

Consortium: Nebraska Space Grant

Lead Institution: University of Nebraska at Omaha

Director: Dr. Scott Tarry

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Affiliate members: Chadron State College, College of Saint Mary, Creighton University, Hastings College, Little Priest Tribal College, Metropolitan Community College, Nebraska Indian Community College, Northeast Community College, University of Nebraska at Kearney, University of Nebraska – Lincoln, University of Nebraska Medical Center, Western Nebraska Community College, 99th Pursuit Squadron – Civil Air Patrol, Duncan Aviation, Great Plains Girl Scouts, Nebraska 4-H, Nebraska Academy of Sciences, Nebraska Department of Aeronautics, Nebraska Aviation Council, Strategic Air and Space Museum, and Tuskegee Airmen, Inc.

Program Description: The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The Nebraska Consortium is a Designated Consortium funded at a level of \$590,000 for fiscal year 2007.

Program Relevance to NASA: Space Grant consortia build human capital and research expertise to support NASA programs and missions, expand NASA's expertise and educational networks, and bring knowledge and awareness of space to a broad range of constituents in every state. The NASA Nebraska Space Grant Program allows Nebraska colleges and universities to implement a balanced program of research, education, and public service programs related to aeronautics, space science, and technology including:

- Engaging 35 undergraduate and 24 graduate students in research experiences (26.8% of participants minority students and 48.7% women)
- Assisting high-potential young faculty to become NASA Project Investigators and effective partners with NASA centers and contractors
- Infusing NASA space exploration goals, knowledge, and materials into the education experiences of K-12 students through teacher training

Program Benefits to the State: The Nebraska Space Grant benefits the state in numerous ways, including:

- Increasing the workforce skills of Nebraska students through fellowships distributed across the state to all academic affiliates

- Funded 10 research mini-grant proposals from all 4 research affiliates; 50% are directly aligned with Nebraska technology or research priorities, and 50% of funded researchers will submit an application for continued funding elsewhere
- 8 researchers and educators awarded travel grants
- 1 higher education mini-grant award to a minority institution
- Provide opportunities for remote and underserved students via distance education through the development of NASA-related course resources in STEM disciplines
- Purchase library materials for the state's library collection related to aerospace and NASA for access by Nebraska educators, students, & public

Program Goals: NASA Nebraska Space Grant Strategic Goals

Goal 1 Workforce Development: Higher Education and Research Fellowship Program

To deliver a scholarship and fellowship program that offers research opportunities to diverse student populations pursuing aerospace-related course work at Space Grant academic affiliates throughout Nebraska. Contribute to the STEM workforce pipeline by providing a progression of educational opportunities for talented Nebraska students, preparing them to pursue careers in aerospace science and industry.

Goal 2 Aerospace Research: Developing Nebraska's Aerospace Infrastructure to Contribute to NASA

To raise the aggregate quality and quantity of Nebraska's aerospace research endeavors to the highest level of national competitiveness through NASA competency-building research opportunities, exploring and refining concepts that will help America return to the Moon, and ultimately travel to Mars and beyond.

Goal 3 Pre-College Educational Opportunities: Providing a Progression of Opportunities to Nebraska Students, Teachers, and Faculty

To strengthen the Nebraska STEM education base from elementary through university levels with emphases on NASA content, teacher training, and delivery to underrepresented groups.

Goal 4 Dissemination and Informal Education: Reaching Nebraskans through NASA Materials and Findings

To increase public support for NASA through informal education and spreading NASA's mission to Nebraska citizens and beyond.

Goal 5 Evaluation and Management: Program Evaluation and Management toward Strategic Goals

To manage the Nebraska Space Grant and EPSCoR programs with broad participation from statewide leaders, and evaluate the impact to assure achievement of NASA's Education Outcomes and NASA's priorities for Nebraska Space Grant & EPSCoR.

Program Accomplishments:

- Fund higher education workforce development activities annually, including higher education activities targeted toward females and underrepresented students

- Student researchers present results at annual research conference or other outreach experience to relay their research outcomes
- Assess impact of student awards by tracking students entering the STEM employment and educational fields as the next step in their career or educational pursuits: FY 07: Most still enrolled; FY 06: 11 of 18 (61%) that were reported as Still Enrolled last year are now onto next step in STEM
- Utilize faculty mentors for student researchers to better equip the students with the skills and proficiency needed in STEM disciplines for future employment at NASA, industry, and higher education
- 75% of mini-grant awards are aligned with the NASA Vision or NASA priorities, 25% of mini-grant awards are used to make new contacts or strengthen relationships with the aerospace industry; and 75% of mini-grant awards include at least 1 student research experience
- At least 1 publication results from each funded research project
- At least 4 mini-grants awarded for teacher training each year, including at least 1 for teachers from Native American tribal colleges and school districts
- At least 1 travel grant awarded for an educator to attend a NASA-sponsored workshop or conference to increase the skills and knowledge in STEM disciplines
- Support at least 2 teacher workshops in Nebraska each year with NASA resources for educators to increase their skills and knowledge in STEM disciplines
- Partner with other schools and organizations participating in authentic NASA pre-college programs in Nebraska to identify content needs, speakers, and other access to STEM-related resources in Nebraska
- Support at least 3 informal education activities per year that align with NASA's informal education goals
- Support 5 underrepresented students per year to attend informal education programs that align with NASA's informal education goals
- Educators trained by Nebraska Space Grant offer the Native American Family Science program at the tribal schools in which at least 50 families participate each year

Student Accomplishments: The Nebraska Space Grant supports student research, workforce development activities, and internships. In the summer of 2008, the Nebraska Space Grant is supporting 3 interns at NASA's Langley Research Center, 2 students at NASA JPL, 1 student at SAWDRIP, and 1 student at Honeybee Robotics. Below are some select student accomplishments.

Dustin Dam, an Electrical Engineering major at the University of Nebraska - Lincoln (UNL), was a student co-op with Jacobs Engineering at JSC. Dustin returned to UNL to lead a group of students in submitting a successful proposal to NASA's Microgravity University Program. In addition to the experiment, the group is also promoting NASA and engineering to schools and the community.

Ann Packard, funded in the fall 2007 statewide scholarship program, was previously funded as an undergraduate while attending Hastings College. After she graduated

from Hastings in May of 2007, she enrolled in medical school at Creighton University where she is conducting research with Dr. John Kuehn in Biology.

Lee Redden is a Mechanical Engineering major at UNL. He has been active in two student design projects: the 2007 and 2008 ASME student design competitions and professional development conferences, a team member for the NASA Reduced Gravity Student Flight Opportunities Program. Redden also completed two industry internships: the first at an aerospace composite manufacturer, Royal Plastic; and the second at Lockheed Martin in the missiles and fire control division.

Jennifer Balmat is an undergraduate student at Chadron State College majoring in Physical Science - Geoscience. She plans to pursue a Master's and Ph.D. in Geology, with a career goal of becoming a professor so she can educate and promote understanding of the planet and conservation of natural resources. She is the lead student researcher on a new EPA "People, Prosperity, and Planet" interdisciplinary student research project. Jennifer presented at the fall 2007 Geological Society of America's national meeting. She is working with faculty mentors Dr. Mike Leite and Dr. Hannan LaGarry on the remote sensing of regional structural trends and mapping of faults along the Pine Ridge Escarpment in northwestern Nebraska. Methods include analysis of NASA Landsat-TM and Space Shuttle Radar images, ground-truthing of trends, mapping of faults, and review of available seismic data.

Evan Luxon, a junior in the UNL Mechanical Engineering program, has pursued opportunities to be involved in research with a faculty member since he was a freshman. This ambition led him to become a research assistant on a project in which he is helping develop a new tool for minimally invasive surgery that will reduce risks and recovery times for patients, while improving efficiency of the surgeries themselves. He recently contributed to a paper submission for publication entitled, "Intelligent Tool for Emergency Surgical Treatment during Payload-Critical Missions." Evan also serves as a tutor in the Engineering Mechanics Instructional Lab. The Nebraska Space Grant is also providing funding for Evan's 2008 JPL summer internship.

Christopher Schuck, Jr. is a UNO undergraduate Physics & Biotechnology major investigating electron density distribution critical points in halomethane bonding for his senior thesis. He recently completed a collaborative research project with two other students that resulted in a paper submitted for publication to the *International Journal of Mathematical Education in Science and Technology*.