

Ohio Space Grant Consortium
Ohio Aerospace Institute
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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 (OSGC) is a Designated Program Grant Consortium funded at a level of \$730,000 for Fiscal Year 2008.

PROGRAM GOALS

1. Increase diversity levels through student awards and develop qualified undergraduate and graduate students who are prepared for employment in various STEM careers;
2. Implementation of university hands-on programs;
3. To develop research project opportunities with OSGC's university base—especially OSGC's Minority Serving Institutions (MSIs) and the Ohio Aerospace Institute (OAI) (OSGC's lead institution), and industry;
4. Increased collaborations with mutually beneficial research/education partnerships.

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

Outcome 1

•OSGC awarded a total of 70 scholarships and fellowships [60 undergraduate scholarships and 10 graduate fellowships (including one special minority fellowship)]. Of the 70 awards, 17 were made to underrepresented minority students (24.29%) including new awards to one Native American and two Hispanic students, and 28 to female students (40%) which is below the 50% NASA target. OSGC scholarship/fellowship awards to underrepresented minorities continue to exceed targets based on the State of Ohio percentage of 16.6% (Source: Table 212).

•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 first award was made to Ms. Emily Roth who is now an OSGC Junior Scholarship recipient.

- Continue to support proposals from affiliate members for Diversity Initiatives which include: The University of Akron was awarded funding to support diversity programs (i.e., Student Bridge Internship Program with corporate funding from ArcelorMittal). The University of Cincinnati was awarded funding for the Special Minority Fellowship. One NASA Glenn Bridge scholarship was awarded to Cleveland State University. The University of Akron received funding for their proposal “Development of the IDEAs Engineering Preview for Akron Public High School Students”.
- Collaborated with Air Force Institute of Technology to place a summer intern (OSGC Junior Scholar from Wright State) at the Air Force Research Laboratory in 2008 with a continued commitment for the future.
- Collaborated with ZIN Technologies to place a summer intern in 2008 with a continued commitment for the future. Student exceeded their expectations and was recalled during 2008 Holiday Break.
- Supported an OSGC Senior Scholar in the 2008 NASA Glenn Academy.
- Supported two Ohio students with travel funding (\$2K each) to NASA Marshall for a 2008 summer internship.

Outcome 2

OSGC’s pre-college efforts are designed to provide pre- and in-service teachers with professional development opportunities in order to encourage the use of space science as a tool for teaching in their classrooms.

- OSGC offered a pre-service teacher workshop in collaboration with NASA Glenn Research Center and NASA CORE 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.
- OSGC continued the NASA Glenn Bridge Program by supporting one underrepresented student from Cleveland State University for ten weeks. In addition to the summer stipend, the student also received a \$750 OSGC scholarship presented during the Fall and Spring terms following the summer internship at NASA Glenn Research Center.
- OSGC continued the High School Bridge Internship Program at The University of Akron in Summer, 2008, which offers summer research opportunities to high school junior and senior students on the UA campus in collaboration with ArcelorMittal. Students tested steel samples and in late summer, ArcelorMittal hosted the students for lunch along with a recognition ceremony followed by a tour of their steelmaking and finishing facilities. OSGC supported a similar program at Ohio Northern University.
- Hosted a GPS workshop in collaboration with OAI and The University of Toledo where teachers have the opportunity to earn credit toward their advanced degrees and a Master’s Degree program in addition to providing content for the classroom.
- Continue to support Ohio NASA Explorer Schools with OSGC seed grants to identify a STEM project tied directly to school’s action plan.
- Award seed grants to for innovative STEM Higher Education programs at Ohio universities. Some representative titles include: "Bi-metallic Catalyst/nano Ceria Composite Anode for Military Fuel Cells", at Wright State University, "High Fidelity Hardware Simulator for In-Space Autonomous Rendezvous and Docking” at the University of Cincinnati, "Linear Parameter Varying Modeling for Robust Control of

Air-Breathing Hypersonic Vehicles", The Ohio State University, and "Promoting Science and Math Education Through Gas Turbine Restoration" as part of the University of Cincinnati TurboCats Gas Turbine Club.

- Award mini-grants to Ohio K-12 teachers for innovative STEM programs. In FY2008, OSGC increased the maximum award from \$1,000 to \$1,500. Some representative titles include: "Rock-it with Physics!", "Space Camp", "The GLOBE Project", "Hands-on Science, Technology, Engineering, and Math", "Hot or Not at Shore?", and "The Moon and Beyond".

Outcome 3

General Public:

- African Americans in Space Science Exhibit [The exhibit has been at NASA, COSI at the NASA Future Forum, OAI events, schools and other SGs.]
- Sponsorship of FIRST Robotics Tournament – nearly 60 high school teams compete building robots from parts and entering them in a series of competitions.
- Funding for educational programs at Ohio Challenger Learning Centers
- Sponsorship of "Science Family Days" at Case Western Reserve University impacting over 700 indirect participants.
- Seed grant funding for an Interactive Science, Space, Aeronautics Center for Education (iSPACE) in Cincinnati. [Over 200 students participate.]

External Relations:

- Drake Science Center in Cincinnati - conducts structured visits for teachers, students, and parents (over 20K students annually) in astronomy topics.
- Assisted NASA Headquarters in event planning for NASA Future Forum in Columbus, Ohio. OSGC Associate Director coordinated and moderated the Inspiration Panel. The OSGC "African Americans in Space Science Exhibit" was also displayed in celebration of Black History Month. Both OSGC and OAI awarded cash prizes totaling \$2K for "Best Forum Posters" (1st place - \$1K; 2nd and 3rd place - \$500 each, respectively)

PROGRAM ACCOMPLISHMENTS

- Received funding from ArcelorMittal for the 2008 Summer Student Bridge Program at The University of Akron (similar program was replicated at Ohio Northern University).
- Received funding from ZIN Technologies for a 2008 summer internship in 2008 with continued future collaborative plans.
- Collaborated with Air Force Institute of Technology to place a summer intern at the Air Force Research Laboratory in 2008 with continued future collaborative plans.
- Supported a University of Akron faculty member on a summer research project working with OAI and GRC on a project entitled "Health Monitoring of Structures Made of SiC/SiC Composite Using Modal Analysis".

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Longitudinal Tracking: Total Fellowship and Scholarship awards = 70. Of the 70 awards, 17 of the awards represent underrepresented minority (24.29%). This year, one Native American scholarship was awarded (first ever in many years) and two Hispanic awards. Twenty-eight (28) awards were to female students (40%). OSGC

recognizes the need to increase these percentages. Two students are employed at NASA (Eric Miller at JPL; Brian Tomko at NASA Glenn Research Center), and four at aerospace contractors (i.e., Northrop Grumman, Parker-Hannifin, Wright-Patterson Air Force Base)

- Course Development: Currently, there are three course developments underway at Ohio universities as follows:
 - 1) "Dynamic Surface Mapping of Lightweight Aerospace Structures in Motion" at the Air Force Institute of Technology – Dr. Jonathan Black;
 - 2) "Development and Improvement of Minority Engineering Seminar and Peer Group Course" at The University of Akron – Dr. Julie Zhao. Students also visited NASA Glenn Research Center and networked with Center scientists as part of this course.
 - 3) "Electrical Power Systems for Space Missions I" at The Ohio State University - Dr. Paul Penko.
- Matching Funds: OSGC's FY2008-2009 budget of \$730,000 shows a match of \$1,331,797, reflecting a match of 1.824:1. In addition, the Ohio Aerospace Institute (OSGC's lead institution) provides \$105,000 annually for scholarships and fellowships and additional in-kind support (i.e., website administration and updates, 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. 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:

- CSU has begun process to explore a partnership with the Maine Space Grant Consortium to collaborate on a remote sensing or a marine science research project;
- Wilberforce University is collaborating with The Ohio State University on "Nuclear Power for Space Colonization Research and Technology Development" for the Ralph Steckler Opportunity;
- Central State is collaborating with NASA Glenn Research Center on "A Science, Technology, Engineering, and Mathematics Diversification Initiative" for the Minority Serving Institution Partnership Development Competition.

IMPROVEMENTS MADE IN THE PAST YEAR

- Ohio Northern University was promoted to Affiliate status 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.
- OSGC felt it was important to increase the undergraduate scholarship awards to remain competitive with other university awards. As a result, OSGC Junior Scholarships were

increased from \$2,000 to \$3,000, and Senior Scholarships were increased from \$3,000 to \$4,000 in FY2008. The \$500 match requirement from the universities remained the same. In an effort to offer additional fellowship opportunities two assistantship-fellowship awards were made (one to Wright State University and one to The University of Akron). These recipients were the next two highest scorers in the fellowship competition and each receive \$4,000 from the OSGC and the university provides tuition as part of the match requirement. Scholarships to community colleges included a new award to Columbus State Community College (underrepresented student).

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

The OSGC currently has 23 members from Ohio colleges, universities, and community colleges. Fourteen (14) universities (Affiliate Members) comprise the OSGC Executive Committee (12 are from the original Ohio universities with Colleges of Engineering). *Two 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. Following are the members who comprise the OSGC Executive Committee:

- Air Force Institute of Technology
- Case Western Reserve University
- Cedarville University*
- Central State University
- Cleveland State University
- Ohio Northern University*
- The Ohio State University
- Ohio University
- The University of Akron
- University of Cincinnati
- University of Dayton
- The University of Toledo
- Wilberforce University
- Wright State University

Central State University and Wilberforce University are Minority Serving Institutions (MSIs). Three schools have Participating Institution status: Marietta College, Miami University, and Youngstown State University. Community Colleges are: Columbus State Community College, Cuyahoga Community College, Lakeland Community College, Lorain County Community College, Owens Community College, and Terra Community College.

Government affiliates include the NASA Centers (especially Glenn, Stennis), NASA CORE, 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 a new partner who assists the OSGC with teacher workshops and pre-service teacher scholarships (i.e., resources for teachers, students and NASA education materials).

New industry partnerships include aerospace (ZIN Technologies), manufacturing (ArcelorMittal), and continuing educational partnership with Space Explorers, Inc.

Outreach affiliates include the Cincinnati Observatory Center, Cleveland Museum of Natural History, Drake Science Center, Walter Schuele Planetarium, and informal educational partners throughout Ohio. New affiliates include: ISPACE and COSI.