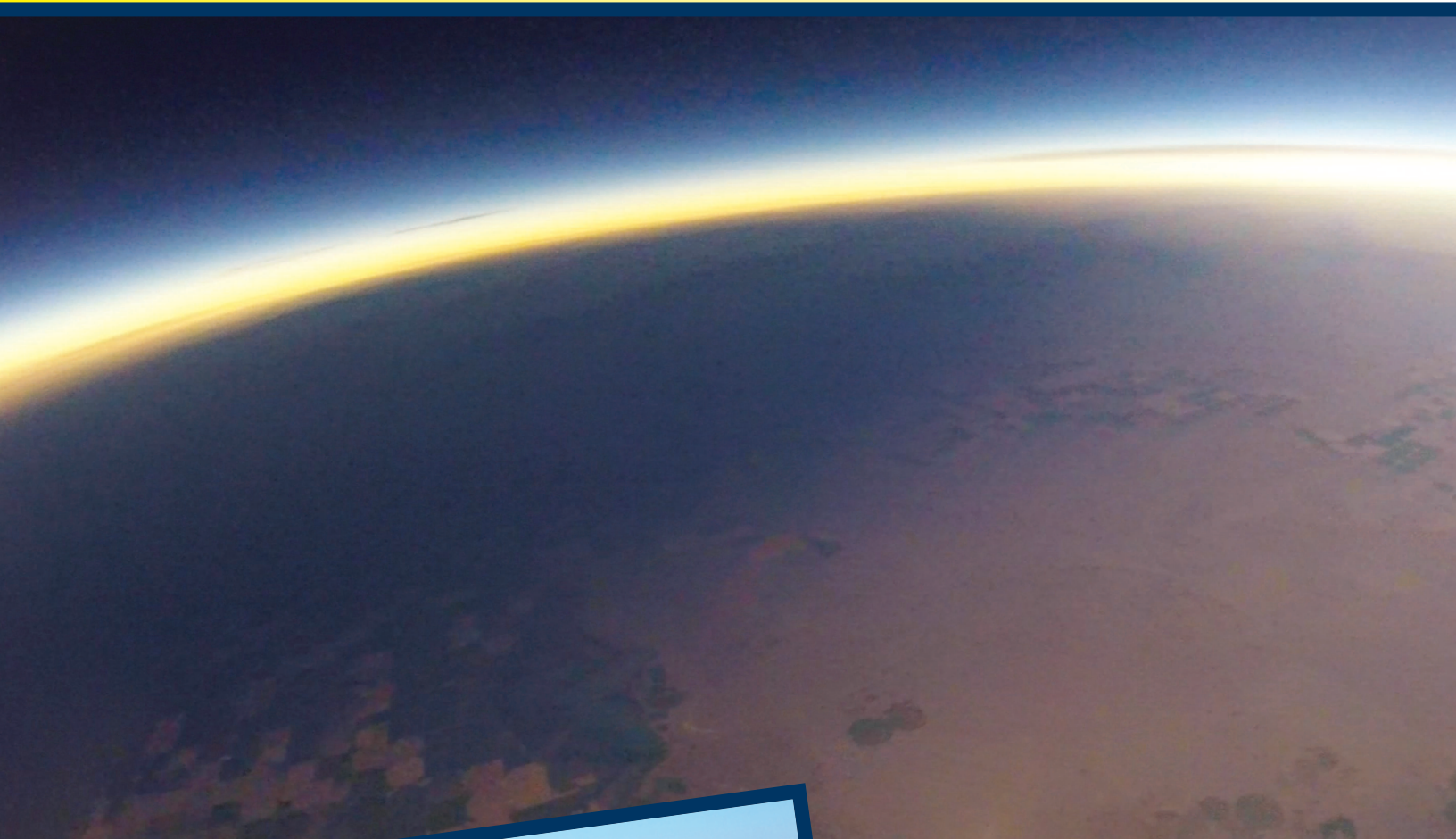


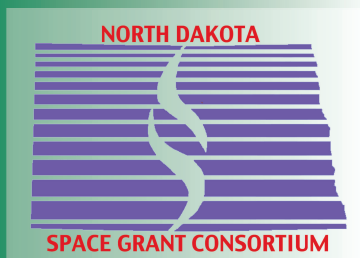
THE

# AUROLA

NORTH DAKOTA SPACE GRANT CONSORTIUM

2018 Edition





Bismarck State College

Cankdeska Cikana  
Community College

Dakota College at Bottineau

Dickinson State College

Gateway to Science Center

Lake Region State College

Mayville State University

Minot State University

North Dakota State  
College of Science

North Dakota  
State University

Nueta Hidatsa  
Sahnish College

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

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The NDSGC is on social media



**Cover Photo:** This image was taken from 64,000 feet during the Total Solar Eclipse, on August 21, 2017, within the path of totality. A team of UND graduate students launched a 2000-gram high altitude balloon from Rexburg, Idaho, as part of the National NASA Space Grant Eclipse Ballooning Project. More information can be found on pages 16 and 17.

# Notes from the Director

## Nurturing Space and STEM in North Dakota

Greetings to our Space Grant Colleagues.

It was an exciting year for the North Dakota Space Grant Consortium. We were able to expand student and educator support, participated in the National Eclipse Ballooning Project, hosted the National Space Grant Meeting, and were able to see many of you in-person around the state.

We were able to support six students with **NASA Internships**. These students saw and participated in leading space-related research projects and returned to their institutions inspired with ideas for their own research. In addition to this research opportunity, six students received **travel grants** to present work at conferences. The three impressive **FIRST Robotics teams** all had a great year, and the Northwood team even made it to the World Championship!

Fourteen students from across the state received **fellowships**, conducting research all across North Dakota. Our new research opportunity, the Bridge Fellowship program, helps students transition from a 2-year college to a 4-year research institution, familiarizing them with new professors, research, and the campus. Taylor Hewson from Dakota College at Bottineau received the first Bridge Fellowship award, as she transferred to the University of North Dakota (UND). We have great plans for expanding the **Bridge Program** even more in the next year.

As in past years, we owe a great deal to the energy and enthusiasm of our six **STEM Ambassadors** this year. These undergraduates, from UND, North Dakota State University, and Mayville State University, worked with the Space Grant team to extend our outreach efforts across the state. They also went out on their own to schools and events to inspire kids in STEM. We are working on getting more Ambassadors from the western part of the state. We are proud to announce that our 2015-2016 STEM Ambassador, Janelle Hakala, is now at South Pole Station conducting research.

August brought the total solar eclipse and North Dakota Space Grant had a team to cover it. Because we weren't going to see totality in North Dakota, the team of 8 students, 2 staff, 1 faculty, and 2 K-12 students journeyed to Rexburg, Idaho in a 32-ft RV to launch a balloon as part of the **National Eclipse Ballooning Project**. Our payload reached 64,000 feet, capturing the Moon's shadow on the Earth, from the stratosphere.

The **National Space Grant Meeting** was held in Grand Forks. Caitlin and Marissa did a terrific job organizing it all. We would like to thank all of our affiliates who were able to participate. It was great to showcase our wonderful state to the rest of the NASA and Space Grant community. Both Lt. Governor Mark Sanford and Mayor Mike Brown started the meeting, welcoming everyone to Grand Forks.

**Outreach** continues to expand throughout North Dakota. Nineteen teachers participated in an in-service professional development workshop, where they conducted a "Mission to Mars" series of hands-on-activities. Six pre-service **teacher workshops** were held at UND, Minot State, and VCSU, reaching 108 teachers. Our K-12 outreach reached 2400 students!! Much of this success was with our STEM Ambassadors. A great way for us to reach more students is through these STEM Ambassadors – so, let us know if you have students interested in the program!

We hope to see you in 2018 in our travels around the state visiting Affiliates and conducting workshops.



Jim Casler



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### ***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 950 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, technology, engineering, and mathematics, or STEM, as well as curriculum enhancement and faculty development. Member colleges and universities also administer pre-college and public service education projects in their states.



# Space Grant Meetings

National  
Space Grant  
Meeting –  
Washington,  
D.C.



NDSGC with Senator Hoeven



NDSGC with Senator Heitkamp

From March 1st to the 4th, the Director, Deputy Director, and Coordinator attended the 2017 National Council of NASA Space Grant Directors' Annual Spring Meeting in Washington, D.C. and visited with United States legislators from North Dakota. They shared the successes of the North Dakota programs and projects funded by Space Grant over the past year. Senator John Hoeven, Senator Heidi Heitkamp, and U.S. Representative Kevin Cramer were all receptive to the North Dakota Space Grant program. At the Directors' Meeting, the Space Grant team was fortunate to meet the two daughters of Katherine Johnson, who was one of the first women "human computers" at NASA responsible for the success of the space program.

Annual  
NDSGC  
Affiliates  
Meeting –  
Bismarck,  
ND

## Affiliate Involvement

On April 6-8th, the 2017 NDSGC Affiliates Meeting was held at Bismarck State College in Bismarck, ND. Presentations included Space Grant funded student research, team projects, faculty research, and funded STEM education projects from across North Dakota. The schedule for the meeting, along with research presentation downloads, can be found here: <https://goo.gl/GctMYR>



Affiliates and students conducted an Apollo 13 simulation, which strengthens communication and team-building skills.



# NASA Internships

Every year, the NDSGC funds North Dakota students to complete an internship at a NASA Center. Those eligible include any undergraduate or graduate student attending a two-year college, four-year college, Tribal college, or research university in the state of North Dakota. In 2017, the NDSGC funded six North Dakota students' experiences: three at Goddard Space Flight Center and three at Marshall Space Flight Center.

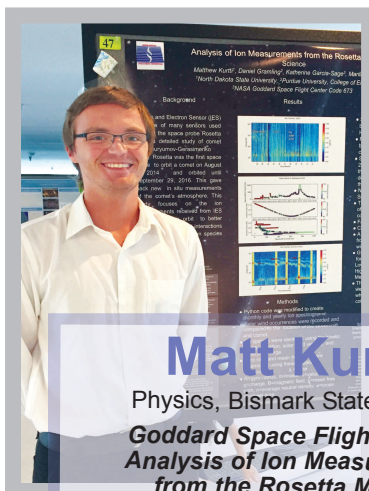


**Ashley Peterson**

Mechanical Engineering,  
North Dakota State University

**Goddard Space Flight Center: WFIRST  
Facility Cryo Radiator Support**

"This internship opened my eyes to the endless possibilities in the field of engineering. I am beyond thankful to have had this opportunity and am excited to see all that lies ahead!"

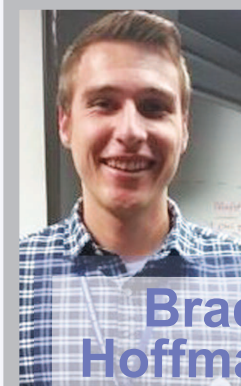


**Matt Kurtti**

Physics, Bismark State College

**Goddard Space Flight Center:  
Analysis of Ion Measurements  
from the Rosetta Mission**

"My dream job is to work as a research scientist, and thanks to Space Grant, I have been able to experience that dream."



**Brad Hoffmann**

Mechanical Engineering,  
North Dakota  
State University

**Goddard Space Flight  
Center: On-Board Orbit  
Propagation Model  
Verification of Dellingr  
CubeSat Mission –  
Attitude Control Systems  
Engineering Intern**

"I enjoyed the multidisciplinary atmosphere of science and engineering at GSFC that sparked growth in my understanding of the processes to further space flight missions, particularly, orbital dynamics for satellite flight software. It has been my career aspiration to work with NASA Human Space Flight and thanks to the NDSGC, I have strengthened my academic goals of attaining my Biomedical Engineering Ph.D. beyond my Mechanical Engineering M.S. degree."



**Skye Leake**

Geography,  
University of North Dakota

**Marshall Space Flight Center: Reverse  
Geolocation of Images Taken from the  
International Space Station Utilizing  
Various Lightning Datasets**

"North Dakota Space Grant enabled my internship at NASA MSFC for my pursuit in the remote sensing field. Without their support, this opportunity would not have been possible. Although I was already on a path towards a STEM career, the experience I gained and the connections I made have ensured my continued interest in finding a niche in the aerospace/ remote sensing industry."

**Colton Mosser**

Mechanical Engineering,  
North Dakota State University

**Marshall Space Flight Center: Research  
Associate, Propulsion Academy**

"My internship at Marshall Space Flight Center was the most hands-on engineering experience I've had. It combined the engineering I've been taught with real-world applications. I was continuously inspired to continue on this path to a future career in this line of work."



**Taren Wang**

Space Studies, University of North Dakota

**Marshall Space Flight Center: Integrated Remote  
Operation and Control System for Habitat  
Maintenance System Simulator**

"Thanks to the funding of the North Dakota Space Grant Consortium, I realized my long-held dream of working at NASA, for a short while at least. This experience has been invaluable; I've gained experience in my field, new insights into the workings of NASA, and connections that will last a lifetime."





# National Space Grant Meeting

Grand  
Forks,  
North  
Dakota!



The NDSGC meeting was held at the Alerus Center, from September 14-16, 2017.

The NDSGC hosted the National Space Grant Directors' Meeting from September 14-16, 2017, where over 200 delegates from across the nation visited Grand Forks, ND. This was the first time the NDSGC hosted the conference, which was an excellent opportunity to highlight North Dakota.

Meeting delegates participated in tours of the Ronald Reagan Minuteman Missile Site, kayaked down the Red River, got a behind-the-scenes look at the Ralph Engelstad Arena, and experienced the UND Human Spaceflight Laboratory. The meeting included an interactive session on diversity, video footage and project highlights of the Eclipse Ballooning Project, a student poster session & Eclipse Fair, and round table discussions with Mike Kincaid, NASA's Associate Administrator for Education.

North Dakota had a strong presence throughout the meeting, including appearances by Grand Forks' Mayor, Michael Brown, the Lieutenant Governor, Brent Sanford, Senator Heidi Heitkamp's Northeast Area Director, Gail Hand, Senator John Hoeven's Regional Director, Tom Brusegaard, and a welcome message from Representative Kevin Cramer. The University of North Dakota (UND) College of Aerospace Dean, Paul Lindseth, and Associate Dean, Beth Bjerke, attended the meeting and the

UND Vice President for Research & Economic Development, Grant McGimpsey, gave a warm welcome to the delegates.

The invited speaker was Stephen Sandford, author of *The Gravity Well: America's Next, Greatest Mission*. Sandford generously donated 100% of his book sale proceeds to a scholarship fund for ND students studying in STEM fields.

Meeting attendees also participated in a new networking app, called *GooseChase*. Throughout the conference, guests earned points by collaborating and snapping photos with other Space Grant teams, NASA personnel, and students. A few *GooseChase* uploads can be seen on the following page, highlighting some fun moments throughout the meeting.

As the conference was held less than a month after the Total Solar Eclipse, this was a wonderful opportunity to highlight student successes with the excitement and emotions still fresh in everyone's minds. For the "Eclipse Fair," a ballroom was transformed into the path of totality, where spectators could visit student booths and learn about flight projects, eclipse research, and outreach efforts while following along as if they were the shadow of the Moon, traversing across the country.

The NDSGC would like to thank the Space Grant Foundation, the Space Grant Executive Committee, UND student volunteers, meeting presenters, and a generous grant from the Greater Grand Forks Convention and Visitors Bureau for helping to make this conference a success!

You may read an article about the National Meeting in UND Today, here: <https://goo.gl/YwNycJ>.



UND student, Denise Buckner, presents North Dakota's accomplishments during the National Eclipse Ballooning Project. She and her team launched from Rexburg, Idaho.



The Associate Administrator for NASA's Office of Education, Mike Kincaid (far right), had a great conversation with the Space Grant consortia.



UND graduate students were amazing team players throughout the entire meeting.



# National Space Grant Meeting



Dr. Angela Des Jardins received prestigious awards (including one from Princess Leia) for all her hard work and passion for the Eclipse Ballooning Project.



Meeting guests participated in a mid-meeting yoga session, led by Grand Forks' Kay Williams.



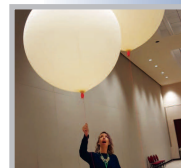
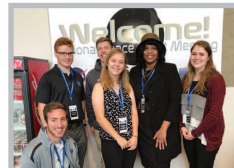
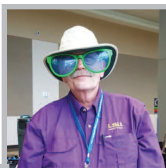
North Dakota affiliates had a great time at the National Meeting. Featured here are NDSCS Professor Shannon King, DCB Professor Angie Bartholomay, and the Curator of Education at the ND Heritage Center, Erik Holland.



Guests could walk through the Eclipse presentations, just like the Moon's shadow! Featured in the foreground are guests from the North Dakota Vision Services/School for the Blind, visiting South Carolina Space Grant Director, Cass Runyon, and her Braille tactile Eclipse books.

GooseChase

The GooseChase networking app brought the consortia together, encouraging them to meet new colleagues, share their success stories and challenges, and form new collaborations!





# National Student Competitions

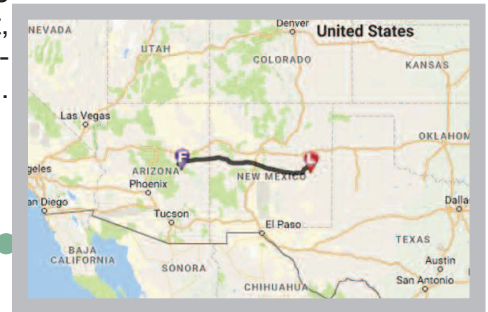
## HASP



The High Altitude Student Platform (HASP) is a student competition organized by NASA and the Louisiana Space Grant Consortium. Every year, 12 student-built instruments are launched from Fort Sumner, NM on a zero-pressure balloon. The University of North Dakota and the University of North Florida have collaborated together since 2008 and fly a nanocrystalline sensor payload to measure ozone profiles in the troposphere and stratosphere. UND Space Studies graduate student, Denise Buckner, participated as the student lead.

### Fast Facts:

Launch location: Fort Sumner, NM  
Institution: UND  
Faculty Advisor: Dr. Ron Fevig



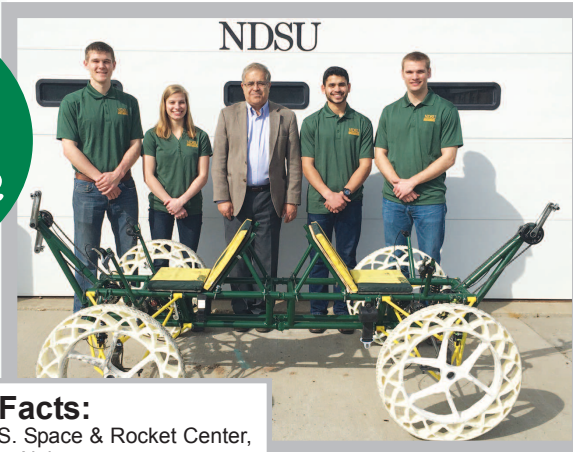
## AIAA Design Build Fly

### Fast Facts:

Competition Location: Tucson, Arizona  
Institution: NDSU  
Faculty Advisor: Dr. Bora Suzen

The Design Build Fly team had a great time working on their tube-launched UAV. The 4-person team was certainly one of the smaller groups at the competition, but seeing all of the students from around the world compete was such a fun learning experience. One of the best moments was when NDSU, along with dozens of other teams, helped one student from Asia rebuild his plane after his teammates and electronics had to be left at customs during traveling. The plane, made out of spare parts donated from the other teams at the competition, actually flew! It was a huge win for not only that student, but all of the teams who helped him out, even though it was a competition. The project served as the team's Senior Capstone project, and after completing the design challenge, the team certainly felt eager and like they deserved to graduate from NDSU's Mechanical Engineering program. The support from the North Dakota Space Grant Consortium was SO appreciated and incredible for our team and all of the NDSU DBF teams to come. Thank you!

## NASA Rover Challenge



### Fast Facts:

Competition Location: U.S. Space & Rocket Center, Huntsville, Alabama  
Institution: NDSU  
Faculty Advisor: Dr. Ghodrat Karami

The NASA Rover Challenge requires the use of technical skills, hands-on skills, team cooperation, and physical fitness with the purpose of maturing students. The project required developing a budget, project plan, and presenting progress reports at weekly meetings. After creating a design for the rover, the students fabricated the vehicle using techniques such as 3D printing, forming carbon fiber, molding, machining, and welding. Upon completion of the rigorous course, NDSU placed 17th out of 57 collegiate teams. Team members were: Patrick Bergh, Nathan Hanson, Lisa Meyer, and Luke-Singh. A project summary and video footage of the competition was presented at the 2017 Affiliates Meeting.



# National Student Competitions

The University of North Dakota Formula SAE team competed in June 2017 at the Lincoln, NE Formula SAE event held by SAE International, a professional engineering association with an emphasis on transportation solutions. This competition requires that the team designs, builds, and races an open-wheel Formula-style racecar, with several dynamic events that test the handling, speed, and reliability of the racecar. In addition, there are presentations in which the students are challenged to validate the engineering decisions made for the racecar as well as the cost of the final product.

## FSAE Racecar

### Fast Facts:

Competition Location: Lincoln, NE  
Institution: UND  
Faculty Advisor: Dr. Marcellin Zahui



## NASA Robotics Mining

### UND Robotics

The objective for the UND's Team Raptor was to significantly upgrade the capability of last year's robot as well as its testing capabilities. These improvements included establishing autonomous operation through the introduction of several sensors and programs, improving dust tolerance and efficiency by reducing the robot's mining angle by ten degrees, decreasing the overall mass by 10%, and redesigning electrical systems to improve power consumption. To test these changes, team Raptor upgraded their testing facility to include an enclosure and computer station to more accurately simulate competition environments. With these design upgrades, the robot was able to perform good test runs at the competition by efficiently navigating towards the mining site, collecting regolith, and navigating back to the base station to unload the collected regolith.



### Fast Facts:

Competition Location:  
Kennedy Space Center, FL  
Institutions: UND and NDSU  
Faculty Advisors:  
Dr. Jeremiah Neubert (UND)  
and Drs. Majura Selekwa and  
Armon Myrick (NDSU)



### NDSU Robotics

NDSU's Robotics Mining Team placed 11th of 46 teams and 4th in the amount of regolith mined. The team's three main goals included making the robot as light as can be, mining as much as possible, and have the robot be fully autonomous.

Their backhoe-style robot could mine up to 40 pounds in a single scoop and traverse uneven terrain throughout the course. The NDSU students gained great teamwork and problem-solving skills through this engineering process.



The UND Frozen Fury Rocket Team was able to build a rocket and accomplish the three design goals set forth by the Annual NASA Student Launch Initiative. During the academic year, over a dozen students designed and built the rocket that reached an altitude of 5,137 feet at the competition which took place at NASA Marshall Spaceflight Center. The rocket was designed with a roll induction and counter roll system and a payload bay that held a clay pigeon during its launch and descent. The team placed in the top ten on the altitude board including 50 other schools and universities from all over the United States. The team also participated in outreach activities throughout the year. They spent time teaching grade school children the basic functions of a rocket and worked with them to make their own paper rockets for a STOMP launch activity. Two other members of the rocket team organized an hour-long lecture for university students in the physics program, covering the history and physics concepts that drive every aspect of a rocket's design.

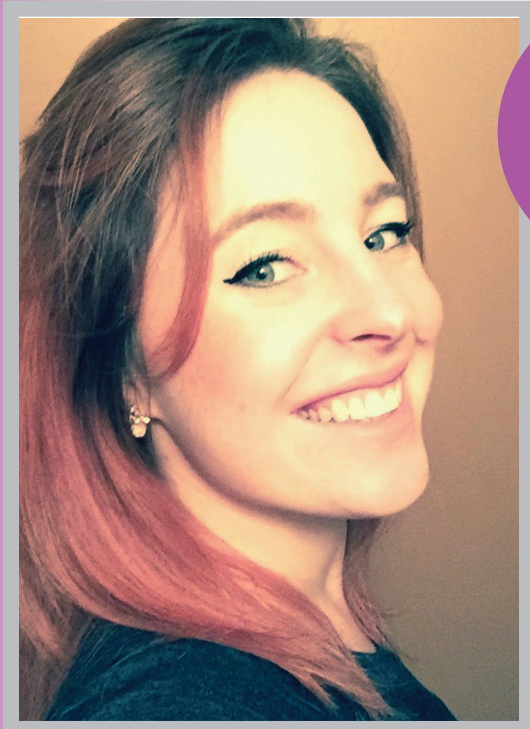
The team had a great year teaching over 200 students and competing with some of the most talented engineers and physicists in the country!

## NASA Student Launch

### Fast Facts:

Competition Location:  
Marshall Space Flight Center, AL  
Institution: UND  
Faculty Advisor:  
Dr. Tim Young

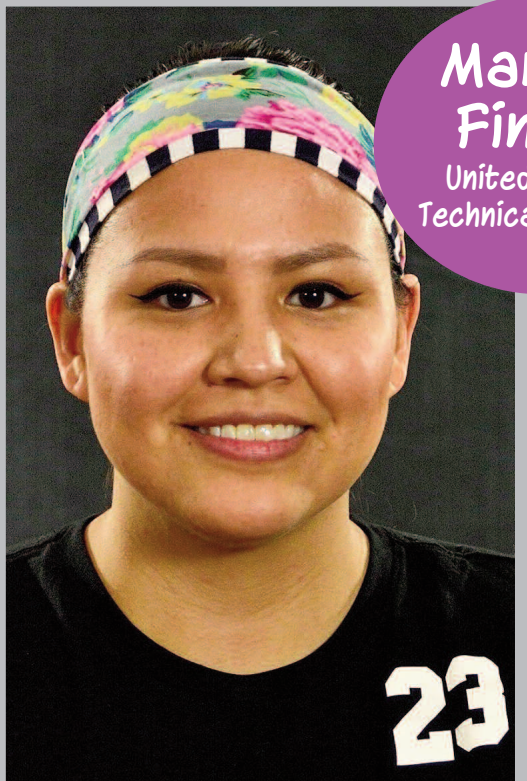
# Pearl I. Young Scholarship



**Sophie Orr**  
University of North Dakota

*I am a Space Studies graduate student who believes the best way to enrich my own education is to not only perform well academically, but to be heavily involved throughout the department. I created the UND Space Studies student website that facilitates campus and distance student cooperation.*

*I am the acting Student Representative to the Space Studies Assessment Committee, where I hope to assist in the improvement of Space Studies courses, and ultimately student learning success. I also participate in NDSGC STEM outreach events, encouraging future generations to be inspired by science through space-themed activities. It has been my privilege to work in the Human Spaceflight Laboratory as a GRA, and for the Space Studies department as a GTA. I am an active member of the Dakota Space Society and an officer of the UND AIAA chapter. Throughout the school year I also assist with the NDSGC ballooning projects as their acting Safety Officer.*



**Marlee Finley**  
United Tribes Technical College

## American Indian Scholarships

**Memphis Belgarde**  
Turtle Mountain Community College

**Sheena Gladue**  
Sitting Bull College

**Caley Fox**  
Nueta Hidatsa Sahnish College

**Danacia Greywater**  
Cankdeska Cikana Community College



# **NDSGC Scholarships**

Every academic year, the NDSGC provides each of the affiliate two-year, four-year, and Tribal colleges with scholarship funding. Students are selected by faculty at their home institution and must have an excellent academic record and be majoring in a STEM field.

## **Bismarck State College**

Mitchell Quist  
Matthew Kurti  
Tyler Weigel  
Levi Kinn  
Candi Yates

## **Cankdeska Cikana Community College**

Alexis Lohnes  
Traci Owlboy  
Bridget Baker  
Bailee Longie  
Nicole Demarce

## **Dakota College at Bottineau**

Spencer Dorsey  
Taylor Hewson  
Jesse Mendel  
Braden Pewe

## **Dickinson State University**

Parker Egli  
Braeton Erhardt  
Travis Huff  
Aleesa Joslyn  
Zachary Miller  
Brittany Decker  
Seth Ehlang  
Shanta Zietz

## **Lake Region State College**

Tailor Rudoph  
Nicholas Hammons  
Landyn Swenson

## **Mayville State University**

Summer Dearing  
Jacob Eaton  
Shayla Fossum  
Maren Johnson  
Jacob Leier  
Brooklyn Miller  
Brady Nygaard  
Leah Olson  
Taylor Plautz  
Morgan Porter  
Adrian Sevigny  
Jeannette Sevigny  
Hannah Torgerson

## **Minot State University**

Caitlyn Bachmeier  
Inga Dudley  
Donald Forche  
Mark Fulbright  
Michael Heck  
Rachel Holmes  
Annika Kraft  
Stephanie Sundhagen  
Dennis Uhrmacher  
Matthew Winburn

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

Faith Goettle  
Brandon Joos  
Logan Kisgen  
Cody Danielson  
Hope Krumm  
Nathan Schmit  
Jolene Kerr  
Brandon Eckholm  
Dalton VonRuden  
Braeden Neiber  
Mitchel Johannsen  
Emily Sjoquist  
Caleb Bellig

## **Nueta Hidatsa Sahnish College**

Sonya Abe  
Lee Voigt  
Alexis Archambault  
Flo L. Garrett

## **Sitting Bull College**

Luke Black Elk  
Anitra Hill  
Melanie Howard  
Jacquelyn Mitchell

## **Turtle Mountain Community College**

Crystal Azure  
Trevor Thomas  
Kevin Brien  
Joshua Lackey  
Nefer Villalobos  
Sanchez Jr.

## **United Tribes Technical College**

Kimberly Blevins  
Bonita Claymore  
David Shillingstad

## **Valley City State University**

Alex Askerooth  
Machenzie Bruce  
Haley Christofferson  
Max Kollar  
Nick Kramer  
Lindsey McMaster  
Brady Smith  
Marielle Villarin  
Madelyn Zahnow  
Clarissa Olson  
Ashley Metcalf  
Kristin Haff  
Ryan Schneider  
Michael Bloch

## **Integrated Scholarship Mariah Foote**

Lake Region State College

The NDSGC research fellowships are given on a competitive basis to undergraduate and graduate students at all affiliate colleges. Throughout 2017, the NDSGC awarded fourteen fellowships to North Dakota students.

# Research Fellowships

## Haylee Archer

*Spring Recipient*

Physics,

University of North Dakota

### ***Unveiling the Nature of Red-Sequence Spiral Galaxies***

"This project has prepared me for the research I will undertake as a graduate student at Stony Brook University as I pursue a doctoral degree in physics and a career in astronomy. Throughout my five years as an undergraduate here at UND, the North Dakota Space Grant Consortium has been the number one source of funding for the many opportunities I have had. I firmly believe that I would not be nearly as prepared for a future in astronomy as I am without the help of the NDSGC."



## Gabriel Ferragut

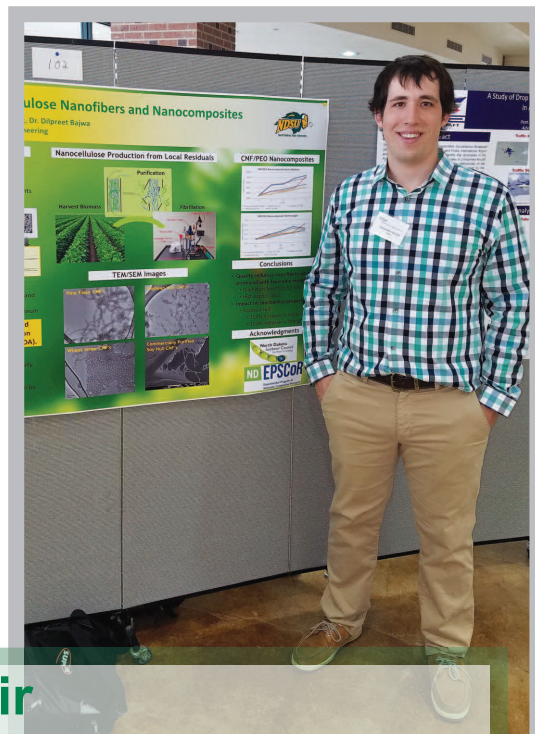
*Spring Recipient*

Physics and Geology,

North Dakota State University

### ***Sublimation Modeling in Paleoclimate Reconstruction of the Great Basin, North America***

"The Space Grant experience has enabled me to engage in meaningful research of my own and garner experience in academia that has prepared me for future scientific endeavors and problems. Beyond the actual research, this opportunity has given me the skills and background necessary to pursue the next steps in my education and has undoubtedly played a role in getting an internship in the Stanford Geophysics Department this summer!"



## Alexander Sinclair

*Spring Recipient*

Mechanical Engineering, North Dakota State University

### ***High Performance "Green" Rubber Utilizing Functionalized Cellulose Nanofibers***

"I am very thankful and humbled by the NDSGC's support. The success of this research and its future potential will significantly contribute to the realization of my career and personal goals. My major career goal is to earn an advanced degree, which leads to a meaningful career path in the field of materials/structural engineering and research. This research provides credibility to my aspirations and skill set. Ultimately, it is my personal goal is to have a lasting impact on the future of 'green materials' and do my part to engineer a more sustainable future."



# Research Fellowships

## Suzi Voce

*Summer Recipient*

Mathematics, University of North Dakota  
***Modeling Regulatory Gene Networks in Hematopoietic Multipotent Cells***

"Space Grant has allowed me to gain valuable experience in Systems Biology. I now have basic knowledge on Data Mining and Artificial Neural Networking and as a result, this work has been influential in helping me decide what career path to follow upon graduation."

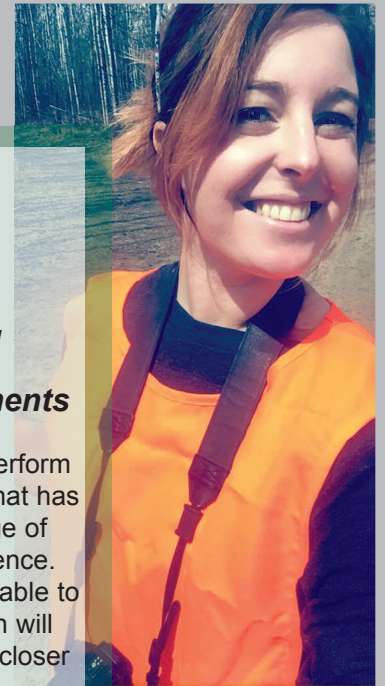


## Sophie Orr

*Summer Recipient*

Space Studies,  
University of North Dakota  
***Effects of Suited and Unsited Locomotor Gaits in Reduced Gravity Environments on Muscles of the Leg***

"NDSGC Fellowship funding allowed me to perform individual research for my thesis, something that has given me a chance to expand my knowledge of human space exploration and space life science. Without this funding I would never have been able to invest so much time into my research, which will help me earn my master's degree and move closer to a career in the space industry."



## Alan Perrault

*Summer Recipient*

Mechanical Engineering,  
North Dakota State University  
***T3A Transition Model Verification***

"Receiving the Space Grant fellowship has helped me further pursue my research for my graduate degree. When I graduate, I want to find a position working with Computational Fluid Dynamics which will utilize the information learned this summer."



## Elijah Mathews

*Summer Recipient*

Physics,  
University of North Dakota  
***Probing the Globular Cluster Population of Edge-On Spiral Galaxies***

"The experience that this research fellowship gave me allowed me to grow as a scientific researcher, and it let me continue to explore the ever-expanding field of astrophysics."



# Research Fellowships



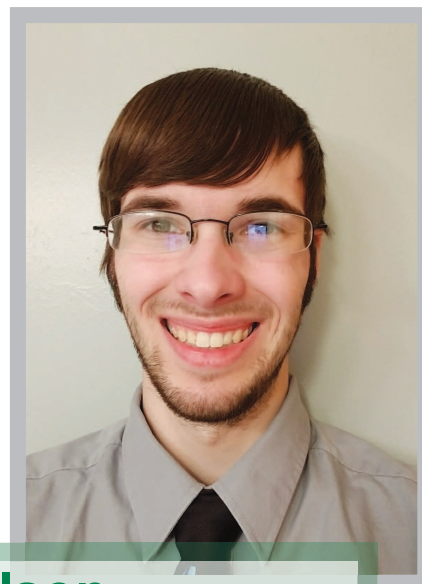
## Denise Buckner

*Summer Recipient*

Space Studies,  
University of North Dakota

### **North Dakota Solar Eclipse Ballooning Project**

"Thanks to the North Dakota Space Grant Consortium for granting me this summer fellowship; it allowed me to work on an exciting nationwide project, taught me a diverse set of valuable technical and scientific skills, and has since encouraged me to continue pursuing space research via high altitude balloons."



## Lance Wilson

*Summer Recipient*

Atmospheric Sciences,  
University of North Dakota

### **Eclipse Balloon Project Code Support**

"This project has given me a valuable opportunity to apply my programming skills to a challenging problem and helped me build an understanding of the multi-faceted use of high-altitude balloons for both weather and space studies."



## Sophie Orr

*Fall Recipient*

Space Studies,  
University of North Dakota

### **Effects of Locomotor Gaits under Simulated Reduced Gravity Conditions on Muscles of the Leg**

"NDSGC Fellowship funding has given me a chance to do real science with real space exploration applications. This opportunity has cemented my desire to work in the space life science field and given me the necessary background experience to start my career in the space industry."

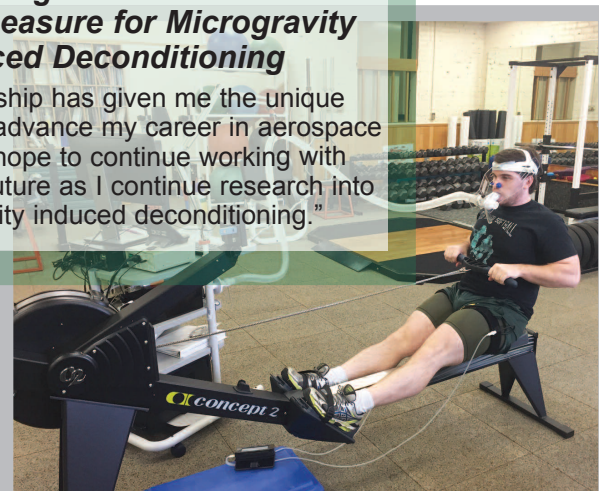
## Sean Mahoney

*Fall Recipient*

Health, Nutrition, and Exercise  
Science,

### **North Dakota State University Leg Blood Flow Restriction during Rowing Exercise as a Countermeasure for Microgravity Induced Deconditioning**

"This fellowship has given me the unique opportunity to advance my career in aerospace research. I hope to continue working with NASA in the future as I continue research into microgravity induced deconditioning."





# Research Fellowships

## Brad Hoffman

*Fall Recipient*

Mechanical Engineering,  
North Dakota State University

***Embedding Biomimetic Silk Fibers and  
Thin Films with Carbon Nanoparticles for  
Electro-Mechanical Shape Responsive  
Nanocomposites***

"The North Dakota Space Grant Consortium has allowed me to pursue my curiosity and interest in biomaterials research allowing me to strengthen my graduate studies. I am excited to continue my academic career towards continued biomedical and space suit materials research."



## Drew Ross

*Fall Recipient*

Electrical Engineering,  
University of North Dakota

***Robotic Vehicle Wireless Communications***

"North Dakota Space Grant allowed me to work on an intriguing project and interact with brilliant students that share a passion for aerospace."

## Fellowship Bridge Program

The NDSGC established the Community College and Tribal College Bridge Program with the goal of helping students to "bridge the gap" between completing a two-year degree and enrolling at a four-year institution in a STEM field. Students in the program conduct research with a faculty mentor the summer before they transfer to familiarize themselves with the campus, peers, and faculty, and make for a smoother transition to a research environment. In the summer of 2017, the NDSGC had their first successful student complete the program and they plan to implement improvements in 2018 to open up the opportunity to even more students with the overall goal of increasing retention in STEM fields for this population of students.



## Taylor Hewson

*Summer Recipient*

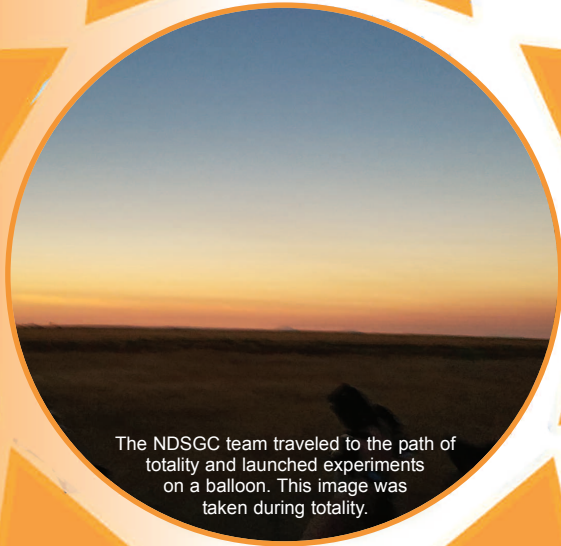
Physical Therapy, University of North Dakota –  
transferred from Dakota College at Bottineau

***Levels of Metformin in Soybeans***

"I feel very honored to be a part of this program for transfer students. It was a unique opportunity and I was able to meet some great people out of it. I would like to thank the NDSGC for introducing me to this opportunity as well as helping me through the whole process. I would also like to thank Dr. Alena Kubatova for advising me through the project and Hossain Khwaja for providing me with the seed samples. You are all greatly appreciated."



# National Eclipse



The NDSGC team traveled to the path of totality and launched experiments on a balloon. This image was taken during totality.

The NDSGC participated in a nation-wide high-altitude balloon project as part of a National Space Grant- and NASA-sponsored project to live-stream aerial video footage of the “Great American Eclipse” on August 21, 2017. All 55 teams live-streamed their footage directly to the NASA.gov homepage, as well as Stream, which was viewed live by tens of millions of people.

On the 21st, the moon entirely blocked out the sun, while casting a shadow from the Pacific coast in Oregon (1:17 p.m. PCT) to the Atlantic coast in South Carolina (2:47 p.m. EST). This was the first time since 1918 that the path of totality traveled across the entire continental United States!

Since 2016, the NDSGC attended the training workshop in Bozeman, Montana, where they constructed and learned about their “common payload”. The North Dakota team drove a 32-foot RV to Rexburg, Idaho, bringing all of their launch equipment with them. The launch team set up at Camas National Wildlife Refuge, where they launched a 2000-gram, helium-filled balloon, with the support of the Montana Space Grant team. The rest of the team tracked the location of the balloon from the Rexburg Airport, located about 20 miles away.

The balloon was launched at approximately 11 A.M. Bursting at 64,065 feet, the balloon successfully traveled through totality and captured amazing footage of the Moon’s shadow traversing Earth, available for viewing here: <https://goo.gl/CPJzy1>.



Right before launch time, all 55 teams can be seen along the path of totality, using the same iridium satellite tracking.



Precise ascent calculations were made to accurately place the balloon in the path of the Moon’s shadow.

After launching the balloon, the launch team views totality.



Precise ascent calculations were made to accurately place the balloon in the path of the Moon’s shadow.



With the help of the Montana Space Grant Consortium, the NDSGC team launched their balloon in time to capture the eclipse from the stratosphere!



# Ballooning Project

The NASA-sponsored project marks the first time that high-altitude video footage of a total solar eclipse has been broadcast live, watched by tens of millions of viewers.

In addition to a video camera, the NDSGC balloon carried a GPS tracking system, two GoPro cameras, and 90 ping pong ball payloads from a third grade class from Edwin Loe Elementary School in New Town, ND. After the eclipse concluded, the balloon burst and returned back to Earth. The student-led chase and recovery team located the payloads and analyzed the eclipse-based data afterwards in their RV. What was their conversation topic after the launch? *Let's get ready for the next total solar eclipse!*

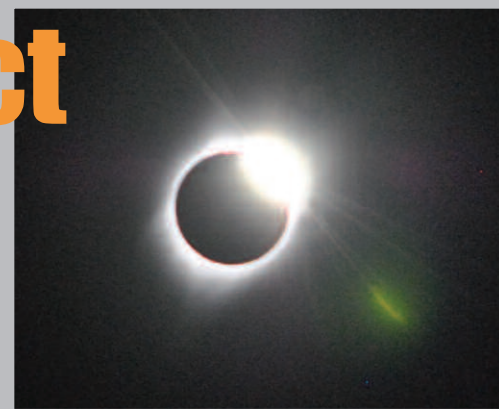
A video highlighting UND team members and the project can be found here:

<https://goo.gl/mMzJNY>



The team was highlighted in a UND Today article!

<https://goo.gl/xT28GQ>



UND student, Wes Solway, and his family captured this image of totality while visiting Rexburg, Idaho.



The NDSGC team drove a 32-foot RV from Grand Forks to Idaho, transporting 8 UND students.



The NDSGC team was fortunate to meet JoAnn Morgan, the first female engineer at Kennedy Space Center while in Rexburg, ID.

Mission success! The NDSGC team debriefs after totality, watching the incredible GoPro footage from their RV. Their camera captured the Moon's shadow traversing along the surface of the Earth from the stratosphere.



While in Medora, ND, the NDSGC stopped to recreate their accomplishments. From left to right, there is the launch team, the (center) ground station tracking the balloon, and (right) the balloon train.



# Student Travel Grants



## Tyson Jeannotte

University of North Dakota

*Phosphorus Export Model  
Development in a Terminal Lake Basin*

**American Geophysical Union  
Meeting**

New Orleans, LA

*"I would like to express my gratitude for the travel funding that made it possible for me to experience my first AGU Meeting. It was diverse and educational, and it presented several professional opportunities. Being a young Native American scholar that hasn't had the opportunity to travel much, the first thing I noticed was the diversity that was present. It was an amazing feeling to meet researchers that experience the same struggles and achievements as me. My experience at the meeting was like no other."*

The NDSGC provides travel grants to North Dakota students to present papers or posters at conferences throughout the U.S. The students have the ability to not only share their research with others in the STEM community but also to network with others in their field. This allows them to eventually become employed in a STEM field as a result of their travel to the conference.

## Denise Buckner

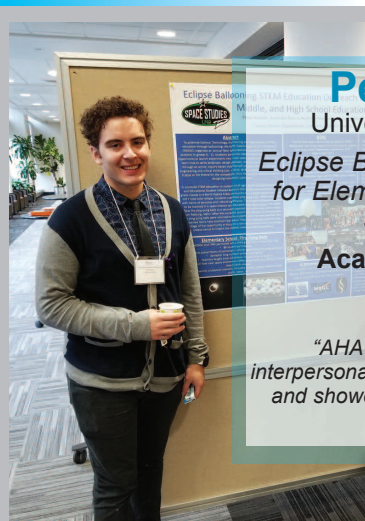
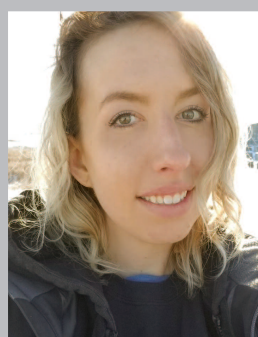
University of North Dakota

*Effects of Total Solar Eclipse on  
Stratospheric Ozone Production*

**Academic High Altitude Conference**

Minneapolis, MN

*"Attending AHAC was an awesome opportunity that greatly enriched my grad school experience. Not only did I get to present the research I completed during my Space Grant summer fellowship, I also got the chance to see research from other high altitude ballooning groups and network with scientists from across the country. The research presented has already inspired me to initiate other projects, and has helped provide solutions to problems faced during past balloon operations."*



## Peter Henson

University of North Dakota

*Eclipse Ballooning STEM Outreach  
for Elementary, Middle, and High  
School Education*

**Academic High Altitude  
Conference**

Minneapolis, MN

*"AHAC helped me build stronger interpersonal skills in the scientific community and showed me technology I hadn't been exposed to before!"*

## Lane Kashur

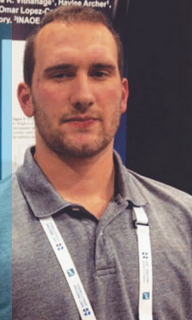
University of North Dakota

*The Nature of Red-Sequence  
Cluster Spiral Galaxies*

**American Astronomical  
Society Meeting**

Grapevine, TX

*"Although the aspect of the trip that benefited me the most was presenting at the poster session, I also took advantage of the many opportunities to learn new things in areas outside of my expertise. The meeting also served as a networking platform, as I was able to meet with many astronomers currently working in academia to talk about graduate school opportunities."*



## Gregory Foote

University of North Dakota

*Mapping Star Formation via U-band  
Observations of Low-Redshift  
Galaxy Clusters*

**Kitt Peak National Observatory**

Tucson, AZ

*"This experience has given me skills that are crucial to any aspiring astronomer, namely understanding how an observatory works, how data gathering works, and where my lapses in understanding were."*



## Haylee Archer

University of North Dakota

*Mapping Star Formation via U-band  
Observations of Low-Redshift  
Galaxy Clusters*

**Kitt Peak National Observatory**

Tucson, AZ

*"This experience has solidified my desire to pursue a career in observational astronomy. I gained hands-on experience using professional telescopes and obtaining data for astrophysical research."*





# STEM Ambassador Program

In 2017, NDSGC selected six students to be STEM Ambassadors. These students are enrolled at any of the affiliated institutions in North Dakota. They visit K-12 schools, conduct public outreach events, or other STEM projects, representing Space Grant's outreach program. On September 26th, these students visited Grand Forks for a training session, learning hands-on STEM activities and pedagogical advice for classrooms. The 2017 STEM Ambassadors were from Mayville State University, North Dakota State University, and the University of North Dakota. They have impressively reached over 2500 students, including students who are homeschooled and rural communities.



**Levi Lemer**  
Mayville State University

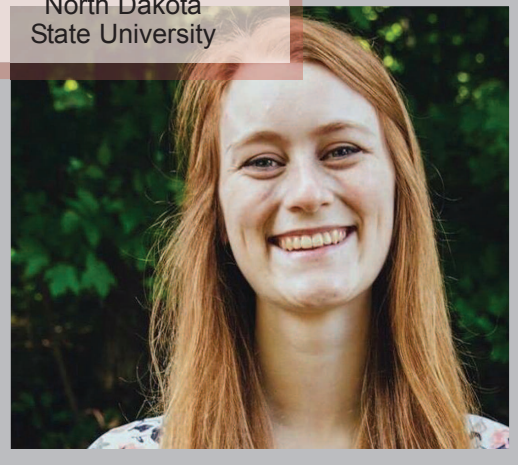


**Connie Nelson**  
Mayville State University



**Matthew Kurtti**  
North Dakota  
State University

**Emma Twedt**  
North Dakota  
State University



**Jacob Leier**  
Mayville State University

**Shae Skager**  
University of  
North Dakota





# North Dakota Vision Services/ School for the Blind



YouTube Video:  
NDVS/SB is Getting  
a Feel for Eclipses  
<https://goo.gl/qMUzxa>



Throughout 2017, the NDSGC and STEM Ambassadors visited the North Dakota Vision Services/School for the Blind (NDVS/SB), conducting hands-on activities with students who are visually impaired or blind. The NDSGC team continues to strengthen their collaborative relationship with this school, bringing STEM to students of all ages.

In August, South Carolina Space Grant Consortium Director, Dr. Cass Runyon, visited Grand Forks and led a session with the NDSGC at the NDVS/SB. She helped students to explore and learn about total solar eclipses, through NASA's tactile guide, "Getting a Feel for Eclipses," and various hands-on demonstrations. Dr. Runyon was on the team to develop this unique book and the NDSGC and the NDVS/SB were grateful to have Dr. Runyon's energy and expertise in North Dakota!



**NDSGC visits the  
NDVS/SB throughout  
the year and enjoys  
conducting  
STEM activities!**

In August, the NDSGC team and South Carolina Space Grant director, Cass Runyon, pose with students at the NDVS/SB. They engaged in hands-on eclipse lessons, interactive solar system alignments, and fun tactile braille books! Photo credit: NDVS/SB



# Undergraduate Student Instrument Project



The University of North Dakota was awarded the Undergraduate Student Instrument Project (USIP) in 2017, working through the National Space Grant Program and NASA's Science Mission Directorate. NASA awarded more than \$8 million through this competitive project to 47 teams with the goal of conducting hands-on flight research. NDSGC's research project is titled, "Development of Digital Thermosonde Instrument for Quantification of Relative Cn2 Estimation Error between NWP Analysis and Thermosonde Measurements", which will culminate in multiple high altitude balloon launches in Grand Forks. UND Engineering students have created a thermosonde, or temperature data logger, that will gather data to construct a temperature profile of North Dakota's atmosphere. UND Atmospheric Science students will analyze these results with models with Numerical Weather Predicted models. Future steps will include UND Marketing students, who will analyze the commercial value of the thermosonde and system. For more information, visit

<https://goo.gl/NqNz3A>.



USIP students conduct a tethered balloon launch with their finished thermosonde.

## Inflatable Lunar/Martian Analog Habitat

The University of North Dakota (UND) conducted its fourth mission in the Inflatable Lunar/Martian Analog Habitat (ILMAH), in October 2017, housing three crewmembers for 14 days. UND is the only university in the United States to conduct this type of spaceflight research, which helps prepare for long-duration Martian missions. The crewmembers live in this confined environment, studying psychological factors, biomedical research, and mission operations.

### New in 2017

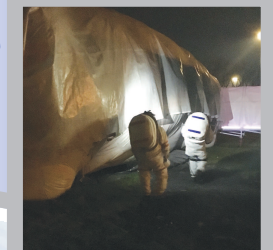
Four more modules were added to the living quarters, allowing the crewmembers to study botany and biology for a trip to Mars. Docked to the ILMAH via a tunnel is the Pressurized Electric Rover (PER). The UND students use this vehicle to conduct Extravehicular Activities (EVAs), or research outside of the habitat. During the fourth EVA, these three crewmembers launched a high altitude balloon with the help of the Atmospheric and Educational Student Initiated Research (AESIR) Ballooning Team. The crewmembers tested the ballooning equipment and flexibility of the space suits, and completed procedures just as if they were collecting weather data on Mars. The mission was a success, and the crew members received great flight data. To see footage from this EVA flight, visit: <https://goo.gl/WYXhjN>.



To learn more about the Human Space Flight Program at UND, visit: <https://goo.gl/9ZK9M3>



UND Space Studies students supported the three crewmembers throughout their mission, including EVA support.



The three crewmembers were UND Students Stefan Tomovic, Joe Clift, and Prabhu Victor.





# 2017 Near Space

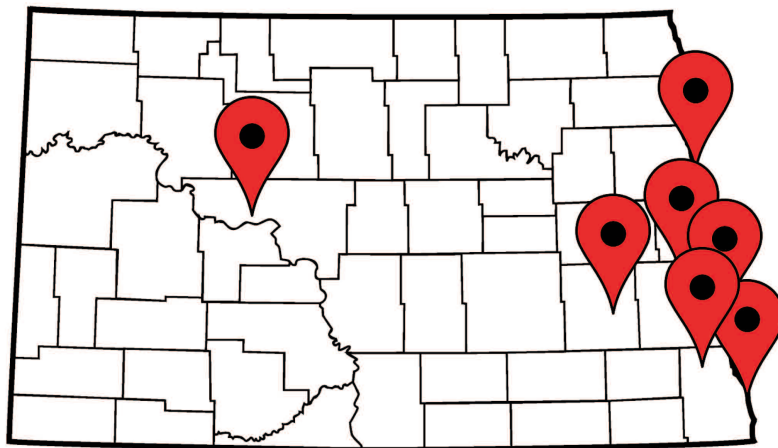
The 7th annual Near-Space Balloon Competition (NSBC) was held at the University of North Dakota and Northern Cass School (Hunter, ND). To compete in NSBC, qualifying students must design and construct an experiment that investigated an Earth Science topic. Their projects are then launched on a helium-filled balloon into the stratosphere, by Space Studies graduate students. Using Iridium satellites and GPS, the students track the experiment until the balloon lands back on the ground. The teams then process their data, analyze their

results, and ultimately produce a final report, just like NASA scientists and engineers.

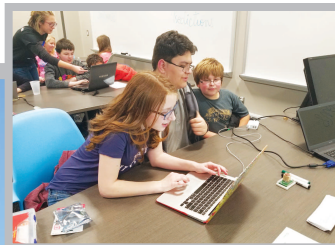
This year, ten payloads flew on two 2000-gram high altitude balloons. The participating North Dakota teams included: Garrison, Tower City, Grand Forks, West Fargo, Wahpeton, and Kindred. On Friday, December 1st, the teams traveled to UND for integration night, where they worked in hands-on stations to finalize their experiments and prepare themselves for the upcoming flight. On Saturday, December 2nd, the launch team, NSBC teams, superintendents, and even the nearby sheriff convened at the launch site at Northern Cass School.

The balloon was launched at 9:50 am, ascended to 80,266 feet, and was quickly located in the Tamarac National Wildlife Refuge in Minnesota. The team from Kindred earned the NSBC's first prize, with a study on North Dakota soil, before and after it was exposed to these high altitudes. This team has won a STEM-related field trip of their choice as well as involvement as mission control for the upcoming habitat mission. The team from Garrison High School won second place and the team from Northern Cass School won third place. Congratulations to all the participants!

This project would not have been possible without the time and effort of the NSBC teachers! To see a video about NSBC, including footage from altitude, please visit: <https://goo.gl/QmrL3A>



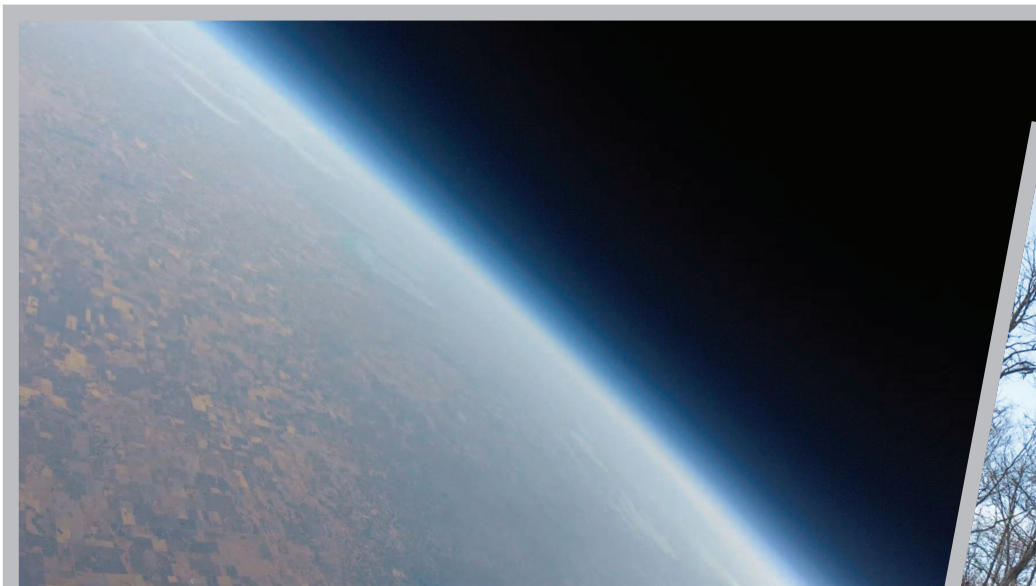
The geographical locations of our 2017 North Dakota teams.



Middle and high school students visited UND for Integration Night and Northern Cass School to launch their experiments on the balloon. When the balloon returned back to the ground, the students located and retrieved their experiments from a wildlife refuge in MN.



# Balloon Competition



The students' experiments reached 80,266 feet, bursting over northwest Minnesota.



After recovering their experiments, the NSBC students were proud of their hard work, payloads, and success!



# Community Outreach Events

## Bottineau Water Festival



On April 20, 2017, the NDSGC Team traveled to Bottineau, North Dakota to conduct a hands-on activity at the annual Water Festival. Students from across the region learned about NASA's Neutral Buoyancy Lab, the effects of microgravity, and how to manipulate variables, one at a time. At the end of the session, the students learned about the August 21st total solar eclipse and received their own viewing glasses!



## Bottineau Career Day



The NDSGC Team and STEM Ambassador Hope Gutschmidt visited Bottineau, North Dakota, on March 15, 2017. They participated in the annual Career Day, where they operated a 16' x 24' StarLab. The students were able to visually interact with the solar system, the August 21, 2017 total solar eclipse, constellations, and our Universe. These students learned about potential STEM activities and teams that they could join in college, such as UND's high altitude balloon program.

## Marketplace for Kids Cavalier, ND

The NDSGC Team traveled to Cavalier, North Dakota to conduct a hands-on activity called Strange New Planet. Approximately 250 students worked in groups and observed an exoplanet as an astronomer, satellite, orbiter, and fly-by spacecraft, learning about the progression of astronomical observations. Students also learned about the August 21, 2017 Total Solar Eclipse and received their own eclipse-viewing glasses.



## STEM Carnival Mayville, ND

On April 29, 2017, The NDSGC Deputy Director, STEM Ambassador Shae Skager, and UND Space Studies Graduate Students Maggie Dievendorf, Carolyn Newton, and Sophie Orr traveled to Mayville State University, where they led hands-on activities at the Mayville STEM Carnival. Students were able to

construct their own UV Astronaut, testing out different space suit materials. They also analyzed Professor Mike Gaffey's meteorite collection.



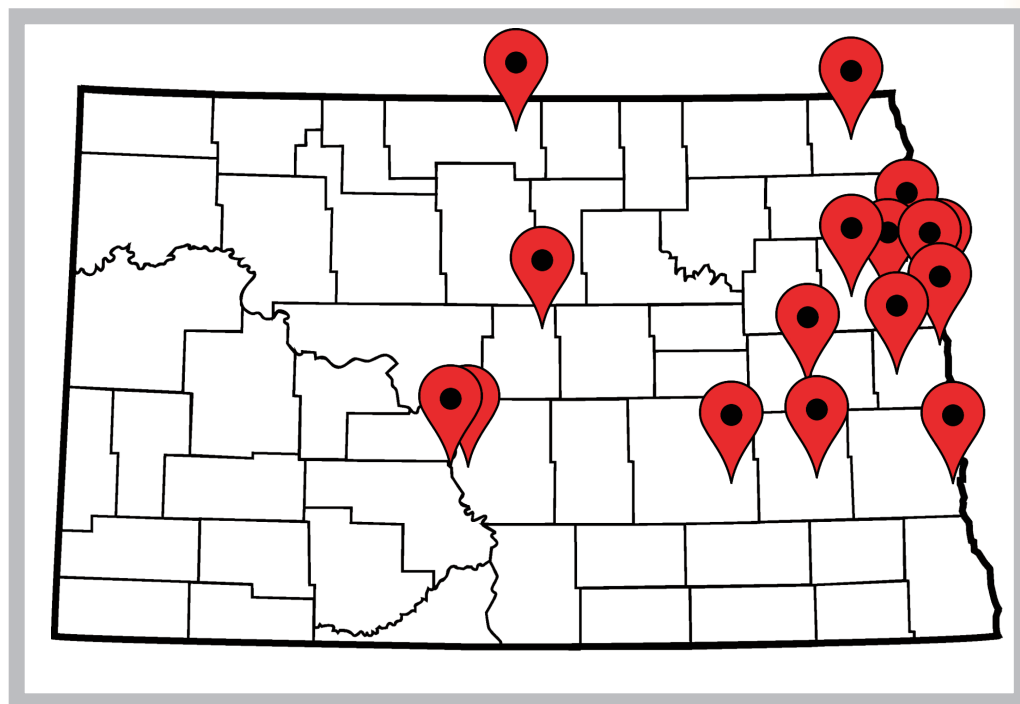
## STEMtastic Day Jamestown, ND

On March 31, 2017, the NDSGC Team traveled to Jamestown as the keynote speakers and activity leaders for 330 middle school boys. They discussed the Human Spaceflight Laboratory, engineering challenges and the numerous STEM possibilities in North Dakota. Later that day, students worked on their communication skills, critical thinking skills, and the engineering design process with the Apollo 13 simulation and the Mars Rover Lander activity. These students are ready to represent North Dakota and work for NASA!





# Community Outreach Events



The NDSGC team and STEM Ambassador team traveled around North Dakota, conducting fun and engaging outreach activities.

On February 24, 2017, the NDSGC Team visited Trinity Elementary in West Fargo to conduct hands-on STEM Activities! This would not have been possible without STEM Ambassador Tiana Delzer, UND Space Studies Graduate Students Sophie Orr, Denise Buckner, and Peter Henson!

## Activities:

- Kindergarten: Protect your Astronaut
- 1st Grade: Parachute Parade
- 2nd Grade: Rockets to the Rescue
- 3rd Grade: ISS Robotic Arms
- 4th Grade: Strange New Planet
- 5th Grade: Super Sleuths and meteorites



## West Fargo Visit

## Winship School, UND Tour

On February 21, 2017, third graders from Grand Forks' Winship School visited UND for a tour of the Human Spaceflight Lab, as well as a hands-on session of the Mars Rover Lander activity. Through teamwork, they constructed and descended their own inventions to the surface of Mars. These future scientists and engineers demonstrated their great teamwork and communication skills!



## ARRL Workshop

# Educator Professional Development

The NDSGC Deputy Director attended the Teachers Institute on Wireless Technology organized by the Amateur Radio Relay League (ARRL) in July 2017. The professional development workshop was held at ARRL Headquarters in Newington, CT. Workshop participants gained hands-on experience in amateur radio technologies, soldering, and electronics, designed and programmed their own rovers, and learned strategies for incorporating these lessons into K-12 and higher education curriculum at their home institutions.

The NDSGC team has since integrated these activities into their high altitude ballooning practices and pre-service and in-service educator workshops with the goal of bringing more radio technologies and electronics into the classrooms of North Dakota.



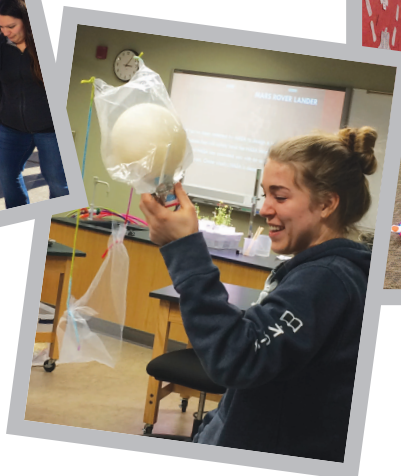
NDSGC Deputy Director and workshop participants align their rovers with infrared sensors to "dance" with the direction of a TV remote control. Photo Credit: Schley Warren



Educators from across the country attended the workshop. Photo Credit: Schley Warren



The NDSGC Deputy Director and Coordinator conducted pre-service teacher workshops for more than 150 education students throughout 2017. These workshops took place at the University of North Dakota, Valley City State University, Minot State University, and North Dakota State University. These future teachers learned about NASA resources and educator opportunities, studied human space exploration, launched rockets, built rovers, and designed NASA missions. These workshops aim to increase educator confidence in teaching space sciences through hands-on lessons and problem-based learning.



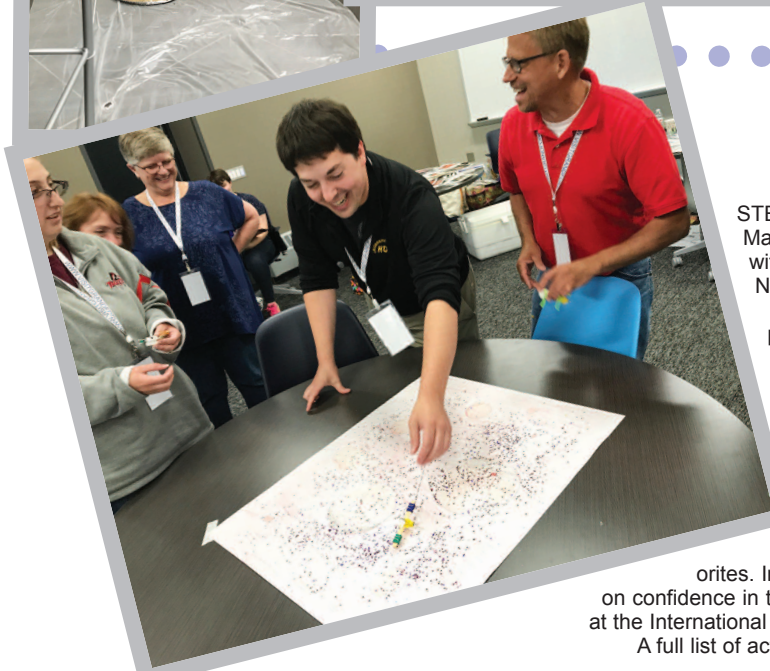
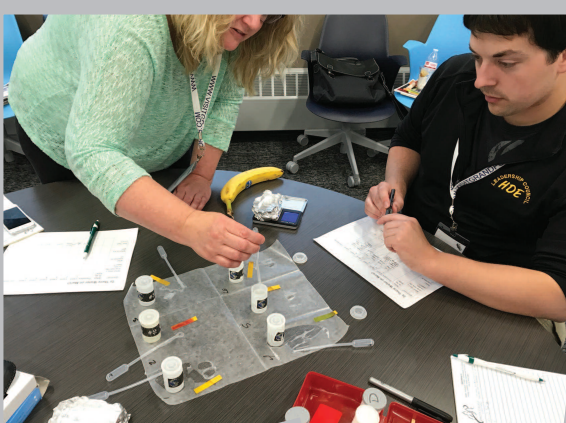
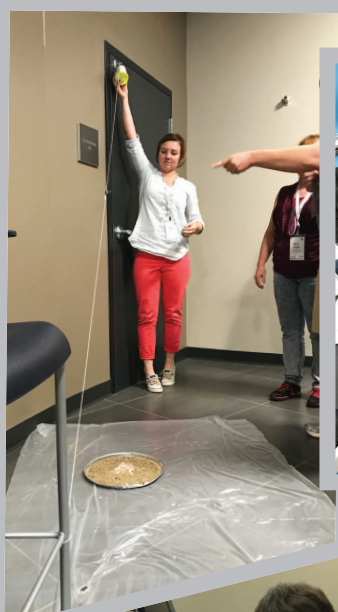
## Pre-Service Workshops





# Educator Professional Development

## In-Service Workshop



The NDSGC Deputy Director and Coordinator attended the 2017 STEAM Conference for Science and Math Teachers in North Dakota March 24th – 25th at Minot State University. They presented the teachers with handouts, lesson plans, and NASA-related STEM resources at their NDSGC booth.

The NDSGC also conducted their own **NASA in the Classroom** professional development workshop held at UND June 8-9, 2017. The nineteen teachers in attendance worked in teams to design a crewed mission to Mars. They used the engineering design process to create rockets, water filtration systems, rovers, and landers, modified lesson plans using the SciGirls Seven teaching strategies, and toured the Human Spaceflight Laboratory. Angie Bartholomay, Associate Professor at Dakota College at Bottineau and NDSGC affiliate co-presented at the workshop. Guest presenters included Cynthia Jelleberg with an inflatable planetarium and Space Studies Professor, Dr. Mike Gaffey, with an impressive collection of meteorites. In addition to the workshop, the NDSGC also surveyed the participants on confidence in teaching space sciences in the classroom and presented these results at the International Astronautical Congress in Adelaide, Australia in September 2017.

A full list of activities and lesson plans can be found here: <https://goo.gl/KbBVZW>





# FIRST Robotics



## Team 877 "North Star" from Cando

FIRST Robotic Competition Team 877 from Cando had an awesome season. Our motto was "We climb, every time!" and we did so in all the practice and qualification rounds, advancing to the elimination rounds as captain of Alliance 7.

Our team strives to promote STEM throughout our community and region. We were invited to display at the EduTech Technology Showcase at the Capitol Building in Bismarck, and enjoyed presenting at the NASA Space Affiliates meeting in April. We have visited nursing homes and schools to show off our robot and presented at the 6th grade Career Fair for area schools. We also led an EV3 programming/build activity as part of Star Wars Day at Camp Grafton, a fun-filled day for the children of military families.

We are so grateful for the support of UND/NASA Space Consortium and the opportunity to have hands-on learning in an important field like robotics. We are excited to see what the future holds for us!



## Team 4818 "The Herd" from West Fargo

The year of 2017 was a great year for The Herd-4818. We started working hard during the offseason developing a better swerve drive to implement on our robot during the season. With 25 students on our team we participated in 2 regional events: Duluth, MN and Cedar Falls, IA. Although we enjoyed the Duluth regional event we did much better in the Iowa regional and got to collaborate with our fellow North Dakota Team-Thunder Robotics. Although we did not move on to the world event The Herd has a strong group of students that learn a lot and will be back next year to lead our 2018 team.

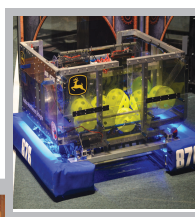
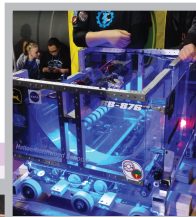
## Team 876 "Thunder Robotics" from Northwood

Thunder Robotics, Team 876, had a terrific year in 2017. At the Northern Lights Regional in Duluth we finished as a Finalist in 2nd place AND won the most prestigious prize that FIRST gives out...the Regional Chairman's Award. It honors the team that best represents a model for other teams to emulate and best embodies the purpose and goals of FIRST. Team 876 was very excited as it punched our ticket to the Championships.

At our second competition at the Iowa Regional, we went on a winning streak of 14 straight matches before we lost 2 out of 3 in the finals to finish 2nd. Our robot "BB876" and the drive team worked well together. At the World Championships in St Louis, we finished with a 6-4 record.

Our team runs a summer golf tourney, assists with a community prime rib supper, helps the Northwood Men's Club with their annual coyote hunt fundraiser, helps disadvantaged families here in ND and in Haiti, and demonstrates at parades and functions. We were the recipient of the Red River Regional Conference's Determination Award. It recognizes projects moving from ideas to action and creating a significant impact on a community.

Check out their video: <https://goo.gl/7NpvDQ>





# Summer Faculty Fellowships

Every summer, the NDSGC provides funding to faculty to create or revise a college-level course that is in a science, technology, engineering, or mathematics (STEM) field and is NASA-relevant.



**Larry Brooks**  
Biology Department,  
Dakota College at Bottineau  
**ENVT 270 –**  
***Water Resource Management***



**Craig Whippo**  
Department of  
Natural Sciences,  
Dickinson State University  
**BIOL 254 –**  
***Introduction to Botany***



**Angie Bartholomay**  
Science Department,  
Dakota College at  
Bottineau  
**Soils 210**  
***and Educator***  
***Workshops***



**Nathan Hopkins**  
Division of Science,  
Minot State University  
**GEOL 499 –**  
***Introduction to***  
***Remote Sensing and***  
***Earth Observation***



# Meet an **Affiliate**



**Jeff  
Hovde**  
Mayville  
State  
University

Jeff Hovde is an Instructor of Science at Mayville State University and became a Space Grant Affiliate in the Fall of 2017. Jeff grew up outside of Portland, ND and attended Mayville State University where he earned a B.S. degree in chemistry in 2008. After graduation he worked as a high school science teacher in Hope, ND while attending UND and receiving a Master's in education. After five years working in secondary education he began teaching at Mayville State University and is currently in the middle of his fourth year in that position. He is also continuing his education at the University of North Dakota in the Space Studies program.

As a co-advisor for the Mayville State Science Club, Jeff is currently overseeing the construction of a \$75,000 nature trail that is to be located within the city limits of Mayville, ND. This project will create an outdoor space that will be open to the public and will connect area public schools with both the Mayville State Education and Biology departments. The nature trail is being funded primarily through grants and it is this experience of getting to use grant money to create educational opportunities for students that has given him cause to be very excited to work with the Space Grant.



Jeff Hovde completing field research.

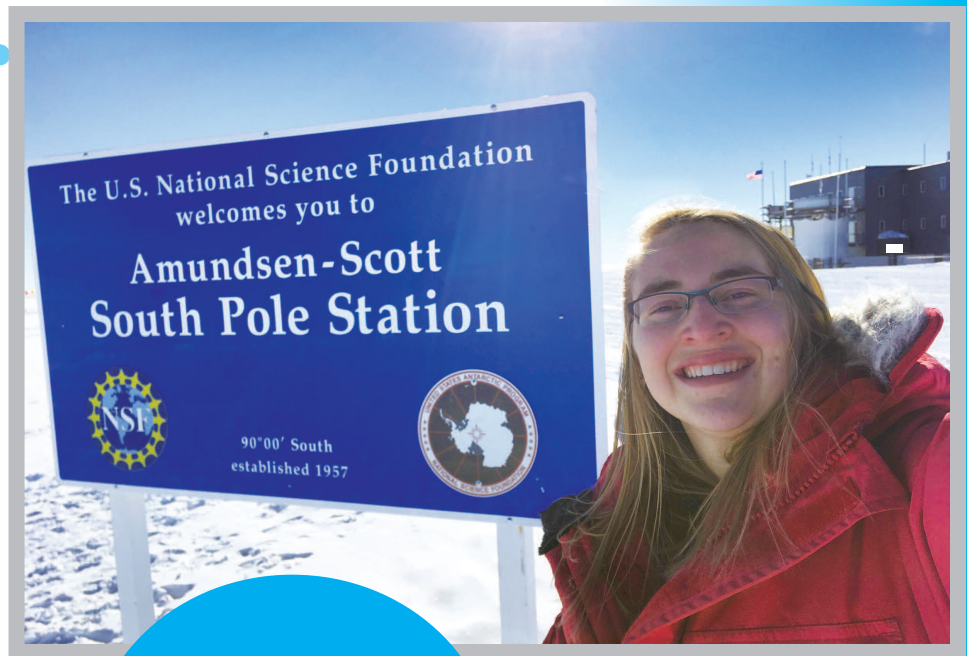


# Student Success Story

Starting at a young age, I was always interested in the weather. I would watch meteorologists on TV and my parents both worked for the Forest Service and talked about fire weather often. I also enjoyed science and math classes the most in school. These all influenced me to pursue a degree in atmospheric science at the University of North Dakota.

When I started at the University of North Dakota in the fall of 2013, I knew that I wanted to become involved with everything I could that would give me experience, get a chance to meet people, learn, and ultimately try to help me decide what exactly I would do with my degree when I finished or if I would continue on to grad school. I knew for sure my passions were science, math, and weather but it was unclear at the time what path I would take in the meteorology world. I participated in UND Weather Update throughout my four years. This student run weather show gave me a little taste of broadcast meteorology. During my sophomore year of college, I had the opportunity to serve as a STEM Ambassador through the North Dakota Space Grant Consortium. It was a rewarding experience of doing outreach events for all ages and being able to not only promote science but broaden my horizons and also promote technology, engineering, and math. I was fortunate to be a recipient of a NASA Space Grant scholarship during my time at UND and receive some funding to help pay for school. During my junior year, I had the chance to experience the research side of meteorology through the NOAA Hollings Scholarship Program. I interned at the NOAA Colorado Basin River Forecast Center in Salt Lake City. Another branch of meteorology I got to experience was the operational sector. During my senior year, I was a student intern at the Grand Forks National Weather Service Weather Forecast Office. It was great to be able to explore all these opportunities in science and meteorology.

I knew from all this experience that I wanted to work for a while and ideally do more field work or at least not be in an office stuck at a computer the entire day. I also needed a break from school and wanted to try out the real world for a while and not dive directly into grad school. I started job searching early on during senior year. I was ready to move anywhere for a job to just get started, little did I know I would find myself at the South Pole. I found a job posting for Antarctica and I knew I couldn't pass it up. It was an amazing opportunity to do weather in one of the most extreme environments in the world. It was a dream job not only for the work but also for an adventure and a new challenge for which I love. Also, originally coming from Ely, MN and then Grand Forks, ND I thought I was prepared pretty well for the environment. I signed a year contract (Nov 2017-Nov 2018) to work at Amundsen-Scott South Pole Station. The National Science Foundation manages the United States Antarctic Program and the US maintains three year round stations in Antarctica. I ended up at the coldest station 90 degrees south. At my new job, I take hourly weather observations to support aircraft, send up weather balloons, and some other daily duties. It is truly a dream come true and I still can't believe that I am at the bottom of the world working a job where all my passions come together of weather, outdoors, and adventure.



Janelle  
Hakala



Janelle Hakala is now working on the other side of the world!





**Bismarck  
State College**



**Cankdeska Cikana  
Community College**



**Dakota College  
at Bottineau**



**Dickinson  
State University**



**Gateway to  
Science Center**



**Lake Region  
State College**



**Mayville  
State University**



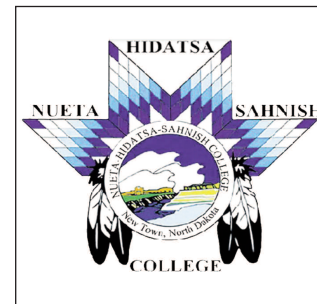
**Minot  
State University**



**North Dakota State  
College of Science**



**North Dakota  
State University**



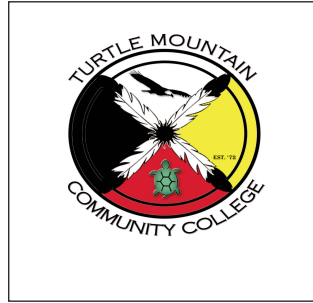
**Nueta Hidatsa  
Sahnish College**



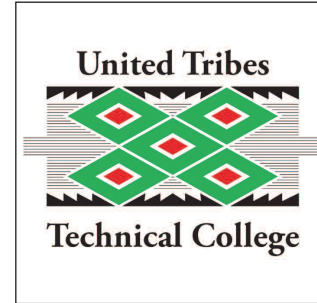
**Sitting Bull  
College**



**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**