

Oregon Space Grant Consortium
Oregon State University
Jack Higginbotham, Ph.D.
Telephone Number: 541-737-2414
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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 **Oregon** Consortium is a Program Grant Consortium funded at a level of **\$430,000** for fiscal year 2011.

PROGRAM GOALS

The Oregon Space Grant Consortium (OSGC) focuses on interdisciplinary and inter-institutional collaborations among the OSGC member institutions to strengthen the statewide STEM-based educational infrastructure and increase science literacy for Oregon students with an emphasis on authentic, hands-on student/mentor projects. OSGC relies on the strength of its community college, university, and informal education partners to provide a diverse pool of students, educators, researchers, and administrators to sustain a Consortium that continually and effectively contributes to the National Space Grant Program.

Oregon Space Grant's Diversity Plan goals include the following: 1) Maintain diverse Consortium management, members, and projects; 2) Award undergraduate scholarships to underrepresented minorities congruent with the state demographics of 12.9%; 3) Increase female participation in the scholarship program applicant pool by 5% from FY09.

Scholarship/Fellowship Program goals include: 1) Administer the OSGC scholarship/fellowship call and payment processing of the awards; 2) Competitively make awards for the Undergraduate Scholarship Awards Program congruent with the state demographics of 12.9% of underrepresented minorities in the STEM disciplines; 3) Maintain 5 graduate fellowship awards; 3) Increase female participation in the FY10-11 Scholarships Program applicant pool by 5% over FY09.

Research Infrastructure goals: 1) Administer the OSGC Affiliated Faculty Research Award Program call and award at least 4 faculty research grants with an emphasis on hands-on authentic science inquiry with at least one awarded to a female and/or underrepresented minority; 2) Host the annual OSGC Student Symposium to highlight OSGC-supported student research projects.

Higher Education goals: 1) Provide support for 5 pre-service educators who are working towards STEM teaching certification at an OSGC affiliate institution; 2) Award up to one university team participating in the NASA Reduced Gravity Student Flights Opportunity Program; 3) Make one team award in support of the OSGC Launch Oregon Balloon Satellite Program or Rocket Program; 4) Award one STEM Course Development Award to an OSGC affiliate faculty to encourage development of interdisciplinary courses designed around NASA research areas of interest as defined by the Mission Directorates; 5) Provide web hosting and promotion of Volcano World, an online volcano information resource for students and educators; 6) Disseminate information and provide financial support for NASA center internship and academy opportunities with at least one award provided to a female or underrepresented minority student.

Pre-College Program goals: 1) Disseminate information for teacher professional development opportunities that incorporate hands-on, science inquiry and award at least one opportunity to an in-service STEM educator.

Public Outreach Program goal: 1) Disseminate NASA material, resources, and professional development opportunities via the OSGC website and online educator blog.

Consortium Management FY2011 goals: 1) Host the OSGC Annual Affiliate Meeting at Portland State University in Portland, OR in September 2011; 2) Attend the Western Regional Meeting and Spring National Council of Space Grant Directors Meeting; 4) Disseminate information and opportunities from NASA Headquarters and the National Space Grant Program network directly to affiliate representatives; 5) Maintain the OSGC website with current OSGC and NASA program information, research and education opportunity announcements, resources for students and educators, and other general OSGC and NASA news and updates; 6) Make annual affiliate site visits as permitted; 7) Complete NASA contract reporting in a timely manner; 8) Provide contact information for OSGC student awardees for the longitudinal tracking program.

PROGRAM/PROJECT BENEFIT TO OUTCOME (1,2, or 3)

Student comments gathered through longitudinal tracking are below:

Space Grant has consistently been a major supporter of projects that have given me applicable real world experience in engineering, namely the OSU Mars Rover. Additionally, the Space Grant program has helped me develop a deep interest in space exploration. Most recently, Space Grant has been instrumental in helping me acquire a summer internship at NASA's Jet Propulsion Laboratory. (Cody Hyman - on 05/16/11, 2009 OSU Robotics Team, 2010 OSU Robotics Team, 2011 JPL Internship, Jet Propulsion Laboratory - Integrated Spacecraft Analysis Intern). This opportunity is linked

to Outcome 1 and 2 by contributing directly to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals and by offering a student a progression of educational opportunities in the STEM disciplines.

It provided opportunities in the aerospace field allowing me to get practical experience with my degree(s). It provided me with mentors in the industry with a wealth of experience and a network that provides contacts for future projects. It also provides educational outreach program opportunities and the ability to make friends along the way. (Damani Proctor - on 12/21/11, 2009 NASA SAWDRIP, 2010 Goddard Flight Center Internship, 2011 Goddard Internship, Intel - Research and Development tech). This opportunity is linked to Outcome 1 and 2 by contributing directly to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals and by offering a student a progression of educational opportunities in the STEM disciplines.

PROGRAM ACCOMPLISHMENTS

Diversity Plan: 1) Maintained diverse Consortium management, members, and projects; 2) Awarded 29% undergraduate scholarships to underrepresented minorities in excess of the state demographics of 12.9%; 3) Achieved 37% female participation in the scholarship program applicant pool, exceeding goal of 5% projected increase from 26% in FY09.

Scholarship/Fellowship Program: 1) Awarded 19 scholarships, ranging from \$3,000 to \$5,000 per student depending on scholarship program; 2) Increased number of awards to underrepresented minorities to 29%, in excess of the state demographics of 12.9%; 3) Maintained funding of 5 graduate fellowships; 4) Increased the female applicant pool to 37% from 26% in FY09. Scholarship/Fellowship accomplishments relate to NASA's Education Priorities and current areas of emphasis by utilizing authentic, hands-on student experiences in STEM disciplines. (Outcome 1)

Research Infrastructure: 1) Continued second-year funding for the following 2 Faculty Research Awards with emphasis on interdisciplinary collaborations: a) Portland State University/Sherry Cady/Geology project "Modern and Ancient Mars Analog Studies; Linking STEM Research, Training and Education"; b) Portland State University/Mark Weislogel/Mechanical and Materials Engineering project "Oregon Microgravity Drop Tower Research"; 2) Maintained one Faculty Research Award science-based project incorporating NASA's Education Priority of hands-on science inquiry experiences for students to a woman and/or underrepresented minority during the FY11-12 budget cycle; 3) Provided first-year funding for a new Faculty Research Award: Oregon State University/Jack Higginbotham/Engineering project "The Effect of Cosmic Ray Radiation on Tumor Growth in Zebra Fish Corneas"; 4) Hosted the OSGC Student Symposium to highlight OSGC-supported student research opportunities. 23 students participated in a poster session and made project presentations to an audience of students, faculty, media, and general public with an approximate attendance of 60. Research Infrastructure accomplishments relate to NASA's Education Priorities and current areas of emphasis through hands-on student experiences in STEM disciplines, environmental science and

global climate change research, diversity of institutions, faculty, and student participants, and support of innovative research infrastructure for early career faculty to focus on NASA priorities. (Outcome 1)

Higher Education: 1) Funded 2 pre-service STEM education students in collaboration with the Increasing Diversity in Earth Sciences (IDES) NSF program; 2) Supported the following five team projects under the Undergraduate Research Program: a) OSU Mars Rover Team; b) OSU Robotics Autonomous Aerial Team; c) OSU Underwater Remote Operated Vehicle Team; d) OSU Pico Satellite Team; e) The Oregon State Space Society Supersonic Rocketry Team; 3) Provided support for the Linn Benton Community College High Altitude Balloon Program; 4) Supported 12 students to participate in 2012 NASA Academies or NASA Center student internships of which three were female/underrepresented; 5) Provided support to OSU physics department for development and implementation of space studies course development project and mentorship of OSU Pico Satellite Team; 6) Funded Western Oregon University physics professor to attend the STS-135 Shuttle Launch in support of the Student Spaceflight Experiments Program (SSEP); 7) Provided funding for OSGC staff and student to participate in the 28th National Space Symposium; 8) Provided administrative and mentoring support for the foundation of the new student group, Oregon State Space Society (OSSS) Students for the Exploration and Development of Space (SEDS) Chapter. Higher Education accomplishments relate to NASA's Education Priorities and current areas of emphasis by utilizing hands-on student experiences and engagement with community colleges, by promoting environmental science and global climate change research, and by supporting diversity of institutions, faculty, and student participants. (Outcome 1)

Pre-College Education: 1) Administered an Informal Education Award to The Museum at Warm Springs/Carol Leone/The Seeds of Discovery Program, a collaborative program between The Museum at Warm Springs tribal museum and the Jefferson County School District; 2) Supported the Evergreen Aviation & Space Museum Star Party series; 3) Continued to provide the Educator/GPS Loaner Program to the Oregon K-12 community, supported by the NASA AESP representative; 4) Provided the Education STEM Lending Library to support GPS and NASA content curriculum integration; 5) Provided K-12 community access to the OSGC-supported Higher Education Teams to conduct outreach activities. Pre-College Education accomplishments relate to NASA's Education Priorities and current areas of emphasis through hands-on student experiences and engaging middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. (Outcome 2)

Public Outreach Programs: 1) Disseminated NASA material, information, resources, and professional development opportunities via the OSGC website, educator blog, social media including Facebook, Twitter, Pinterest, Dig, LinkedIn, and Google +; 2) Provided organizational and promotional support for NASA initiatives including NES and AESP; 3) Purchased a bronze plaque to commemorate a NASA Moon Tree located on the OSU campus in preparation for the statewide dedication in 2012; 4) Supported a NASA Student Ambassador from Oregon to sponsor an exhibitor booth at the 2012 OryCon

Convention. Public Outreach accomplishments relate to NASA's Education Priorities and current areas of emphasis by engaging middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. (Outcome 3)

Consortium Management: 1) Hosted annual affiliate meeting at Portland State University in Portland, OR in September 2011 attended by OSGC affiliates, NASA initiative representatives, OSGC scholars, and OSGC administration; 2) Added two affiliate institutions to Oregon Space Grant Consortium utilizing the voting process outlined in the Consortium bylaws; 3) Attended Western Regional and Spring National Council of Space Grant Directors Meeting; 4) The OSGC Director served on National Space Grant Program boards as nominated/elected; 5) The OSGC Assistant Director served on the NASA OEPM Task Force to assist with the implementation of the OEPM reporting system; 6) The OSGC Assistant Director served on the Space Grant National Distinguished Service Committee; 7) The OSGC Public Information Assistant assisted in representing the National Space Grant Program at the 28th Space Symposium; 8) Disseminated NASA information and opportunities via the OSGC website, Educator Resource Blog, and via social media resources; 9) Maintained the OSGC website and educator blog to be compliant with 508 accessibility codes; 10) Completed NASA contract reporting in a timely manner; 11) Collected demographics and information of OSGC student awardees for longitudinal tracking.

- Percentage of students whom have taken their next step and have been successfully tracked though their next step vs last year of SG support.
 - 90% for 2006
 - 94% for 2007
 - 100% for 2008
 - 100% for 2009
 - 100% for 2010
 - n/a for 2011 – all participants sill enrolled
 - 97% for 2006-2011
- 92% of students significantly supported by went onto next steps in STEM disciplines

Outcome #1 (employ and educate)

- 55 students took next step in FY11 (SG participation supported from FY06-FY10 funds)
 - 24 are pursuing advanced degrees in STEM disciplines
 - 20 accepted STEM positions in industry
 - 4 accepted STEM positions in K-12 academia
 - 2 accepted STEM positions in academia
 - 5 went on to positions in non-STEM disciplines

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Student Data and Longitudinal Tracking: Total awards = 74; Fellowship/Scholarship = 24, Higher Education/Research Infrastructure = 50; 7 of the total awards represent underrepresented minority Fellowship/Scholarship funding. During the FY11 program year all of the 74 total awardees were still enrolled in their programs of study, pursuing advanced degrees in STEM disciplines.
- Diversity: OSGC strives to maintain a diverse Consortium management, faculty, institutions, student participants, and projects within the Consortium portfolio. Of 19 affiliate institutions, 10 are four-year institutions, 5 are community colleges, and 4 are informal education institutions. Of the 2 new affiliate representatives, 1 is female. Consortium management consists of 1 male and 3 females. OSGC has continued to increase the female applicant pool in the fellowship/scholarship program over the past two years and has been successful in making awards to underrepresented minorities congruent with the state demographics.
- Minority-Serving Institutions: There are no minority-serving institutions within the state of Oregon.
- NASA Education Priorities: OSGC's program portfolio was designed specifically to focus on the current areas of emphasis of NASA's education priorities as stated in the NASA Education Strategic Coordination Framework: A Portfolio Approach. The OSGC proposal emphasizes the following areas: 1) Authentic hands-on student experiences - OSGC increased support for student team experiences, resulting in increased significant student involvement. Teams include: a) OSU Mars Rover Team, b) OSU Robotics Autonomous Aerial Team, c) OSU Underwater Remote Operated Vehicle Team, d) OSU Pico Satellite Team, e) Oregon State Space Society Supersonic Rocketry Team, and f) Linn Benton Community College High Altitude Balloon Program. OSGC continues to promote and support student involvement in NASA Center internships and academies that provide quality, authentic, hands-on mentorship opportunities; 2) Engaging middle school teachers - OSGC supported the PSU Drop Tower Microgravity program via a Faculty Research Award that provided opportunities for university faculty and students to engage middle school teachers in hands-on physics experimentation; 3) Community college involvement - OSGC made a concerted effort to increase community college involvement by adding a new community college affiliate that has a strong emphasis on robotics and pre-engineering curriculum; 4) Supporting innovative research infrastructure activities - OSGC maintained the Faculty Research Award Program, which supports innovative research infrastructure by providing funding to early career faculty. A mentorship component was required as part of faculty research to encourage faculty and undergraduate student connections.

IMPROVEMENTS MADE IN THE PAST YEAR

The Oregon Space Grant Consortium reports the following improvements in the past year: 1) Shifted focus to higher education and research projects that offer authentic,

hands-on student/mentor opportunities in the STEM disciplines by supporting more student team opportunities and requiring a mentorship component to faculty research, resulting in increased student involvement; 2) Utilized social media to increase the visibility of Space Grant leading to greater participation in national and international competitions by OSGC-supported student teams; 3) Demonstrated an increase in the percentage of students going into STEM fields as reported in the longitudinal tracking data from FY06-FY10; 4) Increased participation of underrepresented students in fellowship/scholarship programs by 9% over FY10; 5) Increased community college involvement with the addition of a community college with an emphasis on robotics and pre-engineering and serves as a feeder school to OSU, the state's leading engineering institution; 6) The OSGC director was appointed as director of newly created Space Programs with the OSU College of Science, to be developed over the next couple of years.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Higher Education Affiliate Institutions:

- Eastern Oregon University (EOU) - Focus on teacher education. Affiliate representative: Physics.
- George Fox University (GFU) - Focus on liberal arts and science education. Affiliate representative: Mathematics and Physics.
- Lane Community College (LCC) Aviation Academy - Offers Flight Technology and Aviation Maintenance Technology programs, a pilot certification program, and an Aviation Leadership concentration in collaboration with Oregon State University. Affiliate representative: Aviation.
- Linn Benton Community College (LBCC) - Focus on robotics, mechatronics, and pre-engineering. Also functions as a feeder school for OSU. Affiliate Representative: Engineering.
- Oregon Institute of Technology (OIT) - Focus on technical and health related fields. Affiliate representative: Computer Systems Engineering.
- Oregon State University (OSU) - Lead Institution - Focus on engineering. Programs in nuclear engineering, ecology, biochemistry, oceanography, and pharmacy have been recognized nationally as top tier programs. Affiliate representative: Nuclear Engineering.
- Pacific University (PU) - Focus on math and science education. Affiliate representative: Science Education.
- Portland Community College Cascade Campus (PCC) - Focus on adult education. Affiliate representative: Portland Teachers Program (PTP)
- Portland Community College Rock Creek Campus (PCC) - Focus on adult education. Affiliate representative: Science and Technology.
- Portland Community College Sylvania Campus (PCC) - Affiliate representative: Physics.
- Portland State University (PSU) - Drop tower research and geophysics. Affiliate representative: Mechanical Engineering.

- Southern Oregon University (SOU) - Focus on liberal arts including criminology, natural sciences, and environmental science. Affiliate representative: Physics.
- University of Oregon (UO) - Manages the Pine Mountain Observatory in Bend OR. Affiliate representative: Physics.
- University of Portland (UP) - Small private institution with a focus on business and education. Affiliate Representative: Mechanical Engineering.
- Western Oregon University (WOU) - Focus on science and math education. Affiliate representative: Physics.

Informal Education Affiliates:

- Evergreen Aviation & Space Museum - aviation and space museum, IMAX, and aviation education programs.
- Oregon Museum of Science and Industry (OMSI) - hands-on science museum and the Oregon NASA Education Resource Center.
- ScienceWorks Hands-On Museum - Science center with educational programs for both students and educators including workshops, lectures, and science camps.
- The Museum at Warm Springs - Tribal museum that partners with the local school district to offer hands-on science education utilizing expertise from within the community and around the state.