



VIEW THIS ISSUE & ARCHIVED ISSUES OF
AURORA ONLINE!

ndspacegrant.und.edu/aurora



NDSGC AURORA

NORTH DAKOTA SPACE GRANT CONSORTIUM | 2023 EDITION



NOTES FROM THE Director

Dear colleagues-

2022 brought quite a bit to celebrate! From community engagement (p. 32-33) to research presentations (p. 15), and team competitions (p. 16-17) to NASA internships (p. 8-9), the NDSGC team, students, and affiliates stayed engaged in all things STEM and NASA.

In spring 2022, North Dakota's Gateway to Science was awarded the first-ever ASCEND grant, the NDSGC's new seed grant program for affiliate institutions. Their "Affiliate Synergistic and Collaborative Engagements across North Dakota" grant benefited students in the Western side of the state with hands-on experiences with flight simulators (p. 21). Also in the spring, the NDSGC Director, Dr. Caitlin Milera, earned her Ph.D. in Teaching and Learning, completing an historical analysis for her dissertation (p. 15).

In June 2022, the NDSGC hosted a summer camp for middle school girls, as an official partner of SciGirls in Space! Campers participated in team-based challenges and STEM activities and worked with role models in STEM fields and at NASA (p. 34-35). In July 2022, the NDSGC partnered with South Carolina and North Carolina Space Grant Consortia to host a professional development workshop for educators focused on accessibility (p. 40-41). Also in the summer, the NDSGC Deputy Director, Dr. Marissa Saad, earned her Ph.D. in Teaching and Learning, completing a quantitative analysis on gender equity in STEM teams (p. 15).

And throughout the year, our STEM Ambassadors continued to impress with their innovative ideas and unique accomplishments (p. 22-23). They developed a virtual experience so that students could explore the UND Human Spaceflight Laboratory from anywhere in the world through "Escape from Astronaut Training" (p. 7). And they earned highly competitive awards! To name a few, Michaela Neal was awarded UND's and North Dakota's Student Employee of the Year, was a regional runner-up, and was a co-winner of the National Student Employee of the Year Award; Sydney Menne was selected as a Brooke Owens Fellow on Virgin Orbit's propulsion engineering team. We are beyond proud of each of the STEM Ambassadors.

Because of successes such as these, the NDSGC really hit it out of the park at the NASA site visit in September 2022. A huge thank you to all of the students, affiliate representatives, teachers, and awardees on their continued contributions in NASA and STEM research and education initiatives across the state. We would not be the consortium that we are without such a strong network of educators, researchers, and learners.

And we are excited for the new things that 2023 brings. In January, the NDSGC team hired a new Office Manager; please welcome Grecia Flaws to the crew! Ms. Flaws comes to the NDSGC team with a background in the public library system and in language interpreting services. We are very excited to have her on the team. We look forward to another year of engagement and exploration across North Dakota, and encourage you to reach out and make new connections. Together, we are #NASAINND.

Thank you for your continued support,

Caitlin Milera

Caitlin Milera
Director, NDSGC

DIRECTOR

Caitlin Milera
milera@space.edu
701.777.4856



DEPUTY DIRECTOR

Marissa Saad
msaad@space.edu
701.777.4161



COORDINATOR

Tori McIntosh
tori.mcintosh@und.edu
701.777.4897



OFFICE MANAGER

Grecia Flaws
grecia.flaws@und.edu
701.777.6819



CONTACT US

University of North Dakota
Clifford Hall Room 270
4149 University Avenue Stop 9008
Grand Forks, ND 58202-9008

Cover Photo: Participants of the NDSGC and IDEAS Summer 2022 Educator Workshop explore the Inflatable Lunar/Mars Analog Habitat at the University of North Dakota.



WHAT IS SPACE GRANT?

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 engagement 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.

TABLE OF Contents

4	SPACE GRANT MEETINGS	23	STEM AMBASSADOR PROGRAM
5	AFFILIATE INVOLVEMENT	26	AWARDED SCHOLARSHIPS
6	INFLATABLE LUNAR/MARS ANALOG HABITAT	26	Pearl I. Young Scholarship
		27	Lillian Goettler Scholarship
7	ESCAPE FROM ASTRONAUT TRAINING	28	American Indian Scholarships
		29	NDSGC Scholarships
8	NASA INTERNSHIPS		
10	STUDENT RESEARCH FELLOWSHIPS	31	FIRST ROBOTICS
13	STUDENT RESEARCH BRIDGE FELLOWSHIPS	32	COMMUNITY ENGAGEMENT EVENTS
		35	SCI GIRLS CAMP
14	SUMMER FACULTY FELLOWSHIPS	36	PLANT THE MOON/MARS
15	NDSGC CONFERENCE PRESENTATIONS	37	NDVS/SB
15	SPACE EXPLORATION EDUCATORS CONFERENCE	39	COMMUNITY DAY
16	NATIONAL STUDENT COMPETITIONS	41	EDUCATOR PROFESSIONAL DEVELOPMENT
18	STUDENT TRAVEL GRANTS	42	WHERE ARE THEY NOW?
19	MINI GRANTS	44	MEET AN AFFILIATE: NUETA HIDATSA SAHNISH COLLEGE
19	Student Mini Grants		
20	Affiliate Mini Grants		
21	ASCEND GRANT	49	WE ARE #NASAINND
		51	STAY ENGAGED WITH SPACE GRANT



LEARN MORE ABOUT NDSGC'S AFFILIATES!
ndspacegrant.und.edu/about/affiliate-members

AFFILIATE Involvement

SPRING AFFILIATE'S MEETING >

The 2022 NDSGC Student Symposium and Affiliates Meeting was hosted on April 8th and 9th in Robin Hall, on the University of North Dakota campus. During the meeting, the NDSGC team presented 2021 accomplishments and new funding opportunities to faculty and staff. NDSGC funded students and competition teams presented their work from the 2021-2022 academic year. In addition to the 28 student presentations, James Harrington from NASA Goddard and Elizabeth Joyner from NASA Headquarters also presented.

A big thank you to UND President Andrew Armacost and UND Aerospace Dean Robert Kraus for sharing inspirational messages to our space community.

COFFEE CHATS

To continue providing engagement and networking opportunities among affiliates and students, the NDSGC started hosting monthly Coffee Chats. Coffee Chats are a time and place for the NDSGC to touch base with their audience and stakeholders, and for all to share new endeavors, networking opportunities, and successes. Those attending the monthly Coffee Chats are encouraged to ask questions about NDSGC programming, share upcoming events, and cultivate new connections.



Top: NDSGC students and affiliates pose for one last photo before heading home.

Center: NDSGC STEM Ambassadors helped facilitate the 2022 Student Symposium and Affiliates Meeting.

Bottom: Students pose with UND President Andrew Armacost at the 2022 Student Symposium and Affiliates Meeting.

SPACE GRANT Meetings

WY REGIONAL MEETING

In the Fall of 2021, all fifty-two Space Grant Consortia, the leadership team from NASA's Office of STEM Engagement, and various NASA personnel met in Jackson, WY to network, facilitate dialogue on best practices for STEM engagement, and discuss program evaluation. Alongside NASA's Space Grant Program Managers, NDSGC Director Caitlin Milera was part of a presentation and panel discussion on Diversity, Equity and Inclusion in Space Grant.

CAPITAL HILL MEETINGS

The NDSGC was excited to visit with U.S. Representative Kelly Armstrong online. They also met with staff from both U.S. Senator Kevin Cramer and U.S. Senator John Hoeven's offices. NASA-related research and education projects, STEM, and the technical workforce of North Dakota were among the topics discussed in the meetings. The NDSGC is grateful for all the support Senator Cramer, Senator Hoeven, and Representative Armstrong provide Space Grant from Washington, D.C.

DC NATIONAL MEETING

The National Space Grant Meeting was held in Washington, D.C. in March 2022. NDSGC Director Caitlin Milera co-led a flipped session on Diversity, Equity, Inclusion, and Accessibility. NDSGC Deputy Director Marissa Saad and Coordinator Tori McIntosh served as facilitators during this session. Guest speakers for this national event included Elaine Ho, the National Space Council's STEM education and workforce portfolio director.



Top: Wyoming Space Grant Meeting attendees.

Right: The North Dakota Space Grant team meets with Representative Armstrong via Zoom.



Above: Educators attending the NDSGC and IDEAS 2022 Educator workshop spent a morning touring the Inflatible Lunar/Mars Analog Habitat.

Right Top: Mission ILMAH XII crew member Michael Castro, M.D., completes an EVA.

Right Middle: Mission ILMAH XII crew member Michael Gildersleeve investigates weather conditions. Gildersleeve is a Purdue graduate student specializing in plant research.

Right Bottom: The ILMAH Mission XIII crew.



ESCAPE FROM ASTRONAUT TRAINING

THE NDSGC'S **ESCAPE FROM ASTRONAUT TRAINING** IS A SERIES OF CROSS-DISCIPLINARY ASTRONAUT TRAINING CHALLENGES, ENDING IN A VIRTUAL SCAVENGER HUNT THROUGH UND'S INFLATIBLE LUNAR MARS ANALOG HABITAT.

Each activity is North Dakota standards correlated. If you are a North Dakota educator and would like copies of educator and student guides, along with a set of NASA posters sent to your classroom, please contact the NDSGC team.

[TINYURL.COM/
NDSGCESCAPE](https://tinyurl.com/nsgcescape)



INFLATIBLE LUNAR/MARS ANALOG Habitat

MISSIONS

UND Space Studies ILMAH Missions XI and XII took place in April and May of 2022 with crews conducting research-related tasks such as: the daily collection of EEG neural data, neurofeedback training, drone training flights, plant biology studies, advancements in 3D printing, nutrition studies, exercise research, Lunar surface rescue operations and equipment testing. ILMAH XI was the longest mission since 2014, lasting 21-days with a constant 10-minute one way time delay emulator app. ILMAH Mission XII was 14 days with 3 of 4 crew members holding active military status. ILMAH XII also used the 10-minute time delay and recorded EVAs nearly every day. ILMAH Missions XIII and XV took place over the course of September, October, and December. Each mission lasted two weeks. Mission XIII included an all active military crew and helped complete research in the following areas: psychology and behavioral studies in isolation and confinement with

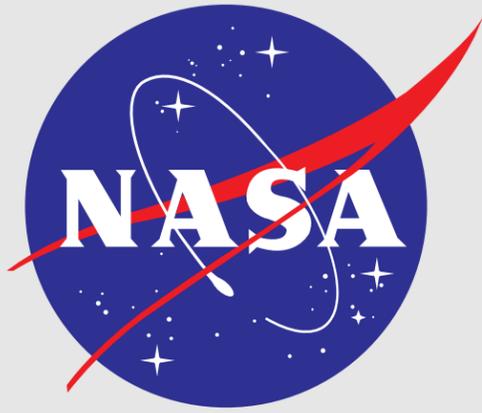
plants, electrolysis for use on planetary surfaces, plant studies with simulated Martian regolith, and enhanced versions of daily extravehicular activity. The crew part of Mission XIV conducted research measuring crew stress, implemented environmental enrichment practices, gathered data on nutrition, sleep quality, cognitive performance, and exercise science. Crew vlogging, baking, and extensive extravehicular activity were some tasks the ILMAH XIV crew enjoyed.

EDUCATOR WORKSHOP AND AFFILIATE'S MEETING

Dr. Pablo de Leon and team graciously hosted tours for the attendees of the NDSGC's Summer 2022 IDEAS Educator Workshop and Spring 2022 Student Symposium and Affiliates Meeting. The NDSGC is grateful for these guided tours and for Dr. de Leon taking time to share ILMAH research capabilities and research endeavors.



The Inflatible Lunar/Mars Analog Habitat (ILMAH) has five modules: the living quarters module, a botany/greenhouse module, geology module, exercise module, and an extravehicular activity (EVA) module. Docked to the ILMAH via a tunnel is the Pressurized Electric Rover (PER), which students used to conduct EVAs outside of the habitat.



NASA Internships

THE NDSGC IS COMMITTED TO SUPPORTING NORTH DAKOTA STUDENTS IN NASA INTERNSHIPS.

Students who are US citizens and enrolled at NDSGC-affiliated institutions will be able to engage in authentic, hands-on learning experiences that involve real-life problem-solving.



BAILEY CARLSON

Summer 2022 | University of North Dakota
Space Studies
Internship Location: Goddard Space Flight Center

Modular Reconfigurable Robot for Space Applications

"I am very thankful for the opportunity to work with NASA this summer and for the funding I received through the NDSGC. The experience taught me a great deal about how they operate, and enabled me to apply my educational experience towards a large-scale project. This internship was a highly valuable step in my current and future education and career goals as I pursue a Master's Degree in Space Studies, and I look forward to working with NASA again in the future."



WILL GREEN

Fall 2021 | University of North Dakota
Space Studies
Internship Location: Johnson Space Center

Spacesuit Engineer, working on the Environmental Protection Garment (EPG) of the eXploration ExtraVehicular Mobility Unit (xEMU), a prototype lunar spacesuit

"Thank you NDSGC and NASA's Crew and Thermal Systems Division for the opportunity of a lifetime. This internship has opened many incredible doors and launched my career."



MARCOS FERNANDEZ TOUS

Summer 2022 | University of North Dakota
Aerospace Studies
Internship Location: Marshall Space Flight Center

In-Space Repair and Maintenance Practices

"I feel fortunate to have had the opportunity to work with such professionals and interns this past Summer at NASA's Marshall Space Flight Center. Every day there were new engineering practices to explore, historical projects to discover and space programs to get involved with. During the semester, I felt I was becoming a witness of small history bits sweeping the Huntsville facilities, and the experiences of people that made that dream possible will accompany me forever. As a life-long learner, I am looking forward to repeating this experience soon. Thanks to the staff of North Dakota Space Grant Consortium (NDSGC) for unlocking the gates of space to our State!"



REBECCA SEEMANN

Summer 2022 | University of North Dakota
Chemical Engineering
Internship Location: Goddard Institute for Space Studies

Investigating the Role of Dry Deposition on Air Pollution Episodes

"The North Dakota Space Grant has allowed me to pursue research as an air quality intern at NASA GISS. It's been an amazing experience and has ignited a desire to focus my career towards aerospace and work in air quality modeling."

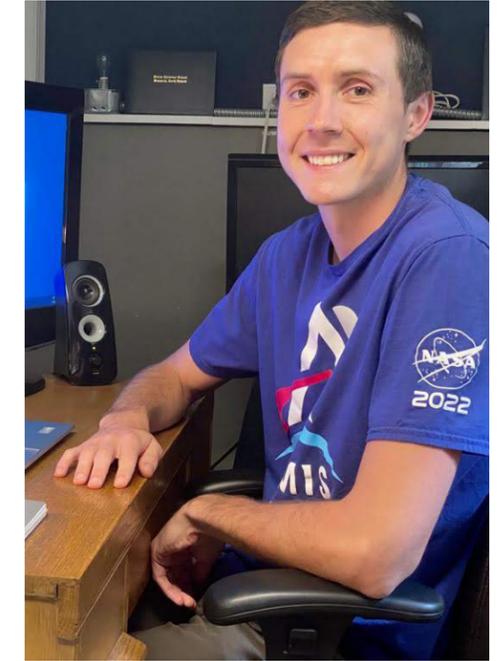


ETHAN JORDAN

Summer 2022 | University of North Dakota
Geography
Internship Location: NASA Headquarters

Human Exploration Knowledge Management

"Working with the NASA Knowledge Management Team gave more insight into how broad NASA's reach is and how much they do. The Knowledge Management Team is involved with tying together many of the lessons learned across the different programs. I was introduced to knowledge sharing and have a deeper understanding of how the NASA community works. It was a welcoming learning experience that will continue to shape my outlook in the future. This was the kind of opportunity I had dreamed about doing since I was a child."



AARON HULTSTRAND

Summer 2022 | University of North Dakota
Computer Science
Internship Location: Goddard Space Flight Center

Deep Learning to Tackle Climate Change

"The opportunity to obtain a NASA internship through the ND Space Grant Program opened the door to career opportunities after graduation that would not have been possible before. The real, in-the-field experience I had through this internship has been instrumental in improving my confidence and skill in my subject area of computer science."

STUDENT RESEARCH Fellowships

The NDSGC Student Research Fellowships are available to students completing NASA-relevant research in a STEM field under the guidance of a faculty mentor. Awards are offered throughout the fall, spring, and summer semesters to undergraduate and graduate students at NDSGC affiliate colleges. All NDSGC Student Research Fellowships are awarded on a competitive basis.

FALL 2021



MATTHEWSCOTT DALE

North Dakota State University
Mechanical Engineering & Physics

Diagnostics of Flow in Optical Supersonic Nozzle Design

"I am extraordinarily grateful for the opportunity to be a part of the NDSGC program, and have used the funds provided to me to expand my research ambitions and improve my working knowledge of gas dynamics and nozzle propulsion systems."



BAILEY CARLSON

University of North Dakota
Space Studies

Design and Manufacture of Prototype 3D-Printed Gloves for Pressurized Garment Systems

"The Student Research Fellowship enabled me to participate in the development of an exciting new space technology, and provided me with valuable experience and insight that will be extremely beneficial as I pursue a Master of Science in Space Studies."



MARCOS FERNANDEZ-TOUS

University of North Dakota
Aerospace Studies

A Time Synchronization Protocol for UAS

"I am grateful for the opportunity I had to benefit from the Student Research Fellowship which allowed me to successfully finish my Ph.D. last Spring semester. My dissertation consisted of an analysis of a new synchronization protocol for drones, a novel approach that I discussed previously with Dr. Faruque, from the Department of Electrical Engineering, to whom I am also indebted. I think Student Research Fellowships are a great way to align STEM research activities with NASA priorities in the mid-term and would encourage any current student with similar research interests to apply for them."



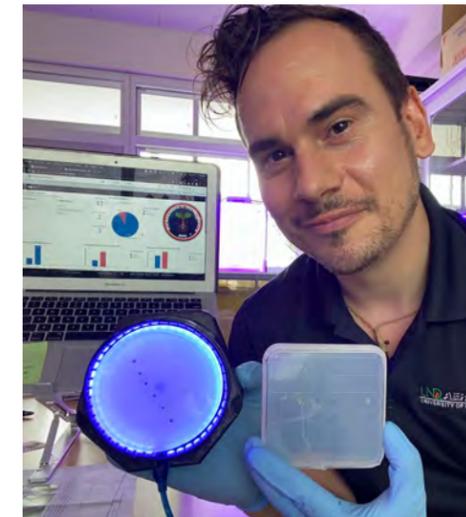
VINCENT LEDVINA

University of North Dakota
Physics

The Correlation between Ultra Low Frequency Ionospheric Waves and Aurora Events in North Dakota

"NDSGC's Fellowship award allowed me to explore a research project I was passionate about, leading me to discover interesting phenomena about how aurora behave in North Dakota."

SPRING 2022



GILBERT CAUTHORN

University of North Dakota
Space Studies Graduate Program

Space Plant Bioinformatics Aggregation and Visualization Matrix

"The experience provided by the ND Space Grant program provided me with an invaluable opportunity to develop an integral component of my doctoral research into space plant biology integration as elements in bioregenerative life support systems. The tools and methods I was able to develop through this program will not only support my research moving forward, but also help future space plant biology researchers and educators. I am grateful and honored to have been selected to take part in this program."



ABRAHAM AHUMADA

University of North Dakota
Space Studies

Uncovering the Effects of Off-Planet Microgravity on Microgreens Through the Utilization of Enriched Martian Regolith

"This experience with the NDSGC Student Research Fellowship taught me research skills within my field that crossover into NASA projects at Kennedy Space Center. I now have a better grasp of the field of Astrobiology and am currently interested in expanding my knowledge on the subject."



LEARN MORE ABOUT DR. GIFFORD'S HISTORIC FLIGHT!

<https://www.minxray.com/news>

SPRING 2022

SUMMER 2022



Photo credit: Steven Boxall, 2022

SHEYNA GIFFORD

University of North Dakota
Space Studies

Extending Aerospace Medical Diagnostic Capabilities with DUXS: Diagnostic Ultraportable XRAY System

“Doing anything worthwhile will be harder than you think: do it anyway. Though we had been working toward clearing our device to launch on a parabolic flight for more than two years, dozens of unexpected issues cropped up in the planning phase alone. That’s the ground truth of life in space and on Earth. I am extremely grateful for the opportunity afforded by this grant to tackle the unexpected challenges inherent to doing something entirely new and extremely important.”



EVAN REINHOLZ

North Dakota State University
Mechanical Engineering

Computational Study of Morphing Airfoils

“The ND Space Grant Consortium provided me with the opportunity to advance my knowledge and develop my ability in computational fluid dynamics. This experience has confirmed my desire to pursue career in aerospace focusing on the development of new technology.”

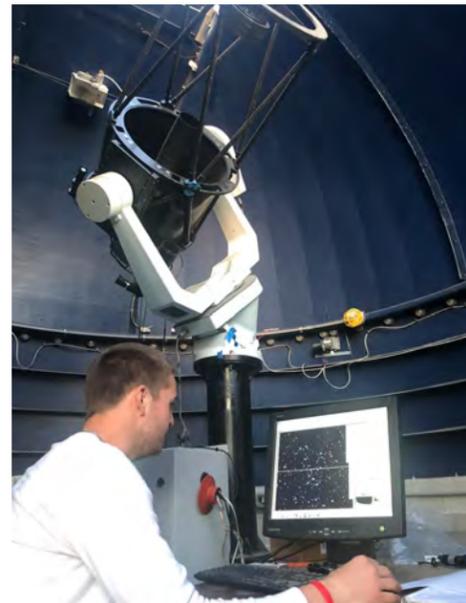


JORDYN CARRABRE

University of North Dakota
Commercial Aviation

How Lower RPM Settings Affect Fuel Output

“My NDSGC fellowship allowed me to work on a prominent topic with my peers for the aviation community. This opportunity showed me that the future is bright for aviation and environmentalist to come together for a common cause.”



PARKER JOHNSON

University of North Dakota
Physics/Astrophysics

Survey for Exoplanet Detection and Light Curve Analysis

“I am grateful for the North Dakota Space Grant Consortium providing me with this amazing opportunity to explore an astrophysics topic I am interested in. The skills I learned throughout summer will help me as I work towards pursuing a graduate degree in the field of astrophysics. Being able to conduct research on the topic of exoplanets would not have been possible for me if it wasn’t for the North Dakota Space Grant.”

STUDENT RESEARCH

Bridge Fellowships

Students who’ve earned an undergraduate degree and are starting a new program at a NDSGC-affiliate program can apply for funding to complete entry-level STEM research projects. This program is open to students who are enrolling in a higher degree program at the same, or a different, NDSGC affiliate institution (A.S. to B.S., B.S. to M.S., B.S. to Ph.D., or M.S. to Ph.D.). Students interested in applying are strongly encouraged to contact the NDSGC to help with mentor pairings. Students with little or no research experience are encouraged to apply.



READ THE ARTICLE ON UND TODAY!

<https://blogs.und.edu/und-today/2021/12/bridge-fellowship-connects-students-to-stem-research/>

Liz Deckert checks the placement of reflective balls that sit atop a Velcro strap before attaching the strap to the arm of her volunteer. The balls bounce infrared light back to 18 different cameras, which can triangulate marker positions in 3D space. Once researchers have a clean marker set, they can run the video through sophisticated software to collect detailed kinetic data. Photo by Mike Hess/UND Today

ELIZABETH DECKERT

Lake Region State College to University of North Dakota
Kinesiology

Work Envelope Assessment of Commercially Designed Extravehicular Space Suit

“This is not something I ever would have imagined myself doing, especially because I know nothing about space [...] It’s so cool to be part of this and so humbling at the same time to be surrounded by all these people who know so much.”

Quote from UND Today Article “Bridge Fellowship connects students to STEM research” by Janelle Vonasek, published 12/9/21.

SUMMER FACULTY Fellowships

Summer Faculty Fellowships are designed to assist faculty in creating or revising a college-level course that is part of the Science, Technology, Engineering, or Mathematics (STEM) field and is NASA-relevant. This program directly supports one of the goals of NASA Education, and the overall goal of this program is to increase the exposure of college students to NASA and NASA research.



DR. WILLIAM SHAY

Math and Science Faculty, North Dakota State College of Science
Chemistry 110/110L: Survey of Chemistry Lecture and Lab



DR. SHERRY FIEBER-BEYER

Space Studies Faculty, University of North Dakota
SpSt 570: Asteroids: Prospective Energy and Material Resources



MICHAEL DODGE, JD

Space Studies Faculty, University of North Dakota
SpSt 570: Science Fiction, Popular Media, and the Space Age

"The Faculty Fellowship program managed by the NDSGC provides a truly useful opportunity to improve upon the content and educational experience faculty endeavor to provide. I have worked to better my own course content through the use of this wonderful program, and hope students have seen the difference it provides."

NDSGC

Conference Presentations

- The North Dakota Space Grant Consortium (NDSGC) virtually attended the 2021 Astronomical Society of the Pacific Conference. The NDSGC hosted a presentation that focused on their NASA-in-the-Classroom PurpleAir Educator Workshop.
- Alongside the South Carolina Space Grant Consortium, the NDSGC presented at the 2021 American Geophysical Union Conference in New Orleans. The presentation discussed the IDEAS (Innovative Differentiated Exploration Activities in Space Science) Project and how it relates to eclipses and ballooning.
- The NDSGC, along with the South Carolina and North Carolina Space Grants, virtually presented their IDEAS Project at the International 2021 SciAccess Conference.
- The NDSGC Director and Coordinator traveled to the NASA Langley Research Center. While there, they recorded adaptations for NASA STEM lesson plans as part of the IDEAS program. The NDSGC was joined in the studio by both the North Carolina and the South Carolina Space Grant Consortia.



WATCH THE PAPER AIRPLANE ACTIVITY WITH ACCESSIBILITY OPTIONS!

<https://www.youtube.com/watch?v=6Fbidvuw5dl>



LEARN MORE ABOUT THE ROVER RACES ACTIVITY

<https://www.nasa.gov/stem-ed-resources/rover-races-activity.html>

DISSERTATIONS



The NDSGC Director, Caitlin Milera, was awarded her PhD in Teaching and Learning in May of 2022. Read about Dr. Milera's dissertation titled "Ms. Pearl Irma Young: "Raising Hell" for Women in STEM Fields and Women at NASA, 1914 - 1968."

Scan the QR code or visit: <https://commons.und.edu/theses/4279/>



The NDSGC Deputy Director, Marissa Saad, was awarded her PhD in Teaching and Learning in August of 2022. Read about Dr. Saad's dissertation titled "Investigating Gender Diversity, Equity, and Inclusivity (DEI) and Students' Experiences within Collegiate Team-based Learning Environments".

Scan the QR code or visit: <https://commons.und.edu/theses/4372/>



SPACE EXPLORATION Educators Conference

SEEC: FEBRUARY 2022

Hosted at the Space Center Houston in Texas, this professional development conference allows pre- and in-service educators the chance to network with other education professionals and learn about hands-on STEM activities to bring into their classrooms. Keynote speakers for the 2022 conference included STS-129 Mission Specialists and Audrey Powers, Vice President of mission and flight operations at Blue Origin. Coordinator Tori McIntosh, and two STEM Ambassadors attended this year's conference online. The NDSGC will continue sending the call out to all ND educators to attend SEEC, in-person!

Top: Space Exploration Educators Conference logo

Bottom: Each year educators learn about new STEM engagement activities during SEEC.

NATIONAL STUDENT Competitions

The North Dakota Space Grant Consortium proudly provides funding to students participating in national competitions such as NASA's Robotics Mining Competition and the Formula SAE Race Car Competition. It is imperative that students be given the chance to partake in these events as they challenge a student's collaboration and problem-solving skills while promoting innovation.

NDSU AIAA DESIGN BUILD FLY

The 2022 AIAA Design/Build/Fly competition team from NDSU included students from mechanical engineering, computer science, and electrical engineering disciplines. The 2022 AIAA competition challenged teams to design, assemble, test, and report on a radio-controlled aircraft. After multiple flights that ended in crash landings, the NDSU team revised aircraft components and had multiple successful flight runs. From team lead Isnalal Nanjin Roan Eagle: "We are grateful for the experience the ND Space Grant allowed us to partake in. The competition that the Space Grant allowed us to attend was a fantastic learning opportunity and experience. It gave us a steppingstone for the future as we move into our professional careers as engineers."

NDSU NASA ROVER CHALLENGE

Guidelines for NASA's 28th annual Human Exploration Rover Challenge included designing and building a rover durable enough to traverse a Mars-based obstacle course, yet, light and compact enough to be stowed in a rocket's cargo bay. NDSU's Rover Challenge team represented the state of North Dakota, on an international level, during the 2022 virtual competition and competed in multiple categories for design, documentation, safety, and presentation. Not only did the team from NDSU create an impressive rover, they also 'paid it forward' by reaching out to local elementary students through STEM engagement activities and encouraged young students to join the STEM career field.

UND FSAE RACECAR CHALLENGE

UND's 2022 Formula SAE team met all preliminary deadlines for manufacturing

targets and testing times. After passing inspection, the team was able to take part in every competition event in Michigan. They finished in similar positions as previous UND FSAE teams and walked away with valuable insight that will be of help for years to come. With the team being a healthy mix of seniors and underclassman, seniors made sure to mentor their younger team members and hope UND can be a strong performer at the 2023 FSAE competition.

NDSU ROBOTICS MINING COMPETITION

NASA's Robotics Mining Competition challenges teams to design, build and operate a robot capable of mining ice and other materials on lunar surfaces. Teams must take weight, power, communication, and technical capabilities into consideration when participating in the competition. NDSU's 2022 Bison Robotics club competed at this national competition in Florida, at the Kennedy Space Center. With the majority of their team members slated to return next year, they hope to incorporate lessons learned and have a strong showing at the 2023 competition.

NDSU FSAE RACECAR CHALLENGE

NDSU's 2022 Formula SAE team put in the work to revive NDSU's presence at future FSAE competitions. The nine-person team was able to design and build a full car but ran into engine issues before competition. The team's 2022 accomplishments will greatly aid the 2023 team as the team won't have to start anew. From team lead Ethan Langerud: "We are grateful for the support and experience we have received from the ND Space Grant Program. With their help we were able to attend the annual Formula SAE competition in Michigan. This has given us so many new

ideas for future cars and has greatly helped to improve our program."

UND LUNABOTICS

"UND's Lunabotics competition year started with the team entering the Robotics Lab which had been unoccupied for a year and a half, with a physically complete robot in one corner and components scattered about. The year ended with a fully autonomous robot redesigned from the ground up, and a knowledge base, which has been passed on to the next year's team. There were many challenges along the way, but the team and its advisors were able to overcome those obstacles and succeed. The team members participated in several outreach events such as FIRST Lego League and the club plans to continue volunteering at these events going forward. The year concluded with systems setup to ensure the upcoming teams will be able to have access to not just the previous design itself but also the rationale behind each design to avoid pitfalls and iterate to a new more successful robot." -2022 UND Lunabotics Team

UND NASA STUDENT LAUNCH

The UND Advanced Rocketry Club competed in two competitions during the 2021-2022 academic year. Their first was the NASA Student Launch, where they traveled to Huntsville, Alabama and were challenged to locate their rocket sans GPS. At the competition the team received 3rd place for the 3D Printing Award. This award is presented to the student team with the best consideration, design, and implementation regarding 3D printing of the rocket and payload. The UND Advanced Rocketry Club also competed in the Minnesota Space Grant Midwest High Powered Rocketry Competition, with the competition goal of designing a multitude of diverse rockets to display the team's knowledge of rocketry and creativity.

UND LUNABOTICS



NDSU NASA ROVER



UND FSAE RACECAR



NDSU ROBOTICS MINING



NDSU FSAE ELECTRIC TEAM



NDSU FSAE ELECTRIC RACECAR CHALLENGE

"From 2021-2022 the NDSU Society of Automotive Engineers team began work on the school's first ever Formula Electric racecar for competition. Currently we have finished a majority of the design, and are now focusing on fabrication, testing, and organization restructuring to make the team more efficient and successful. A dedicated group of over 30 students from a variety of engineering disciplines such as mechanical, electrical, computer, and industrial engineering have worked together to better their understanding of what professional engineering standards and environments are through hands-on experience, leadership opportunities, and interdisciplinary team environments." - 2022 NDSU FSAE Electric Team

UND NASA STUDENT LAUNCH



STUDENT Travel Grants

The NDSGC provides travel grants to students at affiliate schools who will present papers or posters at conferences throughout the U.S. By attending these conferences, students are given the opportunity to share their research and network with others in the STEM community. For the Fall 2020, Spring 2021, and Summer 2021 semesters, NDSGC funded students attended online conferences.



JAMES NORMAN

Fall 2021 | University of North Dakota
Aerospace Sciences

FFA Aviation Infoshare

"The NDSGC grant allowed me to deepen the quality of my research by interfacing with industry leaders and current topics in aviation safety. My research will be current and relevant. Conference attendees recognized the Consortium's and UND's commitment to helping students achieve."



VINCENT LEDVINA

Fall 2021 | University of North Dakota
Physics

American Geophysical Union

"Receiving a travel grant from the NDSGC allowed me to participate in the AGU conference, giving me an amazing opportunity to connect with scientists in my field and industry professionals."



DOMINIC ROSCH-GRACE

Spring 2022 | North Dakota State University
Computer Science

IEEE Aerospace Conference

"This experience has inspired me to consider how my own areas of research align with other's, in a way that highlights how collaborative pursuits of knowledge better society."



NATHAN JUVEN

Spring 2022 | University of North Dakota
Mechanical Engineering

"I am grateful for the experience I received through the ND Space Grant Program in allowing me to further develop my rocket senior design project."



SKYE SCHWARTZ

Summer 2022 | University of North Dakota
Space Studies

"The NDSGC NASA mini-grant allowed me to fund and execute vital components of my research for my M.S. in Space Studies. I am honored to be a recipient and believe it is a great program to help students."

Mini Grants

STUDENT MINI GRANTS

Student mini-grants are available for undergraduate and graduate students who are completing STEM- or NASA-relevant research that directly affects their thesis or dissertation (or a similar culminating project that enables students to graduate). Student mini-grants are awarded each semester and may include materials funding.

AFFILIATE MINI-GRANTS

Affiliate Mini-Grants are available to NDSGC affiliate representatives who are hosting or participating in research or education events related to STEM and/or NASA. Affiliate Mini-Grants may also be applied towards college-level initiatives, such as materials funding for STEM courses and research, or travel funding for college students to participate in field research related to their STEM courses. Faculty or staff must be directly involved in the programming to be eligible for a Mini-Grant.



ERIK HOLLAND

Fall 2021 | North Dakota Heritage Center

Bringing Space Junk Back Down to Earth- A Jack Bacon Tour Across North Dakota



JANET ROSARIO

Fall 2021 | North Dakota's Gateway to Science

Free Family Day at NDGTS

"Free Family Day attendees loved exploring space with Dr. Young and Dr. DeMuth in the GeoDome and at hands-on activity stations. It was a great opportunity to engage families with STEM."

Pictured: A young attendee participates in a hands-on activity at one of the tables during Free Family Day at NDGTS.



TIM YOUNG

Spring 2022 | University of North Dakota

James Webb Telescope Planetarium Presentation and Telescope Workshop

Pictured: Young students sit and watch a presentation at the planetarium.

ASCEND Grant

The Affiliate Synergistic and Collaborative Engagements across ND (ASCEND) program is designed to promote, develop, and expand NASA research and projects within North Dakota. These grants, which may be research- or teaching-based, will be defined by the goals found within NASA's Mission Directorates (MDs) and the NDSGC's proposal.



ND'S GATEWAY TO SCIENCE

North Dakota's Gateway to Science earned an ASCEND grant to develop a flight simulator education system for rural and western ND students.

North Dakota's



Gateway to Science

STEM AMBASSADOR Program

TO PROMOTE SCIENCE, TECHNOLOGY, ENGINEERING, AND MATH (STEM) ACROSS NORTH DAKOTA, THE NDSGC ESTABLISHED THE STEM AMBASSADOR PROGRAM.

Available for undergraduate and graduate students at all NDSGC affiliate schools.

STEM Ambassadors conduct hands-on activities to North Dakota students, families, and communities. This can include K-12 classroom visits and informal education events such as library engagement events, family nights, and science festivals.



THOMAS POWER
Bismarck State College | Secondary Science Education



HOPE BURDOLSKI
University of North Dakota | Secondary Science Education

"The STEM Ambassador program has played an integral role in my college experience. It has given me many opportunities to grow as an educator and has allowed me to become more involved in my community. I have loved every second!"



SYDNEY MENNE
University of North Dakota
Physics & Astrophysics and Mathematics

"I absolutely love working as a STEM Ambassador. Being able to engage students and do work that I am passionate about while helping others is such an incredible opportunity!"



MICHAELA NEAL
University of North Dakota | Environmental Studies

"Being a STEM Ambassador was, in so many ways, the pinnacle of my undergraduate experience. As I reflect on all my STEM Ambassador experiences, I am just awed by all the doors that open with the right combination of collaboration, perseverance, and training. This job opened my eyes to possibilities, and I grew exponentially as both a team member and a leader."



RYAN KRAM
University of North Dakota | Commercial Aviation



CASSANDRA TAGGART
University of North Dakota | Atmospheric Sciences and Secondary Education



JACOB HUBBARD
University of North Dakota/
North Dakota State University | Physics



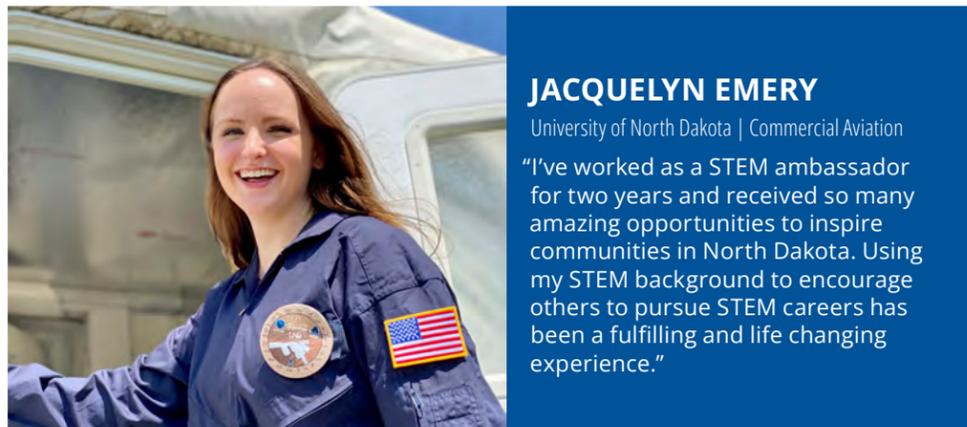
VINCENT LEDVINA
University of North Dakota | Physics



ISABELLE ADAMS
University of North Dakota | Aviation



ABIGAIL MOE
University of North Dakota | Psychology



JACQUELYN EMERY
University of North Dakota | Commercial Aviation

"I've worked as a STEM ambassador for two years and received so many amazing opportunities to inspire communities in North Dakota. Using my STEM background to encourage others to pursue STEM careers has been a fulfilling and life changing experience."



AMANDA HIGGINBOTHAM
University of North Dakota | Commercial Aviation and International Studies

"Being a STEM Ambassador has been an outlet to express my passion for aerospace. Through this position, I've been able to inspire children, encourage my peers, and promote the STEM industry to people of all ages, backgrounds, and talents. It's been an 'out of this world' opportunity!"



DANNY ERDMANN
University of North Dakota | Commercial Aviation



DANNY ERDMANN
University of North Dakota | Commercial Aviation



STEM Ambassador of the Year is awarded each spring to a STEM Ambassador that has made a lasting impact on the program through high performance and outstanding achievements. Each student awarded STEM Ambassador of the Year receives a \$250 scholarship.

STEM AMBASSADOR
OF THE YEAR

JACQUELYN EMERY

2022

“I am a University of North Dakota aviation student originally from Denver, Colorado and Austin, Texas. I’m majoring in Commercial Aviation with specializations in Aviation Safety and Business Aviation. I have worked with the North Dakota Space Grant Consortium since June 2020 as a STEM Ambassador.

During my time with NDSGC, I’ve received amazing opportunities like crewmember for the ILMAH IX mission and NASA intern for the International Space Station. I am honored to be representing North Dakota Space Grant Consortium with this scholarship and excited to continue my job as a STEM Ambassador.”

-Jacquelyn Emery

AWARDED Scholarships



LEARN MORE!

<https://ndspacegrant.und.edu/college-students/scholarships/pearl-i-young.html>

PEARL I. YOUNG SCHOLARSHIP

The NDSGC has established the prestigious Pearl I. Young Space Grant Award for a female student pursuing a STEM degree at the University of North Dakota. This \$2500 award honors Pearl I. Young and all she did as a female scientist.



HOPE BURDOLSKI

University of North Dakota, Secondary Science Education

"My name is Hope Burdolski, and I am extremely grateful to be a 2022 recipient of the Pearl I. Young Scholarship! I am a senior studying Secondary Science Education with minors in Biology, Middle Level Education, and Music at the University of North Dakota. I developed a love for STEM at a very young age and hope to inspire the generation to love it as much as I do. Through the North Dakota Space Grant Consortium and North Dakota's Gateway to Science, I have been able to work with students in grades 1-5 and teach them about the many aspects of STEM. I have gained valuable experience in the classroom that I will apply to my future career as a science educator. I am

heavily involved on campus and have held leadership roles across multiple organizations such as Greek Life, the Big Event, and Concert Choir. I was also a founding member and leader of both Dance Marathon at UND and UND's mixed Chamber Choir. In addition, I serve as a STEM ambassador for the North Dakota Space Grant Consortium. In my free time, I love to volunteer in the community, sing, and spend time with friends and family. I am deeply honored to represent Pearl I. Young through this scholarship as I approach student teaching and my career as a STEM educator."



ELIZABETH MISLAN

University of North Dakota, Commercial Aviation and High Altitude Unmanned Aircraft Systems (UAS)

"Firstly, I would like to thank the North Dakota Space Grant for their immense generosity in awarding me the Pearl I. Young Scholarship. This award means a great deal to me and has dramatically influenced my time at the University of North Dakota.

I am starting my last semester at the University of North Dakota where I have double majored in Commercial Aviation and High Altitude Unmanned Aircraft Systems (UAS) as well as completed a safety specialization. During my time at UND I have served on the Student Aerospace Advisory Council for 7 consecutive semesters, flown a 2500-mile race as a pilot on the Women's Air Race Classic, and shared my love for aviation, STEM, and UND with hundreds

of prospective students and families as a student ambassador with the aerospace college.

More recently, I have transitioned to being a flight instructor for the UAS department on the Insitu Scaneagle- a medium sized fixed wing drone. I hope to take these skills and experiences with me when I graduate in May as I join the workforce for a defense contractor working on counter UAS systems. A future goal of mine is to earn a master's degree and PhD in Human Systems Engineering and to continue to use my passion for safety and teaching in a collegiate setting. Once again I must express my sincere gratitude and appreciation for the NDSGC for their continued generosity and support of myself and students alike."



LEARN MORE!

<https://ndspacegrant.und.edu/college-students/scholarships/lillian-goettler.html>

LILLIAN GOETTLER SCHOLARSHIP

The NDSGC has established the prestigious Lillian Goettler Space Grant Award for a female student pursuing a STEM degree at North Dakota State University. This \$2500 award honors the ideals of scholarship as exemplified by Dr. Lillian Goettler.



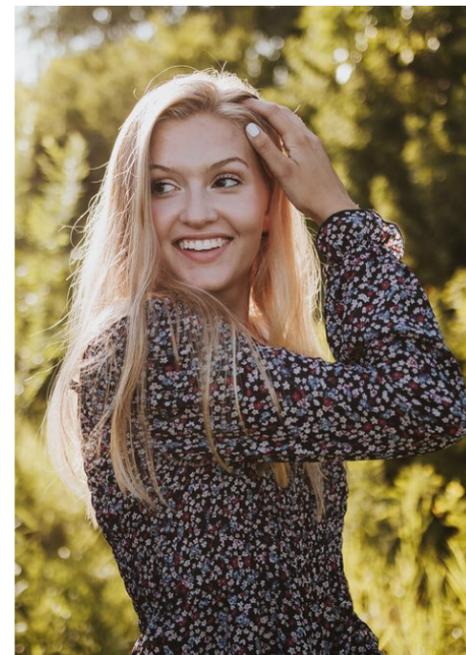
BETHANY ROBERTON

North Dakota State University, Entomology

"I am a PhD student at North Dakota State University studying entomology in the School of Natural Resource Science. My passion for science and conservation led me to NDSU in 2021 to pursue my current research project examining bee community structure and floral resource use within different grazing regimes in rangelands. At NDSU, I am a member of the Natural Resource Women in Science group and am currently trying to kickstart an Entomology Club for the 2022-2023 school year. Additionally, I am a student liaison for the North Dakota Chapter of The Wildlife Society and a member of the

Student Affairs Committee for the North Central Branch of the Entomological Society of America. I enjoy working with students and technicians, and I am a major advocate for diversity and inclusiveness.

After graduating, I hope to become a faculty member at a research-oriented university or work for a non-profit insect conservation organization. I am extremely honored and grateful to receive the Lillian Goettler scholarship as I continue my education and pursue more mentorship, advocacy, and conservation research opportunities while attending NDSU"



KIRSTEN WARCUP

North Dakota State University, Biology

"I am a second-year student at North Dakota State University majoring in biological sciences and minoring in botany. I plan on graduating next spring and going right into graduate school, with an eventual goal of earning a PhD in genetics.

My time at NDSU has revealed my strong passion for research. Researching is a creative outlet for me, and it allows me to explore ideas and it pushes me to think critically to overcome obstacles. My current research revolves around the central topic of conservation and ranges from the analysis of pollen grains to the identification of genes in plants. My first project involves analyzing pollen samples collected non-lethally from bees in North Dakota. My goal with this project is to publish a paper that overviews the foraging patterns of bees in North

Dakota and explains my methodology for working with minute pollen samples. My other project that I am working on this semester involves identifying heat shock proteins (HSPs) in horsenettle. This project has introduced me to several research techniques used in molecular biology and genetics and has significantly aided my preparation for graduate school.

In addition to research, I enjoy being involved with organizations on campus such as the Natural Resource Management Club, the CAFSNR Honor Commission, and the Mancur Olson Scholars reading group program. Outside of school, I enjoy gardening and various other outdoor activities. I want to thank the NDSGC for their investment in my education and future endeavors, I truly appreciate the support."

AMERICAN INDIAN SCHOLARSHIPS

American Indian Scholarships are awarded to students at each of the five Tribal colleges. Students awarded have an excellent academic record and plan to complete a four-year degree in a STEM field. Students are selected by faculty at their home institution.



MORGEN GRADY
Sitting Bull College



PAUL THIELE
Cankdeska Cikana Community College



SHADLYNN SEVERANCE
Nueta Hidatsa Sahnish College



TREVER THOMAS
Turtle Mountain Community College



TANNER VEO
United Tribes Technical College

NDSGC SCHOLARSHIPS

Each academic year, the NDSGC provides scholarship funding to affiliate schools. Scholarship recipients are selected by faculty and staff at their home institution. Students must have an excellent academic record and be majoring in a STEM field.

BISMARCK STATE COLLEGE

Joshua Lakoduk-Ernst
Ethan Wells
Nathan Heinert

CANKDESKA CIKANA COMMUNITY COLLEGE

Nicholas Bittner
Lance Gourd
Randy Leben
Miguel Noriega

DAKOTA COLLEGE AT BOTTINEAU

Courtney Herman
Connor Beck
Ashtyn Allard
Koylynn Gulliford
Whitni Peck

DICKINSON STATE UNIVERSITY

Dawson McGlothlin
Ryan Barndt
Chase Steiner
Victoria Trochez
Molly Rayhorn
Isabel Lopez

LAKE REGION STATE COLLEGE

Nicole Beckley
Dawson Biby
Alexis Telehey
Hannah Lundeby
Caitlin Nielsen
Nathaniel Grafsgaard
Grace Sherr
Marisa Smith

MAYVILLE STATE UNIVERSITY

Austin Urlaub
Riley Wass
Samantha Passa
Ashlyn Tingey
Brittney Deitz
Kaitlin Ensign
Ellie Reiersen
Trevor Gravseth
Paul MacSteves

MINOT STATE UNIVERSITY

Rayela Folstad
Ross Hardy
Keegan Summers
Jacob Jensen
Camden Jasmin
Karen Robinson
Travis Smith
Quinn Sullivan
Sarah Upton
Noah Keller
Christopher Scott
Kelby Armstrong
Carson Medeiros

NORTH DAKOTA STATE COLLEGE OF SCIENCE

Jacob Trout
Jenna Seifert
Tyler Tollefson
Carson Weber

NUETA HIDATSA SAHNISH COLLEGE

Laurice MorningStar
Jazmyn Dancing Bull
Tuesday Church
Francis Short Bull

SITTING BULL COLLEGE

Amara Martinson
Sunshine White
Zane Prentice

TURTLE MOUNTAIN COMMUNITY COLLEGE

Brandon Roussin
Christina James
FaLynn Daniell Ferris

UNITED TRIBES TECHNICAL COLLEGE

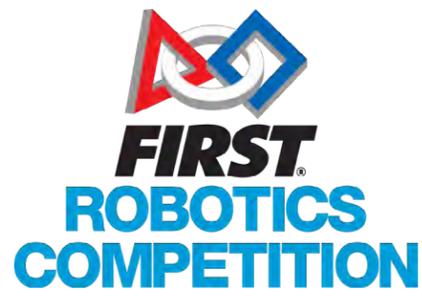
James Richards
Audrey Hall
Robert Sam

VALLEY CITY STATE UNIVERSITY

Kristin Albrecht
Macie Danielson
Danike Green
Mya Klein
Cassidy Sanderson
Madison Yoder
Lindsey Kiecker
Liberty Cleveland
Hannah Gordon
Alora Woodruff
Harmony Hennings
Keith Collins
Cora Fastner
Sage M. Longtin
Colton Taylor
Katherine Gehrig

WILLISTON STATE COLLEGE

Luis O. Maria Mendoza
Brooklyn Fay Douglas
Abby Olson



The FIRST (For Inspiration and Recognition of Science and Technology) Robotics Competition promotes inclusivity and hopes to inspire students to engage in STEM activities in order to become future STEM leaders.

All students, whether they possess technical or non-technical skills, are encouraged to be part of these competition teams. The FIRST Robotics Competitions combine STEM and sports. Past regional qualification rounds have put robots to the test of playing basketball! The North Dakota Space Grant Consortium is thrilled to fund FIRST Robotics Teams across the state of North Dakota. In the past, North Dakota teams have even advanced to the FIRST Robotics World Championships.

FIRST Robotics

GRAND FORKS: TEAM #8188

The FIRST Robotics team out of Grand Forks is mentored by students at the University of North Dakota. During the 2022 competition year, team Grand Force was selected to be part of the Eighth Seed Alliance for the Great Northern Regional Competition, where they advanced to finals. Throughout the season students and mentors learned a range of valuable skills, from how to operate power tools to speaking in public. Grand Force is looking forward to returning next year, with an even more robust team.

BISMARCK: TEAM #6645

Bismarck's FIRST Robotics team was crowned the "Think Award", an award that honors a team's engineering notebook and portfolio. As the season progressed, Bismarck's FIRST Robotics team found themselves supporting others and starting an additional team for the 2022-2023 season. Next year, the team hopes to improve on their communication skills and robot design. Paying it forward, the team presented their robot to two middle school classrooms and presented at the FRC Regional competition in Grand Forks to help inspire others to become part of FIRST Robotics.

CANDO: TEAM #877

Team 877 earned the Gracious Professionalism Award at the Great Northern Regional in Grand Forks during the 2022 FIRST season. Gracious Professionalism is a core value of FIRST robotics. Additionally, coach Lisa Ramey

was selected as one of twenty-four coaches nation-wide to participate in the FIRST/Air Force Leadership Experience, which took place at Eglin Air Force Base in Florida. The team was very excited to design an over-the-bumper intake system during the season using mecanum wheels, pneumatics, and 3D printed bearing brackets.

FARGO: TEAM #7048

Team 7048, Red River Rage, entered its fifth year of competition during the 2022 season. They are a composite team with 9th to 12th grade students from the Fargo area. Their goal is to provide student driven experiences in technical problem solving, design, build, testing, and the programming of a competition ready robot. Upperclassmen serve as technical leads and are assigned to various components of the robot. Designs are conceived and prototyped by students with support from adult mentors. All of the team's final build decisions are made by the students!

JAMESTOWN: TEAM #7578

The Quantum Misfits, Jamestown's FIRST Robotics team, saw a record number of students participate in the 2022 season. Team mentors came from a range of backgrounds including manufacturing, computer science and engineering. The well-rounded team and their mentors built a robot that could climb, load, and shoot a ball! The team went on to share their love for STEM and FIRST Robotics with audiences at local STEM community events such as STEMtastics Day and

Manufacturing Day. The team hopes to continue introducing local students and mentors to STEAM.

ROLLA: TEAM #8255

The Rolla Robodogs gave it their all during the 2022 FIRST Robotics season. Although young, the team stayed competitive and brought spirit. They built a competitive robot and attended the Great Northern Regional Event. Throughout the season, the team learned about robotics, future STEAM and STEM career paths, community service, and how to work together. The Rolla Robodogs hope to return in 2023 with a larger team and will strive to continue promoting STEM activities within their community.

HATTON-NORTHWOOD: TEAM #876

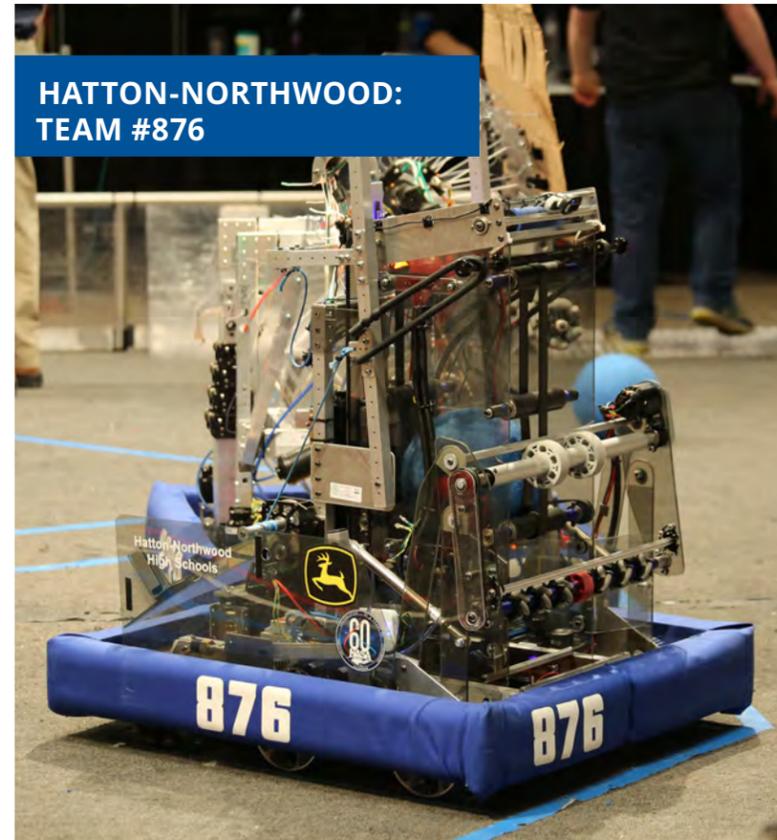
Thunder Robotics had a strong showing during the 2022 FIRST Robotics season. They placed five students on the conference All-Academic Team, placed 2nd at the Lake Superior Regional and finished as champions of the Great Northern Regional, qualifying for the World Championships in Houston, TX! Thunder Robotics also won the Autonomous Award at their regional competition. This award is presented to a team that has "...demonstrated consistent, reliable, high-performance robot operation during autonomously managed actions." During the World Championships in Houston, Thunder Robotics advanced to the division semifinals before being eliminated.



JAMESTOWN: TEAM #7578



BISMARCK: TEAM #6645



HATTON-NORTHWOOD: TEAM #876



CANDO: TEAM #877



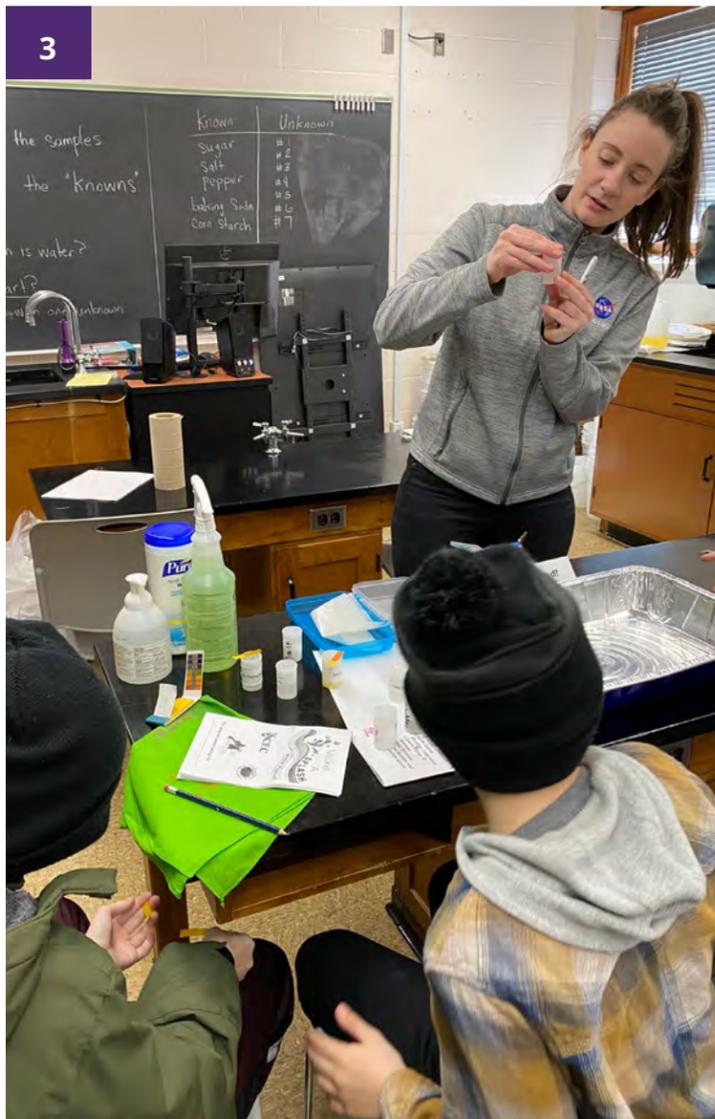
ROLLA: TEAM #8255



1



2



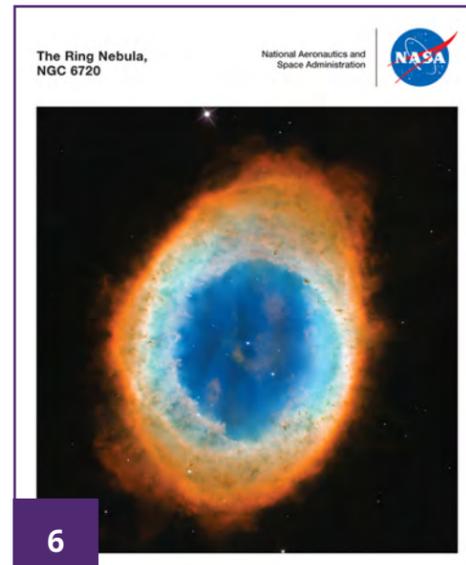
3



4



5



6

COMMUNITY Engagement Events

COMIC CON

In Fall of 2021 the NDSGC attended the Grand Forks Comic Con, connecting with the local community over the love of all things science and space. Those in attendance were invited to drive Sphero robots through a racecourse, explore VR headsets, and learn about NDSGC opportunities.

introducing rural North Dakota students to the STEM workforce, NDSGC STEM Ambassadors Jacquelyn Emery and Izzy Adams conducted an engineering design challenge with students, challenging them to design a paper rocket with the capacity to protect an extra special payload.

DCB WATER FESTIVAL

The NDSGC team traveled to Dakota College at Bottineau (DCB) for the 2022 DCB Water Festival in April. The NDSGC conducted a "Water on Mars" activity for junior high school students from rural and Tribal communities. Space Grant also met with DCB affiliates and students to discuss funding and future collaborations.

UND ART COLLECTIONS

In collaboration with the UND Art Collection, the NDSGC continues to share STEM art. Various posters featured in the NDSGC's UND Art Collection are available at the NDSGC office. A special thank you to UND Art Collections Curator Sarah Heitkamp for allowing the NDSGC to be part of the UND Art Collection, here's to STEAM!

Make sure to visit the art gallery in Skalicky!



LEARN MORE!

<https://commons.UND.edu/uac/>

NDSGC'S 30TH BIRTHDAY

The NDSGC celebrated its 30th Birthday on February 6th, 2022 with an open house, balloons and cupcakes.



Read the full story on UND Today!

<https://blogs.und.edu/und-today/2021/02/north-dakota-space-grant-consortium-turns-30/>

BISMARCK LARKS STEM EXPO

STEM Ambassadors Hope Burdolski and Thomas Power attended the MDU Lark's STEM Expo in August of 2022 at the Bismarck Municipal Ballpark. For the second year in a row, Hope and Thomas hosted a hands-on STEM activity for the families that were in attendance. Stomp rockets, posters, and NDSGC hand outs were enjoyed by all.

JAMESTOWN REGIONAL STEM EVENT

The 2022 STEMtastic & Tech Savvy event was held at the University of Jamestown in March. With the goal of

JACK BACON

Working with affiliates from ND's Gateway to Science and the State Historical Society of North Dakota, 31-year veteran rocket scientist from NASA, Jack Bacon, visited Grand Forks schools and the UND campus. Dr. Bacon shared his experiences in helping develop the International Space Station and his own international coordination efforts to reduce orbital debris.

1 STEM Ambassadors engage young students with VR headsets and Sphero robots at Comic Con.

2 Stem Ambassadors pose for a picture at their outdoor table at the MDU Lark's STEM Expo.

3 Program Coordinator Tori McIntosh helps students in a lab setting during a "Water on Mars" activity.

4 Deputy Director, Marissa Saad and STEM ambassador Jacquelyn pose in front of the NDSGC office while handing out cupcakes to celebrate the program's 30th year.

5 Veteran NASA rocket scientist Jack Bacon, accompanied by STEM ambassador Sydney, walks one of the connecting tunnels in the Aerospace Building.

6 NASA photograph of the Ring Nebula.



Sci Girls Camp

INVESTING IN FUTURE STEM LEADERS

In June of 2022, the North Dakota Space Grant Consortium hosted a SciGirls summer camp for middle school girls. Sixteen girls from the region participated in four hands-on sessions over four days. The final day included a Sphero Race competition and an awards ceremony, complete with friends, mentors, and families in attendance.

Over the course of the camp the girls completed team-based challenges and toured UND Aerospace facilities. They designed neutrally buoyant tools for astronauts, explored space craft simulators, toured UND's Spaceflight Lab, made atmospheric investigations, launched stomp rockets, designed a spaceflight crew, and drove robots through a Mars-inspired racetrack.

Guest speakers at the camp included NASA Langley Researcher Jen Fowler, who shared her STEM experiences and STEM career path with the students. Jacquelyn Emery and Isabelle Adams discussed the roads that led them to becoming aviation students at UND and the time they spent as NASA and weather modification interns. Sydney Menne spoke remotely from her internship at Virgin Orbit and discussed 3D printing metal components for rockets.

This summer camp was made possible through a partnership with the PBS series SciGirls. The NDSGC is a partner in their SciGirls in Space! program.

"I LEARNED THAT THE ARTEMIS PROGRAM MIGHT BE FOR ME."

- 2022 SciGirls Participant



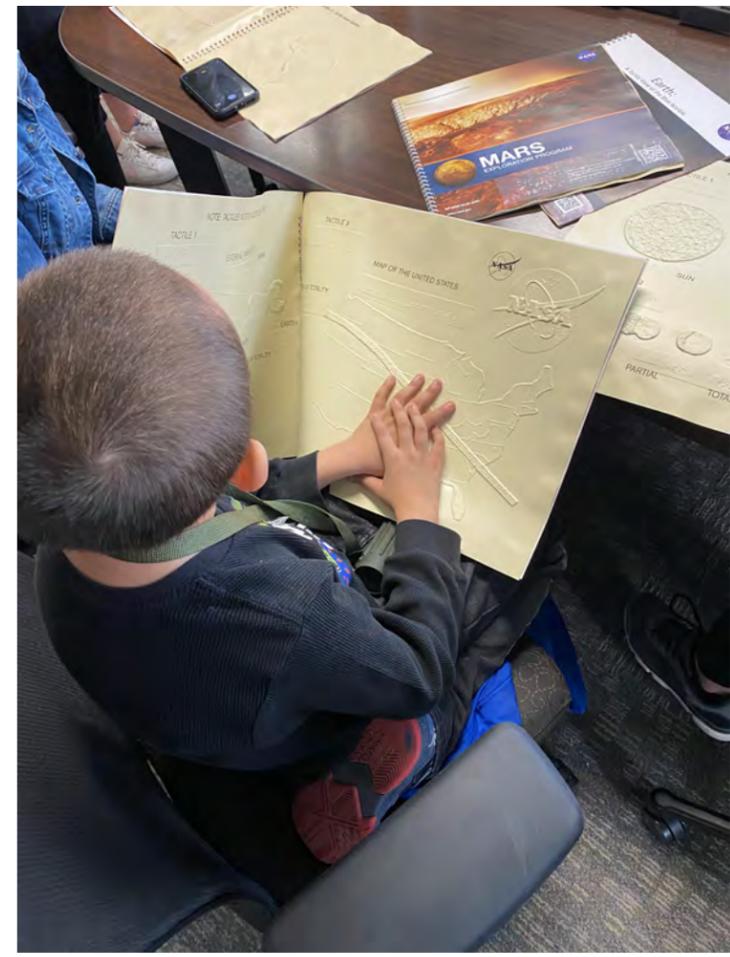
Top: After taking cloud observations, the Sci Girls decided to interpret their findings through dance!

Left: Sci Girls work on creating stomp rockets.

Right: Sci Girls get a tour of UND's Human Spaceflight Laboratory and explore 3D printed suits.



Spring 2022 Plant the Moon experiment results from the Galaxy Gardeners, team #9402 from Rickard Elementary School.



Plant the Moon/Mars

In 2021, the North Dakota Space Grant Consortium supported 18 North Dakota K-12 teams to participate in the Institute of Competition Science's "Plant the Moon Challenge". This agricultural based challenge asks students and their mentors to grow plants in lunar and Mars regolith; soil from Mars and the Moon that has

been re-created in a lab. The NDSGC-sponsored team "Dancing Flowers" from Theodore Jamerson Elementary School, located on the campus of United Tribes Technical College, was featured in the local news!

Check out the news articles below!



READ THE STORY FROM KFYR TV

<https://www.kfyrtv.com/2022/02/26/plant-moon/>



READ THE STORY FROM KX NEWS

<https://www.kxnet.com/video/5th-and-6th-graders-of-theodore-jamerson-elementary-school-participate-in-the-plant-the-moon-challenge/7595152/>



NDVS/SB

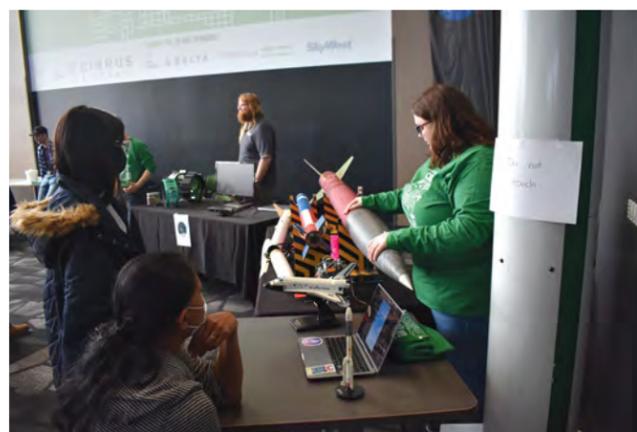
In Spring of 2022 the NDSGC gave UND Aerospace tours to students from North Dakota Vision Services/School for the Blind. Upon arrival, students spent time with tactile and braille space exploration books, models, and 3D-printed solar systems. Students posed intriguing questions about space settlements and the moon. After, students were given a tour of UND's Human Spaceflight Lab where they learned about 3D printed space suits and had the chance to sit in spacecraft simulators.

NDVS/SB SCHOLARSHIP

The NDSGC, through a partnership with North Dakota Vision Services/School for the Blind (NDVS/SB), is now awarding an annual NDVS/SB & NDSGC Scholarship. Students studying STEM at any the NDSGC's 16 affiliate schools and who qualify for services from the NDVS/SB are highly encouraged to apply. The scholarship was awarded for the first time during the 2020-2021 academic year.



To learn more, scan the QR code or visit:
<https://ndspacegrant.und.edu/college-students/scholarships/ndvssb.html>



Community Day 2022

STEM AND COMMUNITY ENGAGEMENT AT THE JOHN D. ODEGARD SCHOOL OF AEROSPACE SCIENCES

This was the third year that the NDSGC team helped organize and host the UND Aerospace Community Day. Over 3,000 guests visited this “open house” event. Children, adults, and industry members visited UND to immerse themselves in aviation, space, sustainability, meteorology, and flight operation activities. Guests stamped their “UND Aerospace Passports” at various stations throughout the day, exploring what academic aerospace and NASA opportunities are available at UND. Families could explore static displays of helicopters and airplanes, aircraft and spacecraft simulators, hear about real-life experiences from industry members (many UND alumni!), fly UAV (mini-drones), explore the space suit laboratory, and the 360° air traffic control tower simulator. NDSGC’s STEM Ambassadors offered tremendous assistance throughout the event, facilitating hands-on STEM activities including Sphero robots, the 3D printer, stomp rockets and atmospherium movies.





Above: An educator (left) from North Dakota Vision Services/School for the Blind in Grand Forks, along with two more educators from North Carolina, prepare for the upcoming 2023-24 solar eclipses by observing the sun, safely, through eclipse sunglasses.

EDUCATOR PROFESSIONAL Development

SUMMER 2022 IDEAS WORKSHOP

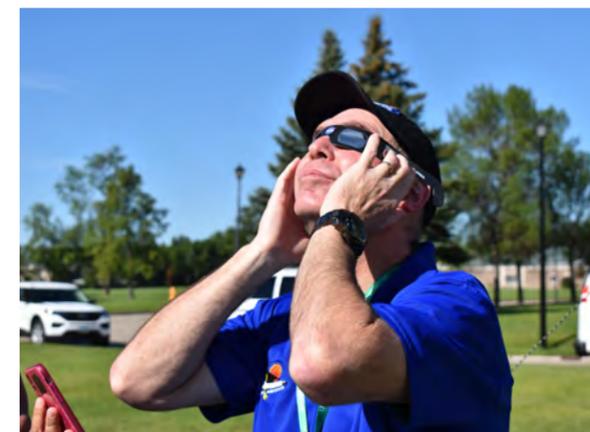
In July of 2022, the NDSGC and IDEAS team hosted a nation-wide DEIA-focused educator professional development workshop at the University of North Dakota's Robin Hall. The IDEAS acronym stands for Innovative Differentiated Exploration Activities in Space Science and is a collaborative project between the North Dakota, North Carolina, and South Carolina Space Grant Consortia and various NASA centers.

For the workshop, educators from North Dakota, North Carolina, South Carolina, Tennessee, and West Virginia gathered to discuss incorporating universal design concepts into their STEM classrooms, participated in hands-on STEM investigations, explored UND's Human Spaceflight Laboratory, Inflatable Lunar/Martian Analog Habitat, and Aerospace atmospheric. Educators' experiences lead to rich discussion on how to improve inclusive and accessible STEM pedagogy.

Guest speakers included team members from Johns Hopkins Applied Physics Lab,

Edinboro University, and Georgetown University. Educators had the chance to receive continuing education credits for their attendance at the workshop. The NDSGC and IDEAS team will host another nation-wide DEIA-focused educator professional development workshop in the summer of 2023, at the Johns Hopkins Applied Physics Lab. ND educators, especially early career, are encouraged to attend!

Top left page: Educators recreate the surface of the moon with impression material. Top right: Educators create tactile-based photos for students. Center left: Two educators explore Earth's magnetic field with a globe and magnet. Center: An educator uses eclipse glasses while observing the sun. Center right: Two workshop participants explore a globe. Bottom: Educators wait outside the Inflatable Lunar Mars Habitat for their tour.



GAINING IDEAS FROM IDEAS

"Partaking in this wonderful learning opportunity was such a blast! I learned various instructional strategies and gained knowledge and resources to make space science activities accessible and inclusive."

—Cindy Williams, Student Programming Coordinator, NDVS/SB

Read Cindy's blog post!



<https://www.ndvisionservices.com/news/gaining-ideas-ideas>



READ THE STORY ON UND TODAY!

<https://blogs.und.edu/und-today/2022/10/space-grant-educators-fuel-love-for-science/>

Students and affiliates are encouraged to submit Student Success Stories to the NDSGC team.

SPACE GRANT ALUMNI SUCCESS STORIES

Where are They Now?



MARCOS FERNANDEZ TOUS

NDSGC Involvement: Fall 2021 Student Research Fellow and Summer 2023 NASA Intern at MSFC

Education: PhD Space Sciences at UND

Where are you now? Assistant professor in the Space Studies Department

Advice to Students: Be brave enough to err and recognize it



LORI WATERS

NDSGC Involvement: Fall 2020 Graduate Student Research Fellow, Summer 2020 NASA Intern, and Fall 2020 Mini-Grant

Education: UND Master of Science - Space Studies

Where are you now? As a Space Training Program Specialist for the U.S. Navy at Peterson Space Force Base, I am a space instructor for the joint forces at the National Security Space Institute and USSF 319 Combat Training Squadron

Advice to Students: Achieve your "moonshot" by deciding to go and then generating forward momentum that turns consistent small steps into giant leaps. Those small steps include applying for internships, analog missions, and research projects. Dream, apply, and do!



Both Lori Waters and Marcos Fernandez Tous are NDSGC-funded graduates of the John D. Odegard School of Aerospace Sciences at the University of North Dakota.



MEET AN AFFILIATE:

Nueta Hidatsa Sahnish College

THE ESTABLISHMENT OF NUETA HIDATSA SAHNISH COLLEGE (NHSC)

The Nueta Hidatsa Sahnish College (NHSC) is tribally chartered by the Three Affiliated Tribes of the Fort Berthold Reservation headquarters at New Town, North Dakota. NHSC is tribally controlled by a Board of Directors, which consist of seven members. The College was founded May 2, 1973, as the agency responsible for higher education on the Fort Berthold Reservation.

The Three Affiliated Tribes endorsed the concept that a locally based higher education institution was needed to train Tribal members and to act as a positive influence in retaining the Tribal cultures. A steering committee was appointed to oversee the initial operations of the College. This committee was replaced by the selection of a Board of Directors in 1974.

The first classes offered at NHSC were on an extension basis with coordinating accredited institutions. The articulation agreements made in the beginning were with University of Mary, Bismarck, ND; Minot State College, Minot, ND; and the University of North Dakota, Williston Center, Williston, ND. The College proceeded to develop long-range planning models. This planning resulted in the development of a framework for carrying out the mission and goals of the College, and in the improvement of the educational and vocational services in the communities throughout the Reservation.

Nueta Hidatsa Sahnish College was granted accreditation on February 12, 1988, through the North Central

Association of Schools and Colleges. On July 12, 2006, Nueta Hidatsa Sahnish College was granted continued 10-year accreditation through the Higher Learning Commission of Schools and Colleges (HLC). The college is also one of thirty-two tribal colleges granted 1994 Land Grant Institution status. Nueta Hidatsa Sahnish College is accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools. The Nueta Hidatsa Sahnish College is also a member of the American Indian Higher Education Consortium (AIHEC). On February 25, 2011, HLC's Institutional Actions Council (IAC) voted to extend the College's Accreditation to include Bachelor of Science Degrees in Elementary Education and Environmental Science, and the Bachelor of Arts in Native American Studies, making NHSC a Four-Year Institution.

NHSC PHILOSOPHY

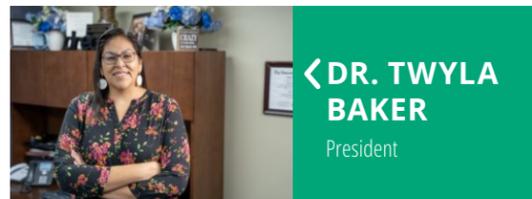
Nueta Hidatsa Sahnish College seeks to:

- Enhance the quality of life for the Mandan, Hidatsa, and Arikara Nation.
- Build a positive, strong identity of the Three Affiliated Tribes.
- Ensure development of global citizenship by providing necessary training and leadership.
- Develop a financially strong institution which meets the needs of the students by providing a safe learning environment that promotes diversity and relevant curriculum.
- Encourage the need to voice informed opinions to make positive change.

Left: Bheri Hallam and Jessica Uran investigate crop health. NHSC has a land lab for agricultural research and offers an A.S. and B.S. in Environmental Science.



LEARN MORE
<https://nhsc.edu/>



NHSC MISSION

A unique educational community founded in culture and spirituality that nurtures student success.

NHSC VISION

Integrates dynamic, cultural principles to honor the past, for those living in the present and shaping the future.

NHSC VALUES

- Honesty
- Respect
- Responsibility
- Being a good relative
- Tenacity
- Curiosity
- Innovation



Left: NHSC is the only tribal college in the nation offering a degree in Equine Studies. Right Top: Dr. Twyla Baker, President of Nueta Hidatsa Sahnish College. Right Center: Bernie Young Bird, Native American Studies Faculty member. Right bottom: Kerry Hartman, Academic Dean and Science Faculty member. Dr. Hartman facilitates NDSGC Undergraduate Scholarships and the American Indian Scholarship at NHSC.

- Become a leader among tribally controlled colleges, providing the highest quality of cultural, academic, and vocational education and student services.

PROGRAMS AT NHSC

Nueta Hidatsa Sahnish College offers three certificates, fourteen associates, and four bachelors degrees. NHSC is the only Tribal college to offer three indigenous languages through our Native American Studies program. We also offer an Associates in Equine Studies where students can choose the degree path of Natural Horsemanship or Trauma-Focused Equine Assisted Services. In recent years, NHSC received approval to offer a Sustainable Energy

Technologies program, which is also the first one to be offered by a Tribal college.

NHS College's most popular programs these days are Business Administration (AA), General Studies (AA), Environmental Science (AS and BS) and Equine Studies (AS).

NHSC FACILITIES

NHS College has robust facilities for a small Tribal College. We have two buildings on the main campus. One is our 65,000 square foot main building and the second building is our Cultural Center which is located across the street. The Cultural Center has a wellness center, kitchen, meeting area, classrooms, and office space for use by the Native American Studies

Department and community. The main building houses classrooms which include three classrooms designated to STEM courses, offices, labs, technology center, and welding lab.

NHSC has invested resources in upgrading its technology the past 4 years. The building has been completely rewired, new computers and laptops purchased for instructors, bandwidth increased to 10 gig and new switches, servers and network have been added. NHSC has also invested in IT staff with the college having 4 full time IT technicians. This provides staff and students with technology help basically 24 hours a day.

Additionally, NHSC has a land lab where students can participate in agricultural

Above: NHSC has three federal government grants to support undergraduate science degree programs.

research. NHSC also partners with the Northeast Segment to offer equine degree courses and events at the Healing Horse Ranch located 10 miles east of the college. The equine program also provides equine assisted therapy activities for local schools as well as community events.

STEM AT NHSC

NHSC provides a plethora of opportunities for students and community members. In addition to all the coursework offered (Pre-engineering, Computer Science and a Comp TIA++ certificate, Math, Science and Environmental Science degrees), NHSC has three federal government grants to support undergraduate science degree programs. These include two NSF TCUP (National Science Foundation Tribal College University Program) Grants for the pre-engineering and environmental science programs. NHSC also has an NNSA/MSIPP (National Nuclear Security Administration/Minority Serving Institutions Partnership Program) grant. Students accepted into the cohorts of each grant receive tuition assistance which includes all tuition and fees, books, travel, and monthly stipend. All three grants also require students to conduct

and/or participate in research activities involving individuals and faculty research projects. Students in these cohorts are also required to participate in K-12 outreach activities which include science days, science fairs, poster presentations and assisting local K-12 schools with science activities. These grants also offer students professional mentoring, opportunities to attend tribal, state, and national conferences. All three grants also offer students the opportunity to accept internships at local and national research universities and labs during the summer.

NHSC also participates in American Indian Higher Education Consortium and American Indian Science and Engineering Society (AISES) regional and national activities.

BUILDING A COMMUNITY AT NHSC

NHSC offers many opportunities for students and community members to participate in programming and activities. We have Lunch and Learns, Welcome Week, STORM Family Study Sessions, social, and cultural activities for students to participate. Students can also participate in one of six student

organizations: All Chiefs Society (open to NHSC students and community members), American Indian Business Leaders (AIBL), American Indian Higher Education Consortium (AIHEC), American Indian Science and Engineering Society (AISES), Student Senate, and NHSC Horse Nation. We have three athletics programs for both men and women; basketball, golf, and cross country.

Community events include summer science camp, STORM the community events, Sunday Science Academy, and K-12 STEM/Culture events. The equine program also hosts various activities for community members to participate. NHSC also partners with ND Extension Services to provide youth activities. The Youth Director's office is housed at NHSC. This partnership strengthens our relationship with youth and families in the NHSC service area.

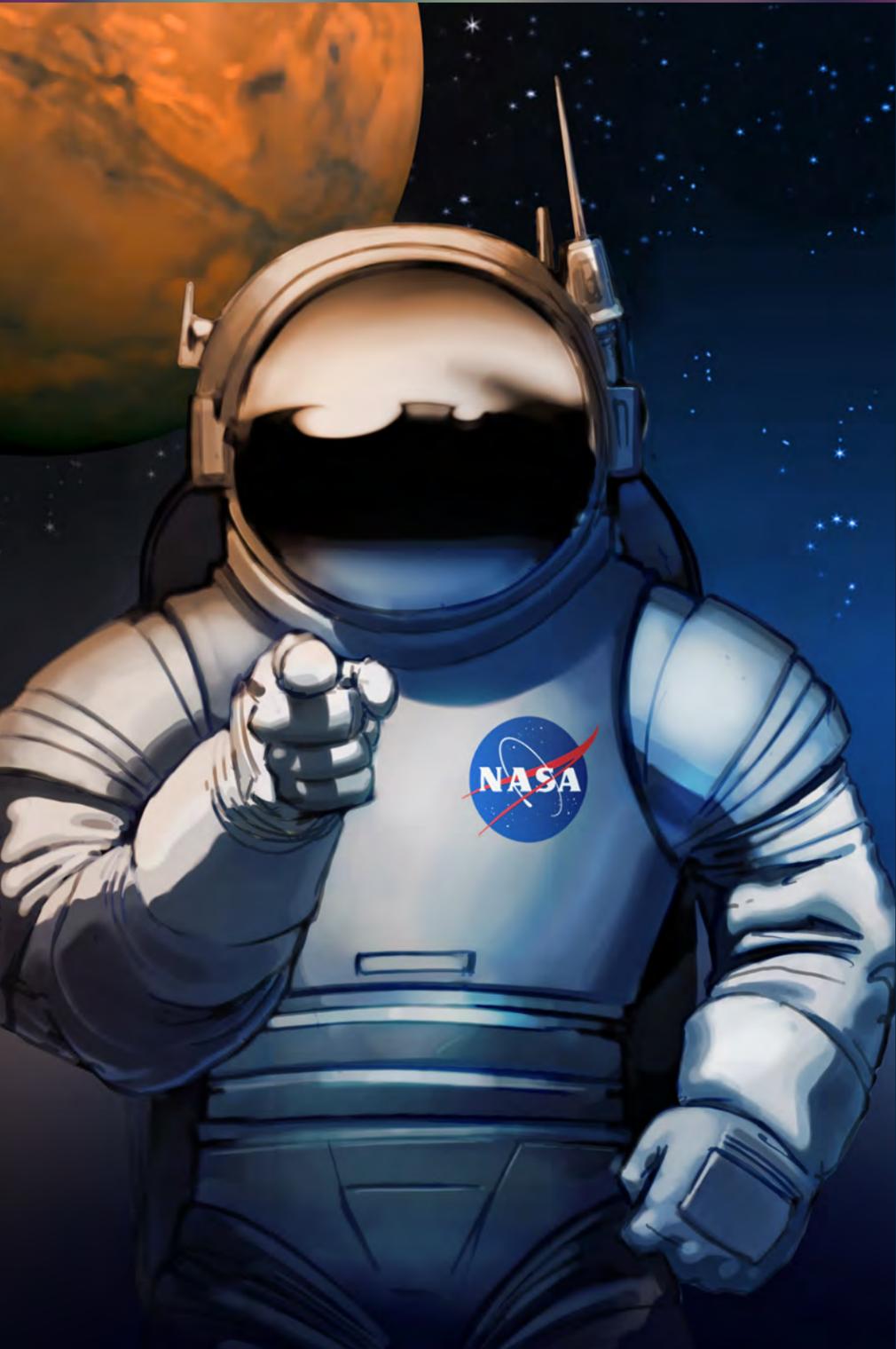
STAY ENGAGED WITH Space Grant



JOIN OUR MAILING LIST
tinyurl.com/mpncthaf



VIEW OUR BROCHURE
tinyurl.com/2p97j4zf



WE WANT YOU!

The NDSGC is always looking to expand its reach with students and educators across North Dakota.

If you are interested in any of the opportunities described in this newsletter, want to engage your students or colleagues, or want to contact us, please reach out to any member of the NDSGC team. Contact information is listed on the inside of the front cover. You can register for our electronic mailing list and look at our brochure with the QR codes found on this page.

EDUCATOR WEBSITE

Educator activities can be found on our K-12 Engagement website.

Scan the QR code below to get involved with e-field trips to the Human Spaceflight Lab, to find STEM lesson plans, to request classroom guest speakers, and more!



VISIT OUR
EDUCATOR WEBSITE

spacegranteducation.wixsite.com/ndsgc

WEBSITE AND SUBMITTABLE

To view all of the active NDSGC applications, please visit our Submittable application site. This list of programs changes throughout the year and reflects open application windows.

You can find information about NDSGC opportunities on their respective web pages, at <https://ndspacegrant.und.edu>.



VIEW ACTIVE
NDSGC APPLICATIONS

ndspacegrant.submittable.com/submit

We Need You: NASA commissioned poster for an exhibit at the Kennedy Space Center Visitor's Complex in 2009.

SOCIAL MEDIA

Stay up to date with North Dakota Space Grant events and happenings by following the North Dakota Space Grant on social media.

@NORTHDAKOTASPACEGRANT

@NDSGC

@NDSPACEGRANT

@NDSPACEGRANT

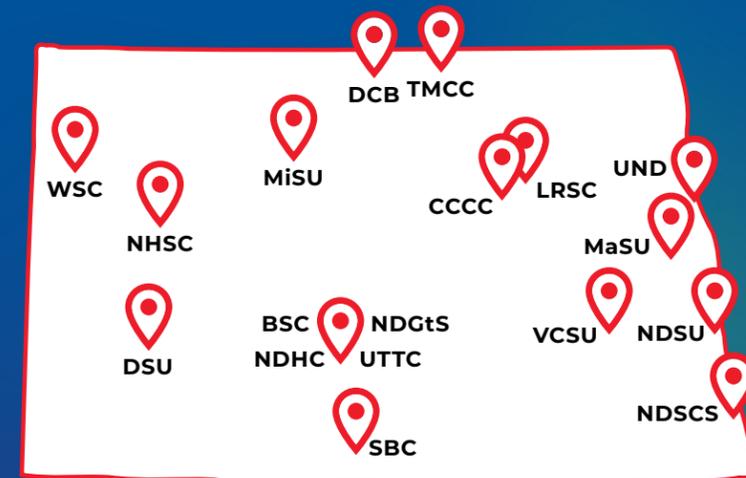
NORTH DAKOTA SPACE GRANT

NORTH DAKOTA SPACE GRANT CONSORTIUM

@NDSPACEGRANT

NORTH DAKOTA SPACE GRANT CONSORTIUM

NORTH DAKOTA SPACE GRANT AFFILIATES



THANK YOU!

None of these events would be possible without the amazing work of representatives at the NDSGC affiliate institutions (listed on the back cover). Their efforts allow the NDSGC to expand its reach statewide and ensure that students across North Dakota are able to participate in a number of programs. The NDSGC would like to thank each of them for their dedication to NDSGC programming, promotion of opportunities, and continued involvement.

Thank you, also, to Heather Schuler (Visual Communications Specialist in the School of Aerospace at the University of North Dakota) for designing the Aurora Newsletter. The NDSGC is grateful for all the work Heather has done and her contributions to the NDSGC.

WE NEED YOU



THANK YOU TO OUR AFFILIATES!



BISMARCK STATE COLLEGE



CANKDESKA CIKANA COMMUNITY COLLEGE



DAKOTA COLLEGE AT BOTTINEAU



DICKINSON STATE UNIVERSITY



ND'S GATEWAY TO SCIENCE



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

VALLEY CITY STATE UNIVERSITY



WILLISTON STATE COLLEGE