Ohio Space Grant Consortium
Ohio Aerospace Institute
Gary L. Slater, Ph.D.
(513) 556-3223
http://www.osgc.org/

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 **$845,000** for Fiscal Year 2010.

PROGRAM GOALS

The Ohio Space Grant Consortium has the four following goals for FY2010-2011 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.

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.

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.

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.

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.

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.

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.

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 FY2010 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, Pre-service teachers, and Bridge 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 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 tuitions 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). 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).

The Bridge awards include one summer stipend (10 weeks) at the NASA Glenn Research Center and a $750 scholarship from OSGC.

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.

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

•OSGC awarded a total of 112 scholarship and fellowship awards [9 graduate fellowships (including two special minority fellowship awards), 103 undergraduate scholarships (including two awards to honor two late OSGC Directors at their home universities)]. Of the 112 awards, 32 were made to underrepresented minority students (28.57%), and 54 to female students (48.21%). OSGC scholarship/fellowship awards to underrepresented minorities continue to exceed targets based on the State of Ohio percentage of 16.6% (Source: Table 212) and are under from FY2009 (31.11%). For female awards, OSGC is well above the 40% NASA target (changed from previous Ohio 50% target), and have increased from FY2009 (44.44%). Awards were increased to 112 in FY2010 from 90 in FY2009 awards due to OSGC receiving additional funding in the Augmentation budget for 16 additional Senior scholarship awards for either female or underrepresented students at OSGC member universities. All students who have received significant OSGC support and who have taken their "next step" have been successfully tracked.

•OSGC awarded 21 NASA CORE (Central Operation of Resources for Educators) gift cards to pre-service scholarship award recipients with augmentation funding.

•OSGC provided additional support to fellowship recipients for university fees with augmentation funding.

Former Student Testimonial:

•**Chad O. Yoshikawa** was the recipient of an OSGC Doctoral Fellowship Award (FY2003-2006). Chad received his Ph.D. in Computer Science from the University of Cincinnati in 2008 and is currently employed as a Software Engineer for Google in Seattle, Washington. *"The OSGC Fellowship Program helped me tremendously. Without the fellowship, completing my PhD research at the University of Cincinnati would have been very difficult and I'm sure my research would not have been as significant. The research that I performed under the OSGC Fellowship Program helped me learn about another area of computer science: theoretical computer science with an application of distributed networking and load balancing. Dr. Berman and I published some good results -- proving how certain network configurations are better than others -- in a few computer science conferences and the Journal of Combinatorial Optimization. Having this research background and experience helped me then get a job at Google."*

Student Internship Testimonials:

"The support of the OSGC over the years has been invaluable to my engineering career. Thanks to the OSGC internship program I have multiple career opportunities when I graduate in March. I hope that other students can have an equally beneficial experience in the future. Over the Summer, 2010, my internship allowed me to continue research on hybrid-electric propulsion systems for general aviation and remotely piloted aircraft at the Air Force Institute of Technology. The resulting conceptual design tool could be used to develop unique airframes to accommodate revolutionary propulsion systems." **Matthew D. Rippl, OSGC Scholarship and Internship recipient, Air Force Research Laboratory. Matthew received his B. S. in Mechanical Engineering from Wright State University in June, 2009, and is currently pursuing his Master's Degree in Aerospace Engineering from the Air Force Institute of Technology.**

"My internship was the most influential experience I have had as an undergraduate. It expanded my knowledge of mathematics and astronomy. This experience also showed me my options as an astronomy-loving mathematician and encouraged me to be more confident in the work place. I also found supportive mentors that can answer any questions I have, and are willing to guide me whenever I need it. In addition, I had a great time learning, experiencing, and observing things, which I could have never experienced without this internship." **Courtnay N. C. Dollinger, Intern, NASA Marshall Space Flight Center, Sophomore, Mathematics, Wittenberg University.**

"My experience at NASA proved to exceed my initial expectations. Among other things, I had the opportunity to develop a challenging Excel based application to analyze solar cell performance. It felt rewarding to learn something new and apply it to a real-world application. The opportunity to be surrounded by other motivated students as well as very intelligent and experienced individuals contributed to my growth and perception of just how valuable an internship experience can be." **Eden F. Hummel, Intern, NASA Glenn Research Center, Senior, Electrical Engineering, Cleveland State University.**

•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 third scholarship was awarded to Erika Stevens, Sophomore, 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 second award was made to Mikhail Kimbel, Sophomore, Mechanical Engineering.

Higher Education
•Award seed grants to for innovative STEM Higher Education programs at Ohio universities. Some representative titles include: "Intelligent Aerospace Systems for Enhanced Emergency Management of Wild-land Fires" at the University of Cincinnati (Dr. Kelly Cohen); "NASA Lunabotics Mining Competition" (Thomas V. Vo, The University of Akron); "Development of a Solar Array Testing Facility" at Cedarville University (Dr. Timothy B. Dewhurst); "CFD Investigation of Wing/Control Surface Gap Effects" at Ohio Northern University (Dr. Jed E. Marquart); "Transition of Small Unmanned Aerial Vehicle Research Testbed to Undergraduate Educational Purposes" at Wright State University (Dr. Scott K. Thomas).
•All OSGC scholarship and fellowship recipients attended the 18th Annual OSGC Student Research Symposium on April 16, 2010, at the Ohio Aerospace Institute, in Cleveland, Ohio, where all OSGC students present their research and are evaluated. Senior Scholars and Master's and Doctoral Fellows make oral presentations of their research project. Junior Scholars, Community College Scholars, and Bridge 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*.
•Provided support for The University of Akron student team for the NASA Lunabotics Mining Competition. After several heroic days of fixing their Internet-based communications and controls, the Akron team was one of only six teams that were able to load lunar regolilth into the meter high bin with their teleoperated robot miner. The Akron team received the 5th Place Honorable Mention award. 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. Also, while at the competition, the team saw the Space Shuttle Atlantis land from the runway bleachers, observed a Delta rocket launch at night, ate dinner under the Apollo 18 vehicle, spoke with several astronauts, talked with the driver of the Mars rovers along with other NASA engineers, interacted with the Kennedy Space Center Director, and talked with the Assistant and Associate NASA Directors from Washington. Overall, the team had an amazing experience."*
•Continue to support proposals from affiliate members for Diversity Initiatives which include: The Ohio State University received funding for two Special Minority Doctoral Fellowships (one female and one male). The University of Cincinnati received funding for one Minority Master's Fellowship (male). One NASA Glenn Bridge scholarship was awarded to an underrepresented female sophomore student at Cleveland State University.

OSGC received augmentation funding for additional senior scholarships awards to underrepresented and female students.

•Supported an OSGC Senior Scholar (underrepresented female) from Central State University in the 2010 NASA Glenn Academy.

•Supported three students with summer internships at NASA Glenn Research Center and Marshall Space Flight Center (three females).

•Supported one student (male) with a summer internship at Johns Hopkins Applied Physics Laboratory (APL).

•Supported a student research project in collaboration with Ohio Northern University and Teton Aircraft in Summer, 2010 entitled "Design and Analysis for a New Aircraft".

•OSGC continued the NASA Glenn Bridge Program by supporting one underrepresented student from Cleveland State University for a summer internship. In addition to the summer stipend, the student also receives a $750 OSGC scholarship presented during the Fall and Spring terms following the internship.

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

•OSGC Senior Physics Scholar Davin Flateau was selected as one of 50 students nationwide to represent the State of Ohio in NASA's Space Science Student Ambassadors Program. Davin shared the following summary of his experiences: *"We've recently seen an explosion of discoveries of planets around other stars. New planets are being discovered at an exponential rate, most notably by the Kepler mission, which is slated to discover thousands of planets over the next few years. I'm currently investigating how small telescopes can successfully observe planets in other star systems passing in front of their stars. These planets are aligned just right to our line-of-sight so that they pass in front of their star from our point of view. Such planets are called "transiting extrasolar plan-ets", and they're detected by watching the light from their host star dim ever so slightly as the planet passes in front of the star. From the nature of the dimming, we can figure out a lot about the planet, including size, mass, orbital period and its distance from its sun. Because these events can be observed by small telescopes, I think this is an excellent opportunity for high school students to get directly involved in science. Astronomy is one of the few disciplines where "amateurs" with modest equipment often participate in gathering meaningful data, and even make exciting discoveries. Getting students directly involved with science is an important way toward sparking their interest in careers in math, science and engineering, and taking direct measurements of extrasolar planet transits, and even working toward looking for new planets, is a great way for them to get excited about scientific careers. In other words, they can see themselves doing it for a living. I'm going to be working with high school teachers on how their students can observe these transits and analyze the data, through remote telescopes they can access via the internet, or even with telescopes of their own. A website will be the key to providing information and training materials toward this goal, and for teachers to network with each other. I'm also interested in facilitating partnerships with existing organizations in astronomy research and education toward this goal. This will be an ongoing project long after my Space Grant scholarship ends, but someday soon, I hope that a whole new generation of budding scientists will begin to be inspired by getting directly involved with the most exciting scientific discoveries of our time."*

•Supported "Engineering Week" at Case Western Reserve University.
•Provided support for one student (underrepresented) and one faculty member from the University of Cincinnati to attend the Great Midwest Space Grant Regional Consortia meeting held in Minneapolis, Minnesota. The student presented his research during the formal Agenda and also during the Poster Session. (September, 2010).
•Provided support for two students (both underrepresented) one faculty member (underrepresented) from Central State University (MSI) to attend the Great Midwest Space Grant Regional Consortia meeting held in Minneapolis, Minnesota. The students also presented their research in the Poster Session. (September, 2010).
•With augmentation funding, OSGC is coordinating the first OHIOSAT CUBESAT Workshop in collaboration with NASA Glenn Research Center, the Air Force Institute of Technology (AFIT), and the Ohio Aerospace Institute (OAI). The workshop is scheduled for June 16-17, 2011, at AFIT with 25 attendees. The two day workshop will include discussions of possible 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.
•With augmentation funding, OSGC plans to fund 1-2 proposals focusing on "Climate: Education; Effects; Issues". Proposals must have educational component. The opportunity is currently advertised through OSGC's university network and the OSGC website.

Senior Design Courses

Provided support for the following two Senior Design courses:
•As a result of his grant entitled, "Framework for Stochastic Simulation of 3-D Constitutive Behavior of Granular Materials", Dr. Kallol Sett, The University of Akron, made some changes to the syllabus of an existing undergraduate level course, 4300 314: Geotechnical Engineering (foundation design), to introduce students to the uncertainty aspects and subsequent trends in civil engineering. A new graduate course is being offered in Fall, 2011, 4300 694-809: Computational Geomechanics.
•As a result of his grant entitled, "Transition of Small Unmanned Aerial Vehicle Research Testbed to Undergraduate Educational Purposes", Dr. Scott K. Thomas, Wright State University. The objective of this work is twofold: Initially, the P.I. and one graduate student will 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 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 431) 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. The request for funding is related to the development of the curriculum in the three classes for use in the 2011/2012 academic year and beyond. It is comprised of one month of salary for the P.I. and three months of summer funding for a graduate student. Depending on when the funding from the Air Force arrives, the timetable for the project should commence this September, 2010. Design, construction and testing of the motor/propeller testbed should be completed in early spring 2011, and then the curriculum development outlined above should run during Summer Quarter, 2011, and Fall Quarter, 2011. The deliverables will be a final report that outlines the improvements to the curriculum in the three classes, samples of completed student work related to the curricular development, and faculty feedback on the potential for improvement of the lectures and labs associated with the test facility.

•OSGC provided support for two Ohio faculty members to attend the "Workshop for Aircraft Design and Hands-on Learning", June 17-19, 2010, at the Missouri University of Science and Technology, sponsored by the Great Midwest Regional Space Grant Consortia. Dr. Jed E. Marquart, Professor, Mechanical Engineering, Ohio Northern University, and Dr. Scott K. Thomas, Associate Professor, Department of Mechanical and Materials Engineering, Wright State University. Although, no senior design courses were created, Dr. Marquart indicated that some of the concepts from the workshop have been used in the AIAA-run SAE AeroDesign project. Dr. Thomas has a Wright State University graduate student working on a project inspired directly from it entitled: "Transition of Small Unmanned Aerial Vehicle Research Testbed to Undergraduate Educational Purposes" which was also funded by the OSGC.

Research Infrastructure

•Award seed grants to for innovative STEM Research Infrastructure programs at Ohio universities. Some representative titles include: "Framework for Stochastic Simulation of 3-D Constitutive Behavior of Granular Materials" at The University of Akron (Dr. Kallol Sett); "High Temperature Shape Memory Polymers" at The University of Akron (Dr. Robert A. Weiss).

•Provided additional support to Nuclear Power for Space Colonization Research and Technology Development, Phase I (Ralph Steckler Project) at The Ohio State University and Wilberforce University (Minority Serving Institution). Note that OSGC's proposal for Phase II was also selected for funding by NASA in March, 2011.

Outcome 2 - Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty (Educate and Engage). OSGC FY2010 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.
•Provided support for NASA Glenn Research Center's Balloonsat High Altitude Flight (May, 2010); Upper St. Clair High School; Stansbury High School; North Carolina School of Science and Mathematics; Charlottsville High School.
•Cedarville University 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 and Ohio Teacher of the Year along with other national teaching awards. Mr. Richey is also an adjunct professor at Miami University.
•Supported "Enhancing Physics Education with Open-Ended Engineering Design Projects" teacher workshop at The University of Toledo.
•Award mini-grants to Ohio K-12 teachers for innovative STEM programs. Some representative titles include: "What Happens in Science Class Goes Beyond Science Class", Genoa Area School District, Genoa, Ohio (Donna M. Katafias); "21st Century Robotics, Part II", Adams Junior High, Sandusky, Ohio (Jeanne E. Helgeson); "Mission to Mars/Science Olympiad", St. Pius School, Toledo, Ohio (E. Catherine Ujvagi); "Voices of Aviation", Fredericktown Schools, Fredericktown, Ohio (Kathleen S. Carpenter).
•Provided support for "Mars Camp Expo 2010" - Ohio Chapter, Mason, Ohio (Lyle H. Kelly).
•Two OSGC scholarship recipients participated in a visit to OAI by Ohio Senator Sherrod Brown on May 24, 2010. OSGC receives favorable public relations (photo opportunity) by participating in this visit by Senator Brown who indicated that meeting Ohio students is always a highlight for him.
•Sponsorship of the FIRST Buckeye Regional Robotics Competition – 59 high school teams (Ohio has 22 teams) from across the country competed in a robotics competition that combines sports with engineering and technology (March 25-27, 2010).
(URL: http://www.nasa.gov/centers/glenn/news/pressrel/2010/10-014_FIRST.html.
[OSGC receives favorable publicity as a sponsor to this event (i.e., websites, signage, banners, and ads in Ohio newspapers.)]
•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.
•Supported "SPACE: A Girl's Frontier", a summer camp for 40 underrepresented middle school girls from the Greater Cincinnati Region. The girls learned about our universe as astronomers do by observing light in a variety of ways. Participants "listened to light" (infrared) using an amplifier and remote controls for TVs, used indicator beads to observe presence of ultraviolet light even on very cloudy days, and made their own spectroscope

for viewing the spectrum in visible light. They also learned about some of the space exploration missions that are actively discovering information about the universe by gathering light in these ways. They also designed, built and programmed robots to carry out specific tasks which encouraged them to utilize various problem solving skills while simultaneously requiring them to master a number of mathematical and scientific concepts. They explored the concept of "What impact will robotic technology have in the working world?" or "Is it ethical to replace humans with robots?" They investigated Newton's Laws of force/motion utilizing paper rockets with air launchers and experimented with activities in air pressure and Bernoulli's Principle and aeronautics basics. They explored topics relating to manned and unmanned flights such as reduced gravity and launch recovery systems by designing launch recovery systems and participating in V.E.E.P. (Vertical Egg Experiment Project).

As a result of this grant, OSGC received these comments from Director Linda A. Neenan: *"OSGC has been wonderful to iSPACE. Preliminary results based on pre and post assessments: 100% of the girls showed increased content knowledge; 97.5% demonstrated an increased awareness of STEM careers; 72.5% showed an increased interest STEM careers; 67.5% said they thought they had the capacity to learn the skills needed for a career in science and/or engineering. Most importantly, they made new friends and discovered that STEM could be their future. I know that we are making an impact here in Greater Cincinnati and stimulating interest in STEM and also to promote STEM careers."*

•Collaborated with Space Explorers Aerospace Outreach offering professional development to 14 Ohio teachers in Canton, Cincinnati, Milford, and Willoughby, Ohio, schools to train teachers using hands-on lessons and activities with a vision to connect students with space exploration in mission simulations and activities that expand their knowledge of space, earth, physical, and life science. Willoughby Middle School Teacher Tony Marinelli's testimonial: "*I am amazed at the quality of the Geology of Mars Explorer simulation. This activity allowed my students to use their knowledge of basic geology concepts on Earth and apply them to the other planets in the Solar System, especially Mars. The students are amazed that Mars has similar features as Earth, such as mountains, volcanoes, valleys, polar ice caps, and dust storms."* Willoughby Middle School students are featured "Exploring the Geology of Mars" on Space Explorers' website at the following link:
http://www.space-explorers.com/internal/common/announce/willoughby1.html

•With augmentation funding, plans are being finalized for "Inspire, Engage, Education (IE^2) STEM Southeastern Ohio Expansion Program" through Ohio University (Professor Al Cote). It is proposed that IE^2 in collaboration with the South East Ohio Center for Excellence in Mathematics and Science (SEOCEMS) will expand its current program to provide professional development for 40 middle school math and science teachers in 9 Ohio Appalachian School Districts. A key component of the program will be to implement distance learning into classrooms so teachers can communicate and collaborate with specialists all over the world (i.e., NASA Live from Gemini). Program is scheduled for Summer, 2011.

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 FY2010 goals were met.

Informal Education

•Sponsorship of "Science is Fun!" family days at Case Western Reserve University impacting over 700 indirect participants.

•OSGC co-chaired the reception for the AFRL/NASA GRC HBCU/MI STEM Collaboration Symposium held at the National Museum of the United States Air Force. Students and faculty from Central State University and Wilberforce University also attended the event.

•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.

•Supported "Exploring the Solar System: Planetary Science Lecture Series" at Ohio University.

PROGRAM ACCOMPLISHMENTS

The majority of OSGC programs include scholarships and fellowships (required research component with faculty mentor), Higher Education projects (CIP/FRIGP/SICHOP grants), Research Infrastructure projects (FRIGP grants), Precollege (teacher training thrust and mini-grant program), Informal Education projects (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 FY2010 goals were met.

Fellowship/Scholarships

•Awarded 112 Scholarships and Fellowships.

Higher Education

•Provided support for 18 participants in Higher Education programs.

Research Infrastructure

•Provided support for 17 participants in Research Infrastructure programs.

Achievements and Progress

Fellowship/Scholarships

•Awarded 112 Scholarships and Fellowships:

-71 STEM undergraduate scholarships (49 seniors; 22 juniors)
- 8 Community College scholarships
- 21 Pre-service Teacher scholarships
- 1 Bridge scholarship
- 2 Special scholarships (honoring two late OSGC Directors at their home universities)
- 9 Graduate Fellowships (5 Doctoral; 4 Master's – includes 2 special minority awards

-Of the 112 awards, 32 were made to underrepresented minority students (28.57%).
-Of the 112 awards, 54 were made to female students (48.21%).

•Awarded 21 NASA CORE (Central Operation of Resources for Educators) gift cards to pre-service scholarship award recipients with augmentation funding.
•Provided additional support to fellowship recipients for university fees with augmentation funding.
•Eighteenth Annual Student Research Symposium was held at the Ohio Aerospace Institute in April, 2010, with over 150 attendees.

Higher Education
Supported 18 Higher Education students as interns, participants in NASA Academy, or as part of the OSGC Higher Education grant program.

•Provided support for 5 internships (3 females) in Summer, 2010.
•Provided support for 1 participant (underrepresented female) in the NASA Glenn Academy in Summer, 2010.
•Provided support for 6 innovative STEM Higher Education programs at Ohio Universities.
•Provided support for 2 innovative student-led, hands-on student experiences in STEM disciplines at Ohio universities (i.e., University of Cincinnati, The University of Akron).
•Davin C. Flateau, Senior at the University of Cincinnati majoring in Physics, was selected as one of 50 students nationwide to represent the State of Ohio in NASA's Space Science Student Ambassadors Program.
•Provided support for 2 senior design courses at Ohio universities (i.e., The University of Akron, Wright State University).
•Continue to support Balloon Satellite/Rocketry programs at Ohio universities (i.e., Cedarville University, Central State University (MSI), The University of Akron, University of Cincinnati, and Wright State University).
•OSGC is coordinating the first OHIOSAT CUBESAT Workshop (June, 2011) in collaboration with NASA Glenn Research Center, the Air Force Institute of Technology (AFIT), and the Ohio Aerospace Institute (OAI).
•OSGC plans to fund 1-2 proposals focusing on "Climate: Education; Effects; Issues".
•Provided support for two faculty members to attend the "Workshop for Aircraft Design and Hands-on Learning", at the Missouri University of Science and Technology (June, 2010). This was collaboration between the Great Midwest Regional Consortia members.
•Provided support for three students (all underrepresented) and two faculty members (one underrepresented) from the University of Cincinnati and Central State University (MSI) to attend the Great Midwest Space Grant Regional Consortia meeting held in Minneapolis, Minnesota. (September, 2010).

Research Infrastructure
Provided support for 2 innovative STEM Research Infrastructure programs at Ohio Universities.

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 FY2010 goals were met.

•Provided support for 21 pre-service teachers at a workshop held at OAI (November, 2010). Student participants received hand-on training and NASA education materials.
•Provided support for 8 teacher mini-grants for innovative teaching.
•Provided support for 4 schools to participate in NASA Glenn Research Center's BalloonSat High Altitude Flight Program (May, 2010).
•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 for 50 teachers.
•Provide support for "Inspire, Engage, Education (IE^2) STEM Southeastern Ohio Expansion Program" through Ohio University 40 middle school math and science teachers in 9 Ohio Appalachian School Districts (Summer, 2011).
•Support FIRST Robotics (March, 2010).
•Provided support for Women in Engineering at the University of Dayton.
•Supported iSPACE's camp entitled "Space: A Girl's Frontier" for 40 underrepresented middle school females.
•Provided professional development for 14 Ohio teachers through Space Explorers Aerospace Outreach Program.

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 FY2010 goals were met.

•Provides support for "Science is Fun!" family days at Case Western Reserve University impacting over 700 indirect participants.
•Supported "Exploring the Solar System: Planetary Science Lecture Series" at Ohio University.
•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.

NASA 2010 EDUCATION PRIORITIES

- Authentic, hands-on student experiences in science and engineering disciplines – OSGC supports student-led balloon satellite/rocketry programs at: Cedarville

University, Central State University (MSI), The University of Akron, University of Cincinnati, and Wright State University. OSGC initiated the new Student-Innovative-Creative-Hands-on Project (SICHOP) grant opportunities as part of our reformatted Grant Program. OSGC supported a student team from The University of Akron in the NASA Lunabotics Mining Competition. Students at the University of Cincinnati were involved with Dr. Kelly Cohen and his hands-on project entitled "Intelligent Aerospace Systems for Enhanced Emergency Management of Wild-land Fires".

- Engage middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. OSGC offers an annual workshop (November) for its pre-service education scholarship recipients in collaboration with NASA Glenn Research Center Educational Programs Office, NASA Aerospace Education Services Project (AESP), NASA CORE (Central Operation of Resources for Educators). Jim Fitzgerald, Aerospace Education Specialist, Glenn Research Center, is the facilitator for the workshop. Other programs include training with Space Explorers and middle school teacher workshops at Cedarville University and The University of Toledo.
- Summer opportunities for secondary students on college campuses with the objective of increased enrollment in STEM disciplines or interest in STEM careers. Dr. Robert Weiss is working with a female high school student on his OSGC funded grant project entitled "High Temperature Shape Memory Polymers" at The University of Akron. OSGC campuses have individual programs that provide secondary students exposure to STEM disciplines and STEM careers.
- Community Colleges – Six Ohio community colleges actively participate in OSGC, and in FY2010, eight scholarships were awarded (highest in OSGC history) with a new award made at Terra Community College. OSGC would like to add Sinclair Community College as a future affiliate.
- 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). – OSGC plans to support the new Aeronautics Academy at Glenn Research Center in Summer, 2011.
- Environmental Science and Global Climate Change – With augmentation funding, OSGC plans to fund 1-2 proposals focusing on "Climate: Education; Effects; Issues" with an educational component. The opportunity is currently advertised through our university network and the OSGC website.
- Diversity of institutions, faculty, and student participants

  •Institutions - The OSGC consists of 23 affiliates and there are two HBCUs in Ohio (1 private, 1 public). Central State University is a Public Historically Black four-year degree-granting university, and Wilberforce University is a Private Historically Black four-year degree-granting university). Wilberforce University has the honor of being the first HBCU in the country!

  •Faculty – There is an individual who serves as the Campus Representative at each of the 23 OSGC member institutions. Dr. Gary Slater, OSGC Director, also serves as the Campus Representative from the University of Cincinnati. The diversity breakdown is 17 males (73.91%) and 16 females (26.09%); 8 African American (34.78%); 2 All Other (8.70%) and 13 Caucasian (56.52%).

•Student Participants – In Fellowships/Scholarships, of the 112 awards, 32 were made to underrepresented minority students (28.57%) and 54 were made to female students (48.21%). In Higher Education, of the 18 participants, there was 1 underrepresented minority student (5.56%) and 4 female participants (22.22%). In Research Infrastructure, of the 15 participants, there was 6 underrepresented minority student (35.29%) and 4 female participants (23.53%). OSGC diversity statistics for underrepresented students continue to exceed the State of Ohio targets.

- 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 grant program (formerly known as the "Seed Grant" Program) was reformatted to include new opportunities for faculty and students at Ohio member universities. The 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, etc. The Curriculum Innovation Proposal (CIP) is 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. The Student-Innovative-Creative-Hands-on Project (SICHOP) is to aid in funding for undergraduate student "hands-on" projects. This can be an individual or a group project. A faculty mentor is required.

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Longitudinal Tracking:
  Total Awards = **147***
  Scholarship/Fellowship = **112**
  Higher Education = **18**
  Research Infrastructure = **17**

  42.18% - Total Women (62 students)
  26.53% - Total Underrepresented (39 students)

For FY2010, 62 students are pursing 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.

*Note these numbers may be revised when additional reporting information is collected for the Survey Monkey.

- Course Development:

•"Framework for Stochastic Simulation of 3-D Constitutive Behavior of Granular Materials", Dr. Kallol Sett, The University of Akron, made some changes to the syllabus of an existing undergraduate level course, 4300 314: Geotechnical Engineering (foundation design), to introduce students to the uncertainty aspects and subsequent

trends in civil engineering. A new graduate course is being offered in Fall, 2011, 4300 694-809: Computational Geomechanics.
•"Transition of Small Unmanned Aerial Vehicle Research Testbed to Undergraduate Educational Purposes", Dr. Scott K. Thomas, Wright State University. 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 431) 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. The three classes will be for use in the 2011/2012 academic year and beyond. The curriculum development outlined above should run during Summer Quarter 2011 and Fall Quarter, 2011.
(This is explained in greater detail under Senior Design Courses on page 7.)

- Matching Funds: $1,097,106 matching funds for FY2010. The ratio of funds leveraged equals 1.12:1. Note that the Ohio Aerospace Institute (OSGC's lead institution) provides $105,000 (cash) annually for scholarships and fellowships and additional in-kind support (i.e., website administration and updates, facilities space for events, etc.)

- Minority-Serving Institutions: The OSGC currently has two universities designated as Minority Serving Institutions (MSIs): 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.

•Personnel from Central State University (Gerald T. Noel, Sr.) and Wilberforce University (Edward Asikele) participated in the AFRL/NASA GRC HBCU/MI STEM Collaboration Symposium held on July 7-9, 2010, in Dayton, Ohio. OSGC and the Ohio Aerospace Institute (OSGC Lead Institution) co-chaired the reception at the National Museum of the United States Air Force. Students and faculty from Central State University and Wilberforce University also attended the event.
•OSGC provided travel support for Central State University faculty participation in the "Education Opportunities in NASA STEM (EONS) Workshop" through the Minority University Research and Education Program (MUREP) held on January 20, 2011, in Washington, D. C.

•OSGC provided travel support for two Central State University students and one faculty member (all underrepresented) to attend the Great Midwest Space Grant Regional Consortia meeting held in Minneapolis, Minnesota. (September, 2010).
•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 CSU 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 I of the "Nuclear Power for Space Colonization Research and Technology Development" for the Ralph Steckler Opportunity. A new proposal "Nuclear Power for Space Colonization Research and Technology Development - Phase II" was recently selected for funding by NASA (March, 2011).
•Central State University collaborated with the OSGC and the Ohio Aerospace Institute for NASA's Summer of Innovation proposal "Ohio Students and Teachers Aspiring to Research and Science (OhioSTARS): A proposal from the Ohio Space Grant Consortium/Ohio Aerospace Institute to implement NASA's Summer of Innovation Pilot Project".

IMPROVEMENTS MADE IN THE PAST YEAR

•Created a new OSGC Strategic Plan, Vision, Mission, Goals and SMART Objectives were approved and implemented in January, 2010.
•Established four new industry partners for the OSGC internship program.
•OSGC increased the pre-service teacher College of Education scholarship awards from $1,250 to $1,750 to remain competitive with other university awards. The previous $500 cash match requirement from the Colleges of Education was removed.
•OSGC revamped the current seed grant program to include the following new four grant categories which were implemented in January, 2011:
1) Faculty Research Initiation Grant Proposal (FRIGP) - This grant opportunity 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, etc. Funding is restricted to one year. Total OSGC budget request limited to $25,000.
2) Curriculum Innovation Proposal (CIP) - The curriculum development project is 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. Total OSGC budget request limited to $10,000.
3) Student-Innovative-Creative-Hands-on Project (SICHOP) - This grant opportunity is specifically to aid in funding for undergraduate student "hands-on" projects. This can be an individual or a group project. A faculty mentor is required. Total OSGC budget request limited to $10,000.
4) Informal Education Innovation Proposal (IEIP) - The Informal Education Innovation Proposal (IEIP) is to support informal education activities that support STEM education

in areas supported by NASA. Collaborative proposals involving a combination of participants and ones that can be shared with other organizations are especially preferred. Total OSGC budget request limited to $5,000.
•Scholarships to community colleges included two new awards at Terra Community College and Lakeland Community College (one award at each community college). The remaining were continued awards to Columbus State Community College, Cuyahoga Community College, and Owens Community College [8 total awards--one underrepresented student (12.50% and 5 female students (62.50%)]. OSGC is continuing to increase the number of community college scholarship awards with a 33.33% increase in FY2010 from FY2009.
•The OSGC Executive Committee personnel changed at the following universities due to former members assuming new roles/responsibilities at their respective universities: Case Western Reserve University, Ohio University (accepted a position as Vice Provost for Research and Economic Development at the University of Arkansas in Fayetteville), University of Dayton, and The University of Toledo. In addition, new campus representatives at Miami University and Cuyahoga Community College were appointed.
•An updated OSGC student display was created whereby an entire wall at the lead institution is dedicated to annual OSGC scholarship and fellowship recipients.
•Updated the OSGC website making navigation and on-line application submission easier.
•OSGC joined Facebook and Twitter.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

•Ohio Aerospace Institute (OAI) – is the lead institution 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.

The OSGC currently has 23 members (from Ohio colleges, universities, and community colleges). Diversity for the OSGC affiliate membership includes 6 female members (23.09%) and 10 underrepresented members (43.48%). Fourteen (14) universities (Affiliate Members) comprise the OSGC Executive Committee (12 are from the original Ohio universities with Colleges of Engineering).[1] Diversity for the OSGC Executive Committee includes 3 female members (21.43%) and 6 underrepresented members (42.86%). The OAI liaison, OSGC Program Manager, and Program Assistant are all females.

[1]Two universities were promoted (Cedarville University in FY2007 and Ohio Northern University in FY2008) 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).

Affiliate Members and OSGC Executive Committee Members (14):

•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. 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. Dr Kadambi replaced Dr. J. Iwan Alexander.

•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., serves as the Associate Director of the OSGC, the campus representative at Central State and member of the OSGC Executive Committee.

•Cleveland State University – (Public Ph.D. degree-granting research university). Ms. Pamela C. Charity is Manager of Engineering Student Affairs and serves as the campus representative at Cleveland State and member of the OSGC Executive Committee.

•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. Füsun Özgüner 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. Roger D. Radcliff is Professor in the School of Electrical Engineering and Computer Science, Russ College of Engineering and Technology. Dr. Radcliff has rejoined the OSGC as the campus representative at Ohio University and member of the OSGC Executive Committee. He replaced Dr. James M. Rankin who accepted a position as Vice Provost for Research and Economic Development at the University of Arkansas in Fayetteville.

•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, Department of Aerospace Engineering and Engineering Mechanics. 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. Dr Weber replaced Dr. Malcolm W. Daniels.

•The University of Toledo – (Public Ph.D. degree-granting research university). Dr. Lesley M. Berhan is Assistant 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. Dr Berhan replaced Dr. D. Ramon Hixon.

•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 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, 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 (3):

•Marietta College – (Private four-year degree-granting university). Dr. Benjamin H. Thomas is Assistant Professor, Department of Petroleum Engineering and Geology, and serves as the campus representative at Marietta College.

•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. Dr. Cameron replaced Dr. Osama M. Ettouney.

•Youngstown State University – (Public Ph.D. degree-granting urban university). Dr. Hazel Marie 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.

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 is Ohio's only public MSI. Central State University and Wilberforce University are Minority Serving Institutions (MSIs).

Community Colleges:

•Columbus State Community College – (Associate degree-granting community college). Mr. Jeffery M. Woodson 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 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. Dr. Moore-Ramsey replaced Ms. Sandy Robinson who was promoted to Dean of Academic Affairs.
•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 is Interim Vice Provost, and serves as the OSGC campus representative at Owens Community College.
•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. For many years, a member of GE Aircraft Engines had also been an industry member who regularly attended OSGC meetings until his retirement. Four additional new industry partnerships were formed in FY2010 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 and others to add additional industry members.

Outreach partnerships 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 for innovative STEM programs.

Other Significant Achievements
•Continued support from Teton Aircraft and ZIN Technologies (Aerospace) and ArcelorMittal (Manufacturing). OSGC also received new industry funding from four additional partnerships that were formed in FY2010 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 and others to add additional industry members.

•OSGC's proposal was selected for funding by NASA entitled "Nuclear Power for Space Colonization Research and Technology Development, Phase I" (Ralph Steckler Project) at The Ohio State University and Wilberforce University (Minority Serving Institution).

•OSGC's proposal was selected for funding by NASA Exploration Systems Mission Directorate (ESMD) entitled "OH-SPACE! (Ohio-Space Partnerships Advancing Career Exploration). OH-SPACE! is a student summer internship program which focuses on research exploration with Ohio industry partners.