

**Virginia Space Grant Consortium (VSGC)**  
**Old Dominion University Peninsula Higher Education Center**  
**600 Butler Farm Road, Suite 2200**  
**Hampton, VA 23666**

**Lead Institution:** Virginia Space Grant Consortium/Old Dominion University Research Foundation

**Director:** Mary Sandy

**Telephone number:** 757-766-5210

**Fax number:** 757-766-5205

**Consortium website URL:** [www.vsgc.odu.edu](http://www.vsgc.odu.edu)

**Affiliate members:** College of William and Mary, Hampton University, Old Dominion University, University of Virginia, Virginia Polytechnic Institute and State University, NASA Langley Research Center, NASA Goddard Space Flight Center's Wallops Flight Facility, Science Museum of Virginia, State Council of High Education for Virginia, Virginia Community College System, Virginia Department of Education, MathScience Innovation Center, Virginia Air and Space Center, Virginia's Center for Innovation Technology

**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 Virginia Space Grant Consortium is a Designated 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. VSGC programs are fully aligned with NASA's Educational and Space Grant programmatic goals. NASA Langley Research Center and NASA Wallops Flight Facility are Consortium members. In addition, VSGC manages programs for NASA Langley and is engaged in collaborative activities with NASA Langley, NASA Wallops, NASA Kennedy Space Center and has coordinated and supported internship placements at all of the NASA facilities through various programs, including its management through December 2007 of the NASA Undergraduate Student Research Program. VSGC programs and activities support all NASA mission directorates.

**Program Benefits to the State:** VSGC has strong partnerships with State agencies. The Virginia Department of Education (VDOE), the State Council of Higher Education for Virginia, the Virginia Community College System, Virginia's Center for Innovative Technology and the Science Museum of Virginia are active Consortium members. In addition, VSGC has worked with other state agencies such as the Virginia Economic Development Partnership, Office of the Secretary of Technology and Virginia Cooperative Extension. Four of Virginia's five Space Grant universities are state schools. VSGC undertakes a wide range of collaborative programs with member State agencies and other state partners for specific projects. All precollege programs are fully aligned with state Standards of Learning. VSGC has a line item in the State budget through the State Council of Higher Education which provides \$170,000 per year in State support for scholarships and fellowships.

### **Program Goals:**

1. Provide a higher education scholarship and fellowship program that provides research and education opportunities to students from diverse populations in science, math, technology, engineering and related education disciplines at Consortium member institutions.

2. Foster and nurture a strong science, mathematics, and technology education base from kindergarten through 12<sup>th</sup> grade levels together with an interdisciplinary approach whenever possible.
3. Foster a strong science, mathematics, engineering and technology educational base at the university level. Nurture interdisciplinary approaches whenever possible.
4. Model diversity in VSGC programs and activities and facilitate the National Space Grant's focus on involving women, underrepresented groups, and persons with disabilities in all aspects of education, including fellowship awards, curriculum development, and degree programs in scientific and technical fields.
5. Support science, math, engineering and technology as well as interdisciplinary public service programs through informal education and public programs with affiliates and partners.
6. Develop an effective external relations program for creating public awareness and visibility of NASA and VSGC program activities and outcomes.
7. Extend NASA and VSGC member research capabilities by creating effective links between stated NASA goals and the technical and scientific expertise of our partners and affiliates.
8. The staff and resources of the VSGC will be effectively managed to ensure that all VSGC programs sustain a high standard of quality.
9. The VSGC will maintain its national program recognition for excellence.

### **Program Accomplishments for FY 2007 (April 2007 through March 2008):**

VSGC actively works with its members and many external partners to accomplish Consortium goals. NASA's funding investment is heavily leveraged by external funding from federal and state agencies and other nongovernmental sources. For 2007, each NASA Space Grant dollar was leveraged by more than five dollars. The external funding enhanced the VSGC's ability to staff and run a wide range of program in concert with NASA goals.

### ***Higher Education Initiatives***

- Successful management of the NASA Undergraduate Student Research Program (USRP) from 2000 through December 2007. A total of 139 students were placed at 12 NASA Centers, Wallops Flight Facility and Los Alamos National Labs. NASA Headquarters program funding was leveraged by \$116,853 in Center-sponsored placements. Additionally, six Space Grant Consortia sponsored 11 students.
- Management of NASA Langley Aerospace Research Summer Scholars Program for the second year. 150 total students (100 undergraduate, 40 graduate and 10 high school students) were placed in the spring, summer and fall sessions.
- Initiation of a GIS Internship and Faculty Research Program with NASA Langley Research Center. Twelve interns have been placed for summer 2008 and one William and Mary faculty member and graduate student are providing research support.
- Under the National Science Foundation's Advanced Technology Education Program, VSGC is working with three Virginia Community Colleges, the Virginia Community College System and Virginia Tech/Virginia Cooperative Extension on a planning grant to develop geospatial technical career pathways for Virginia's Community Colleges.
- Management of the FAA University Design Competition for the FAA which engages college students nationwide in safety and operational issues facing our nation's airports. The Competition is now in its second year. For more information, see [http://www.faa.gov/runwaysafety/design\\_competition.htm](http://www.faa.gov/runwaysafety/design_competition.htm)
- Though a U.S. Department of Education grant, VSGC worked with three area colleges to provide six free courses towards endorsement in Earth Science to 79 practicing teachers. Courses were offered through summer 2007.
- Provided a two-week, 2007 summer teacher workshop in partnership with NASA Langley Research Center, National Institute of Aerospace, and the North Carolina, Georgia and Maryland Space Grants. Thirty-two teachers participated.
- Thirteen incoming female freshman engineering students were funded to participate in the 2007 Early Advantage Program at Old Dominion University. This ongoing summer program provides hands-on engineering experiences, college orientation, relationship building with faculty and staff and mentoring.

***Student Research and Mission Initiatives:*** A Consortium focus is to engage students in real-world aerospace missions. The Consortium currently undertakes the following programs:

- The annual Student Research Conference was held in April 2007. The conference allows VSGC fellows and scholars to present their research and receive feedback from practicing professionals. Fifty-six students presented their work at the 2007 conference, which includes a special luncheon and speaker honoring scholars and fellows sponsored by the VSGC's Board of Directors.
- Development with the Colorado Space Grant Consortium and NASA Wallops of a national Space Grant sounding rocket workshop, RockOn, which will teach 58 faculty and students from across the nation how to design, build and launch sounding rocket payloads. The workshop will be held in June 2008.
- Virginia Tech students completed a study on adapting the NASA Langley sponsored MicroMAPS (Measurement of Air Pollution from Space) instrument package to the NASA Dryden Ikhana UAV platform. Two UVA students developed refinements to the radiative transfer algorithms for data analysis of MicroMaps. Another UVA student is completing the development of the radiative transfer algorithms for data analysis and an undergraduate student at Virginia Tech is working on a detailed analysis of the thermal characteristics of the MicroMAPS instrument package in two different configurations.
- An undergraduate team sponsored by NASA Wallops, the VSGC/Virginia Tech Project, "Academic Research Team for the Establishment of a Lunar Magnetic Field Investigation System" (ARTEMIS), is mapping the moon's magnetic field. The team first built a test instrument package to evaluate the proposed magnetometer approach that package flew on a High Altitude Student Platform (HASP) in September 2007. The intent is to evolve the lunar orbiting instrument package by flying a series of test configurations on Wallops High Altitude Balloon launches.
- Work continued at the University of Virginia and Virginia Tech on planning for the Hy-V hypersonic launch initiative, aimed at a launch in 2009, with the launch and launch vehicle to be supplied by NASA Wallops Flight Facility. In addition to VSGC funds, Hy-V received \$100,000 in funding from Aerojet.
- A project was initiated through VSGC in September 2007 at Virginia Tech titled "Design and Prototype of a Flight Vehicle for Large Event Surveillance" under the sponsorship of the Naval Air Systems Command at Patuxent River, Md. The project involves 28 undergraduates and two faculty members.
- VSGC also participated in several NASA Exploration Science Mission Director (ESMD) sponsored activities. Three interns were placed at NASA Langley and one at NASA Wallops Flight Facility with matching funding for each provided by both Centers. VSGC sponsored Virginia Tech's CanSat team which developed a payload and participated in the national CanSat competition. ODU students were supported to design a reusable Mars exploration vehicle.

### ***Precollege Initiatives***

- VSGC is implementing the Virginia Aerospace Science and Technology Scholars program in partnership program with NASA Langley Research Center. Forty-eight high school juniors from across the Commonwealth are participating in a space exploration-themed, distance learning course developed by NASA Johnson Space Center for its Texas Aerospace Scholars program. The students will participate in a one-week, problem-based immersion experience at NASA Langley in summer 2008.
- In cooperation with New Horizons Regional Education Center, six Virginia School divisions, two community colleges, NASA Langley, Northrop Grumman and Cannon Virginia, VSGC has received funding for a Governor's Academy for Innovation, Technology and Engineering (GAITE). One of six such academies awarded through the State with funding from the National Governor's Association, the Academy will engage 7th through 12 grade student in preparing for careers in electrical and mechanical engineering technology.
- Through the National Science Foundation's Diversity in Geosciences Program in partnership with TERC, NASA Johnson Space Center, and the National Federation of the Blind, VSGC is undertaking a project entitled, "Weather Education for Blind Students."

- VSGC manages OVERspace (Offering Virginia Educators Resources in Spatial Practices Across the Curriculum for Excellence), a statewide professional development program that teaches teachers how to implement GPS/GIS in the classroom. A total of 36 teachers participated in 2007.
- A total of 148 teachers participated in precollege professional development activities sponsored by the VSGC.

### ***Informal Science Education and External Relations Initiatives***

- VSGC collaborated with the Science Museum of Virginia and Multiverse Ventures to develop a multimedia presentation prototype called MindsEye Science. MindsEye explores STEM topics with exciting, fast-paced visuals and futuristic themes. A proposal was submitted to the National Science Foundation to request funding. VSGC also provided sponsorship for two Virginia Air and Space Center programs: MindStorm and Robot Science Camp Program.
- VSGC was a key planner and participant in the NASA-sponsored *Aerospace Day* at the General Assembly in late January 2008. VSGC exhibited at the evening reception for legislators and Executive branch personnel, participated in briefings for state legislators, and held a press conference with NASA Langley announcing the Virginia Aerospace Science and Technology Scholars program.

### **Student Accomplishments—Highlights for FY 2007 (April 2007 through March 2008)**

- VSGC awarded \$287,000 in scholarships and fellowships to students attending Virginia universities.
  - \$225,000 went to 45 students for graduate research fellowships
  - \$42,500 went to 6 students for undergraduate research scholarships
  - \$9,500 went to six community college students majoring in STEM
  - \$10,000 went to 10 students majoring in education who plan to teach in STEM
- VSGC also sponsored six internships including:
  - A high school teacher who joined a team of undergraduate students at NASA JPL
  - A student with a disability for an internship at NASA Goddard through the ACCESS program
  - An underrepresented minority female student to participate in the NASA Academy at Goddard
  - Two others students for internships at NASA Goddard and one at NASA Langley
- Kara Olson, Ph. D. computer science student at ODU received the Interservice/Industry Training, Simulation and Education Conference Doctoral Level Scholarship. This was one of only two awards nationally.
- For all student award programs, 20% of awards were provided to underrepresented minority students and 58% of awards were made to female students.
- A total of 15 professional publications by scholarship and fellowship students.
- Virginia Tech's CanSat team, sponsored by VSGC, placed third in the national CanSat competition. This team also won third place in NASA's ESMD student paper competition.
- Patrick Hopkins, a recent Ph. D. graduate from the University of Virginia and a participant in the MicroMaps project presented a paper at the American Geophysical Union Conference and has also accepted a post-doc position with Sandia National Laboratories.
- Other recent graduates and former scholarship/fellowship/internship awardees include:
  - Eric Lundgren with Scaled Composites where he is currently working on the SpaceShipTwo program as a structural analyst.
  - Scott Randall currently working at the Smithsonian Astrophysical Observatory as a data specialist for NASA's Chandra X-ray satellite program.
  - Robert Williams is a Staff Engineer with NASA/JPL working on the Aquarius project.
  - Chris Gunther is a systems engineer with Boeing and the lead for scenario development for wargames and ground tests for the Ballistic Missile Defense System.
  - Sam Miller is an electronics engineer with NASA Langley.