

MONTANA SPACE GRANT CONSORTIUM

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MSGC Newsletter January 2012

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Montana NASA EPSCoR

Director's Note

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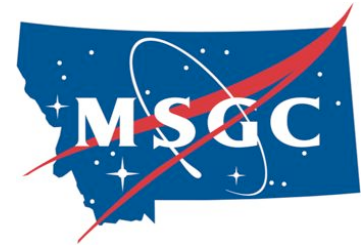
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20 Years of MSGC

The Montana Space Grant Consortium was created in 1991 by the late Dr. William A. Hiscock to "help Montana students become tomorrow's aerospace leaders." In the past twenty years MSGC has awarded \$405,000 in scholarships, \$1,165,000 in fellowships, over \$545,000 in paid internships, and even more across our other programs. 2011 also marked the 15th anniversary of the MSGC public outreach program **SPOT**, the 10th anniversary of the MSGC sponsored student satellite lab **SSEL**, and the 10th anniversary of MSGC's ballooning program **BOREALIS**.



Hiscock Radiation Belt Explorer



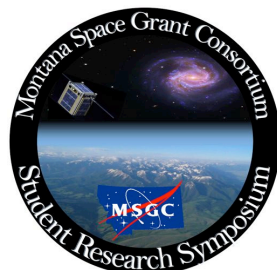
Montana's first satellite launched with NASA's NPP mission on October 28, 2011 from Vandenberg Airforce Base. Formerly known as Explorer 1 [PRIME], the Hiscock Radiation Belt Explorer (HRBE) is a Cubesat-class satellite named in honor of the founding Director of MSGC Dr. William A. Hiscock. [Read more on page 2.](#)

National Student Solar Spectrograph Competition

The **National Student Solar Spectrograph Competition** challenges teams to design, build, and use a ground-based solar spectrograph. Twelve teams of undergraduate students from across the country will compete in Bozeman May 16-19, 2012 for scholarship and travel prizes. [Read more on page 4.](#)



MSGC Student Research Symposium April 20



MSGC will be hosting the second annual **MSGC Student Research Symposium** at Montana State University in Bozeman on **Friday April 20, 2012**. MSGC students from across the state will have the opportunity to present their research. [Read more on page 4.](#)

Updates

HRBE Operations Team



Montana's first satellite, the Hiscock Radiation Belt Explorer (HRBE), is currently orbiting the Earth approximately every 90 minutes. HRBE is a Cubesat-class satellite designed, built, tested, and now operated by Montana students at the Space Science and Engineering Laboratory (SSEL) at Montana State University. Four times a day HRBE passes over the communications ground station on the roof of Cobleigh Hall at Montana State University. While the satellite is in view of the ground station students in the Space Science and Engineering Lab (SSEL) collect HRBE's data sent in packets every 15 seconds. HRBE's amateur call sign is K7MSU-02 and the downlink frequency is 437.505 MHz (nominal). HRBE's mission is to study the Van Allen radiation belts in honor of the 50th anniversary of Explorer-1, America's first satellite. HRBE carries a miniature Geiger

tube donated by Dr. Van Allen, using it to measure the intensity and variability of energetic electrons trapped in the Earth's magnetic field. For more information visit the [HRBE Operations](#) website.

Out of This World JPL Summer Internship



MSU engineering student Andrew Crawford spent an exciting summer at the Jet Propulsion Laboratory (JPL) working with the Deep Space Network (DSN) Antenna Mechanical Group. Andrew graduated from Flathead Valley Community College in the spring of 2011 and spent the summer working at JPL before starting school at Montana State University in the fall. As a former professional snowboarder the story of his summer was featured on the [ESPN website](#). Andrew's internship experiences included meeting the Mars Rover drivers, a visit to the Deep Space Network tracking facility, and an interview with the director of JPL. Visit his [official JPL blog](#) for more exciting stories from his internship.

Congratulations to MSGC Graduates

Last spring at graduation ceremonies across the state of Montana 31 MSGC students wore graduate sashes to highlight their involvement with MSGC. All MSGC scholarship, fellowship, internship, and research students are encouraged to pick up a graduation sash to wear at their graduation ceremony and festivities. Congratulations to all of the 2011 MSGC grads!



Awards

William A. Hiscock Memorial Award



Congratulations to Noel White Running Water Stewart, recipient of the 2011-2012 **William A. Hiscock Memorial Award**. Noel is working with the Salish Kootenai College (SKC) Cubesat project and was a summer intern at NASA's Marshall Space Flight Center (MSFC). As the Hiscock Memorial Award recipient Noel will be studying ways to use the SKC Cubesat project to enhance the hydrology, science, and education curricula at SKC. She will also be serving as a NASA Student Ambassador sharing NASA science and opportunities with fellow students and her community. Congratulations Noel!

The Hiscock Memorial Award is awarded each fall on a competitive basis to an MSGC student who has demonstrated a strong commitment to their educational goals and proposes the most compelling use of the funds. The award is named for Dr. William A. Hiscock, the founder of the Montana Space Grant Consortium.

2011/2012 MSGC Fellowship Recipients

Douglas Brinkerhoff	Computer Sciences	University of Montana
Kristen Crandell	Biology	University of Montana
Gary Lowe	Physics	MSU - Bozeman
Alexander Michaud	Ecology/Environmental Science	MSU - Bozeman
Meredith Rainey	Ecology	MSU - Bozeman

2011/2012 MSGC Scholarship Recipients

Spencer Abdo	Mechanical Engineering	MSU-Bozeman
Steven Barton	Chemistry/Biology	MSU-Billings
Angelita Bearquiver	Engineering	Chief Dull Knife College
Nathan Boll	Math/Geology	UM-Western
Britney Cheff	Biology	Rocky Mountain College
Dillon Conway	Engineering	MSU-Bozeman
Andrew Crawford	Aerospace/Mechanical Engineering	MSU-Bozeman
Jacob Downs	Computer Science	Rocky Mountain College
Mathew Friedlander	Computer Engineering	Salish Kootenai College
Brendon Gobert	Math/Science	Blackfeet Community College
Luke Humphrey	Mechanical Engineering	MSU-Bozeman
Jenell Jackson	Biology/Ecology	University of Great Falls
Levi Krutzfeldt	Mechanical Engineering	MSU-Bozeman
Katherine Lohff	Physics	University of Montana
Martin Lorenzo	Civil Engineering Technology	MSU-Northern
Jordan McIntyre	Computer Science	Rocky Mountain College
Paula Michell	Pre-Engineering	Blackfeet Community College
Dan Molgaard	Astrophysics	University of Montana
Daniel Parod	Physics/Mathematics	Rocky Mountain College
Alyssa Peck	Statistics/Economics	MSU-Bozeman
Briana Peck	Physics	University of Montana
Courtney Peck	Physics	MSU-Bozeman
C. Gunnar Pope	Mechanical Engineering	Flathead Valley Community College
Tashina Russette	Computer Science	Stone Child College
Katherine Steiner	Mathematics	Montana Tech
Noel Stewart	Hydrology	Salish Kootenai College
Abby Thane	Physics	University of Montana
Nathan Woods	Computer Science/Math	Carroll College

Student Opportunities

National Student Solar Spectrograph Competition



The 2011 pilot of the [National Student Solar Spectrograph Competition](#) included teams from Montana State University and Salish Kootenai College. Both teams built spectrographs to observe the sun and showcased their instruments at the MSU Engineering Design Fair. The teams competing in the national competition in 2012 are Flathead Valley Community College - "FVCC Spectrogeeks", Harding University - "Harding Solar Spectroscopy Group", Hobart and William Smith Colleges - "Heron", Montgomery College - "Montgomery College", Montana State University - "Dark Star", Montana State University - "ΓΔΣ J", Montana Tech - "Ad Astra Per Ardua", Mt. Hood Community College - "Star Catchers", Salish Kootenai College - "SKC", San Diego State University - "SDSU", University of Montana - "GrizSpect", and University of North Dakota - "Black Body".

MSGC Student Research Symposium



The [MSGC Student Research Symposium](#) in 2011 included 159 participants from 13 Montana campuses, 56 student speakers, and 25 student posters. The 2012 Symposium keynote speakers are Jaime Waydo, JPL Mobility Engineer for NASA's Curiosity mission, and David Levy, co-discoverer of comet Shoemaker-Levy 9. All MSGC student participants and their advisers should plan to attend. [Online registration](#) opens February 1, 2012.

2011 MSGC Student Research Symposium Awards

Each year at the MSGC Student Research Symposium cash prizes are awarded to the top student presenters.

Adam Gunderson	MSU	Best Undergraduate Talk from a Research Institution	Designing a University CubeSat Radio Using Commercial Off the Shelf Parts
Chandra Macauley	MSU	Best Undergraduate Poster from a Research Institution	The influence of CrxOy microstructure on the oxidation behavior of CoMn coatings on SOFC/SOEC interconnects
Amber Walter	UM-Western	Best Undergraduate Talk from a Small Institution	Historic Climate Change at Ennis, Montana
Amanda Kortum	UM-Western	Best Undergraduate Poster from a Small Institution	Characterization of the Candida albicans Sec63 Protein
Kristen Crandell	UM	Best Graduate Student Talk	Unsteady Aerodynamics in Avian Flight
Matthew Urschel	MSU	Best Graduate Student Poster	Dissimilatory iron reduction in subzero brines
MULE 2.0	MSU	Best Group Talk	Design of a Robotic Lunar Regolith Excavator

MSGC Calendar of Events

January 1, 2012 -

2013 Solar Spectrograph
Competition Registration Opens
spacegrant.montana.edu/IRIS.html

January 23, 2012 -

NASA Academy Applications Due
www.academyapp.com

February 1, 2012 -

NASA Summer Internship
Applications Due
intern.nasa.gov

MSGC Summer Internship
Applications Due
spacegrant.montana.edu

February 15, 2012 -

Spring ARES Applications Due
spacegrant.montana.edu

March 1-3, 2012 -

National Space Grant Meeting
Washington, DC
www.spacegrant.org

April 1, 2012 -

MSGC Scholarship & Fellowship
Applications Due
spacegrant.montana.edu

April 20, 2012 -

MSGC Student Research Symposium
MSU - Bozeman
spacegrant.montana.edu

April 21, 2012 -

MSGC Board Meeting
Museum of the Rockies
Astronomy Day
Museum of the Rockies
eu.montana.edu/astronomyday

May 16-19, 2012 -

National Student Solar
Spectrograph Competition
MSU - Bozeman
spacegrant.montana.edu/IRIS.html

May 31 to August 5, 2012 -

MSGC Summer Internships
Bozeman
spacegrant.montana.edu

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UM and MSU BOREALIS Highlights



This summer six female engineering students at MSU worked as part of an interdisciplinary project team to design a high altitude balloon payload carrying a radiation sensor that is being developed at MSU as part of a radiation tolerant computing research effort sponsored by NASA. The payload was flown on the **MSU**

BOREALIS balloon platform to an altitude of 100,000 feet.

The **UM BOREALIS** team has been working with Salish Kootenai College and the Lake Missoula Chapter of the Ice Age Floods Institute to collect stereoscopic images from tethered balloons of Camas Prairie ripple marks due to ice age floods. They are also studying low altitude (10-15km) vertical profiles of basic atmospheric variables for analysis of water vapor in the Amazon and in Montana to be used in a regional climate change model algorithm.

ARES Research Grants

The Awards for Research in Engineering and Science (ARES) program awards research funds to Montana students. Interested students work with a faculty mentor on a proposed research project beyond their coursework. Students receive a stipend of \$750 per semester or \$500 per quarter. Applications for spring ARES projects are due on **February 15, 2012**. Visit the MSGC website to find an **ARES application**.

Fall 2011 ARES Projects

Anne Ayre	A Quantitative Analysis of Sediment Samples from Tiantai Basin, Zhejiang Province, China and Possible Implications for the Nature of Clutch Deposition	Rocky Mountain College
Matthew Barton	Thermally Assisted Two-Photon Laser-Induced Fluorescence of Atomic Sodium	MSU - Billings
Steven Barton	Thermally Assisted Two-Photon Laser-Induced Fluorescence of Atomic Sodium	MSU - Billings
Benjamin Miller	FVCC All Sky Sentinel Camera	Flathead Valley CC
Ryan Pearson	FVCC All Sky Sentinel Camera	Flathead Valley CC
Richard Shular	Thermally Assisted Fluorescence of Atomic Sodium to Determine Flame Temperature	MSU - Billings

Summer Internships

NASA and MSGC Summer Internships



MSGC sponsors Montana students participating in summer research internships at NASA centers and in Montana. Montana internships are for 10 weeks with a \$6000 stipend from MSGC. Students not from MSU-Bozeman can apply to spend the summer working with the Space Science and Engineering Laboratory (SSEL) at MSU-Bozeman, and all Montana students can apply to work with MSGC's BOREALIS balloon program at MSU-Bozeman. The priority application deadline for Montana summer internships is **February 1, 2012**. MSGC also sponsors Montana students to travel to NASA centers for summer internships. The NASA Academy applications are due on **January 23, 2012**. Other NASA internship applications are due on **February 1, 2012**.

Summer Internships at NASA Centers and MSGC

NASA Academy Jet Propulsion Laboratory NASA Internships on OSSI:SOLAR NASA Langley Aerospace Research Summer Scholars (LARSS)	Applications Due January 23 Priority Application Deadline February 1 Applications Due February 1 Applications Due February 1
SSEL, specifically for students not from MSU-Bozeman BOREALIS, MSGC's high altitude balloon program	Priority Applications Deadline February 1 Priority Application Deadline February 1

2011 NASA and MSGC Summer Interns

Spencer Abdo	Anasphere	MSU - Bozeman
Nick Childs	Lunar Science Institute	MSU - Bozeman
Andrew Crawford	Jet Propulsion Laboratory	Flathead Valley CC
Ryan Hannahoe	Goddard Space Flight Center	MSU - Bozeman
Luke Humphrey	Langley Aeronautics Academy	MSU - Bozeman
Lars Osborne	Ames Robotics Academy	MSU - Bozeman
Brian Redman	Jet Propulsion Laboratory	MSU - Bozeman
Allen Ream	Jet Propulsion Laboratory	MSU - Bozeman
Marianne Addison	BOREALIS	MSU - Bozeman
Jason Bishop	BOREALIS	MSU - Bozeman
George Council	BOREALIS	MSU - Bozeman
Joseph Lutgen	BOREALIS	MSU - Bozeman
Randy Plummer	BOREALIS	Fort Peck CC
Virginia Price	BOREALIS	MSU - Bozeman
David Riesland	BOREALIS	MSU - Bozeman
Sam Sorensen	BOREALIS	MSU - Bozeman
Alyssa Peck	MSGC	MSU - Bozeman
Nick Rijalo	SSEL	Carroll College

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MSGC Affiliates

MSGC Affiliate Meeting

The annual Fall MSGC Affiliate Meeting was held on Friday, September 9 in Bozeman. Thank you to the following affiliate representatives for attending!

Mary Keeffe, Carroll
Stuart Snyder, MSU-B
Xiaobing Zhou, MT Tech
Eric Loberg, MoR
Dan Albrecht, Rocky
Douglas Crebs, SCC
Arthur Alt, UGF
Dan Reisenfeld, UM
Jim Boger, FVCC
Sara Plaggemeyer, LBHC
David Klumpar, SSEL
Angela Des Jardins, MSGC
Randy Larimer, MSGC
Glenda Winslow, MSGC
Joey Key, MSGC
Berk Knighton, MSGC



MSGC Affiliate Campus Visits



MT Tech

BCC

FVCC

SKC

The MSGC central office staff has recently made visits to several affiliate campuses. Visits usually include a presentation about MSGC for interested students, faculty, staff, and administrators and meetings with anyone on campus working in STEM fields or interested in MSGC programs. A science talk or public astronomy presentation is also often included in the visit. Recently MSGC has visited UM-Missoula (4-22-11), Blackfeet Community College (6-27-11), Salish Kootenai College (6-27-11), Flathead Valley Community College (6-28-11), Montana Tech (10-13-11), and UM-Western (11-7-11). Affiliate campuses that are interested in scheduling a visit from MSGC are encouraged to contact us.

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Education

2011 MSGC Education Enhancement Grants

Education Enhancement grants are awarded competitively to significantly improve educational programs and resources in fields of science, technology, engineering, and/or math (STEM) at the MSGC member colleges and universities and/or K-12 school systems.

Chrissie Carpenter	Chemistry	UGF	Learning Chemistry through Inquiry, Action, and Reflection
Antony Berthelote	Hydrology	SKC	Expansion of Technology into the Hydrology Curriculum at Salish Kootenai College
Ross Snider	Electrical and Computer Engineering	MSU	Following the Packet An Educational Enhancement Proposal For Embedded Networking
Joe Shaw	Electrical and Computer Engineering	MSU	Montana Aurora Detector Network for Education Enhancement

Tribal College Research Student Team Competition



Teams of students from each of Montana's tribal colleges were challenged to complete various activities related to the **Tribal College Research Aurora Detection and Remote Sensing** projects. Congratulations to the team from Blackfeet Community College (BCC) for winning the Overall Trophy and to the team from Stone Child College (SCC) for winning the Best Overall Presentation. The BCC team members were Ron Falcon, Noel Stewart, and Charlene Weatherwax. The SCC team members were Mike Corcoran, Jarom Crebs, Sky Grant, Tashina Russette, and Joel Spinler. Congratulations!

The Space Public Outreach Team



The **Space Public Outreach Team (SPOT)** provides FREE presentations about current NASA missions to Montana schools, youth programs, and community groups. Presentations available for the 2011/2012 school year are *Roadside Geology of the Solar System* and the new show *The Sun-Earth Connection*. To request a free presentation email spot@spacegrant.montana.edu or visit the **SPOT website**.

In 2012 the SPOT office will also be offering free teacher workshops through the **NASA Education Activity Training (NEAT)** program. NEAT specialists will travel to schools to train teachers on a selection of NASA activities related to the current SPOT shows. Participating teachers receive two free OPI renewal credits. Find more information and a registration form on the **NEAT website**.

Montana NASA EPSCoR

Montana NASA EPSCoR Faculty Connections Program



Montana NASA EPSCoR has been awarded funding for a new Montana faculty professional development opportunity. Selected faculty will work with a facilitator and will receive funding to arrange travel to a NASA research center with the goal of developing new collaborations, projects, and proposals to foster the growth of NASA related funded research at Montana institutions. The **Montana NASA EPSCoR Faculty Connections Program** is an opportunity for Montana faculty to make connections with NASA personnel and develop NASA research programs on their campus. Selection of faculty will be based on the following priority: being a member of a) a Tribal College, b) other Community College, c) other small campus, or d) other faculty who are not part of a research

group that has NASA funding. Underrepresented minority and female faculty are especially encouraged to apply. Travel funding up to \$1500 will include airfare, hotel, transportation, and per diem for up to a week working at a NASA research center. Montana NASA EPSCoR anticipates that the Faculty Connections program will be available in 2012 and 2013. Applications are due to the MSGC office by **February 13, 2012**.

Current NASA EPSCoR Research Group Grants

NASA EPSCoR Research Group grants are awarded nationally each year. For the past several years, Montana groups have been successful in winning a number of these large awards.

Rafal A. Angryk 2011-2014	Computer Science	MSU	Large-scale Content-based Image Retrieval System (CBIR) for Interactive Search through Virtual Solar Observatory
Joel Harper 2011-2014	Geosciences	UM	Enhancement of NASA's Polar Missions: Adjoint Data Assimilation into Numerical Models to Reveal Physical Properties of the Greenland Ice Sheet
Brock LaMeres 2010-2013	Electrical and Computer Engineering	MSU	Development and Testing of a Radiation Tolerant Flight Computer with Real-Time Fault Detection, Recovery, and Repair
Stephen Sofie 2009-2012	Mechanical Engineering	MSU	Regenerative SOFC Development for Aerospace Technology Platforms
Kevin Repasky 2008-2012	Electrical and Computer Engineering	MSU	Development of a Novel High Spectral Resolution Lidar for Studies of the Effects of Aerosols on the Earth's Climate

2011 MSGC & MT NASA EPSCoR Faculty Research Initiation Grants

Research Initiation grants are awarded competitively through internal and external review of proposals. These are intended as seed money to submit a follow-on proposal to NASA for regular research funding.

Jennifer Brown	Chemical and Biological Engineering	MSU	Magnetic Resonance Microscopy Studies of Ice Structure
Paul Gannon	Chemical and Biological Engineering	MSU	Interfacial Stability of Multilayer Nanostructured Thermal and Environmental Barrier Coatings for Aerospace Applications
Wataru Nakagawa	Electrical and Computer Engineering	MSU	Nanostructured optics for high-performance imaging at non-traditional wavelengths

A Note from the Director

Dear Friends of Montana Space Grant,



Wow, has it been a great year. Thank you to everyone who made all the successes in the preceding pages happen - there are a lot of you! It's amazing to think that in this one year, we've 1) launched Montana's first satellite, 2) had over 150 people attend our first full MSGC Student Research Symposium, 3) begun our first National Student Solar Spectrograph Competition, 4) celebrated 20 years of MSGC, 5) won two \$750,000 NASA EPSCoR Research Group Awards, 6) put in six proposals for additional NASA funding (three awarded, three pending), 7) begun construction of our multi-level student/alumni database for all 20 years of participants, 8) visited half of our Affiliate Institutions, and much, much more. Enjoy all the fantastic stories from 2011 and we hope to see or hear from you soon. Keep up to date on MSGC opportunities by liking us on Facebook and checking our webpage regularly.

Best Regards,

Angela

