet Center

JoAnn Schapp

Bishop Ryan High School in Minot
Solar System Program

Laurie Torkelson

Ray Public School
Video Library

Rodney Kramer

Sargent Central School in Forman
A Weather Station

Kim Mahrer

Sargent Central School in Forman
Science Take Home Exploration Packs

Sally Brovold/Tammy Strobel

Kulm Public School
Field Trip to Bismarck-Mandan

Shawn Heinle

Bowbells High School
Supplies and Equipment for Physics Lab

Mike Rudy

Gussner Elementary School in Jamestown
Microscopes

Dave Hedland

Hatton Public School
Materials for Robotics Program

Joan Nelson

Longfellow Elementary School in Fargo
Subsidy for Space Camp 2006

Larry Lystad

Stanley High School
Field Trip to Regina

Connie Treiber

Richardton Taylor Public School in Taylor
Field Trip to UND Aerospace

Linda Gabbert

Dodge Public School
Field Trip to Coal Country

Bonnie Kroeber

Lincoln Elementary School in Jamestown
Materials for Earth Science Unit

Scott Schmiedeberg

Lincoln Elementary School in Jamestown
Microscopes

Ryan Moser

Scranton Public Schools
Field Trip to Wind Cave National Park and Devil's Tower

Barry Olson

Discovery Junior High School in Fargo
Rental of Scuba Diving Gear

Patty Mosset

Golden Valley High School
Combination River Tank Ecosystem

Kim Gruchalla

Midway Public School in Inkster
Equipment for Life Science Experiments

Tricia Gaffaney

Gussner Elementary School in Jamestown
Supplies for Rock/Mineralogy Unit

Mary Rachel

Gussner Elementary School in Jamestown
Materials and Equipment for Life Sciences Unit

Laurie Christensen

Kensal Public School
Field Trip to Planetarium at VCSU

Tanis Marschner/Joy Bloom/ Karen Landblom/Beth Sjostrand/ Sid Culver

Hope Christian Academy in Dickinson
Rental of Star Lab

Rachael Held

North Central Public School in Rock Lake
Simple Machines

Scarlett Detlaff Dean

Dakota Elementary School at Minot Air Force Base
Materials for an Aviation/Rocketry Unit

Cheryl Helm

Sterling Elementary School
Materials for a Planets/Space Unit

Amy Iverson/Amanda Moe

Rickard Elementary School in Dickinson
Gears, Levers, Pulleys, Wheels

Lori Foss

Miller Elementary School in Bismarck
FIRST Lego League Challenge

Kenneth Quam

Dakota Prairie High School in Petersburg
Equipment to Study Light and Weather/Climate

Margaret Unruh

Cannon Ball Elementary School
Equipment to Study Landforms

Kim Gehring

Bob Callies Elementary School in Garrison
Equipment for Daily Science Units

Norma Heidt

Hurdsfield Elementary School
Rockets

Janice Kanwischer

Fessenden Bowdon School in Fessenden
Equipment for a Portable Greenhouse

Peter Sykora

Ellendale Public School
Equipment for Advanced Biology

Stacy Bang

Killdeer Public School
Prairie Garden

Adrian Timmons

Johnson Corners Christian Academy in Watford City
Lab Science Kits

Jodie Froemke

Sheldon Public School
Equipment for Natural Habitat Units

Nancy Schnable

New Rockford School
Equipment for Forensic Unit

Terri Greenwood

Westhope Public School
Science Equipment

Mike Vogelwede

Northwood Public School
Materials for Robotics Program

Bill Bohnsack

MayPort Clifford Galesburg High School in Mayville
Rocketry Equipment

Julie Heuchert

Century Elementary School in Grafton
Telescope

Gladys Gerr

Steele-Dawson School in Steele
Space Science Cluster

Research Projects



Back left circling around the car is as follows: Scott Tolbert; Nick Jetter; Jared Johnson; Joe Knutson (NDSU); Keith Severson; Michelle Sterle; Anna Vosgerau; Crissy Watson; Tyler Palmer; Steve Donaldson; Josh Howland; and Andrew Hexum.

Fuel Cell Car

"The 2005 North American Solar Challenge began in Austin, Texas. From there, we travelled north to Winnipeg. We drove west to Calgary where the race officially ended after traveling 2500 miles in 10 days. Our vehicle, Subzero IV H2, was designed to run in this race even though we used hydrogen fuel cell technology. Our goals were to demonstrate that this type of vehicle was viable and to encourage other teams to make the shift to fuel cell technology."

Brandon Burnette
Industrial Technology, UND

Leafy Spurge Eradication and Remote Sensing

In 2005, Dereck Stonefish, a student at Sitting Bull College (SBC), assumed a leadership role in a leafy spurge research project on the Standing Rock Indian Reservation. The project involved using large numbers of flea beetles (approximately 670,000 of the little critters!) to control infestations of leafy spurge. Selected patches were measured to determine the impact of the biological control. Those patches were mapped using GPS devices. The North Dakota Space Grant Consortium (NDSGC) funded a workshop so that Stonefish and other students at Standing Rock could be trained on GPS and remote sensing applications. Dr. Brad Rundquist and Scott Abel of the Department of Geography at UND and Shubhada Savant of the Department of Space Studies conducted the workshop. The faculty advisor for the research project was Gary Halvorson, science instructor at SBC. Stonefish previously had received training in remote sensing during a summer internship at Goddard Space Flight Center. He also was a recipient of a NDSGC scholarship for Spring semester 2005.



Derek Stonefish stands in a patch of leafy spurge as he checks his GPS equipment.



Paul Haugen visits JSC after working for two years on the KC-135 project.

KC-135 Project/JSC

"I was recently given the opportunity by the North Dakota Space Grant Consortium to visit the Johnson Space Center in Houston, Texas. I was able to visit a multitude of areas, including the old Apollo Mission Control Center, the Mission Control Center currently being used for Shuttle launches, the Mission Control Center for the International Space Station (ISS), the life-sized mock-up of the various sections of the ISS and the Neutral Buoyancy Laboratory in the Sonny Carter Training Facility. I was given a tour of Ellington Air Force Base and watched the astronauts training for their private pilots' licenses in their small white T-38 jets. The most memorable part of my visit to JSC was the ability to spend a few hours observing the engineers working in the Mission Control Center for the ISS."

Paul Haugen
Electrical Engineering, NDSU



Scholarships and Fellowships

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 research that is of particular interest to NASA.

NDSGC Fellowships for Fall 2005 and Spring 2006

North Dakota State University

Bret Enderson

Coatings and Polymeric Materials Undergraduate student
"Blister Analysis of Epoxy Coating"

Garrett Hoff

Computer Science Graduate student
"Improved Software Reliability Testing"

Levi Stanley

Chemistry Graduate student
"Development and Application of a New Class of Chiral N, P Ligands Containing Fluxional Groups"

Adam Wohl

Chemistry Undergraduate student
"Synthesis and Properties of Dithieno (3,2-b:2'3'-d) pyrrole (DTP) Oligomers as Models of Conjugated Polymer Systems"

Todd Morken

Geology Undergraduate student
"Optical Dating Properties of Thenardite (NA₂SO₄)—a Potential Sulfur Source Mineral in Martian Sediments"

University of North Dakota

Adam Theisen

Atmospheric Science Undergraduate student
"Polarimetric Radar and Analysis of Convective Clouds"

Chris Kinchin

Chemical Engineering Graduate student
"Development and Test of a Thermally Integrated SOFC-Gasification System for Biomass Power Generation"

Jennifer Sattler

Physics Graduate student
"Calcium Kinetic Studies in Animal Models for Osteoporosis Using 47CA/41CA Radiotracers"

Steven Rehan

Physics Graduate student
"An Investigation into Gamma and X-ray Behavior in Supernovae and Related Phenomena"

Steven Riedinger

Chemical Engineering Graduate student
"Photocatalytic Oxidation Reactions"

Chris Flakker

Chemical Engineering Graduate student
"Photocatalysis"

NDSGC Scholarships

NDSGC scholarships are given annually to students at 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.

NDSGC Scholarships for Fall 2005 and Spring 2006

Sitting Bull College

Jade Ducheneaux
Dylan Jones
Content Marshall
Leah Friend

Minot State University

Michaela Schwan
April Anderson

Valley City State University

Matthew Axtman
Brandon Barch
Justin Bearinger

Dickinson State University

Kayla Strand
Derrick Kuntz

United Tribes

Technical College

Richard White, Jr.
Ramona Saragosa
Kelli Soto
Brittany Marshall
Marla Collins
Keith Hawk
Michael Lindeman

Mayville State University

Aaron Mehus
Brandon Schafer
Margaret Thompson

Bismarck State College

Martha Bolling
Jacqueline A. Materi
Lisa Murry

North Dakota State College of Science

Carisa Allen
Megan Gelinksi
Tyrel Rau

Little Hoop Community College (Cankdeska Cikana Community College)

Terrance Halsey
Heather Joshua
Jade Frier

Lake Region State College

Amanda Kitchens
Heather Everding
LeAnn Renee Van Dolah

Williston State College

Janice Wass
Andrew Rogers
Ruth Pontonero

Minot State University at Bottineau

Abigail Harlow
Jeremy Lee Gourneau

Turtle Mountain Community College

Gloria Rose Marion



Bret Enderson, recipient of Space Grant fellowships for Fall semester 2005 and Spring semester 2006, is shown here working in the Coating and Polymers Lab at NDSU. Dr. Victoria Johnston Gelling is his advisor

Pearl I. Young Scholarship 2006



Rebecca Bahnmitter
undergraduate in
Astrophysics at UND

Pearl I. Young Scholarship

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).

"There is little more to say other than I love physics! I find it challenging to be presented with problems that have real life applications and gratifying to be able to solve these questions...As I delved into my first astronomy course and its corresponding laboratory work, I found myself enthralled with its relationship to physics. I enjoyed calculating the Hubble constant, measuring wave lengths/types in galaxies and observing and manipulating red shifts..."

Lillian Goettler Space Grant Scholarship 2006

Lillian Goettler Space Grant Scholarship

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.



Lindsay Merchant
undergraduate in
Mathematics at NDSU

"Math is one of the few subjects that I have to work at to fully understand. My competitive spirit and strong desire to succeed also makes Mathematics an appropriate course of study for me as I am often times the only female in my classes...I plan to attend graduate school. It has been a major personal goal of mine to earn a Ph.D in Mathematics...I plan to work for the government in a field of intelligence."



Western Region Space Grant Meeting Back to the Moon and Beyond



Katie Pruzan, NASA HQ, is shown with ND Governor John Hoeven and UND President Charles Kupchella.

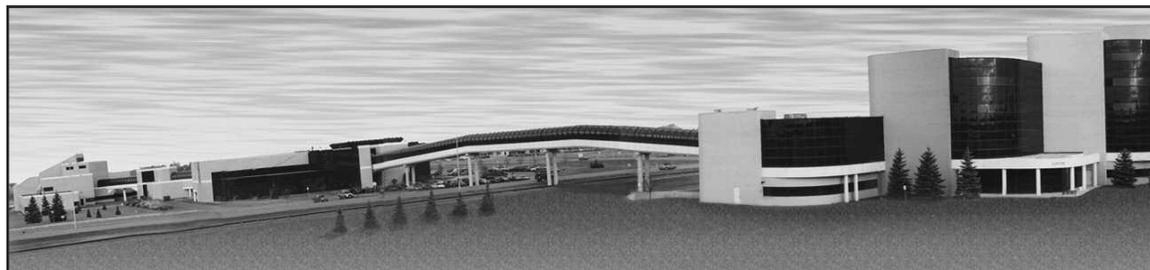
The North Dakota Space Grant Consortium (NDSGC) hosted the Western Region Space Grant Meeting on September 21-24 at the Hilton Garden Inn on the campus of the University of North Dakota (UND). The NDSGC used this Meeting to showcase the human capital in North Dakota and the many research and technology projects at both the high school and college level that Space Grant has funded.

These included robotics teams, the North Dakota State University (NDSU) Moonbuggy, the UND Fuel Cell Car and AgCam. We also introduced some of the many students from UND and NDSU whose research projects have been supported by Space Grant. The education and research infrastructure present in the state was also on display as represented by the facilities at the J.D. Odegard School of Aerospace Sciences (JDOSAS) at UND.

Twelve states in the Western Region sent representatives to the Meeting. In addition, Diane DeTroye and Katie Pruzan represented NASA Headquarters. Linda Rogers (Jet Propulsion Laboratory), L. Michael Freeman (Marshall Space Flight Center), Berta Alfonso (Kennedy Space Center) and Janie Nall (Goddard Space Flight Center) also were in attendance.



Scott Hughes of Idaho SGC uses a JDOSAS simulator "to fly" an airplane.



Space Grant Meeting on, On to Mars to Dacotah

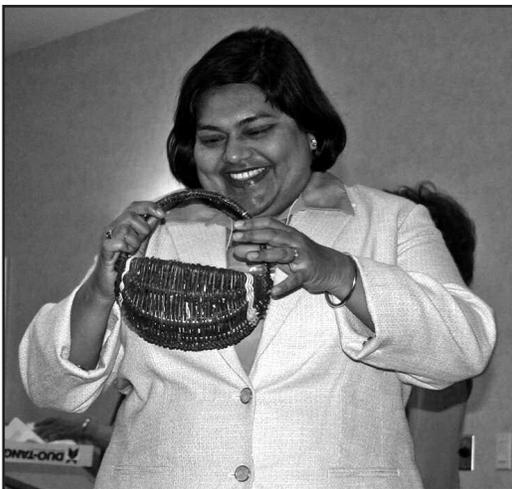


Special guests at the Meeting included:

- Byron Dorgan, United States Senator from North Dakota
- John Hoeven, governor of North Dakota
- Charles Kupchella, president of UND
- David Gipp, president of United Tribes Technical College
- Carol Davis, president of Turtle Mountain Community College
- Greg Weisenstein, vice president for academic affairs and provost of UND
- Peter Alfonso, vice president for research at UND
- Bruce Smith, Dean of the J.D. Odegard School of Aerospace Sciences at UND
- George Seielstad, director of the Upper Midwest Aerospace Consortium
- Jerry Brown, director of Foundations of Discovery
- Nick Hacker, state senator from Grand Forks



Linda Rodgers explains JPL's summer internship program for 2006.



Sreela Mallick of Florida SGC looks at her door prize, a handwoven Ojibwe willow basket from the Turtle Mountain Indian Reservation.



Attendees attempt to safely land airplanes at the 360° Air Traffic Control Center at JDOSAS.





2005 Space Grant Summer Internships

Lisa Geschwill

University of North Dakota
undergraduate in Mechanical Engineering

NASA Academy, Marshall Space Flight Center

"Having the opportunity to participate in the Marshall Space Flight Center NASA Academy has been a life-changing experience. The program is invaluable. It allows dreams to become reality, and I was able to share that with many other outstanding students, who will forever have a place in my heart. We saw many of the NASA Centers, spoke with countless amazing and encouraging people that are leaders in the space industry and are a part of NASA research. My research was about Autonomous Assembly of Space Structures. My PI was an exceptional mentor, and my co-workers were also incredible. I am a completely different person after this last summer, and I owe it to the Academy staff and all of my fellow RAs!"



John Sartori

University of North Dakota
undergraduate in Electrical Engineering

Jet Propulsion Laboratory

"Thanks to the sponsorship of the North Dakota Space Grant Consortium, I was able to travel to Pasadena, CA last summer to work in NASA's Jet Propulsion Laboratory (JPL). While at the lab, I assisted a team of engineers in the design and testing of a Multi-Mission System Architecture Platform (MSAP). Basically, MSAP is a modular, expandable system, incorporating all essential spacecraft functionality. In the future, the MSAP will provide support for missions with varying objectives, while maintaining a level of standardization that will minimize redesign and promote reuse of flight system components. As a result of my experiences at JPL, I have met new and interesting people, participated in innovative research and development, and opened doors to numerous future opportunities. I am glad to have had the opportunity to represent North Dakota in the Space Grant program."



Karl Ostmo

University of North Dakota
undergraduate in Electrical Engineering

Jet Propulsion Laboratory

"My experience with NASA has been invaluable both academically and professionally. I got to work side-by-side with practicing scientists, and learned exactly what they do on a day-to-day basis. The experience has given me new insight on the world, academia, and politics, plus I got to apply a bit of what I studied in school! My time at JPL has also been an impressive addition to my resume."

BalloonSat



Balloon and Payloads Disappear into Vast Prairie Wetland

After a near perfect launch and an exciting chase, the balloon, GPS tracking system and payloads for ND BalloonSat 2005 disappeared somewhere in the 33,000 acre Lone Tree Wildlife Management Area in central North Dakota.

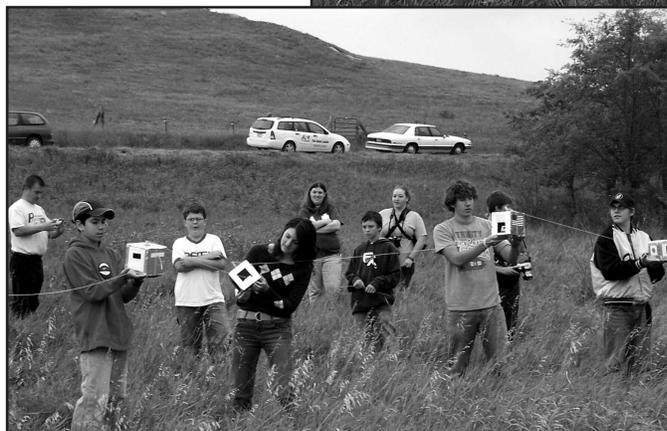
In July of 2005, the North Dakota Space Grant Consortium (NDSGC) sponsored six people to attend the BalloonSat Workshop conducted by the Colorado Space Grant Consortium in Boulder. Those individuals were: Mike Walz, science teacher at Century High School in Bismarck; Dr. Corinne Krauss, physics and astronomy faculty at Dickinson State University; Mike Voglewede, science teacher at Northwood High School; David Hedland, science teacher at Hatton High School; Prakash Ranganathan, pre-engineering faculty at Turtle Mountain Community College; and Suezette Rene Bieri, assistant director of NDSGC at the University of North Dakota (UND).

The launch of the six small "sats" took place in September about 15 miles north of Bismarck on the land of Mr. and Mrs. Pat Ripple. The launch could not have occurred without the assistance and expertise of the High Altitude Balloon Project from UND.

A southeast wind pushed the balloon towards Harvey, North Dakota which is located near a vast public, prairie wetlands owned by the Bureau of Reclamation and managed by North Dakota Game and Fish. As the balloon was descending, contact with it was lost at about 32,000 feet. Calculations put it over Lone Tree which does not have the customary grid of roads and is filled with numerous sloughs and lakes.

But the students, teachers and faculty are undaunted by the loss and plans are to hold ND BalloonSat 2006 this fall in a location not so close to Lone Tree.

The NDSGC plans to sponsor another set of teachers and faculty to the BalloonSat Workshop in Boulder this summer. They and their students will then join with last year's participants to launch an even bigger balloon with more payloads.





FIRST Robotics

Rugby Robotics Team



Rugby's robotic team built Zipshot. Team members included: Chad Haugen; Lisa Schmaltz; Kirsten Welk; Kelsea Volk; Grace Quick; Tara Kuntz; Jenessa Sjol; Travis Fritel; Taylor Skweira; Courtney Jorgenson; Leah Wentz; Kaycee Grochow; Joclyn Seiler; Jacie Mundahl; Kristi Black; Shelby Deckert; Marne Johnson; Jacob Stadum; Cody Goetz; Michael Schmaltz; Ryan Wissink; Steven Voeller; Emeka Eubuzor; Adam Hoffert; and Matt Wangler. The advisor was Jan Hagen.

Alexander Robotics Team



Alexander built the robot S. T. S. Team members included: Tate Mrachek; Jena Swearingen; Brittany Bennett; Caydee Hystad; Louis Hermanson; and Adam Wilson. The advisor was Kirk Olson.

Hatton-Northwood Robotics Team



Hatton-Northwood High Schools' FIRST team took Thunder, their robot, to the 2005 Midwest Regional competition in Chicago. Thunder placed seventh in the qualifying rounds and went on to finish in the top four, losing in the semi-finals. The team won the Judge's Award and received the Safety Award. Five seniors, four juniors, eight sophomores and five freshmen comprised the team that went to that competition. The team had support and mentoring from 15 faculty/members of the two communities. The advisors were Dave Hedland and Mike Voglewede.

The North Dakota Space Grant Consortium provided partial funding for four FIRST robotics teams in North Dakota in fiscal year 2005. Those teams were from Alexander, Cando, Hatton-Northwood and Rugby High Schools.

Justin Nygaard
Isaiah Goodrun
Sean Zimprich
Chad Severinson
Alex Lider
Cody Anhorn
Dylan Zimprich
Dennis McVeigh
Jenna Engen
Mark Aamold
Michael Todd
Kasey Ness
Chelsea Stone
Matthew Bahr

Sophie Hoge
Michael Moore
Timothy Evenstad
William PanKratz
Jenny Holte
David Carpenter
Alyssa Aaland
Philip Bumgardner
Alicia Brereton
Marin Aamold
Callie Berg
Justin Rude
Tiffany Johnson
Miguel Martinez

Rachel Gorres
Chad Taylor
Sasha Silvis
Kevin Skeldum
Adam Swenson
Rachel Grossman
Ross Meland
Zach Skovlund
Rami Carlson
Lucas Johnson
Desi Frenzel
Carl Armstrong

FIRST Robotics



2/24/06

Shan de Silva and Suezette Rene Bieri,

The Cub Robotics, Team 877, of Cando has been in existence for the past five years. Each year we have had an increasing number of students sign up for the team (we have six young women of 18 members this year) so the budget keeps growing. The students participate in all phases of the team from fundraising, to promotions, to building and design, to programming and even with the packing and shipping process. The kids truly are overwhelmed by the regional competitions. One student made the comment two years ago how "it's more exciting than 'State'," (referring to class B basketball!). This year we compete at Las Vegas on March 31-April 2. The team has been to Denver, Chicago and St. Louis and enjoys the differences of meeting and competing with the new teams at each event. We've received the Highest Seeded Rookie Award in 2002, a Finalist Award in 2003, made it to the semi-finals in 2004 and won the Judges Award in 2005

Team 877 has a banker, lawyer, farmer, manufacturing engineer and a secretary as the primary mentors of the team and many parent or community volunteers for whatever is asked of them. A FIRST Lego-League team has grown from our program, and won the Design Award this year at UND's competition through the SEM department.

Several FIRST alumni that have graduated from Cando have moved into engineering, computer-design or programming or industrial technology studies. The Cando community, its businesses and school are so supportive of the team by giving donations, participating in a raffle and cookie dough sales, buying cotton candy at local games, attending fund-raising meals and just generally checking on "How's the robot coming?" Many locals stop into the shop to check on the progress and see what the game's all about.

Thank you so much for the grant money to help us try to sustain such a positive, technology-centered program for our small school.

Team 877 Mentors:
Dave Wolsky
Faye Dunnigan
Bruce Gibbens
Tom Belzer
Travis Westlund

Demographic Information

Alexander High School

population of Alexander--217
high school enrollment--16

Cando High School

population of Cando--1,342
high school enrollment--78

Hatton-Northwood High Schools

population of Hatton--707
high school enrollment--92
population of Northwood--959
high school enrollment--117

Rugby High School

population of Rugby--2,939
high school enrollment--205

Cando Robotics Team

| | |
|------------------|------------------|
| Carl Anfinson | Katie Swenson |
| Michael Gowan | Bobby Wolsky |
| Darren Weippert | Randy Hunt |
| Zachary Vorlage | Josh Haugen |
| Jarred Sifuentes | Sarah Pederson |
| Tony Elasperger | Nicole Larson |
| Tiffany Kukuk | Whitney Schaefer |
| Kyle Murchie | Jamie MacDonald |
| Derek Johnson | Tanner Aufforth |



The Cando Cubs and their FIRST robot.



North Dakota Experimental



Shown here are the forms for the helmet and hard upper torso for the North Dakota Experimental Planetary Space Suit.

A Work in Progress...

In 2005 the North Dakota Space Grant Consortium (NDSGC) was awarded a grant by NASA to design, construct and test a space suit to be worn on the surface of Mars. Five colleges in the state joined together to complete this project called the North Dakota Experimental Planetary Space Suit (NDEPSS). The project was funded by a \$100,000 NASA Aerospace Workforce Development grant following a proposal that was identified by NASA officials as one of the top three of the 52 submitted.

Shan de Silva, chair of the Department of Space Studies at UND and principal investigator for the space suit project, said, "Our college students here in North Dakota can do amazing things—this project showcases this local talent with a cutting-edge, high-tech project. A lot of people thought we were crazy to undertake this project—but its success unequivocally testifies to the hard work, perseverance, creativity, and ingenuity of North Dakota's young people."

"A space suit is essentially a self-contained spacecraft," said Pablo de Leon, project manager, who coordinated the NASA-funded work of the various student teams that resulted in the product that will be tested in southwestern North Dakota. "But it's not rocket science to build it--what it takes is a lot of very painstaking work--really, it's more of an art than engineering." He noted, for example, that all of the composite parts, including the molds for components such as the suit's torso, was fabricated *by hand* by a team of students. The suit is a prototype for the next generation of planetary suits that NASA will need to realize its Vision. Several patents have already been applied for.

The NDEPSS will be tested in the rugged Mars-like North Dakota Badlands in the spring of 2006.



Dr. Shan de Silva (left), director of the North Dakota Space Grant Consortium, is shown here with Pablo de Leon (right), project manager for the Consortium's space suit program, and Fabio Sau, graduate student in Space Studies at UND. Sau is modeling the undergarment of the planetary space suit that was collaboratively designed and constructed by students from five colleges in North Dakota.

Planetary Space Suit



Turtle Mountain Community College



Faculty Advisor:
Prakash Ranganathan--department of engineering

Students:
Brady Azure--undergraduate student--engineering
Sheldon Martin--undergraduate student--engineering
Alex Frederick--undergraduate student--engineering

University of North Dakota



Principal Investigator:
Shan de Silva--chair of department of space studies

Research Advisor:
Pablo de Leon--department of space studies students:

Students:
Jennie Untener--graduate student--space studies
Mark Williamson--graduate student--space studies
Fabio Sau--graduate student--space studies
Matt Buisker--graduate student--mechanical engineering

North Dakota State College of Science



Faculty Advisor:
Steve Johnson--chair of department of manufacturing technologies

Students:
Tanner Jacobson--machine tooling/automated mfg.
Steve Schaefer--machine tooling/automated mfg.
Kevin Dahme--machine tooling/automated mfg.
Dana Siemieniewski--machine tooling

North Dakota State University



Faculty Advisor:
Dan Ewert--chair of department of electrical engineering

Students:
Mike Zietz--undergraduate student--electrical engineering/mathematics
Dan Williams--undergraduate student--electrical engineering
Joshua Adamek--undergraduate student--electrical engineering
Michael Sorenson--undergraduate student--electrical engineering
Jessica Drutowski--undergraduate student--electrical engineering
Micah Goldade--undergraduate student--electrical engineering
Laura Hagen--undergraduate student--electrical engineering
George Auen--undergraduate student--electrical engineering
Luke Schafer--undergraduate student--electrical engineering

Dickinson State University



Faculty Advisor:
Corinne Krauss--department of astronomy/physics

Students:
Rebecca Rodne--undergraduate student--biology
Steven Klym--undergraduate student--biology
Tom Arnold--undergraduate student--biology
Kyle Michels--undergraduate student--biology
Brandi Roshau--undergraduate student--biology
Megan Wagner--undergraduate student--university studies
Derrick Kuntz--undergraduate student--biology
Scott Rojic--undergraduate student--composite science education
Bret Dockter--undergraduate student--political science
Blake Wilson--undergraduate student--elementary education
Tracy Greff--undergraduate student--biology
Erin Rice--undergraduate student--biology
Susan Bobbitt--undergraduate student--biology
Jeremy Messer--undergraduate student--chemistry
Suzy Reisenauer--undergraduate student-- undecided
Meghan Rolfsrud--undergraduate student--university studies



Fabio Sau, graduate student in Space Studies at UND, tests the environmental system of space suit while wearing the inner garment, the outer garment and the helmet.



The two sides of Joe Stickler: wizard and college professor.

Meet a NDSGC Affiliate: Joe Stickler

Joe Stickler is the Chair of the Division of Mathematics, Science, and Health & Physical Education at Valley City State University (VCSU) where he has been teaching chemistry and astronomy for 25 years. From 1981 until 1992 he was the Director of the VCSU Planetarium. He has a Ph.D. in organic chemistry from the University of Illinois and completed his undergraduate work at Ohio Wesleyan University. A native of Ohio, Stickler previously worked at the University of Colorado at Denver and at the College of Ganado on the Navajo Indian Reservation in northern Arizona.

In 1992, Professor Joe Stickler and his students began the construction of Medicine Wheel Park (medicinewheel.vcsu.edu) to develop a better understanding of Native American astronomy and culture in the region. The 30 acre Park features a horizon solar calendar, a meridian calendar, a distance-scaled model of the solar system, Native American burial mounds, formal gardens, and nature trails through the wooded hillside.

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 six 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, Jamestown College and Dickinson State University.

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.

Rocketry

The NDSGC provided funds for the first year of a rocketry program which will involve eight (8) teams from universities and colleges across North Dakota. The goal of the program is to achieve an ongoing payload launch system in which experimental scientific payloads can be tested. This is an effort to bring increased knowledge of physics, computer science, space and engineering to all institutions of higher education in the state.

StarDate™

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"

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