

Ohio Space Grant Consortium (OSGC) Annual Performance Data for FY2007

CONSORTIUM GENERAL INFORMATION

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Lead Institution: Ohio Aerospace Institute (OAI)
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AFFILIATE MEMBERS AND CAMPUS REPRESENTATIVES

- Air Force Institute of Technology Dr. Jonathan T. Black
- Case Western Reserve University Dr. J. Iwan Alexander
- Cedarville University Professor Charles W. Allport
- Central State University Dr. Gerald T. Noel, Sr.
- Cleveland State University Ms. Pamela C. Charity
- Marietta College Dr. Benjamin H. Thomas
- Miami University Dr. Osama Ettouney
- Ohio Northern University Dr. Jed E. Marquart
- The Ohio State University Dr. Füsün Özgüner
- Ohio University Dr. Roger D. Radcliff
- The University of Akron Dr. Paul C. Lam
- University of Cincinnati Dr. Gary L. Slater
- University of Dayton Dr. Malcolm W. Daniels
- The University of Toledo Dr. D. Raymond Hixon
- Wilberforce University Dr. Edward Asikele
- Wright State University Dr. Mitch Wolff
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COMMUNITY COLLEGES AND CAMPUS REPRESENTATIVES

- Columbus State Community College Professor Jeffery M. Woodson
- Cuyahoga Community College Ms. Mikki Matzelle
- Lakeland Community College Dr. Frederick W. Law
- Lorain County Community College Dr. George Pillainayagam
- Owens Community College Dr. Bruce Busby
- Terra Community College Dr. James Bighouse

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/Program Consortium funded at a level of \$590,000 for Fiscal Year 2007.

PROGRAM RELEVANCE TO NASA

Space Grant Consortia build human capital and research expertise to support NASA programs and missions, expand NASA's expertise and educational networks, and bring knowledge and awareness of space to a broad range of constituents in every state.

Participants in OSGC programs are provided opportunities to build NASA connections through collaborations such as: research opportunities for students and faculty at Ohio institutions, NASA Centers, OSGC affiliates, other Federal institutions, and industry; student internships; NASA educational materials to pre-service teacher scholarship recipients; K-12 teacher enrichment programs, public outreach programs, etc.

PROGRAM BENEFITS TO THE STATE OF OHIO

The high quality research, economic, and social impacts that the Ohio Space Grant Consortium program will produce will be of significant value to the people of Ohio and will aid in its continued prosperity as a leader in STEM workforce development.

Tangible benefits include:

- Increased educational opportunities for students through scholarships, fellowships, and internships at NASA Centers and industry (especially underrepresented and women);
- Research seed grant opportunities for faculty at Ohio universities;
- Better-trained NASA technical future workforce in STEM disciplines;
- Professional development for pre-service and K-12 teachers and mini-grant opportunities for innovative STEM projects;
- Commercial innovations to help Ohio businesses improve efficiency and remain competitive in a global marketplace.

At a recent NASA Future Forum in Columbus, Ohio, Governor Ted Strickland stated "Ohio's history in innovation and exploration has hugely contributed to our nation's achievements in science and technology. We will continue to build on this legacy as we work to bring the jobs of the future to our state." Ohio is a major contributor to NASA's space program proudly claiming 38 astronauts. Ohio currently has three active NASA Explorer Schools, and each Explorer School has received an OSGC grant to purchase technology tools, online services, and in-service support to engage and educate students in STEM with the ultimate goal to become future explorers.

Ohio Governor Ted Strickland and "*The Strickland Vision to Move Ohio Forward, Turnaround Ohio,*" plans to create and keep jobs in Ohio by investing in its strengths, such as energy production and entrepreneurship, while bringing Ohio the jobs of the

future by ensuring that Ohio has the most educated STEM workforce. OSGC's workforce development programs impact the critical key components identified by Governor Strickland's Vision.

PROGRAM GOALS

The Ohio Space Grant Consortium's four major goals for the year to support NASA in pursuit of their three major education goals: 1) Strengthen NASA and the Nation's future workforce; 2) Attract and retain students in STEM disciplines; and 3) Engage Americans in NASA's mission. Additionally, the OSGC strives to mirror the NASA Education Portfolio Strategic Framework of the NASA Pyramid to Inspire, Engage, Educate, and Employ NASA's future workforce by strengthening the NASA vision: "To inspire the next generation of explorers . . . as only NASA can." The goals also mirror the OSGC vision: "To lead in the creation of an environment in the State of Ohio that will encourage significant educational and research contributions in science, technology, engineering, and mathematics while stimulating an understanding and appreciation for aeronautics and space."

OSGC's four goals are as follows:

1. Increase diversity levels through student awards;
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.

The program also aims to meet NASA's diversity goals for supported research by recruiting undergraduate and graduate students (U. S. citizens) to participate in research and acquire valuable experience at NASA Centers and with industry (especially underrepresented and women).

PROGRAM ACCOMPLISHMENTS

- Scholarship and Fellowship Program – OSGC awarded 84 scholarships and fellowships (51 undergraduate scholarships; 10 fellowships--including 2 Special Minority Fellowships; 7 community college scholarships; 15 pre-service teacher scholarships; and 1 bridge scholarship) at its affiliate universities. Additionally, as a legacy to OSGC's former Director Kenneth J. De Witt, the OSGC Executive Committee established a special undergraduate scholarship in his name at The University of Toledo for an undergraduate Chemical Engineering student. The OSGC successfully collaborated with the University's College of Engineering to establish this award on an annual basis.
- Internships - Sponsored 5 students during Summer, 2007 (3 @ NASA Glenn Research Center; 1 @ NASA Glenn Academy; and 1 @ NASA Ames Academy).
- As a continuing Workforce Development project, the following OSGC affiliates were awarded funding to support new or expanded student Balloon Satellite programs: The University of Akron (UA), Cedarville University (CU), Central State University (CSU), University of Cincinnati (UC), and Wright State University (WSU).
- The University of Toledo's project entitled Satellites: Using Geospatial Technology to

Teach Science was awarded funding. Project includes collaboration with faculty from Toledo's Department of Geography and Planning and College of Education, OhioView Remote Sensing Consortium, and OAI associates. Other faculty involved were from Youngstown and Kent State University. OAI hosted the event.

- Two NASA Explorer Schools (Luis Muñoz Marin Middle School in Cleveland and Warrensville Heights Middle School in Warrensville Heights) received funding allowing both schools to integrate technology through videoconferencing equipment to participate in the NASA Digital Learning network.
- The University of Akron (UA) was awarded funding for a new diversity initiative. The Bridge Internship Program offers summer research opportunities to high school junior and senior students on the UA campus and with industry. Of the 15 student participants (7-juniors; 8-seniors), 6 of 8 seniors are pursuing engineering degrees at UA; 2 are studying engineering elsewhere. Three students were placed with local companies.
- The University of Akron won funding for its A Novel De-icing System with Minimal Power Requirements sponsored by BF Goodrich, NASA Glenn Research Center, OAI, and Air Force Research Laboratory (AFRL). The new program includes collaboration between BF Goodrich's Aerospace, Deicing and Specialty Division, Glenn Research Center Icing Research Branch, OAI Senior Researchers, and Air Force Research Laboratory Departments: AFMC Deicing and ASC/ENFA in-Flight Deicing.
- Wright State University was awarded funding for Physics-Based Analysis of Flapping Wing Micro-Air Vehicles (MAV) sponsored by the AFRL. The new project includes collaboration with faculty from the Air Vehicles Directorate of the AFRL. A senior design project at Wright State University will be created as a result of the aforementioned collaboration.
- The Ohio State University received funding for a senior design course in Rocket Design.
- The University of Akron won funding for its Development of Multichannel Coulter Counter for Real Time Anthrax Detection in Mailroom project. The new program includes collaboration between Akron, NASA Glenn, and OAI senior researchers.
- Sponsored the 2007 *FIRST* (For Inspiration and Recognition of Science and Technology) Buckeye Regional Competition where 59 teams of high school students built robots from the parts and enter them in a series of competitions.
- Participated and coordinated NASA's Future Forum held in Columbus, Ohio, in February, 2008 (i.e., OSGC Associate Director led "Inspiration" panel, recruited OSGC students to assist in hands-on activities and present posters of their NASA research projects).
- Awarded mini-grant to the Life Skills Center of Columbus Eastland for a former OSGC pre-service teacher education scholar's project entitled: *"Initiating Hands-on Aerodynamic Labs into a Computer-Based Curriculum"*.

STUDENT ACCOMPLISHMENTS

- Eric Miller** is in his senior year at the University of Cincinnati majoring in Aerospace Engineering. Eric's research project is entitled *"Metrology System for Autonomous Satellite Research"*. Eric was offered a position at NASA Dryden Flight Research Center to begin March, 2008.
- Stacey Henness**, OSGC Biology scholar from Cedarville University, is an Instructor at

Cedarville teaching anatomy and general education biology courses.

•**Walter Schilling, Jr.**, OSGC Electrical Engineering Fellow from The University of Toledo, is an Assistant Professor in the School of Engineering at the Milwaukee School of Engineering.

•**Brian Tomko** is a Computer Engineering major at Ohio Northern who completed a summer internship at NASA Glenn Research Center and currently on co-op. "I found a desire for a career that will combine my future degree in computer engineering with my knowledge of aviation. NASA seems like the perfect environment where I might achieve this dream, and I hope to work there after graduation."

•**Heather Oravec** is in the third year of her Doctoral Program at Case Western Reserve University, majoring in Civil-Geotechnical Engineering. Heather is at NASA Glenn researching the "*Development of a Cone Penetrometer for Surface Exploration on the Moon*". "Through this research I hope to improve both the quality and safety of space travel to the Moon. Man's return to the Moon rests on one thing, literally, and that is lunar soil. Space crafts will land on it, astronauts' homes may be constructed in it, space stations may be constructed on it, in situ resource utilization (ISRU) stems from it, and vehicle mobility depends on it."

•**Thomas Vo**, Senior Electrical Engineering major at The University of Akron whose dream is to work for NASA one day. Thomas is part of UA's Student Balloon Satellite Program and also interned at NASA Glenn Research Center. "Some of my favorite movies growing up were "October Sky" and "Apollo 13". What I liked most about "Apollo 13" was when the engineers had to figure out how to solve the different challenges that arose using only what was available to them on the aircraft. With funding from the Ohio Space Grant Consortium and the National Science Foundation, an intelligent balloon has been designed, assembled and launched by our undergraduate team at Akron."

•**Crystal Kerr**, current OSGC Education Scholar, at Cleveland State University, is studying to be a Middle Childhood Education Math teacher. "I am extremely excited and grateful to have the opportunity to work with NASA/Ohio Space on this project that has helped me tremendously to see how important it is to have cross-curricular activities present within the classroom to make a difference in the lives of children whose eyes need to be opened to the wonderful resources available to them through NASA's programs. Space Shuttle Glider takes Mathematics on a Ride is a project that I adopted using NASA's Educational Brief Space Shuttle Glider Activity. This activity will enable students to make connections to science and math in their daily lives in seeing how a space shuttle glider works and the mathematical logistics behind it. This project will include fun activities for the students to do and include a phenomenal chance to learn all about NASA's program and their resources geared towards students and teachers."