

Ohio Space Grant Consortium
Name of Lead Institution: Ohio Aerospace Institute
Name of Director: Gary L. Slater, Ph.D.
Telephone Number: (513) 556-3223
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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 **Ohio Space Grant Consortium** is a Designated Consortium funded at a level of \$575,000 for FY 2011.

PROGRAM GOALS

The Ohio Space Grant Consortium has the following goals for FY2011-2012 in support of the NASA Office of Education goals. The OSGC 5-Year Strategic Plan, Vision, Mission, Goals and SMART Objectives were redefined, approved and implemented by the OSGC Executive Committee in January, 2010.

Goal 1 - To develop a STEM workforce in Ohio through a comprehensive scholarship and fellowship program at universities and colleges, through internships and educator development programs, and to increase workforce diversity by support of underrepresented groups in higher education to prepare individuals for employment in various NASA-related STEM careers.

Specific: The intent of the scholarship/fellowship programs is to increase the workforce in STEM areas, particularly with regard to female and underrepresented groups.

Measurable: For the combined scholarship/fellowship program our goal is to have 40% female¹ and 20% underrepresented students. 95% of undergraduate scholars will graduate, and 80% will enter STEM fields (education or workforce). 80% of Graduate fellows will graduate within 2 years of the end of the fellowship period and enter STEM fields. Award 1 special minority fellowship annually. Award 2 additional underrepresented scholarships at each OSGC MSI annually. Annually track students who receive significant support through graduation, or until "the next step" via Exit Forms.

¹Percentage was changed from 50% to 40% to reflect the correct NASA target (November, 2011).

All of the aforementioned Specific and Measurable Objectives were met.

**Addresses NASA Outcome 1: Objectives 1.1, 1.2, 1.3; NASA Outcome 2: 2.1, 2.3
Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6,
Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1**

Goal 2 - To support and integrate research and education for faculty and post-doctoral researchers within the State of Ohio through collaborations between universities and with NASA Centers, OSGC affiliates, the State of Ohio, the Ohio Aerospace Institute, the Air Force Research Laboratory, and STEM-related industry.

Specific: We will support seed grants for young faculty at Ohio universities and colleges to enable them to strongly compete for substantial national awards. We will specifically encourage proposals from underrepresented and female faculty.

Measurable: Each year, OSGC will support at least two seed grants for faculty. Within two years of the OSGC award, 50% of our awardees will leverage our support to a more substantial national funding.

All of the aforementioned Specific and Measurable Objectives were met with the exception of awarding a research grant to a female faculty member. It should be noted that Dr. Pedro Cortes-Velasco (underrepresented male from Youngstown State University) is working with Dr. Hazel Marie (female), Co-Principal Investigator, on the mathematical modeling for his research project entitled “The Morphing Properties of a Smart Hybrid Laminate based on Shape Memory Composite.”

**Addresses NASA Outcome 1: Objectives 1.1, 1.2, 1.3, 1.5
Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6,
Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1**

Goal 3 - To encourage the development of new courses and programs that will broaden the availability of STEM curriculum throughout the State of Ohio, especially in rural areas, at Minority Serving Institutions (MSIs) and community colleges, and strengthen existing STEM education programs at affiliate member’s schools through support for curriculum and course development.

Specific: OSGC will support course development in STEM areas of particular interest to NASA, particularly at those colleges and universities which are not dominant research institutions, and which serve mainly minority and rural populations. In some cases this will be best achieved by linking two or more schools together in a collaborative effort.

Measurable: Under current funding levels, we will fund at least two curriculum grants during the upcoming five-year cycle.

All of the aforementioned Specific and Measurable Objectives were met.

**Addresses NASA Outcome 1: Objectives 1.4, 1.5
Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6,
Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1, Outcome 6.4,
Objective 6.4.1**

Goal 4 - To promote hands-on student projects and activities primarily in higher education activities that will excite, inspire, and engage diverse student populations to become involved in STEM education, ultimately to be integrated into the NASA pipeline and STEM career paths.

Specific: We will fund student-oriented, hands-on projects at several schools within the OSGC network. Results of these projects will be disseminated to the OSGC affiliates, thus leveraging also with Goal 4.

Measurable: A minimum of two projects each year will be funded. At least one of these will be a collaborative effort between two or more schools, and at least one will be oriented toward a rocket or space project.

All of the aforementioned Specific and Measurable Objectives were exceeded.

Addresses NASA Outcome 1: Objectives 1.2, 1.3, 1.5, 2.4

Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1

Goal 5 - To work within our affiliate network with a focus on Minority Serving Institutions (MSIs) and community colleges, to ensure that NASA and STEM opportunities are presented, encouraged, and awarded in accordance with respect for the diverse population of Ohio.

Specific: We will strive to increase interest and activity within the Ohio MSIs and community colleges in STEM higher education and research activities by earmarking additional funding for student and faculty projects at these institutions.

Measurable: We will create and fund at least one student intern each year either at an MSI to work with a research faculty at an Ohio university. Community college scholarships will be specifically directed toward students who wish to matriculate to a higher education facility.

All of the aforementioned Specific and Measurable Objectives were exceeded except funding one student intern at an MSI to work with a research faculty at an Ohio university. The OSGC Director was in the process of coordinating these details with OSGC Associate Director Gerald T. Noel, Sr., until his unexpected passing on April 1, 2012. The OSGC will place the minority intern in Summer, 2013.

Addresses NASA Outcome 1: Objectives 1.1, 1.2, 1.3, 1.4, 1.5

Addresses NASA Strategic Goal 5, Outcome 5.1, Objective 5.1.2; Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2; Outcome 6.2, Objective 6.2.1

Goal 6 - To encourage and promote K-12 student interest in pursuing higher education STEM curricula by supporting the development of qualified STEM educators through scholarships and workshops, and provide access to NASA educational materials.

Specific: OSGC will fund College of Education scholars who interested in STEM careers in K-12 education, and connect them with NASA K-12 educational resources. We will

encourage higher education schools with student-oriented projects to work with K-12 students to integrate them into aspects of these projects.

Measurable: We will fund a minimum of 12, \$1,000² scholarships each year, using an application process through the education departments at OSGC affiliates. Each scholar will be funded to attend a NASA-sponsored workshop, and given access to NASA educational materials.

All of the aforementioned Specific and Measurable Objectives were exceeded.

Addresses NASA Outcome 2: Objectives 2.1, 2.3, 2.4

Addresses NASA Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2;

Outcome 6.2, Objective 6.2.1, Outcome 6.4, Objective 6.4.1

Goal 7 - To encourage the development and focus of outreach programs, courses, teacher professional development, and research projects that align with current areas of emphasis within NASA priorities, as well as the needs of the State of Ohio.

Specific: OSGC will interact and liaison with organizations such as museums, observatories, Greater Cleveland Partnership and others, working to improve the STEM educational opportunities of Ohio.

Measurable: We will fund organizations needing minor funding with “mini-grants” to promote their education and outreach activities. We will support other organizations and volunteer our time to promote their activity when consistent with OSGC spectrum of activities.

All of the aforementioned Specific and Measurable Objectives were exceeded.

Addresses NASA Outcome 3: Objectives 3.1, 3.3

Addresses NASA Strategic Goal 6, Outcome 6.1, Objectives 6.1.1, 6.1.2;

Outcome 6.2, Objective 6.2.1, Outcome 6.4, Objective 6.4.1

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

Outcome 1 - Contribute to the development of the science, technology, engineering, and mathematics (STEM) workforce in disciplines needed to achieve NASA’s strategic goals (Employ and Educate) **OSGC FY2011 goals were met.**

Fellowships and Scholarships

OSGC’s Fellowship and Scholarship Program provides financial support to students pursuing STEM degrees at OSGC member universities. A key feature of the program is an emphasis on exposure to research under the direction of a mentor. All awardees are requested to present their research (Fellows and Senior scholars present oral presentations; Junior, Community College, and Pre-service teacher scholars present posters) at the annual Student Research Symposium held every April at Ohio Aerospace Institute in Cleveland, Ohio. All students prepare written reports, which are bound and

²Increased Education Scholarships to \$1,750 in FY2010.

published as *OSGC Symposium Proceedings*. The Ohio Aerospace Institute (OSGC's lead institution) contributes \$105,000 to fellowships and scholarships annually.

Graduate Fellowships include Doctoral 1, 2, and 3 and Master's 1 and 2. The universities provide a cash cost share plus tuition waivers. Doctoral 1, 2, and 3 awards are \$20,000 (\$15,000 from OSGC; \$5,000 from university). Graduate fellowships are renewable based on academic merit and approval of the campus representative.

Master's 1 awards are \$16,000 (\$13,000 from OSGC; \$3,000 from university). Master's fellowships are renewable for an additional six-month period. Master's 2 awards are \$8,000 (\$6,500 from OSGC; \$1,500 from university).

Undergraduate STEM scholarship awards include Senior and Junior awards. The universities provide \$500 for each scholarship award. Seniors receive \$4,000 (\$3,500 from OSGC; \$500 from university). Juniors receive \$3,000 (\$2,500 from OSGC; \$500 from university). The Junior scholarship is renewable based on academic merit and approval of the campus representative.

The Pre-service Teacher scholarship is open to undergraduate or graduate students pursuing certification and licensure in a Science- or Mathematics-related discipline at an Ohio university through the College of Education. Students receive \$1,750 and a \$250 gift card to NASA CORE (Central Operation of Resources for Educators), or the option to add to their award. Students also attend a workshop where they receive exposure to NASA educational resources and lesson plans in collaboration with NASA Glenn Research Center Educational Programs Office, NASA Aerospace Education Services Project (AESP), and NASA CORE (Central Operation of Resources for Educators).

Community College awards are one-year \$1,000 awards (\$750 from OSGC; \$250 from community college).

Two special scholarships are awarded to honor two former OSGC Directors at their home universities: 1) Kenneth J. De Witt Scholarship Award (\$1,000) is a tribute to OSGC's late Director at The University of Toledo to a deserving sophomore Chemical Engineering Student; 2) Paul C. K. Lam Scholarship Award (\$1,000) is in memory of OSGC's late Director at The University of Akron, to an underrepresented, undergraduate student majoring in Mechanical Engineering.

Fellowship and Scholarship Awards

•Thus far, OSGC has awarded a total of 97 scholarship and fellowship awards [11 graduate fellowships (including 3 special minority fellowship awards), 86 undergraduate scholarships (including 2 awards honoring two late OSGC Directors at their home universities)]. Of the 97 awards, 28 were made to underrepresented minority students (28.87%), and 44 to female students (45.36%). OSGC scholarship/fellowship awards to underrepresented minorities continue to exceed targets based on the State of Ohio

percentage of 16.75% (Source: Table 237³). For female awards, OSGC is above the 40% NASA target. All students who have received significant OSGC support and who have taken their “next step” have been successfully tracked.

Former Student Testimonials:

•**Thomas E. Beechem, III** was the recipient of an OSGC Master’s Fellowship Award (FY2004-2005). Thomas earned his Master’s Degree in Materials Science from the University of Dayton in 2005. He began his Ph.D. work at the Georgia Institute of Technology where he focused on micro/nanoscale heat transport and specifically thermal measurements of microelectronics using Raman spectroscopy. Immediately after graduating from Georgia Tech in 2008, he began work as a Staff Scientist in the Nanomaterials Science Department of Sandia National Laboratories in Albuquerque, New Mexico. *“Ohio Space Grant afforded me the opportunity to explore what working in science looked like. It let me see that research was something that I enjoyed doing and made me look forward to going to work every day. Without this opportunity, science is not something that I would have pursued.”*

•**James M. Less** was the recipient of an OSGC Education Scholarship in FY2010 and FY2009, and received his Master’s Degree in Secondary Education from The University of Toledo in May, 2011. Jim is currently a Science Teacher at Bettsville High School in Bettsville, Ohio. *“I was the beneficiary of an OSGC Education scholarship during the 2009-2010 and 2010-2011 academic school years. The financial assistance provide by the scholarship helped defray the significant costs associated with tuition and fees. I benefitted even more from the networking opportunities during the workshops and symposiums; the research projects; and the educational materials/resources that were provided.*

After graduating from The University of Toledo in 2011 with a Master’s in Education, I landed a position as a Science Teacher for Bettsville High School. Bettsville is a very small, rural community in North-Central Ohio, and the school serves a high percentage of low-income families. In my first few months as the new science teacher for the high school, I successfully used the “Newton cars” for several lessons involving motion with the 8th grade, 9th grade, and high school physics classes. I have also built a compressed air rocket launcher for the school, and incorporated the paper rocket projects for several of my classes. The NASA website was used by 8th graders to research information on the Solar System so they could design and construct scale models of the Solar System. I have also used several videos from NASA’s website to reinforce lessons in the Environmental Sciences and Biology classes.

I truly appreciate the support and encouragement provided by the Ohio Space Grant Consortium scholarship program. I will continue to rely on NASA’s resources to help me plan meaningful, interesting and effective lessons for my students.”

³Table 237: Fall enrollment in degree-granting institutions, by race/ethnicity of student and state or jurisdiction: 2009. Source: U. S. Department of Education, National Center for Education Statistics, 2009 Integrated Postsecondary Education Data System (IPEDS), Spring 2010. (This table was prepared October 2010.) Website URL: http://nces.ed.gov/programs/digest/d10/tables/dt10_237.asp

•**Brooke R. Johnson** (female) was an OSGC scholarship recipient in FY2010 (Junior) and FY2011 (Senior) from Youngstown State University. Brooke graduated with a B.S. in Mechanical Engineering in May, 2011, and is currently a Junior Design Engineer Partner at Taylor Winfield Technologies in Hubbard, Ohio.

“The NASA/Ohio Space Grant Consortium scholarship award impacted me as a student and in my future career by teaching me the importance of research, experiments, and how to present my work to an audience in a clear and concise fashion. As a student, it made me a better-rounded student and showed me what it was like to have hands-on experience in my field. The presentation skills gained by the scholarship will help me throughout my career when I have to present my findings to a boss or a customer.”

Student Internship Testimonials:

•**Kamau B. Mbalia** (underrepresented male) was selected to participate in the NASA Ames Academy during Summer, 2011, and was supported by the OSGC. Kamau was also an OSGC scholarship recipient in FY2010 (Junior) and FY2011 (Senior). Kamau graduated with a B.S. in Environmental Engineering from Central State University (Minority Serving Institution) in May, 2011. He is currently a graduate student at The Ohio State University.

“The main focus of my research was earthquake forecasting. I monitored water oxidation and polyaromatic hydrocarbons at the rock-water interface due to the stressing of rocks to determine the probability of earthquake occurrences. Throughout the summer I enjoyed the opportunity to conduct, run, and monitor my own experiments. The knowledge learned thus far has been simply amazing. Taking part in such cutting edge research and being part of the team has taught me a lot and will be very beneficial in my career. I would advise all students to acquire internship experience that aligns with their future career goals during their matriculation.”

•Continue to support the annual Kenneth J. De Witt Scholarship Award (tribute to OSGC’s late Director) at The University of Toledo to a deserving sophomore Chemical Engineering Student. The fifth scholarship was awarded to Ms. Brittany Wilkewitz, Sophomore, majoring in Chemical Engineering.

•Continue to support the annual Paul C. K. Lam Scholarship Award (in memory of OSGC’s late Director) at The University of Akron, to an underrepresented, undergraduate student majoring in Mechanical Engineering. The third award was made to Ms. Lonnie M. Atkinson, Junior, majoring in Mechanical Engineering.

•Awarded 16 NASA CORE (Central Operation of Resources for Educators) \$250 gift cards to purchase educational materials, or was added to scholarship award to pre-service scholarship award recipients.

Higher Education

•Award seed grants for innovative STEM Higher Education programs at Ohio universities. Some representative titles include: "Manufacturing Engineering Program Development and Its Potential Impact on Transforming Undergraduate Engineering Curriculum," Wright State University - Lake Campus (P. Ruby Mawasha (underrepresented male); "Development of Reduced Order Models for Simulations and

Feedback Control of Aerodynamic Flows," Miami University (Edgar J. Caraballo); "Antarctic Climate Change Education through Meteorological Measurements at Schools (ACCEMMS)," Ohio University (Ryan L. Fogt); "Computational Study of Cylinder Heating for Boundary Layer Control," Ohio Northern University (Jed E. Marquart and Derick S. Endicott, student); Large Eddy Simulations of Magneto hydrodynamic Turbulent Boundary Layer Flows for Intelligent Control in Hypersonic Space Vehicles," The University of Akron (Abhilash J. Chandy). Dr. Chandy is collaborating on his research with Dr. Isiah Blankson (underrepresented male), Senior Scientist at NASA Glenn Research Center.

- OSGC continued support for the OhioSAT (Ohio State-wide Student-led Satellite Program) in collaboration with NASA Glenn Research Center, the Air Force Institute of Technology (AFIT), and the Ohio Aerospace Institute (OAI). A successful workshop was held at AFIT (June 16-17, 2011) with 25 attendees. The two-day workshop included discussions of payloads, flight opportunities, work breakdown amongst universities and national labs, overview of AFIT programs, laboratories, and ground station facilities available to the program and a hands-on cubesat demonstration. We seek to move to Phase 2 of a proposed OhioSAT program charged in the design, build, test, launch, and operate a small satellite. Our initial Phase 1 effort in the Summer, 2011, was to create a partnership of universities across the state of Ohio through participation in two workshops and initial infrastructure construction at AFIT. In the current Phase 2 we are seeking to fund programs within the affiliates to perform specific tasks as identified in the AFIT workshop, and directed toward a specific payload. The program will involve collaboration with OSGC, OAI, NASA Glenn Research Center, AFIT, the Air Force Research Laboratory, and ultimately industry partners. Our intent is to fund two university teams for design and construction work during the academic year and summer on the proposed satellite electronic module.

- All OSGC scholarship and fellowship recipients attended the 19th Annual OSGC Student Research Symposium on April 8, 2011, at the Ohio Aerospace Institute, in Cleveland, Ohio, where all OSGC students present their research and are evaluated. Senior Scholars, Master's, and Doctoral Fellows make oral presentations of their research project. Junior Scholars, and Community College Scholars prepare a poster illustrating their work during a formal poster session. Pre-Service Education Scholars also prepare a poster highlighting a future lesson plan that incorporates NASA educational materials. All students prepare written reports, which are bound and published as *OSGC Symposium Proceedings*. The luncheon keynote speaker was Dr. James Gilland, Senior Scientist/Research Team Manager, Ohio Aerospace Institute, who presented "*Who Are You Calling an Engineer?*"

- OSGC was requested by NASA Headquarters to participate in the NASA Future Forum at The Ohio State University in Columbus, OH (February 20-21, 2012). The Forum coincided with the 50th anniversary of John Glenn's historic Friendship 7 space flight. OSGC Director Gary L. Slater was invited to be a member of Leland Melvin's Inspiration and Education Panel. The Panel discussion focused on "*Building the Innovators for Tomorrow*." In addition to the OSGC Director, the following OSGC personnel and Campus Representatives attended the Future Forum: Gerald T. Noel, Sr., Associate Director and Campus Representative, Central State University (MSI); John Weber, Campus Representative, University of Dayton; P. Ruby Mawasha, Campus

Representative, Wright State University; the OSGC Program Manager (Laura Stacko) and Program Assistant (Arela Leidy). NASA also invited OSGC students to participate in the Student Poster Session scheduled on February 20, from 4:30 PM to 6:30 PM after the formal session (Day 1). OSGC recruited 17 students [9 graduate; 8 undergraduate; 5 underrepresented (3 females; 2 males); 5 females] who participated in the Forum activities and presented posters of their research as follows: Robyn L. Bradford, Master's 1, University of Dayton, "Fabrication of Synthetic Tissue Using Nanostructured Materials and Electrospinning"; Robert C. Charvat, Master's 2, University of Cincinnati, "SIERRA Project"; Daniel J. Doucet, Master's, Case Western Reserve University (Presenting with James C. Henning), "PIV Measurements of Air Flow Velocities in Microchannels"; Derick S. Endicott, Senior, Ohio Northern University, "Computational Study of Cylinder Heating/Cooling for Boundary Layer Control"; Daniel R. E. Foster, Doctoral 2, The Ohio State University, "Thermal and Mechanical Characterization of Ultrasonic Additive Manufacturing"; Nicole D. Guzman, Doctoral 3, The Ohio State University, "Characterization and MicroRNA Profiling of Breast Cancer Cell Secreted Microvesicles"; Alan L. Jennings, Doctoral 3, University of Dayton, "Memory-Based Motion Optimization for Unbounded Resolution"; Nicholas S. Jones, Junior, Ohio Northern University, "The Effects of Cg Shifting During Flight"; Krista M. Kecskemety, Doctoral Student, The Ohio State University, "Investigation into the Impact of Wake Effects on the Aeroelastic Response of Wind Turbines"; Joseph P. Montion, Senior, The University of Toledo, "Synthesis of Polymeric Ionic Liquid Particles With Iron Nano Particles"; Ciara C. Seitz, Senior, Cleveland State University, "Thermally Responsive Elastin Like Polypeptides"; Robert A. Sinko, Senior, Miami University, "Characterization and Modeling of Hard Magnetorheological Elastomers"; Matthew G. Smith, Senior, Ohio Northern University, "Mobile Surveillance for Search and Rescue Applications"; Brittany M. M. Studmire, Master's 1, Cleveland State University, "Optimization of Digestate Media Composition for Maximal Lipid Recovery"; Charles F. Tillie, Senior, Cleveland State University, "Characterization of Thin Film Deposition Processes"; Nathan A. Wukie, Senior, University of Cincinnati, "Bleed Hole Simulations for Mixed Compression Inlets". Students had an opportunity to interact with Senator John Glenn, NASA Administrator Charles Bolden; Associate Administrator for Education Leland Melvin; and Chief Technologist Mason Peck.

Quote from Robert Charvat, OSGC Master's recipient at the University of Cincinnati who summed up the Future Forum opportunity, *"I wanted to thank you for the invitation to the NASA event. As a young engineer who has been paralyzed by trying to wrap up a Master's, balancing work/personal life goals, and trying to get a job afterwards; I had lost many of the reasons why I had gotten into aerospace in the first place. I remember two years ago when I was invited to give a speech about the importance of science and technology at SCPA High School, and when I was asked why I picked STEM as a career field myself, my answer didn't include writing 150-page documents, sleeping at computer desks, and practicing for presentations. It was passionate, it was exciting, it was life changing, and inspirational.*

This NASA event was a slap in the face, in the sense that it was a reminder why 150-page documents, late nights, and working harder than everyone else is worth it. In 10 years I

may forget the location of the event, what car I owned, and what was for lunch. What I won't forget are the people, the message, and the idea "don't ask what the future will be like, make it". It was truly inspirational, and provided more than enough evidence of how excited I should be to transfer from my current educational to industry opportunities.

Last note, after the event I was speaking to an individual about the SIERRA Project; he was very interested and had positive things to say about it. We spoke for about 5 minutes before the crowd cleared. The individual was Mason Peck. I think I am still in shock, but luckily I have a photo of it to remind myself that it really did happen!"

- Continue to support proposals from affiliate members for Diversity Initiatives which include: Support was received to fund 6 Fellowships to underrepresented students (4 females; 2 males) at the following Ohio member universities: Ohio University received funding for 1 Doctoral Fellowship (1 underrepresented female). The University of Dayton received funding for 1 Master's Fellowship (1 underrepresented female). The Ohio State University received funding for 2 Doctoral Fellowships (1 underrepresented female and 1 underrepresented male—Special Minority Fellowship). The University of Cincinnati received funding for 1 Special Minority Master's Fellowship (1 underrepresented male). Cleveland State University received funding for 1 Special Minority Master's Fellowship (1 underrepresented female).

Student-Innovative-Creative-Hands-on Project (SICHOP) Higher Education Grants:

- Provided support for the "Rocket Team at the University of Cincinnati (UC)" (Grant W. Schaffner). The UC team will compete in the Regional Space Grant Consortia Rocket Competition in Milwaukee, WI (April 27-28, 2012). The competition is a joint Consortia effort with the Great Midwest Space Grant Consortia spearheaded by the Wisconsin Space Grant Consortium.

- Provided support for the "Rocket Competition Program," at Lorain County Community College (LCCC), (Marlin Linger). The LCCC team will compete in the Regional Space Grant Consortia Rocket Competition in Milwaukee, WI (April 27-28, 2012). The competition is a joint Consortia effort with the Great Midwest Space Grant Consortia spearheaded by the Wisconsin Space Grant Consortium.

- Provided support to the University of Cincinnati Aircraft Design Team for the design of a transport type airplane with the goal of lifting the most weight possible (John W. Livingston).

- Provided support for 2 student Lunabotics Competition teams at: 1) The University of Akron (Thomas T. Hartley); Miami University (Michael Bailey-Van Kuren). University of Akron team member Thomas V. Vo stated, "*The financial support from the Ohio Space Grant Consortium provided the motivation for our team of engineers (electrical and mechanical) to effectively design and assemble a robotics platform. It allowed us to obtain the necessary tools and materials in a timely manner allowing us to achieve our goals.*"

- Supported a team of 9 Ohio Northern University students (3 females) and faculty advisor, Jed Marquart, to design, build, and fly, in competition, a radio-controlled model airplane in the Society of Automotive Engineers (SAE) Aero Design Competition for students.

- Supported Case Western Reserve University student team (3 males) for the “Practical High-Altitude Microgravity Experiment” (James T’ien).
- Supported Miami University team of 33 students (12 females; 21 males; 3 underrepresented) for “Project High Flight” (Robert J. Setlock).
- Provided international travel support to Patrick M. Wensing (OSGC Fellow @ The Ohio State University) to present a paper entitled “*Fuzzy Controlled Hopping in a Biped Robot*” at the 2011 IEEE International Conference on Robotics and Automation (ICRA), held in Shanghai, China (May 9-13, 2011). Patrick collaborated on this research while on fellowship tenure from the OSGC. Formal approval to support Patrick was received from Diane DeTroye, NASA Headquarters: “*Best wishes to Patrick for a successful trip. And congratulations on being selected to make a formal presentation; a wonderful recognition.*” Space Grant will be included in verbal and written acknowledgments in writing reports and publications, and a post-trip report was submitted to the Space Grant office describing the benefits gained as a result of the trip. **Quote from Patrick Wensing:** “*I thank the Ohio Space Grant for their support of this trip. As my first international conference experience, it will always be memorable. The technical content helped to further motivate my graduate school research goals and the presentation was great exposure for my work. This trip provided me with many connections and resources that will be helpful in the pursuit of my academic goals. Additionally, the conference helped to broaden my cultural perspectives, which will be beneficial to future participation in the international research community.*”
- OSGC provided funding to support 2 students (1 underrepresented male) to participate in the NASA Academy and for travel during Summer, 2011:
 - Michael C. Johnston, NASA Glenn Research Center Space Academy
 - Kamau B. Mbalia (underrepresented male), NASA Ames Academy
- OSGC provided funding to support 5 internships and for travel (3 females) at NASA Centers and with industry during Summer, 2011:
 - Internship at NASA Glenn Research Center, Eden F. Hummel, (female)
 - Internship at NASA Ames Research Center, Ashley Jean Pugh (female)
 - Internship at NASA Goddard Space Flight Center, Jacob R. Kilber
 - Internship at Johns Hopkins Applied Physics Lab (APL), Michael D. Kerns
 - Industry Internship at ZIN Technologies, Kirsten S. Nicolaisen (female)
- OSGC provided \$2K each in travel/housing support for 5 supported internships (1 underrepresented male) from a NASA Exploration Systems Mission Directorate (ESMD) award: (Robert C. Charvat (underrepresented male) (Sierra Lobo); Krista J. Kroninger (female), ZIN Technologies); Cory D. Darland (L-3 Cincinnati Electronics); Amy M. Newman (female) (Etegent Technologies, Ltd.); and Robert G. Fogelson (Cornerstone Research Group). **Note that L-3 was very impressed with Cory Darland; as a result, offered him full-time employment which he accepted. Cory started his career with L-3 in January, 2012.**
- Supported a student research project in collaboration with Ohio Northern University (Jed E. Marquart) and Pointwise, Inc. (Carolyn Dear) in Summer, 2011, entitled “Computational Study of Cylinder Heating for Boundary Layer Control” with Student Researcher Derick S. Endicott.
- Continue to support student-led balloon satellite/rocketry programs at: Central State University (MSI), The University of Akron, University of Cincinnati, and Wright State

University. In FY2011, Miami University and Lorain County Community College (LCCC) were added. Miami University received an OSGC grant for Project High Flight led by Professor Robert Setlock. The LCCC received an OSGC grant to form a Rocket Team led by Professor Marlin Linger to construct a rocket and be ready to compete in the Regional Space Grant Consortia Rocket Competition in Milwaukee, WI (April 27-28, 2012). The University of Cincinnati Rocket team will also compete in the Regional Space Grant Consortia Rocket Competition in Milwaukee, WI (April 27-28, 2012).

- Supported “*Engineering Week*” at Case Western Reserve University.
- Provided support for 6 students (2 underrepresented, 2 females) to attend the Great Midwest Space Grant Regional Consortia meeting held in Urbana-Champaign, IL (October 4-5, 2011) from the following universities: University of Cincinnati (2 males, 1 underrepresented), University of Dayton (2 females, 1 underrepresented, 1 male), Miami University (1 male), and one faculty member (underrepresented male) from Central State University (MSI). The students also presented their research in the formal Poster Session (Day 1 of the meeting). OSGC Director Gary L. Slater presented “*My 50 Years in Aerospace*” (Day 2 of the meeting) representing the Space Grant Consortium Director’s Presentation on the Agenda.
- Provided support for 1 faculty member and 2 students from Miami University to attend “*RockOn 2012 The Next How to Workshop*” being held at Wallops Flight Facility (June 16-21, 2012) supported by the Colorado and Virginia Space Grants. Miami University is providing support for 2 additional students to attend the workshop.
- Provided travel support for 1 faculty member and 1 student from Case Western Reserve University to attend the ASME’s 2012 International Mechanical Engineering Congress and Exposition in Houston, TX (November 9-15, 2012).

Senior Design Courses

Provided support for the following Senior Design courses:

- OSGC funded two University of Cincinnati Aerospace Engineering senior design projects in 2011-12. The capstone design course AEEM501-2 has sections for aircraft design and spacecraft/rocket design. The rocket team recently won the 2012 AIAA/Praxis “Battle of the Rockets” in the Mars Rover category. The project required a precise rocket launch, payload recovery, followed by a rover deployment. The Aircraft Design group is participating in two categories in the SAE Aerodesign Competition in 2012. Last year’s team (2011—also OSGC supported) won in the “heavy lift” category against national and international competition. The micro aircraft team also took first place in their category with a 0.7 lb electric powered aircraft that flew with a payload of 3.5 lb.
- OSGC provided a research grant for the “Development of a Solar Array Testing Facility” at Cedarville University (Timothy B. Dewhurst). As a result, a revised Higher Education course was created: EGME 4810-4820, ME Senior Design I and II - a capstone senior design course. The goal of the project was to develop the same capability to measure energy storage capacity in batteries. Secondly, a group of students designed a solar panel system for heating hot water that was then installed in the ABWE Hospital in Liberia, Africa. Dr. Dewhurst stated that as a result of this project the technology designed for the project was also used for the development of the hot water heater. While no funds were used for the solar hot water team, a student team did travel to Liberia to install a solar heating system for hot water for the Hospital. The team also provided better

water filters for the compound, replacing the inadequate pool filters with industrial filters. Date of implementation: Spring, 2011. Additionally, the Cedarville Solar Boat team, winners of the Solar Splash World Championship, were invited to present their research at the IEE/PELS (Institute of Electrical and Electronics Engineers/Power Electronics Society) ECEE (Energy Conversion Congress and Exposition) Conference in Phoenix, AZ (September 18-22, 2011). **Quote from Dr. Timothy B. Dewhurst:** *“The students in this course are the biggest beneficiaries of this project.”*

- OSGC funded "Practical High-Altitude Microgravity Experiment," at Case Western Reserve University (James T'ien). A new hands-on higher education course was developed—EMAI 399-112 Advanced Independent Research and Design which is a one semester independent study to continue development of the project with two planned weather balloon launches. Date of implementation: Spring, 2012.

- OSGC funded “Transition of Small Unmanned Aerial Vehicle Research Test-Bed to Undergraduate Educational Purposes” at Wright State University (Scott K. Thomas) to design, construct and calibrate a test stand for small electric motors and propellers for use on micro air vehicles for the Air Force. This test stand will be composed of a load cell and reaction torque sensor suspended within the wind tunnel at Wright State University. A variety of motors and propellers will be tested to determine the thrust, torque and power consumption at different air speeds. This experimental data will then be used to determine the optimal propulsion system for a new generation of micro air vehicles. The second objective of this proposal is to transition the above-mentioned test stand for use in the classroom at WSU. Students in three different classes for use in the 2011/2012 academic year and beyond will be introduced to the issues involved in the testing of motors/propellers at different stages in their college careers. The first class will be the Introduction to Freshman Design (ME 199) class, where they will be shown the basics of experimental design, data collection and simple units analyses of the data collected. In the Thermal-Fluid Measurements Laboratory (ME 495) class, the students will be required to complete more rigorous testing of the motor/propeller combinations, including the appropriate calibrations and uncertainty analyses. Finally, in the Aeronautics (ME 430) class, the students will use the data collected and stored in a database to iteratively design small remotely controlled airplanes in a design project. In all three cases, the same test stand will be used at the appropriate level such that the students can easily understand the material. However, the students will be pushed out of their comfort zones to reach new levels of understanding.

- OSGC funded "Project High Flight" at Miami University (Robert J. Setlock). A new course was developed, EAS 144, which is intended to be the first part in a four year series of courses designed to serve as the organizational focal point for executing Project High Flight. Project High Flight and EAS 144 taken together form the catalyst of a coordinated effort to improve the level of creativity and innovation in engineering students by developing within them an improved appreciation for, and capacity to effectively use, their divergent thinking skills. This is all being accomplished in the context of researching and developing an operational capability to fly and remotely control long duration high altitude balloon missions to the edge of space. Date of implementation: Spring, 2012.

Research Infrastructure

Award seed grants for innovative STEM Research Infrastructure programs at Ohio universities. Some representative titles include: "Assessment of Latency Impacts on Tracking Accuracy During Telerobotic Surgery Simulation in a Spaceflight Analog Environment," University of Cincinnati (Grant W. Schaffner); Multiscale-based Computational Material Characterization Tool: Integration of FEAMAC with Self-OPTIM Framework," The University of Akron (Gunjin Yun); "The Morphing Properties of a Smart Hybrid Laminates Based on a Shape Memory Composite," Youngstown State University (Pedro Cortes-Velasco) (underrepresented male). Dr. Cortes-Velasco is working with Dr. Hazel Marie (female), Co-Principal Investigator, on the mathematical modeling for his research project. Dr. Cortes-Velasco created a new website with OSGC funding. URL: http://www.ysu.edu/stem/phd/smart-composites_project.php

- Provided additional support to Nuclear Power for Space Colonization Research and Technology Development, Phase II (Ralph Steckler Project) at The Ohio State University (Thomas E. Blue) and Wilberforce University (Minority Serving Institution) (Edward Asikele) (underrepresented male).

Outcome 2 - Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty (Educate and Engage). **OSGC FY2011 goals were met.**

Precollege Programs

- OSGC offered a pre-service teacher workshop in collaboration with NASA Glenn Research Center and NASA CORE (Central Operation of Resources for Educators) for OSGC education scholars and classroom teachers. Participants received NASA education materials, professional development opportunities, curriculum modules for classroom use, and local resources for enhancing classroom teaching and student experiences in the classroom. Students also had an opportunity participate in hands-on educational activities that can be replicated into a future lesson plan under the guidance of a NASA Aerospace Education Specialist. OSGC also provided students with gift cards to purchase educational materials from NASA CORE for their future classroom, or was added to scholarship award. The workshop was held at OAI on February 10, 2012. **Quote from Dr. Ann MacKenzie, Associate Professor, Miami University Teacher Education:** *"This workshop is an outstanding opportunity for our students to receive NASA materials that would not ordinarily be available to them."* Following are some representative evaluation comments about the workshop: *"The workshop made me more comfortable about my lesson plan, and what I need to be doing."* *"Really enjoyed the hands-on activities and learning about the NASA resources available. I hope to use the ideas to inspire hands-on activities for my future classroom."* *"Thank you for all the resources that have been made available to us."* Over 94.44% of the attendees rated the following evaluation categories as "Strongly Agree": The content of the workshop was useful; I am satisfied with this workshop; Activities and materials apply to my major; By participating, I have a better understanding of NASA programs/resources available; I plan to use the materials in a future lesson plan for my class; This workshop will help me develop my lesson plan for the Symposium.

- Award mini-grants to Ohio K-12 teachers for innovative STEM programs. Some representative titles include: "Return to the Moon/Science Olympiad," St. Pious X, (E. Catherine Ujvagi); "Continuing the First Tech Challenge Endeavor," Benjamin Logan Elementary School (Sally Stolly); "Astro Thursdays," Cincinnati Observatory Center (Dean Regas); "Return to the Moon," Bishop John King Mussio Elementary (Susan R. Crites); "Electronics: The On-Ramp to STEM," Benjamin Logan High School (Arthur Stormer); "Getting SERIOUS about 21st Century Skills," Benjamin Logan Elementary School (Sally Stolly); "BLURR – Benjamin Logan Raider Robotics," Benjamin Logan High School (Jackie R. Thompson); "Rendezvous with a Planet," Bishop John King Mussio Elementary (BJKM), (Erin E. Durkee).
- Cedarville University (Robert Chasnov) hosted a pre-service teacher workshop for all Education and Science majors. Highlight of the program was a presentation by Bill Richey, Science Teacher at Xenia High School (also adjunct professor at Miami University) and Ohio Teacher of the Year along with other national teaching awards.
- Supported "*Enhancing Physics Education with Open-Ended Engineering Design Projects*" teacher workshop at The University of Toledo (Kevin P. Czajkowski).
- Sponsorship of the FIRST Buckeye Regional Robotics Competition ("LOGO MOTION") – 58 high school teams (Ohio has 43 teams) from across the country competed in a robotics competition that combines sports with engineering and technology held at Cleveland State University Wolstein Center (April 7-9, 2011). [OSGC receives favorable publicity as a sponsor to this event (i.e., websites, signage, banners, and ads in Ohio newspapers.)]
(URL: http://www.nasa.gov/centers/glenn/news/pressrel/2011/11-016_first.html).
- Provided travel support for iSPACE personnel, Beverly Ketron, Education Director; Sharon Young, Education Outreach Director (2 females) to present and attend the 2011 Space Exploration Educators Conference (SEEC) at NASA Johnson Space Center for teacher professional development.
- Supported the 2011 Women in Engineering Camp at the University of Dayton (July 10-15, 2011) – a week-long, residential summer program that introduces high school females to career opportunities in engineering through classroom activities, hands-on experiments, industry visits, and exposure to engineers as role models.
- With Augmentation funds, a new program entitled "*Bio-Inspired Flight: A Survey of Outreach Activity*" under the direction of Professor Kelly Cohen at the University of Cincinnati, in cooperation with Ms. Amy Jameson, Cincinnati Public School System. This program is designed to expose teachers (and ultimately their students) to the science and engineering aspects of aeronautics and studies the flight of insects to improve the design of micro-UAV towards bio-inspired flight. During the summer recess period, teachers will be brought to the University of Cincinnati campus to be exposed to aerodynamic theory and wind tunnel testing. Based on their experiences, lesson plans for incorporation into their respective STEM curricula will be developed. Follow-on work during the academic year will attempt to measure and quantify the success of this program.
- Also with Augmentation funds, the Student Spaceflight Experiments Program will support a regional launch with more than 20 schools (Cincinnati School District) and over 250 students. SSEP is an education initiative that gives students the ability to design and propose real experiments to fly in low Earth orbit on the International Space Station.

OSGC will partner with the University of Cincinnati, Cincinnati Public Schools, iSPACE, Regional STEM Innovation Collaborative, and P&G. Working together, resources will be leveraged to grow the regional impact of the SSEP and NASA programs.

Outcome 3 – Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA’s mission (Engage and Inspire). **OSGC FY2011 goals were met.**

Informal Education

- OSGC co-sponsored the 2011 HBCU/MSI (Other Minority Institutions) Symposium held at Cleveland State University Wolstein Center (July 26-27, 2011).
- Sponsorship of “Science is Fun!” family days at Case Western Reserve University (Kathryn M. Kwiatkowski).
- Supported the 2011 Women in Engineering Camp at the University of Dayton (July 10-15, 2011).
- Provided grant to Tipp City Exempted Village Schools for "Creating a STEM Club at Tippecanoe Middle School" (Dale F. Bonifas).
- Sponsorship of "Northeast Ohio Regional Science Olympiad" at Case Western Reserve University (Kathryn M. Kwiatkowski).
- Cleveland Museum of African American History – permanent home of the “African Americans in Space Science Exhibit.”
- Supported “Exploring the Solar System: Planetary Science Lecture Series" at Ohio University (Al Cote).
- Drake Science Center in Cincinnati – conducts structured visits for teachers, students, and parents (over 20K students annually) in astronomy topics.

PROGRAM ACCOMPLISHMENTS

The majority of OSGC programs include scholarships and fellowships (required research component with faculty mentor), Higher Education projects (through Curriculum Innovation Proposal (CIP) / Faculty Research Initiation Grant Proposal (FRIGP) / Student-Innovative-Creative-Hands-on Project (SICHOP) grants), Research Infrastructure projects (Faculty Research Initiation Grant Proposal (FRIGP) grants), Precollege (teacher training thrust and mini-grant program), Informal Education projects (Informal Education Innovation Proposal (IEIP) grants).

Outcome 1 - Contribute to the development of the science, technology, engineering, and mathematics (STEM) workforce in disciplines needed to achieve NASA’s strategic goals (Employ and Educate) **OSGC FY2011 goals were met.**

In FY2011, the OSGC provided support for **137 student awards** (breakdown is as follows):

Fellowship/Scholarships

- Awarded 97 Scholarships and Fellowships

Higher Education

- Provided support for 32 student participants in Higher Education programs.

Research Infrastructure

- Provided support for 8 student participants in Research Infrastructure programs.

Achievements and Progress

Fellowship/Scholarships

- Awarded 97 Scholarships and Fellowships:
 - 64 STEM undergraduate scholarships (39 seniors; 25 juniors)
 - 4 Community College scholarships
 - 16 Pre-service Teacher scholarships
 - 2 Special scholarships (honoring two late OSGC Directors at their home universities)
 - 11 Graduate Fellowships (6 Doctoral; 5 Master's – includes 3 special minority awards)

-Of the 97 awards, 28 were made to underrepresented students (28.87%).

-Of the 97 awards, 44 were made to female students (45.36%).

- Awarded 16 NASA CORE (Central Operation of Resources for Educators) gift cards, or the option to add to their award to pre-service scholarship award recipients.
- Nineteenth Annual Student Research Symposium was held at the Ohio Aerospace Institute in April 8, 2011, with over 150 attendees.

Higher Education

Supported 32 Higher Education students as interns (industry or NASA Centers), participants in NASA Academy, or as part of the OSGC Higher Education grant program.

- Provided support for 5 internships (3 females) in Summer, 2011.
- Provided support for 2 participants (1 underrepresented male) in NASA Academies in Summer, 2011.
- Provided travel/housing support for 5 (1 underrepresented male, 2 females) supported interns from a NASA ESMD (Exploration Systems Mission Directorate) award in Summer, 2011.
- Provided support for 5 innovative STEM Higher Education programs at Ohio Universities.
 1. "Manufacturing Engineering Program Development and Its Potential Impact on Transforming Undergraduate Engineering Curriculum," Wright State University - Lake Campus (P. Ruby Mawasha) (underrepresented male).
 2. "Development of Reduce Order Models for Simulations and Feedback Control of Aerodynamic Flows," Miami University (Edgar J. Caraballo).
 3. "Antarctic Climate Change Education through Meteorological Measurements at Schools (ACCEMMS)," Ohio University (Ryan L. Fogt).
 4. "Computational Study of Cylinder Heating for Boundary Layer Control," Ohio Northern University (Jed E. Marquart and Derick S. Endicott, Student).
 5. "Large Eddy Simulations of Magnetohydrodynamic Turbulent Boundary Layer Flows for Intelligent Control in Hypersonic Space Vehicles," The University of Akron

(Abhilash J. Chandy). Dr. Chandy is collaborating on his research with Dr. Isiah Blankson (underrepresented male), Senior Scientist, at NASA Glenn Research Center.

- OSGC continued support for the OhioSAT (Ohio State-wide Student-led Satellite Program) in collaboration with NASA Glenn Research Center, the Air Force Institute of Technology (AFIT), Air Force Research Laboratory, and OAI.

- OSGC supported the NASA Future Forum at The Ohio State University in Columbus, Ohio (February 20-21, 2012). OSGC Director Gary L. Slater was invited to be a member of Leland Melvin's Inspiration and Education Panel. OSGC recruited 17 students [9 graduate; 8 undergraduate; 5 underrepresented (3 females; 2 males); 5 females] who participated in the Forum activities and presented posters of their research at the Student Poster Session.

- Continue to support proposals from affiliate members for Diversity Initiatives which include: Support was received to fund 6 Fellowships to underrepresented students (4 females; 2 males) at the following Ohio member universities: Ohio University received funding for 1 Doctoral Fellowship (1 underrepresented female). The University of Dayton received funding for 1 Master's Fellowship (1 underrepresented female). The Ohio State University received funding for 2 Doctoral Fellowships (1 underrepresented female and 1 underrepresented male—Special Minority Fellowship). The University of Cincinnati received funding for 1 Special Minority Master's Fellowship (1 underrepresented male). Cleveland State University received funding for 1 Special Minority Master's Fellowship (1 underrepresented female).

- Provided support for 8 innovative student-led, hands-on student experiences in STEM disciplines at Ohio universities (Student-Innovative-Creative-Hands-on Project (SICHOP) Higher Education Grants):

1. Rocket Team at the University of Cincinnati (UC) (Grant Schaffner).
2. Rocket Competition Program at Lorain County Community College (LCCC), (Marlin Linger).
3. University of Cincinnati Aircraft Design Team (John W. Livingston).
4. Lunabotics Competition team at The University of Akron (Thomas T. Hartley).
5. Lunabotics Competition team at Miami University (Michael Bailey-Van Kuren).
6. (SAE) Aero Design Competition team at Ohio Northern University (Jed E. Marquart).
7. "Practical High-Altitude Microgravity Experiment" at Case Western Reserve University (James T'ien).
8. "Project High Flight" at Miami University (Robert J. Setlock).

Other Higher Education Program support includes:

- Provided international travel support to Patrick M. Wensing (OSGC Fellow @ The Ohio State University) to present a paper entitled "*Fuzzy Controlled Hopping in a Biped Robot*" at the 2011 IEEE International Conference on Robotics and Automation (ICRA), held in Shanghai, China (May 9-13, 2011).

- "Computational Study of Cylinder Heating for Boundary Layer Control" at Ohio Northern University (Jed E. Marquart).

- Continue to support student-led balloon satellite/rocketry programs at: Central State University (MSI), The University of Akron, University of Cincinnati, and Wright State

University. In FY2011, Miami University and Lorain County Community College (LCCC) were added.

- Provided support for 6 students (2 underrepresented, 2 females) to attend the Great Midwest Space Grant Regional Consortia meeting held in Urbana-Champaign, IL (October 4-5, 2011). OSGC Director Gary L. Slater presented “*My 50 Years in Aerospace*” (Day 2 of the meeting) representing the Space Grant Consortium Director’s Presentation on the Agenda.

- Supported “*Engineering Week*” at Case Western Reserve University.

- Provided support for 1 faculty member and 2 students from Miami University to attend “*RockOn 2012 The Next How to Workshop*” being held at Wallops Flight Facility (June 16-21, 2012).

- Provided travel support for 1 faculty member and 1 student from Case Western Reserve University to attend the ASME’s 2012 International Mechanical Engineering Congress and Exposition in Houston, TX (November 9-15, 2012).

Provided support for 8 senior design courses at Ohio universities (i.e., University of Cincinnati, Case Western Reserve University, Cedarville University, Miami University, and Wright State University).

- OSGC funded two University of Cincinnati Aerospace Engineering senior design projects in 2011-12. The capstone design course AEEM501-2 has sections for aircraft design and spacecraft/rocket design. The rocket team recently won the 2012 AIAA/Praxis “Battle of the Rockets” in the Mars Rover category. The project required a precise rocket launch, payload recovery, followed by a rover deployment. The Aircraft Design group is participating in two categories in the SAE Aerodesign competition in 2012. Last year’s team (2011—also OSGC supported) won in the “heavy lift” category against national and international competition. The micro aircraft team also took first place in their category with a 0.7 lb electric powered aircraft that flew with a payload of 3.5 lb.

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design, construct and calibrate a test stand for small electric motors and propellers for use on micro air vehicles for the Air Force. This test stand will be composed of a load cell and reaction torque sensor suspended within the wind tunnel at Wright State University. A variety of motors and propellers will be tested to determine the thrust, torque and power consumption at different air speeds. This experimental data will then be used to determine the optimal propulsion system for a new generation of micro air vehicles. The second objective of this proposal is to transition the above-mentioned test stand for use in the classroom at WSU. Students in three different classes for use in the 2011/2012 academic year and beyond will be introduced to the issues involved in the testing of motors/propellers at different stages in their college careers. The first class will be the Introduction to Freshman Design (ME 199) class, where they will be shown the basics of experimental design, data collection and simple units analyses of the data collected. In the Thermal-Fluid Measurements Laboratory (ME 495) class, the students will be required to complete more rigorous testing of the motor/propeller combinations, including the appropriate calibrations and uncertainty analyses. Finally, in the Aeronautics (ME 430) class, the students will use the data collected and stored in a database to iteratively design small remotely controlled airplanes in a design project. In all three cases, the same test stand will be used at the appropriate level such that the students can easily understand the material. However, the students will be pushed out of their comfort zones to reach new levels of understanding.

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Research Infrastructure

Provided support for 4 innovative STEM Research Infrastructure programs at Ohio Universities and 8 students.

1. "Assessment of Latency Impacts on Tracking Accuracy During Telerobotic Surgery Simulation in a Spaceflight Analog Environment," University of Cincinnati (Grant W. Schaffner).
2. "Multiscale-based Computational Material Characterization Tool: Integration of FEAMAC with Self-OPTIM Framework," The University of Akron (Gunjin Yun).
3. "The Morphing Properties of a Smart Hybrid Laminates Based on a Shape Memory Composite," Youngstown State University (Pedro Cortes-Velasco) (underrepresented male).
4. "Nuclear Power for Space Colonization Research and Technology Development, Phase II (Ralph Steckler Project)" at The Ohio State University (Thomas E. Blue) and Wilberforce University (Minority Serving Institution) (Edward Asikele) (underrepresented male).

All students who have received significant OSGC support and who have taken their “next step” have been successfully tracked.

Outcome 2 - Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty (Educate and Engage). **OSGC FY2011 goals were met.**

- Provided support for 16 pre-service teachers at a workshop held at OAI (February, 2012). Student participants received hand-on training and NASA education materials.
- Provided support for 8 teacher mini-grants for innovative teaching.
- Award grant to Professor Kelly Cohen at the University of Cincinnati for “*Bio-Inspired Flight: A Survey of Outreach Activity*” in cooperation with Ms. Amy Jameson, Cincinnati Public School System. This program is designed to expose teachers (and ultimately their students) to the science and engineering aspects of aeronautics and studies the flight of insects to improve the design of micro-UAV towards bio-inspired flight. During the summer recess period, teachers will be brought to the University of Cincinnati campus to be exposed to aerodynamic theory and wind tunnel testing. Based on their experiences, lesson plans for incorporation into their respective STEM curricula will be developed. Follow-on work during the academic year will attempt to measure and quantify the success of this program. To be funded with Augmentation funds.
- Also with Augmentation funds, award grant to the Student Spaceflight Experiments Program that will support a regional launch with more than 20 schools (Cincinnati School District) and over 250 students. SSEP is an education initiative that gives students the ability to design and propose real experiments to fly in low Earth orbit on the International Space Station. OSGC will partner with the University of Cincinnati, Cincinnati Public Schools, iSPACE, Regional STEM Innovation Collaborative, and P&G. Working together, resources will be leveraged to grow the regional impact of the SSEP and NASA programs.
- Provided support to assist Cedarville University’s pre-service teacher workshop for all education and science majors.
- Provided support to The University of Toledo for enhancing Physics Education and professional development for teachers.
- Provided support for FIRST Robotics (March, 2011).
- Provided support for Women in Engineering at the University of Dayton.
- Provided travel support for iSPACE personnel, Beverly Ketron, Education Director; Sharon Young, Education Outreach Director (2 females) to present and attend the 2011 Space Exploration Educators Conference (SEEC) at NASA Johnson Space Center for teacher professional development.

Outcome 3 – Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA’s mission (Engage and Inspire). **OSGC FY2011 goals were met.**

- OSGC co-sponsored the 2011 HBCU/MSI (Other Minority Institutions) Symposium held at Cleveland State University Wolstein Center (July 26-27, 2011).

- Provided support for “Science is Fun!” family days at Case Western Reserve University impacting over 700 indirect participants.
- Provided grant to Tipp City Exempted Village Schools for "Creating a STEM Club at Tippecanoe Middle School" (Dale F. Bonifas).
- Supported “Exploring the Solar System: Planetary Science Lecture Series" at Ohio University (Al Cote).
- Cleveland Museum of African American History – permanent home of the “African Americans in Space Science Exhibit.”
- Drake Science Center in Cincinnati – conducts structured visits for teachers, students, and parents (over 20K students annually) in astronomy topics.
- Sponsorship of "Northeast Ohio Regional Science Olympiad" at Case Western Reserve University (Kathryn M. Kwiatkowski).

Miscellaneous:

- Published two OSGC newsletters
- Created and published *2011 OSGC Student Journal*.
- Created and published *2011 OSGC Student Research Symposium Proceedings* – in an effort to reduce paper and be “green”, the Proceedings were produced as a CD.
- Updated the annual *OSGC Congressional Book* – which details all OSGC scholarship and fellowship award, mini- and seed grants since the inception of the program and are broken out by the current Ohio 18 Congressional Districts.
- OSGC Director Gary L. Slater evaluated proposals for NASA EPSCoR “Experimental Program to Stimulate Competitive Research (EPSCoR) Minority Serving Institution (MSI) Faculty Engagement Competition” (December, 2011). Dr. Slater also assisted the Iowa Space Grant Consortium with reviewing 20 two-page concept papers for the Iowa NASA EPSCoR research program (September, 2011).
- Tim Cameron, OSGC Campus Representative from Miami University, drafted several faculty to assist the Iowa Space Grant Consortium with reviewing 20 two-page concept papers for the Iowa NASA EPSCoR research program (September, 2011).

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Student Data and Longitudinal Tracking:

Total Awards	=	137*
Scholarship/Fellowship	=	97
Higher Education	=	32
Research Infrastructure	=	8

Total Underrepresented = 23.36% (32 students) Exceeds target!
Total Females = 40.88% (56 students) Exceeds target!

Of the total 137 student awards, the total of participating underrepresented students was 32 (23.36%) which exceeded the OSGC’s target of 20% and the National Center for Education Statistics (Table 237) target of 16.75%. The total of participating female students was 56 (40.88%) which exceeded the NASA target of 40%.

For FY2010, 62 students are pursuing advanced degrees, 2 are employed in STEM (Aerospace Contractor), 6 are employed in STEM (non-aerospace position), 1 is employed by NASA/JPL, 4 are employed in K-12 STEM Academic Field, and 2 are employed in “Other” STEM Academic Field. Other tracking information will be provided upon evaluation of completed of Student Exit forms.

*Note these numbers may be revised when additional reporting information is collected.

- Diversity: The Ohio Space Grant Consortium (OSGC) is strongly committed to diversity which is inherent throughout OSGC’s Vision, Mission, Goals, and is executed through its programs by the Strategic Plan, program design, and evaluation. The OSGC represents many diverse institutions across the State of Ohio which includes two HBCUs: Central State University (Public) and Wilberforce University (Private) which holds the distinction of being the oldest HBCU in the United States. The OSGC currently has 24 members (from Ohio colleges, universities, and community colleges). Diversity for the OSGC membership includes 10 underrepresented members (41.67%) and 6 female members (25.00%). Fifteen (15) universities (Affiliate Members) comprise the OSGC Executive Committee (12 are from the original Ohio universities with Colleges of Engineering). Diversity for the OSGC Executive Committee includes 6 underrepresented members (40.00%) and 3 female members (20.00%). The OSGC former Associate Director was also an underrepresented male. In addition, the Ohio Aerospace Institute liaison, OSGC Program Manager, and OSGC Program Assistant are all females. Former Associate Director Gerald T. Noel, served on the National Space Grant Diversity Committee.

OSGC strives to attract participants in all OSGC programs who represent America’s landscape and the diversity of Ohio with a strong emphasis on increasing diversity targets. The OSGC actively encourages underrepresented students and faculty members to apply for OSGC program opportunities open to all Ohioans. All NASA opportunities are listed on the OSGC website and sent to campus representatives, affiliates, and OSGC students via a comprehensive list serve. Demographics of OSGC affiliates are used as a tool in making selections as well as recommended targets from NASA. In addition, OSGC utilizes the U.S. Department of Education, National Center of Educational Statistics (Table 237). Special emphasis on minority recruitment of undergraduate scholarship and graduate fellowship programs is encouraged. We will support seed grants for young faculty at Ohio universities and colleges to enable them to strongly compete for substantial national awards. We will specifically encourage proposals from underrepresented and female faculty. We will strive to increase interest and activity within the Ohio MSIs and community colleges in STEM higher education and research activities by earmarking additional funding for student and faculty projects at these institutions. In a dedicated effort to increase the number underrepresented students/faculty engaged in OSGC programs, the following programs were instituted:

- Award 2 additional underrepresented scholarships at each OSGC HBCU annually (1 at Central State University and 1 at Wilberforce University).

- A Special Minority Fellowship award began in 2005. To date, 6 fellowships have been awarded to underrepresented students.
 - Additional Senior scholarship awards to underrepresented minorities/and or females began in 2010. One additional scholarship is offered to each member institution. To date, 21 additional scholarships have been awarded.
 - A special scholarship was established in 2009 in memory of Dr. Paul C. K. Lam who served as the OSGC's Director from 2007-2009. The Paul C. K. Lam Memorial Scholarship is awarded annually to a deserving underrepresented undergraduate student majoring in Mechanical Engineering at The University of Akron. To date, 3 scholarships have been awarded.
 - Create and fund at least one student intern each year either at an MSI to work with a research faculty at an Ohio university.
 - Support the annual HBCU Conference (alternates every other year between Cleveland and Dayton).
- Minority-Serving Institutions: The OSGC currently has two universities designated as Minority Serving Institutions (MSIs)/Historically Black Colleges and Universities (HBCUs): Central State University (CSU) and Wilberforce University (WU). The campus representative from CSU serves as the Associate Director for OSGC. Both of these institutions are federally recognized as Historically Black Colleges and Universities (HBCUs). Both CSU and WU are charter affiliate members of the OSGC. Five OSGC scholarships are awarded to STEM students at each of the two universities. Neither of the two universities has a graduate-degree program; however, students who attend graduate school at other affiliates are strongly encouraged to apply for OSGC fellowships.
 - OSGC was a co-sponsor of the 2011 HBCU (Historically Black Colleges and Universities/OMI (Other Minority Institutions) Collaboration held at Cleveland State University (July 26-27, 2011). Former OSGC Associate Director Gerald T. Noel, Sr., from Central State University, attended the two-day event and provided opening remarks to kick off the event. Dr. Noel spoke about opportunities afforded to students by Space Grant and shared his own perspective as a representative of an HBCU that has worked with NASA. OSGC had a table at the Recruitment Fair segment of the event (Day 2) as well. Nearly 250 people attended the career fair and a high percentage of the population was underrepresented (i.e., African American - 65%; Hispanic - 15%). OSGC materials were distributed and scholarship/fellowship/internship opportunities were presented to student attendees. Students and faculty from universities across the United States attended the event. Since all student attendees were not from Ohio, information on the National Space Grant College and Fellowship Program and other Space Grants were also shared.
 - OSGC provided travel support for Dr. Edward Asileke (underrepresented male), campus representative at Wilberforce University, to attend the "*Education Stake Holders Summit*" in Chantilly, VA (November 29-December 2, 2011).
 - Both universities have students and faculty involved in BalloonSat activities. Faculty members at the MSIs have received seed grants to support their research development activities. Other Central State University faculty have participated in

Summer Faculty Research activities at NASA Glenn Research Center and have received NASA research grants in Low Gravity Studies and other areas.

Other OSGC MSI initiatives include:

•Wilberforce University is collaborating with The Ohio State University on Phase II of the “Nuclear Power for Space Colonization Research and Technology Development” for the Ralph Steckler Opportunity.

• NASA Education Priorities:

➤ Authentic, hands-on student experiences in science and engineering disciplines – the incorporation of active participation by students in hands-on learning or practice with experiences rooted in NASA-related, STEM-focused questions and issues; the incorporation of real-life problem-solving and needs as the context for activities. OSGC supported the following two students as participants in two NASA Academies: Michael C. Johnston, Graduate Student, Case Western Reserve University, at the NASA Glenn Research Center Space Academy and Kamau B. Mbalia, (underrepresented male), recent graduate, Central State University, at the NASA Ames Academy. Other supported students at NASA Centers include: Eden F. Hummel (female), Senior, Cleveland State University, at NASA Glenn Research Center; Ashley Jean Pugh (female), Senior, The Ohio State University, at NASA Ames Research Center; Jacob R. Kilver, Sophomore, The Ohio State University, at NASA Goddard Space Flight Center. OSGC also supported Michael D. Kerns, Junior, University of Dayton, at Johns Hopkins Applied Physics Lab (APL); and Kirsten S. Nicolaisen (female), Junior, Cedarville University, in an industry internship at ZIN Technologies in Cleveland, Ohio.

OSGC also funded the following hands-on student experiences:

- “Rocket Team at the University of Cincinnati (UC)” (Grant Schaffner). The UC team will compete in the Regional Space Grant Consortia Rocket Competition in Milwaukee, WI (April 27-28, 2012). The competition is a joint Consortia effort with the Great Midwest Space Grant Consortia spearheaded by the Wisconsin Space Grant Consortium.
- “Rocket Competition Program,” Lorain County Community College (LCCC), (Marlin Linger). The LCCC team will compete in the Regional Space Grant Consortia Rocket Competition in Milwaukee, WI (April 27-28, 2012). The competition is a joint Consortia effort with the Great Midwest Space Grant Consortia spearheaded by the Wisconsin Space Grant Consortium.
- “University of Cincinnati Aircraft Design Team” (John W. Livingston).
- “Heating for Boundary Layer Control”, Ohio Northern University (Jed E. Marquart and Derick Endicott, Student).
- “Project High Flight,” Miami University (Robert J. Setlock).
- "Practical High-Altitude Microgravity Experiment," Case Western Reserve University (James T'ien).
- "Lunabotics Mining Competition Funding Proposal," The University of Akron (Thomas T. Hartley and Thomas V. Vo).
- “NASA Lunabotics Competition Project,” Miami University (Michael Bailey-Van Kuren).
- “SAE Aero Design Competition,” Ohio Northern University (Jed E. Marquart and Christopher Slattery).

- Engage middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. Capabilities for teachers to provide authentic, hands-on middle school student experiences in science and engineering disciplines (see above).
 - Through the OSGC research grant awarded to Ohio University, Ryan L. Fogt, "Antarctic Climate Change Education through Meteorological Measurements at Schools (ACCEMMS)", has enhanced Earth Science Education at 6 Ohio middle schools (focus on Grades 7-8), and particularly Antarctic Climate Change, through hands-on measurements. Thus far, two operational weather stations have been installed and all the teachers have been trained on GLOBE protocol and the use of their weather station for in-class education. Curricular materials have also been provided that both teachers and students can use to enhance their education/learning/instruction.
 - Supported the Women in Engineering Camp at the University of Dayton – a week-long, residential summer program that introduces high school females to career opportunities in engineering through classroom activities, hands-on experiments, industry visits, and exposure to engineers.
 - Provided support for iSPACE personnel, Beverly Ketron, Education Director; Sharon Young, Education Outreach Director (2 females) to present and attend the 2011 Space Exploration Educators Conference (SEEC) at NASA Johnson Space Center for teacher professional development. As a result of attending the workshop, they were able to develop and implement several new STEM programs using multiple NASA resources, lesson plans, and activities for students, educators and families in the Greater Cincinnati Region. They were also able to network with NASA educators and scientists. After the workshop, iSPACE presented workshops in these topics: SUN-Sational Science: There's More to Light Than Meets the Eye, Robotics Education, and Student Spaceflights Experiment Program at the following 5 schools: Wyoming, Clermont Northeastern, Deer Park, Milford, and Kenton County Schools. Additional programs are being scheduled for the future including summer day camps utilizing activities/content gained from the SEEC sessions and an after-school series with the Hamilton County Juvenile Justice System for first-time offenders.
 - With Augmentation funds, a new program entitled "*Bio-Inspired Flight: A Survey of Outreach Activity*" under the direction of Professor Kelly Cohen at the University of Cincinnati, in cooperation with Ms. Amy Jameson, Cincinnati Public School System. This program is designed to expose teachers (and ultimately their students) to the science and engineering aspects of aeronautics and studies the flight of insects to improve the design of micro-UAV towards bio-inspired flight. During the summer recess period, teachers will be brought to the University of Cincinnati campus to be exposed to aerodynamic theory and wind tunnel testing. Based on their experiences, lesson plans for incorporation into their respective STEM curricula will be developed. Follow-on work during the academic year will attempt to measure and quantify the success of this program.
- Summer opportunities for secondary students on college campuses with the objective of increased enrollment in STEM disciplines or interest in STEM careers. OSGC provided support to Wright State University for the "Wright STEPP (Science, Technology, and Engineering Preparatory Program) (P. Ruby Mawasha). Wright State University (WSU)

has established itself as a leader in providing educational opportunity to low-income, academically talented students through programming which promotes full time enrollment and engineering/science degree achievement. In 1988, Wright State University (WSU) initiated Wright STEPP (Science, Technology, and Engineering Preparatory Program) to increase the pool of racial and ethnic minorities, women, and disabled high school graduates who are academically prepared and sufficiently motivated to complete a four-year college or university mathematics and science curriculum. From the first class in 1988 of 40 Dayton-area 7th graders, this initiative grew into the highly successful and nationally recognized Wright STEPP program, which in 2011, completed its 24th year. In 2011-2012, 130 students from Dayton Public and Springfield City Schools participated in Wright STEPP and 70% (about 90 students) of these students were female and 30% (about 40 students) were male. Racially, the student composition was 90 African Americans; 20 Caucasian Americans; 10 Hispanic Americans; and 5 Pacific and Asian Americans. Wright STEPP is designed to ensure that promising local students complete the college prep curriculum throughout high school to prepare for success in the Science, Technology, Engineering, and Mathematics fields. **Quote from Dr. Ruby Mawasha:** *“Wright STEPP is successful because of excellent community support and project leadership from entities such as The Ohio Space Grant Consortium (OSGC), local industries and the Wright-Patterson Air Force Base.”*

- Community Colleges – develop new relationships as well as sustain and strengthen existing institutional relationships with community colleges. The OSGC added Sinclair Community College as a new community college affiliate in FY2011, and also awarded one community college scholarship. A first-time grant to a community college was provided to Lorain County Community College (LCCC) for construction of a rocket to compete in the Great Midwest Regional Rocket Competition held in Milwaukee, WI (April, 2012). OSGC also provided travel support for the LCCC student team to participate in the competition.
- Aeronautics research – research in traditional aeronautics disciplines; research in areas that are appropriate to NASA's unique capabilities; directly address the fundamental research needs of the Next Generation Air Transportation System (NextGen). Continued research with OSGC funding by Dr. Kelly Cohen @ University of Cincinnati – SIERRA Project. The following University of Cincinnati Aerospace Engineering students working on Aeronautics research on the following projects: Robert C. Charvat, “SIERRA Project”; Krista Kirievich, “Turbomachinery CFD Methods for Compressor Off-Design Modeling”; Alex R. Walker, “Fuzzy Control of Two Two-Degree-Of-Freedom Systems”; and Nathan A. Wukie, “Comparison of Simulations and Models for Aspiration in a Supersonic Flow using OVERFLOW”. Brian J. Stahl, at Case Western Reserve University, researched “Thermal Stability and Performance of Foil Thrust Bearings”. Brian also collaborated with the Tribology and Mechanical Components Branch (RXN) at NASA Glenn Research Center for the use of its test hardware. OSGC also supported Michael Johnston as a participant in the NASA Space Academy @ Glenn Research Center in Summer, 2011.
- Environmental Science and Global Climate Change – research and activities to better understand Earth's environments. An OSGC research grant was awarded to Ohio University, Ryan L. Fogt, "Antarctic Climate Change Education through Meteorological Measurements at Schools (ACCEMMS)".

- Diversity of institutions, faculty, and student participants.
 - Institutions – The OSGC represents many diverse institutions across the State of Ohio in the execution of its programs including universities (2 Minority Serving Institutions which include Central State University and Wilberforce University which holds the distinction of being the oldest HBCU in the United States), colleges, community colleges, Government agencies, and education outreach partners. The Ohio Aerospace Institute (OAI) is the lead institution (501 (c) (3) non-profit organization located in Cleveland and is an active participating OSGC member providing financial (\$105,000 in support of scholarships and fellowships) and supplementary support as part of the required match.
 - Faculty – There is an individual who serves as the campus representative at each of the 24 OSGC member institutions. Dr. Gary L. Slater, OSGC Director, also serves as the Campus Representative at the University of Cincinnati. Gerald T. Noel, Sr., served as the Associate Director of the OSGC and also as the campus representative at Central State University (HBCU) until his recent passing. The diversity breakdown is 6 females (25%); 18 males (75.00%) 8 African American (33.33%); All Other 2 (8.33%); and Caucasian 14 (58.33%)
 - Students – Of the total 137 student awards, the total of participating Underrepresented students was 32 (23.36%) which exceeded the OSGC’s target of 20% and the National Center for Education Statistics (Table 237) target of 16.75%. The total of participating female students was 56 (40.88%) which exceeded OSGC’s target of 40%.
- Enhance the capacity of institutions to support innovative research infrastructure activities to enable early career faculty to focus their research toward NASA priorities. The OSGC Seed Grant Program supports young faculty at Ohio universities and colleges that support and integrate research and education for faculty and post-doctoral researchers within the State of Ohio through collaborations between universities and with NASA Centers, OSGC affiliates, the State of Ohio, the Ohio Aerospace Institute, the Air Force Research Laboratory, and STEM-related industry with the ultimate result to enable them to strongly compete for substantial national awards. OSGC will specifically encourage proposals from underrepresented and female faculty. Following are the types of grants offered: **Faculty Research Initiation Grant Proposal (FRIGP)** - is specifically meant as "seed funding" for untenured faculty to support new, innovative research to provide necessary results for a regular research grant opportunity with a funding agency such as NASA, NSF; **Curriculum Innovation Proposal (CIP)** - to support new, innovation curriculum development to support the development of STEM higher education in areas supported by NASA. Curriculum developments that that can be shared with other schools are especially preferred; **Student-Innovative-Creative-Hands-on Project (SICHOP)** - to aid in funding for undergraduate student "hands-on" projects. This can be an individual or a group project. A faculty mentor is required.

IMPROVEMENTS MADE IN THE PAST YEAR

- OSGC worked with the OAI’s webmaster to design a new, fresher OSGC website. The new website is easier to navigate and more user-friendly. The new site will be easier for the webmaster to maintain the navigation menus and the overall website. In

the past, any menu changes necessitated revising all the pages in the OSGC website. Now menu changes will be made in one place, and all pages will be updated automatically resulting in time and cost savings.

- Revised the OSGC Fellowship evaluation procedure whereby all of the applications were downloaded to a secure site where the evaluators (15 members of the OSGC Executive Committee) could view applications electronically. In the past, multiple hard copies were produced and mailed out individually. The new procedure saved time, copier and mailing costs, and made it easier for the evaluators to view applications electronically.
- Developed additional community college relationships by adding Sinclair Community College as a new affiliate in FY2011-2012. One community college scholarship was awarded to a student majoring in Aviation Technology. Awarded a SICHOP grant to Lorain County Community College for students to construct a rocket and compete in the Great Midwest Regional Rocket Competition held in Milwaukee, WI.
- Updated Miami University to Affiliate Member status from Participating University status which allows Miami to be a voting member of the OSGC Executive Committee.
- A new Campus Representative and member of the OSGC Executive Committee was appointed at Ohio University. Dr. Shawn Ostermann replaced Dr. Roger Radcliff who retired from the university. Dr. Ostermann is Associate Dean for Research, Graduate Studies, and Planning in the School of Electrical Engineering and Computer Science, Russ College of Engineering and Technology.
- A new Campus Representative was named at Marietta College. Dr. Ben W. Ebenhack, Assistant Professor, Department of Petroleum Engineering and Geology, replaced Dr. Benjamin H. Thomas, Assistant Professor, Department of Petroleum Engineering and Geology, who had served previously as the representative from Marietta College.
- Additional new industry partnerships were formed in FY2011 which include: Cornerstone Research Group, Inc. (CRG), Etegent Technologies, L-3 Cincinnati Electronics (CE), and Sierra Lobo.
- The current OSGC Student Display was updated to include all of the FY2011 scholarship and fellowship recipients whereby an entire wall at the lead institution is dedicated to annual OSGC scholarship and fellowship recipients.
- OSGC improved its current seed grant program to include additional detailed information regarding cost sharing and proof of citizenship in the following four grant categories which were implemented in January, 2011: 1) Faculty Research Initiation Grant Proposal (FRIGP); 2) Curriculum Innovation Proposal (CIP); 3) Student-Innovative-Creative-Hands-on Project (SICHOP); 4) Informal Education Innovation Proposal (IEIP). All grant application forms have been updated as well as grant information provided on the OSGC website, and all on-line grant forms.
- OSGC updated its reporting forms for grant recipients to mirror the NASA Office of Education Performance Measurement (OEPM) System Reporting forms and the annual reporting request for participant information replace the former CMIS (Consortium Management Information System) forms (i.e., NASA Education Outcomes, gender, race, ethnicity, demographics, cost sharing, higher education course creation, publications, etc.) and to include the new grant categories listed in

the bullet above). Individual forms were created as Word templates for Research Infrastructure and Higher Education, Precollege, and Informal Education.

- Enhancements were made to the OSGC website to allow grant seekers to apply on-line, or have the option of submitting their application on-line as a single PDF file.
- Enhancements were made to the OSGC website to allow grant recipients to download the NASA Office of Education Performance Measurement (OEPM) System Reporting forms for each of the OSGC grant categories on-line, or have the option of submitting their final report on-line.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

The OSGC represents many diverse institutions across the State of Ohio in the execution of its programs including universities (2 Minority Serving Institutions which include Central State University and Wilberforce University which holds the distinction of being the oldest HBCU in the United States), colleges, community colleges, Government agencies, and education outreach partners. The Ohio Aerospace Institute (OAI) is the lead institution (501 (c) (3) non-profit organization located in Cleveland and is an active participating OSGC member providing financial and supplementary support as part of the required match. OAI's mission is to build Ohio's aerospace economy through research and technology development, education and training, and collaboration and information exchange. Ms. Ann O. Heyward, Vice President of Research and Educational Programs serves as the OAI liaison to the OSGC. OAI contributes \$105,000 in support of scholarships and fellowships to the OSGC annually.

The OSGC currently has 24 members (from Ohio colleges, universities, and community colleges). Diversity for the OSGC membership includes 10 underrepresented members (41.67%) and 6 female members (25.00%). Fifteen (15) universities (Affiliate Members) comprise the OSGC Executive Committee (12 are from the original Ohio universities with Colleges of Engineering).⁴ Diversity for the OSGC Executive Committee includes 6 underrepresented members (40.00%) and 3 female members (20.00%). The OSGC former Associate Director was also an underrepresented male.⁵ In addition, the Ohio Aerospace Institute liaison, OSGC Program Manager, and OSGC Program Assistant are all females.

Affiliate Members and OSGC Executive Committee Members (15):

•Air Force Institute of Technology (AFIT) - (Federal Institution Ph.D. degree-granting university). AFIT is the Air Force's graduate school of engineering and management as well as its institution for technical professional continuing education. Dr. Jonathan T.

⁴Three universities were promoted to Affiliate Member status (Cedarville University in FY2007; Ohio Northern University in FY2008; Miami University in FY2011) as a result of a goal to increase OSGC membership and on the strength of their participation in and contributions to OSGC activities (other participating institutions may be considered for promotion to affiliate status based on performance and the availability of funding).

⁵Dr. Gerald T. Noel, Sr. (underrepresented male) served as the OSGC Associate Director until his unexpected death on April 1, 2012. The OSGC is in the process of updating the position description for the vacancy.

Black is an Assistant Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, and serves as the OSGC campus representative at AFIT and member of the OSGC Executive Committee.

•Case Western Reserve University - (Private Ph.D. degree-granting independent research university). Dr. Jaikrishnan R. Kadambi is Professor and Associate Chair, Mechanical and Aerospace Engineering, and serves as the OSGC campus representative at Case and member of the OSGC Executive Committee.

•Cedarville University - (Private four-year degree-granting university). Dr. Robert Chasnov is Professor of Engineering and Assistant to the Chair, and serves as the OSGC campus representative at Cedarville and member of the OSGC Executive Committee.

•Central State University – (Public Historically Black four-year degree-granting university). Dr. Gerald T. Noel, Sr., (underrepresented male) served as the Associate Director of the OSGC, the campus representative at Central State, and member of the OSGC Executive Committee for FY2011-2012, until his sudden and unexpected passing on April 1, 2012. The OSGC is working with Central State University Administration to name his successor. Currently, Mr. Gorgui Ndao, Program Manager, Center of Excellence in STEM and STEM Education (STEM-X-ED), Center for Student Opportunities, is representing Central State University until a permanent replacement is named. The OSGC is also in the process of updating the position description for the vacant Associate Director position to replace Dr. Noel.

•Cleveland State University – (Public Ph.D. degree-granting research university). Ms. Pamela C. Charity-Leeke (underrepresented female) (formerly Pamela C. Charity – name changed in October, 2011) is Manager of Engineering Student Affairs and serves as the campus representative at Cleveland State and member of the OSGC Executive Committee.

•Miami University – (Public Ph.D. degree-granting research university). Dr. Tim Cameron is Professor and Chair of Mechanical and Manufacturing Engineering, and serves as the campus representative at Miami University and member of the OSGC Executive Committee. Miami University's status was upgraded to an Affiliate Member of the OSGC in FY2011.

•Ohio Northern University – (Private four-year degree-granting comprehensive university). Dr. Jed E. Marquart is Professor of Mechanical Engineering and serves as the campus representative at Ohio Northern and member of the OSGC Executive Committee.

•The Ohio State University – (Public Ph.D. degree-granting research university and is currently the second largest university campus in the United States). Dr. Füsün Özgüner (female) is Professor, Department of Electrical and Computer Engineering, and serves as the campus representative at Ohio State and member of the OSGC Executive Committee. Dr. Özgüner and Ohio State also host OSGC Executive Committee meetings.

•Ohio University – (Public Ph.D. degree-granting university holds the honor as the oldest university in Ohio and the Northwest Territory). Dr. Shawn Ostermann is Associate Dean for Research, Graduate Studies, and Planning in the School of Electrical Engineering and Computer Science, Russ College of Engineering and Technology. Dr. Ostermann replaced Dr. Roger Radcliff who retired from the university.

•The University of Akron – (Public Ph.D. degree-granting research university). Dr. Craig C. Menzemer is Associate Dean of Graduate Studies and Administration and Interim Associate Dean of Undergraduate Programs, College of Engineering, and serves as the

campus representative at The University of Akron and member of the OSGC Executive Committee.

- University of Cincinnati – (Public Ph.D. degree-granting research university). Dr. Gary L. Slater serves as the current OSGC Director and Professor Emeritus, School of Aerospace Systems, College of Engineering and Applied Science. Dr. Slater also serves as the campus representative at the University of Cincinnati and Chair of the OSGC Executive Committee.

- University of Dayton – (Private Ph.D. degree-granting university). Dr. John G. Weber is Assistant Dean, School of Engineering, and serves as the campus representative at the University of Dayton and member of the OSGC Executive Committee.

- The University of Toledo – (Public Ph.D. degree-granting research university). Dr. Lesley M. Berhan (underrepresented female) is Associate Professor of Mechanical, Industrial, and Manufacturing Engineering Department, and serves as the campus representative at The University of Toledo and member of the OSGC Executive Committee.

- Wilberforce University – (Private Historically Black four-year degree-granting university). Wilberforce University has the honor of being the first HBCU in the country! Dr. Edward A. Asikele (underrepresented male) is Chair, Engineering and Computer Science, and serves as the campus representative at Wilberforce University and member of the OSGC Executive Committee.

- Wright State University – (Public Ph.D. degree-granting comprehensive university). Dr. P. Ruby Mawasha (underrepresented male), Assistant Dean of Engineering and Computer Science, and serves as the campus representative at Wright State University and member of the OSGC Executive Committee.

Participating Institutions (2):

- Marietta College – (Private four-year degree-granting university). Dr. Ben W. Ebenhack is Assistant Professor, Department of Petroleum Engineering and Geology, and serves as the campus representative at Marietta College. Dr. Ebenhack replaced Dr. Benjamin H. Thomas, Assistant Professor, Department of Petroleum Engineering and Geology, who has previously served as the Marietta contact.

- Youngstown State University – (Public Ph.D. degree-granting urban university). Dr. Hazel Marie (female) is Assistant Professor, Mechanical and Industrial Engineering, and serves as the campus representative at Youngstown State University. Dr. Marie was a former OSGC fellowship recipient from The University of Akron where she received her Doctoral Degree in Mechanical Engineering.

Minority Serving Institutions (MSIs) (2):

Ohio holds the honor of having the nation's oldest private, historically black university named to honor the great 18th century abolitionist, William Wilberforce—hence the founding of Wilberforce University. Central State University is Ohio's only public MSI. Central State University and Wilberforce University are Minority Serving Institutions (MSIs) and both are active members of the OSGC and voting members on the Executive Committee.

Community Colleges (7):

•Columbus State Community College – (Associate degree-granting community college). Mr. Jeffery M. Woodson (underrepresented male) is Professor, Engineering Technologies Department, and serves as the OSGC campus representative at Columbus State Community College.

•Cuyahoga Community College (Tri-C) – (Associate degree-granting community college). Dr. Donna Moore-Ramsey (underrepresented female) is Associate Dean, Health Careers and Science, and serves as the OSGC campus representative at Cuyahoga Community College. Tri-C is the oldest and largest community college in Ohio.

•Lakeland Community College – (Associate degree-granting community college). Dr. Frederick W. Law is Executive Vice President and Provost, and serves as the OSGC campus representative at Lakeland Community College.

•Lorain County Community College – (Associate degree-granting community college). Dr. George Pillainayagam is Engineering Program Director, and serves as the OSGC campus representative at Lorain County Community College.

•Owens Community College – (Associate degree-granting community college). Ms. Tamara Williams (underrepresented female) is Associate Vice Provost, Academic Services and Retention, and serves as the OSGC campus representative at Owens Community College.

•Sinclair Community College - (Associate degree-granting community college). Dr. Roger W. Abernathy is Dean, Science, Mathematics, and Engineering Division, and serves as the OSGC campus representative at Sinclair Community College. **Note that Sinclair Community College was welcomed as a new member of the OSGC in FY2011.**

•Terra Community College – (Associate degree-granting community college). Dr. James Bighouse is Associate Professor, Physics, and serves as the OSGC campus representative at Terra Community College.

•Government affiliates include the NASA Centers (especially Glenn Research Center), NASA CORE (Central Operation of Resources for Educators), NASA Aerospace Education Services Project (AESP), the Air Force Research Laboratory, Wright-Patterson Air Force Base Education Outreach, Ohio Board of Regents, State of Ohio Aerospace and Defense. NASA CORE is also a partner who assists the OSGC with teacher workshops and pre-service teacher scholarships (i.e., resources for teachers, students and NASA education materials). All the government affiliate representatives are very involved with the OSGC, attend meetings regularly, and work well with the Director and others.

•Industry partnerships include aerospace (ZIN Technologies), manufacturing (ArcelorMittal), and continuing educational partnership with Space Explorers, Inc. Additional new industry partnerships were formed in FY2011 which include: Cornerstone Research Group, Inc. (CRG), Etegent Technologies, L-3 Cincinnati Electronics (CE), and Sierra Lobo. OSGC continues to improve membership in this area and is working with the lead institution, the State of Ohio, and others to add additional industry members.

•Outreach Education Partners include the Cincinnati Observatory Center, Cleveland Museum of Natural History, Drake Science Center, iSPACE, Walter Schuele Planetarium, and informal educational partners throughout Ohio. Many of the outreach affiliates receive OSGC mini-grants and seed grants for innovative STEM programs.

OSGC will provide additional reporting information at a future date that will include both Base and Augmentation funds.