

Montana Space Grant Consortium

Lead Institution: Montana State University
Director: Dr. William A. Hiscock
Telephone number: (406) 994-4223
URL: <http://spacegrant.montana.edu>

Affiliate Members:

Blackfeet Community College
Carroll College
Chief Dull Knife College
Dawson Community College
Flathead Valley Community College
Fort Belknap College
Fort Peck Community College
Little Bighorn College
Miles Community College
Montana State University – Billings
Montana State University – Northern
Montana Tech
Rocky Mountain College
Salish Kootenai College
Stone Child College
University of Great Falls
University of Montana – Missoula
University of Montana – Western
Anasphere, 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 Montana Space Grant 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 Montana Space Grant Consortium programs support NASA and its mission. They include, but are not limited to:

1) Research Initiation and Educational Enhancement Grants

MSGC has, from its initiation in 1991, awarded the majority of its program funds in an annual peer-reviewed statewide competition. This approach allows MSGC to use its modest funds to support the most innovative, worthwhile ideas each year. Research Initiation PIs must have a letter of support from NASA researchers, which effectively aligns this program with NASA's strategic Vision for Space Exploration. Educational Enhancement awards serve to educate students and the general public about space science and engineering, which fulfills both NASA's goal to "inspire the next generation of explorers" and desire, as expressed in the Vision for Space Exploration, to gain support from the American public for NASA's new vision.

2) Undergraduate Research Awards

Providing support for undergraduate research opportunities in NASA-related fields at all MSGC Affiliate institutions continues to be an area of primary focus for MSGC. The Undergraduate Research Awards are aligned with section 2.4.2 of the NASA Education Strategic Coordination Framework to support diversity. These awards can help NASA "to ensure that underrepresented and underserved students participate in NASA education and research programs", since all colleges and universities in Montana, including all seven Tribal Colleges, are Affiliate members of MSGC.

3) Scholarships and Fellowships

The MSGC Scholarship and Fellowship Program has been and will continue to be at the heart of the MSGC program. The Scholarship and Fellowship Program directly supports Outcome 1.2 of the NASA Education Strategic Coordination Framework, as well as indirectly supporting Outcome 1.3, since applications from students directly involved in NASA-related research are favored in the competition.

4) Montana Space Grant Student Satellite Program

MSGC continues to develop and refine programs designed for freshman through senior college students that create a mission-like team environment where students learn to design, build, and fly space hardware. Students can begin building payloads for the BOREALIS (Balloon Outreach, Research, Education, and Land Imaging System) high-altitude balloon program as early as their freshman year and can move up to become part of Student Satellite projects such as Explorer-1 [prime] as they continue their studies. Many students who have been involved in these programs have gone on to internships at NASA centers and similar opportunities. The BOREALIS and Student Satellite programs directly address Outcome 1.3, and indirectly 1.2, of the NASA Education Strategic Coordination Framework. They directly support aerospace workforce development.

5) Space Public Outreach Team (SPOT)

SPOT is an MSGC education/public outreach program. This project sends specially trained Montana State University and University of Montana undergraduate students to Montana K-14 schools to give presentations about space science and exploration. The SPOT program addresses Outcomes 1.2, 2.3, and 2.4 of the NASA Education Strategic Coordination Framework. It is also an effective local way for MSGC "to inspire the next generation of explorers," and "increase Americans' science and technology literacy." (2006 NASA Strategic Plan, p. 30).

Program Benefits to the State:

Members of the MSGC consist of institutions of higher education, business, industry and non-profit organizations. The Consortium works with these affiliates and partners, and through government and public outreach, to promote a strong science, technology, engineering and math (STEM) base in the state. The promotion of this strong STEM base is accomplished via state-wide participation in the programs described above.

Program Goals: (MSGC Strategic Plan, Strategic Objectives)

1. Develop and connect space education programs that will build and enhance a set of K-Graduate opportunities for involvement in space-based science and engineering education, training, and research. **2.** Strive to build an aerospace workforce for the future by creating opportunities and fostering links between MSGC and NASA centers to advance Montana's undergraduate and graduate students. **3.** Create opportunities and support existing programs, such as teacher workshops and visits to NASA centers, for pre-college (both in-service and pre-service) teachers and informal educators around the state of Montana. **4.** Actively engage women and minority students to participate in all MSGC programs at all levels. **5.** Nurture the Montana college and university network and networks with NASA centers, aerospace industries, and local and state governments and creating cooperative programs involving different players within the networks. **6.** Have most MSGC programs be inter-disciplinary in nature, emphasizing science/engineering integration through designing and building space hardware. **7.** Expand and enhance, through competitive funding, aeronautics and space-related research activity in the state's colleges and universities.

Program Accomplishments: Montana Space Grant Successes and Anecdotes

1) Space Public Outreach Team manager and MSU astrophysics graduate student Joey Key visited the Montana School for the Deaf and Blind in December, 2007. She reports: "I visited the Montana School for the Deaf and Blind this year, giving two presentations. My favorite part about visiting Montana schools is the enthusiasm and appreciation shown by the students. The kids at the MSDB were especially happy to have me visit. They each thanked me for coming, and a little first grade girl taught me how to sign 'You're Welcome.'"

2) In fall 2004, Dr. Joseph Shaw (Associate Professor, Electrical and Computer Engineering) used funding from the Montana Space Grant Consortium to use an airborne light detection and ranging (lidar) system for detecting invasive Lake Trout that are threatening the existence of native Cutthroat Trout in Yellowstone Lake (Yellowstone National Park). Data gathered during the exploratory flights were used to create a map of suspected Lake Trout spawning locations. During the fall 2007 spawning season, Yellowstone National Park fisheries biologists followed the lidar-generated map and dropped nets to confirm the previously unknown existence of Lake Trout in the Southeast Arm of Yellowstone Lake. The biologists are now requesting further measurements be taken with airborne lidar to aid their efforts to locate and eradicate the invasive fish.

3) University of Montana – BOREALIS high altitude ballooning flight director Jennifer Fowler reports on a special BOREALIS payload recovery (the Montana BOREALIS payload recovery record is now 100% successful for **both** campus programs):

“In August of 2004 University of Montana -- BOREALIS launched its first payload. As a result of not deactivating the automatic shutoff on the GPS transmitting radio, we lost track of our payload 30 minutes into the launch. The afternoon of 9/7/2007, I received a telephone call from Ky Michaelson of Minnesota. Mr. Michaelson is the owner of Rocketman Enterprises from whom we purchase our balloon parachutes. He called to ask about a high altitude balloon payload found by a rancher in Montana in 2004. This rancher got Michaelson's contact off the parachute attached to the payload and a couple weeks later Michaelson received an unknown package from Montana. He subsequently gave the package to his 7 year old son to take apart. Once his son had the payload open, he called Michaelson's attention to the amount of electronics in the box. In an attempt to find its owners, he first pulled out the card from the camera. Not seeing any identifiable information in the pictures, Ky asked a buddy to decode the amateur radio and retrieve the call sign. It was with this call sign that Ky was able to contact me about returning our payload three years after it's launch. We now have successfully recovered every payload since 2004.”

Student Accomplishments: Student Successes and Anecdotes

1) Dr. Brian Larsen, who was a MSGC Fellow for three years, defended his dissertation on March 20, 2007. Brian is currently a staff scientist in the Center for Space Physics at Boston University. His job title is Instrument Suite Scientist for NASA's Radiation Belt Storm Probes - Energetic Particle Composition and Thermal Plasma (RBSP-ECT) instrument suite. He says, “Without MSGC support, staying in the field would have been less certain. With the support I am now part of a large NASA spacecraft mission and loving every minute of it.”

2) Dr. Michael Obland, who was a MSGC Scholar, was sponsored by MSGC to attend the Ames NASA Academy, was a MSGC Fellow and was a GSRP Fellow, defended his Ph.D. dissertation on April 5th, 2007. Mike is now a NASA Postdoctoral Fellow for the Climate Sciences Branch, Science Directorate, at Langley Research Center. He says, “Without my NASA experiences, I would not be where I am today! I love my job, look forward to work everyday, and am thankful for the experiences that led me to this point.”

3) Dr. Angela Des Jardins, who was a MSGC Scholar, was sponsored by MSGC to attend the Goddard NASA Academy, was Manager of MSGC's Space Public Outreach Team and is the current Deputy Director of MSGC, defended her Ph.D. dissertation on July 19th, 2007. She says, “The experiences I've had working with NASA have really formed who I am today. I have been interested in NASA and space science since I was little, so it is very rewarding to have worked and continue to work with NASA.”