



Virginia SpaceLink

Virginia Space Grant Consortium

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Aerospace Partnerships in Education ♦ Research ♦ Industry

Fall 2003

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HAMPTON UNIVERSITY

OLD DOMINION UNIVERSITY

UNIVERSITY OF VIRGINIA

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NASA GODDARD SPACE FLIGHT CENTER
NASA WALLOPS FLIGHT FACILITY

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SCIENCE MUSEUM OF VIRGINIA

VIRGINIA AIR AND SPACE CENTER

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VIRGINIA COMMUNITY COLLEGE SYSTEM

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VIRGINIA'S CENTER FOR INNOVATIVE
TECHNOLOGY

NASA'S GODDARD SPACE FLIGHT CENTER/WALLOPS FLIGHT FACILITY JOIN VIRGINIA SPACE GRANT CONSORTIUM

The Virginia Space Grant Consortium (VSGC) announces the addition of NASA's Goddard Space Flight Center (GSFC) including its Wallops Flight Facility (WFF) as a Consortium member.

Established in 1989 as part of NASA's National Space Grant College and Fellowship Program, the VSGC undertakes initiatives statewide to improve math, science, engineering and technology education and to improve public science literacy. Another key goal is building research capabilities for aerospace-related and high technology fields in the Commonwealth. In addition to a wide range of professional development programs for teachers and faculty, and sponsorship of real-world aerospace missions engaging university students and faculty, the VSGC provides scholarships, fellowships and mentored research opportunities at the higher education level.

The VSGC has worked with Wallops Flight Facility on a number of sounding rocket, research balloon, and suborbital projects involving universities and industry. VSGC Director Mary Sandy notes, "The

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The Wallops Flight Facility provides flight opportunities for kindergarten to undergraduate students.

The Director's Corner



Since June, the Advisory Council and Staff of the VSGC have been working on a five-year self-evaluation report for NASA. We've taken advantage of this process to also undertake an extensive strategic planning process. I am using this column to share with you some data from the period 1998 – 2002 that reflect our growth and the impact of our programs.

VSGC **Higher Education** programs have impacted 1494 individuals, primarily undergraduate students, but graduate students and faculty as well. Programs have ranged from student involvement in real-world balloon, sounding rocket, and atmospheric science missions to managing NASA's Undergraduate Student Research Program, industry internships and providing graduate student mentors for elementary classrooms.

Scholarships and Fellowships for research as well as community college and teacher education awards were provided to a total of 322 students. Space Grant total funding including matching funds for fellowships and other federal and State funds was \$4,414,470.

In the **Research and Technology Applications** arena, VSGC has generated sufficient funding to develop and maintain a full-time Research Programs Manager slot and benefited substantially from this position. Research missions, applications and infrastructure programs have grown exponentially from \$28,871 in 1998 to \$429,766 in 2002. The additional funding secured from grants and contracts for new projects with members and partners permitted a total of 41 programs involving 3,359 participants. The addition of NASA's Goddard/Wallops Flight Facility as a VSGC member has strengthened this working relationship and opened doors to new collaborative ventures that are mutually beneficial. We are thrilled with the strong startup of our Virginia Space Grant Geospatial Extension program, made possible through a Space Grant Workforce Development award.

A total of 87 **Precollege** programs were undertaken during this evaluation period. All are carefully aligned with State Standards of Learning in math, science and technology, support the Governor's initiatives for at-risk schools and complement NASA's educational goals. Our programs engaged 74,699 participants.

As a part of our tenth-year evaluation, we saw the need to enhance our **Public and Informal Science Education**

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VIRGINIA SPACE GRANT CONSORTIUM

In 1988, Congress enacted the NASA National Space Grant College and Fellowship Program (also known as Space Grant). The Virginia Space Grant Consortium (VSGC) received its designation from NASA in 1989.

The VSGC is a coalition of five Virginia colleges and universities, NASA Centers, State educational agencies, Virginia's Center for Innovative Technology, and other organizations with a strong interest in math, science, engineering and technology education and the preparation of a qualified high technology workforce. The VSGC acts as an umbrella organization, coordinating and developing educational and research efforts for Virginia and the nation.

VIRGINIA SPACE GRANT CONSORTIUM

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Students across the United States participate in sounding rocket, scientific balloon and Space Shuttle mission operations at Wallops Flight Facility.

partnership enhances our mutual missions. This new role will permit even closer working relationships between GSFC/WFF and the VSGC which share NASA's educational vision."

A.V. Diaz, Director of Goddard and John Campbell, Senior Manager at Wallops, both believe the enhanced collaboration with VSGC is advantageous in creating a comprehensive framework for the Center's educational programs that are directly aligned with NASA's overall mission to understand and protect our home planet, explore the Universe and search for life, and to inspire the next generation of explorers. Campbell notes, "I look forward to the closer partnership with the Virginia Space Grant Consortium which should make us much more effective in executing our responsibilities. In return, I hope that we can contribute to the VGSC's complementary mission of education and outreach."



The VSGC and NASA Goddard-Wallops Flight Facility partnership permits closer working relationships in support of NASA's educational vision.

MISSION ACCOMPLISHED: University of Virginia Student Launch A Success

After two years of planning and preparation, undergraduate students from the University of Virginia, (UVA) Charlottesville, launched their experiments aboard a NASA rocket into an early morning October sky at Wallops Flight Facility.

During the sub-orbital flight of the Orion sounding rocket, a remote sensing instrument measured the absorption of infrared radiation by methane gas. A second instrument provided video images and measurements of the distributions of chlorophyll along the coast of the Eastern Shore of Virginia.

In addition to gathering science data, the project also provided engineering undergraduate students the opportunity to obtain valuable hands-on experiences in the development of science experiments for flight.

"I could not have participated in any student project that would have prepared me better for my future career," said Christina Haden, student project leader. "I have learned to manage large projects and become a better public speaker, as well as a leader." Keith Moored was co-student project lead.

In addition to the Virginia experiments, the payload carried an experiment for sixth grade students from St. Andrew's School in Waynesboro, Pa. The students will be studying the impact of the flight, which includes

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programs. As a result, we have increased public and information educational programming with our museum members, added StarDate sponsorships at six Virginia radio stations throughout the Commonwealth, and co-sponsored a Native American Sky Legends planetarium program for national distribution. Forty-seven programs in this arena reached 373,829 participants. An outgrowth of the 15-year evaluation is the establishment of an informal science education committee to facilitate communication, planning and networking. The Consortium has also continued to expand its external relations activities resulting in increased visibility and networking.

From a **Management** perspective, the VSGC has grown in stature as a partner and statewide resource. We have experienced a substantial increase in funding from non Space Grant sources (from \$1,591,083 in 1998 to \$2,897,070 in 2002). Programs and interactions with NASA Centers have grown to include all NASA Centers. State networks have vastly expanded. We will continue to work to build the Consortium's funding base for enhanced program impact.

Mary Sandy



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gravitational forces 15 times greater than normal on Earth, on seeds and brine shrimp eggs and the eggs ability to hatch after recovery.

Led by UVA Professor Gaby Laufer and with the full assistance of the NASA Sounding Rocket Operations (NSROC) Contract Team at Wallops, students participated in the design, fabrication, integration and pre-qualification testing of the experimental payload.

Laufer commented, “ We have received data from both the IR methane sensor and the ocean chlorophyll sensor. We will process the data during the current semester.” He added, “I would like to thank Northrop Grumman, the Virginia Space Grant Consortium and UVA for their support. I also would like to thank the engineers and technicians of NASA and the NSROC program at Wallops

Flight Facility for their help in putting together the payload, launching, and recovering it.”



UVA Professor Gaby Laufer and Student Project Director Christina Haden discuss launch proceedings at Wallops Flight Facility



Pre-Launch at WFF



Up, up, and away...



Mission Accomplished! Former UVA student director, Sarah Armstrong, has graduated and works for Lockheed.

NASA'S UNDERGRADUATE STUDENT RESEARCH PROGRAM (USRP) OFFERS MENTORED RESEARCH EXPERIENCES

For some college students, summer break can mean a dull summer job or a boring internship. This was not the case for the 136 undergraduates selected to participate in NASA's Undergraduate Student Research Program (NASA-USRP) for the summer and fall of 2003. Targeting rising junior and senior undergraduates enrolled full-time in an accredited U.S. college or university to work under the direction of a NASA scientist or engineer, the USRP program placed women in over half of the positions, with 28.5% of the placements from underrepresented minority groups. Each student was paid a \$500 weekly stipend plus round-trip travel expenses. A total of 103 different colleges and universities were represented from across the nation.

Serving as a national program bridge from existing NASA K-12 educational program activities to NASA higher education options, an

"At NASA Glenn Research Center I had the mentorship and assistance of a number of experienced and committed NASA employees. They helped me better understand the problems on which I was working, while still providing me the freedom to seek out unique and novel solutions to them. Through the USRP program I was able to work closely with a team of experienced researchers while still identifying directly with the research which was being conducted. I was able to solve problems which can only be encountered in a handful of places around the world. For example, much of my research in the summer of 2003 related to the analysis of a fuel cell power for a small aircraft. Though this is an area which has become highly visible in the past few years, I may never again find an opportunity to work so closely and directly with it.

My participation in the USRP program has been an inspirational one, and has prepared me well for my continuing education."

Scott Schmucker, USRP
NASA Glenn Research Center

essential objective of the program is to address the need to increase the nation's undergraduate and graduate science, engineering, mathematics and technology skill base.

"USRP not only gave me practical experience as an engineer, but expanded my knowledge of the pressing issues in my field," stated Miller Henderson. "From a supportive mentor to helpful and informative co-workers, this summer at Kennedy Space Center has been a positive experience," Henderson continued. A junior at Rice University majoring in Civil and

Environmental Engineering, Henderson's work at Kennedy involved air emissions inventory and assessment.

Key to the overall success of USRP is the mentor-student relationship. By working on projects that relate to classroom experiences, students are empowered to learn first hand the nature of research.

Greg Terrie, a USRP mentor at NASA Stennis Space Center noted, "I had a great experience as a [USRP] mentor. I give most of the credit to the student though. She had a great attitude and work ethic and appropriate technical skills and background for her remote sensing project assignment. She was able to complete data processing and analysis that will significantly contribute to the success of our project."

Now in its third year, VSGC manages USRP under a grant from the NASA Headquarters Education Division, Office of Human Resources and Education. Support for USRP is also provided through collaborative efforts with the Council on Undergraduate Research, the National Space Grant Foundation, the American Association of Community Colleges and the National Society of Black Engineers. State Space Grants funded 6 of the student placements.

Brenda Neil manages the USRP for VSGC and Sherry Behun is the USRP Program Assistant. USRP information and online application for the 2004 cycle is now available on the website at <http://education.nasa.gov/usrp>.

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Naomi Abrams, a junior at Alabama State University, researched harmful algal blooms (red tides) using fluorescence spectroscopy at Stennis Space Center this summer.



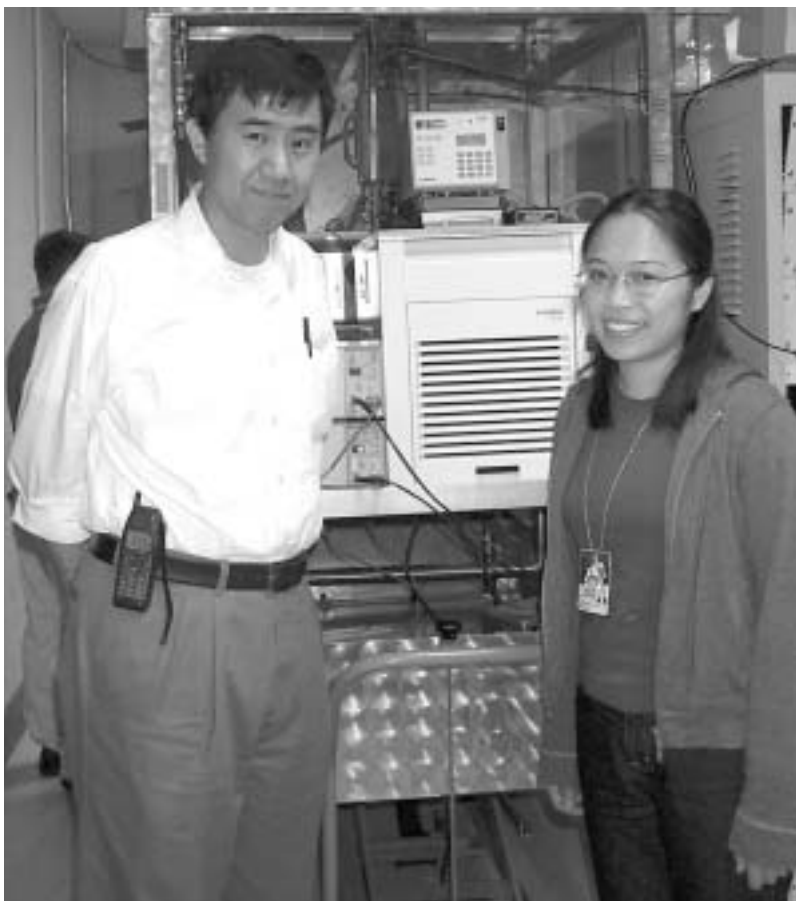
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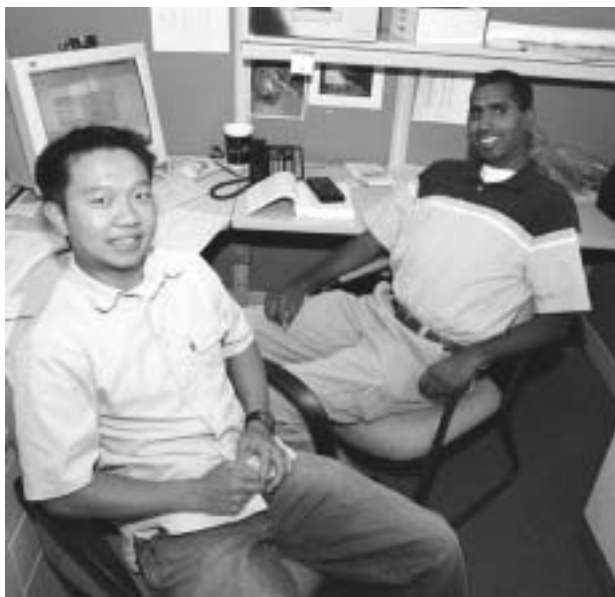
Chris Hansen and Dr. Raj Kaul at Marshall Space Flight Center conducted testing on spectra fiber reinforced epoxy and polyethylene composites including mechanical, physical, and radiation shielding tests, Chris is a senior at Iowa State University.



Miguel Roman, a senior at the University of Puerto Rico at Mayaguez, is conducting research at the Laboratory for High Energy Astrophysics with the NASA Constellation-X Mission Team at Goddard Space Flight Center.



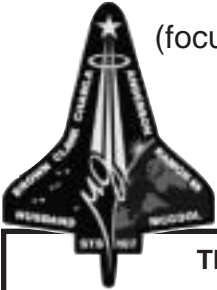
Mary Louie, U.C. Berkeley senior, and her mentor, Dr. Chi-Ming Lee, conducted research at NASA Glenn Research Center on air separation modules (ASM) for exhausted gas to prevent fuel tank explosions in aircraft.



USRP students Jackson Pang, a senior at California Polytechnic State University, and Prasad Komma, a junior at the Georgia Institute of Technology, conducted research on the Quadruplex Flight Control Computer System at Dryden Flight Research Center in California.

“Space Science the Special Way” with a little twist from Assistive Technology

(focusing on the Blind and Visually Impaired and the Deaf and Hard of Hearing)



February 12 and 13, 2004 • 8:30 – 4:30

Science Museum of Virginia

2500 West Broad Street • Richmond, VA 23220

www.smv.org

This special conference:

- is aimed at those educators and support staff responsible for the teaching of Virginia's Earth/Space Systems Standards of Learning (SOL) curriculum to students with special needs, specifically the Blind and Visually Impaired and the Deaf and Hard of Hearing.
- will focus on solutions to the challenges educators face accommodating inclusive earth/space science instruction
- will foster a collaborative responsibility among science and special needs educators and other support staff
- will increase awareness of assistive technology solutions
- will provide educators with a stronger base of knowledge to guide students into science, technology, engineering and math fields

Speakers include:

Dr. Harry G. Lang

Deaf Professor in Physics and Mathematics
Rochester Institute of Technology
National Technical Institute for the Deaf

Mike Kersjes

President, Space is Special
Enhancing math and science skills using space education and getting special needs students to Space Camp

Lucia Hasty

Tactile Graphics Committee Chairperson
Braille Authority of North America

Dr. David Hurd

Planetarium Director/Professor of Space Science and the Tactile Graphics Lab
Edinboro University of Pennsylvania

Troy Cline

Sun-Earth Connection Education Forum
Goddard Space Flight Center

Grant awarded by SERCH (Southeast Regional Clearinghouse)

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Sponsored by:

**Virginia School for the Deaf, Blind and Multi-Disabled
and**

Virginia Space Grant Consortium

In partnership with:

Virginia Department of Education –

Departments of Special Education and Science Instruction

Virginia Department for the Blind and Vision Impaired

Virginia Department for the Deaf and Hard of Hearing

Training Technical Assistance Center ODU (TTAC ODU)

NASA Langley Center for Distance Learning

Science Museum of Virginia

Registration information and forms are available at
Virginia Space Grant Consortium's website: www.vsgc.odu.edu

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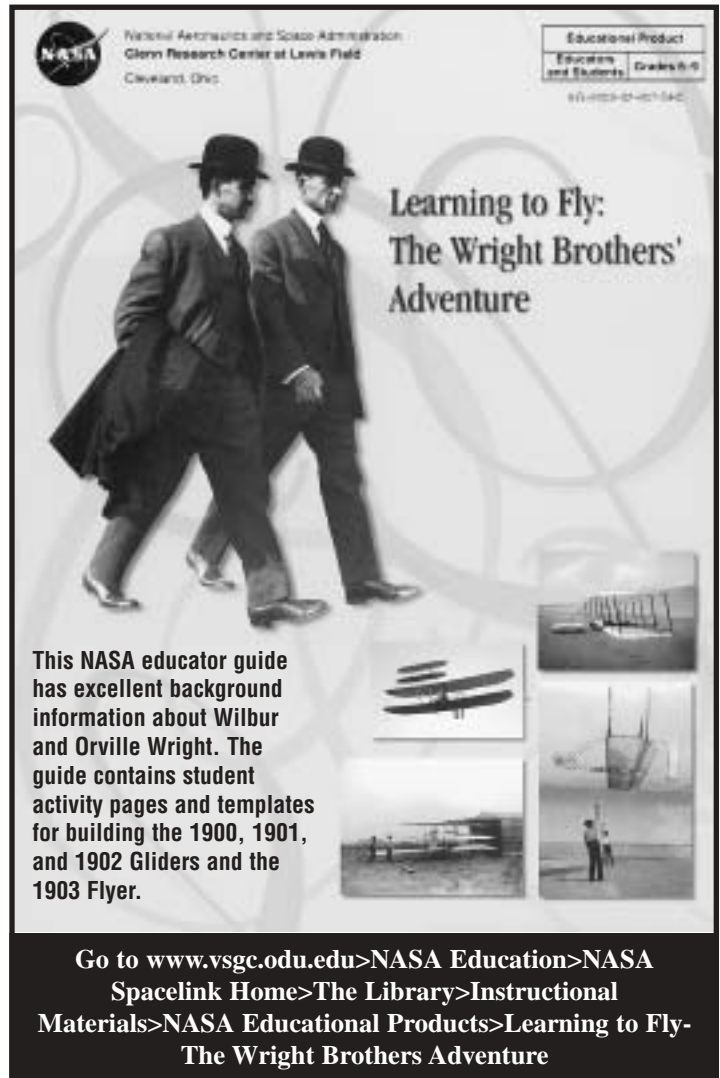
CELEBRATING 100 YEARS OF FLIGHT VIRGINIA AIR AND SPACE CENTER SOARS TO NEW HEIGHTS WITH NEW ADVENTURES IN FLIGHT GALLERY

Nearly one hundred years ago, history was made on a sandy beach in North Carolina. As the country celebrates the centennial of flight, the Virginia Air & Space Center commemorates the anniversary with its new one-million-cubic-foot **Adventures in Flight** gallery, now open. This new state-of-the-art, interactive gallery is the largest expansion in the museum's history and cost \$6.4 million to create. New exhibits in the gallery will not only feature the Wright Brothers' First Flight but will highlight Hampton Roads' significant role in commercial, general and military aviation.

Visitors will take an aviation adventure from the origins of flight to the future of flight with a variety of hands-on, one-of-a-kind exhibits and simulators that can transform anyone into a pilot for the day! Families will come face-to-face with a replica of the **1903 Wright Flyer** and can experiment with flight in the Wright Brothers Bicycle Shop. Several interactives from the **Bishop's Toy Flyer** to the **Wing Warping** display convey the story of two brothers who made history in 1903. Guests who want a taste of barnstorming antics can "wing walk" on a recreated *Curtiss Jenny* and experience a fanciful flight through 100 years of aviation milestones.

An **AirTran Airways DC-9** dominates the main gallery and invites visitors to step aboard and sit at the controls of a **Boeing 717 Glass Cockpit Flight Simulator**. Those who prefer to stay on the ground can become an air traffic controller and practice talking in ATC slang. An air traffic control tower display features a real-time data electronic map of North America showing all aircraft in flight. Little travelers will enjoy discovering what happens to their luggage on a trip at the **Day in the Life of Your Luggage** interactive.

The **Air Power over Hampton Roads** area relates the story of Hampton Roads' rich Air Force heritage. Guests can ride in a World War II bomber with a **B-24 motion simulator**, climb into the cockpit of an F/A-22, and test their flight skills with aptitude tests based on real Air Force exams. The story of



NASA National Aeronautics and Space Administration
Glenn Research Center at Lewis Field
Cleveland, Ohio

Educational Product
Educators and Students Grades 4-9
978-1923-07-001-0-0

Learning to Fly: The Wright Brothers' Adventure

This NASA educator guide has excellent background information about Wilbur and Orville Wright. The guide contains student activity pages and templates for building the 1900, 1901, and 1902 Gliders and the 1903 Flyer.

Go to www.vsgc.edu.edu>NASA Education>NASA Spacelink Home>The Library>Instructional Materials>NASA Educational Products>Learning to Fly-The Wright Brothers Adventure

New Adventures in Flight gallery at the Virginia Air & Space Center

Adventures in FLIGHT
Your Boarding Pass to Adventure!
"Wing walk" on a Jenny, see a replica 1903 Wright Flyer, ride in a stallion, become an air traffic controller, fly an airplane, climb into an F/A-22, explore a DC-9, and more!

The Virginia Air and Space Center is located at
600 Settlers Landing Road in beautiful Downtown
Hampton. Visit their website @
www.vasc.org
For more information call 757/727-0900

Ask about frequent flyer membership!
VIRGINIA AIR & SPACE CENTER
Call 757-727-0900 for more information or visit www.vasc.org

naval aviation will also be addressed in **Air Power at Sea**, through an interactive 1:48 scale model of the *USS Reagan*, a model of the *USS Yorktown*, and an *N2S-3 Stearman* aircraft, used to train early military pilots.

The physics of flight are addressed with several interactives including a paper airplane test flight lab, a flow tank that addresses fluid dynamics and a Bernoulli Wing that illustrates the principle of lift. **Little Wings**, an exciting new play area, will allow young aviators to build a plane, create their own airport, experiment with a hot air balloon and climb into a cockpit to investigate flight. Worn-out aviators, including mom and dad, can rest in the clouds in a very unique seating area.

Admission to the new Adventures in Flight gallery is included in regular exhibit admission. Exhibit admission is \$7.50 for adults, \$6.50 for seniors (65+), military and NASA personnel, and \$5.50 for children (ages 3 to 11). A combination ticket for exhibits and IMAX admission is also available. The Center is open Monday through Saturday, from 10 a.m. to 5 p.m. and Sunday, noon to 5 p.m.

2003-2004 Research Scholars and Fellows Awarded \$250,200

The Virginia Space Grant Consortium awarded a total of \$250,200 in scholarship and fellowship awards for the 2003-2004 academic year. The awards included 11 Aerospace Undergraduate Research Scholarships, 14 new Aerospace Graduate Research Fellowships, and the renewal of 13 previously awarded Graduate Research Fellowships to students at five Virginia colleges and universities. All recipients are enrolled in a course of study with aerospace relevance at one of the five Virginia Space Grant Colleges — College of William and Mary, Hampton University, Old Dominion University, University of Virginia, and Virginia Polytechnic Institute and State University.

The one-year Aerospace Undergraduate Research Scholarships are valued at up to \$8,500. The Aerospace Graduate Research Fellowships are \$5,000 awards and can be renewed for up to three years. Space Grant Scholars and Fellows must be engaged in an identified research project with a faculty advisor as part of their academic program. The awards, which are determined by a committee of Consortium representatives, are based on evaluation of the applicant's research proposal, past

scholastic achievement, and academic potential.

Major goals of the VSGC are to help develop the engineers and scientists of the future and to broaden the opportunities for all students to pursue science and aerospace careers. This year, 53% of scholarships and 47% of fellowships have been awarded to females and/or minority members traditionally underrepresented in the science and engineering fields.

Since receiving Space Grant designation from NASA in 1989, the Consortium has awarded over \$2.9 million in funding to more than 520 Virginia students. To date, 131 Undergraduate Research Scholarships totaling nearly \$820,000 and 215 Graduate Research Fellowships totaling more than \$1.7 million have been awarded. Funding for these awards comes from the National Aeronautics and Space Administration and the Commonwealth of Virginia.

Applications for all VSGC fellowship and scholarship programs which include community college, teacher education, and undergraduate research awards, will be available on the VSGC website at <http://www.vsgc.odu.edu>.

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**Applications for
2004-2005 Academic Year
Scholarships and Fellowships
are now available at
www.vsgc.odu.edu**

UNDERGRADUATE RESEARCH SCHOLARS



Cengiz Akinli, Blacksburg Virginia, is pursuing a B.S. Degree in Aerospace Engineering at Virginia Tech. He is researching the development of a semi-autonomous spacecraft docking control system.

Sharlotte Bolyard is a fourth year student at the University of Virginia majoring in Aerospace Engineering. Her research is on fatigue life measurements of diamond micro-electromechanical systems (MEMS) for Aerospace Applications.



Vinayak Deshpande is a third year student at the University of Virginia majoring in Electrical and Computer Engineering. His research is on the implementation of a cost-effective, remotely-sensed chemical detector.

Jonathan Hill is a fourth year student at the University of Virginia majoring in Mechanical Engineering. His research is on micro air vehicle technologies and power transmission through electromagnetic waves.



Patrick Hopkins is a fourth year student at the University of Virginia majoring in Mechanical and Aerospace Engineering. He is doing research on the development of analysis techniques for MicroMAPS data.

John Hottle is a senior at Virginia Tech majoring in Chemistry. His research is on Polyhedral Oligomeric Silsesquioxanes (POSS) and Polymer blends for aerospace applications.



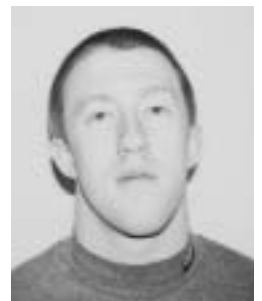
Anushka Lakdawala is a senior at Old Dominion University majoring in Electrical and Computer Engineering. She is conducting research on modeling aircraft aerodynamics for 'Out of the Envelope' regions.

Samuel Miller is a senior at Old Dominion University majoring in Electrical and Computer Engineering. He is doing research on a low cost portable CAVE ultrasonic tracking system.



Carly Stambaugh is a senior at Old Dominion University majoring in Mathematics and Statistics. She is doing research on laser-assisted energy deposition in quiescent air.

Joshua Staubs is a senior at Virginia Tech majoring in Aerospace and Ocean Engineering. His research is on unsteady pressure fluctuations on a rotor blade as a result of the tip leakage vortices produced by a stator-rotor interaction.



Ellis O. Taliaferro II is a senior at Hampton University majoring in Computer Science. His research is on the analysis of gases between plants.





GRADUATE RESEARCH FELLOWS 2003-04



Stephanie Bailey is pursuing a Ph.D. in Physics at the College of William and Mary. Her research topic is the measurement of Neutron Spin Structure Functions in the resonance. She

proposes to study backgrounds and calibration data related to experiment E01-012 for the purpose of gaining a better understanding of the internal structure of the nucleon.



Lance Breitenbach is pursuing a Master's degree in Aerospace Engineering at Old Dominion University. His research topic is the documentation of the test-section flow for the

National Transonic Facility at the NASA Langley Research Center. He will use various-sized objects shaped like submarines to determine how each object affects the wind tunnel flow.



Elliott Bryner is pursuing a Ph.D. in Mechanical and Aerospace Engineering at the University of Virginia. His research topic is the combustion efficiency of a supersonic combustor through water vapor

concentration measurement using infrared laser absorption tomography. He proposes to measure the efficiency of a SCRAMJet with laser-based fluid measurement techniques.

George Davailus is pursuing a Ph.D. in Aerospace Engineering at Old Dominion University. His research topic is the use of Quaternion Algebra in Inertial Navigation and Guidance.



Kris Ford is a Master's candidate majoring in Atmospheric Science at Hampton University. His research interests are to perform data analysis of Sage II ozone profiles to make comparisons with data from other sources and to validate data obtained from Sage II.



Peter Frinchaboy is pursuing a Ph.D. in Astronomy at the University of Virginia. His research topic is the Absolute Space Motion of Galactic Clusters. His research uses star clusters as tracers of the Milky Way to determine its mass and dynamics. This research will allow the amount of dark matter in the disk of our Galaxy to be determined.



Aaron Hawkins is pursuing a Ph.D. in computer science at the College of William and Mary. His research area is in the study of on-line algorithms utilized by a broadcasting server to construct data transmission schedules under various models of the problem.



GRADUATE RESEARCH FELLOWS 2003-04



Todd Heil is pursuing a Ph.D. at Virginia Tech majoring in Materials Science and Engineering. His research topic is the Development of Ferromagnetic Shape Memory Alloys for

Sensing, Acutating, and Shape Morphing Applications. His research studies how metals can be developed that can sense strain and change shape within a magnetic field.



Curt Kothera is pursuing a Ph.D. in Mechanical Engineering at Virginia Tech. His research topic is the Physical State Feedback Control of Ionic Polymers which seek to characterize and

manipulate a membrane material for use in future space telescope applications.



Mark Loeffler is pursuing a Ph.D. in Engineering Physics at the University of Virginia. His research interests are studying how materials age over time in space due to solar winds and meteorite impacts.



Shannon Watson is pursuing a Ph.D. in Thin Film Deposition at the College of William and Mary. Her research interest involves investigating the use of non-traditional materials, such as polymers, in nanometer thick magnetic metal multilayers used in science and industry.

Joseph Schwartz is a Master's candidate at the University of Virginia majoring in Solid Mechanics. His research interest is the basic science that leads to the design of light space structures.



Aaron Sears is pursuing a Ph.D. in Engineering Mechanics at Virginia Tech. His research topic is the mechanics of carbon nanotubes where the development of engineering models for carbon nanotubes through atomic simulations is studied.



Matthew VanDyke is a Master's candidate in Aerospace Engineering (Dynamics and Controls). His research is aimed at developing an algorithm for efficient and accurate pointing of a group of spacecraft performing a cooperation mission.



VIRGINIA TECH EXTENSION, FORESTRY DEPARTMENT PARTNER WITH VIRGINIA SPACE GRANT CONSORTIUM IN GEOSPATIAL PROGRAM



*John McGee, Space Grant Geospatial
Extension Specialist at
Virginia Tech.*

Virginia Tech and the Virginia Space Grant Consortium have established the Space Grant Geospatial Extension Program in the College of Natural Resources at Virginia Tech's Blacksburg campus. The program will facilitate educational programs and workforce training to help deal with the serious shortfall of professionals and trained specialists who can utilize geospatial technologies at the local, regional, and state levels.

"The key goal is to expand opportunities for citizens and organizations across the Commonwealth to apply geospatial tools such as geographic information systems (GIS), global positioning systems (GPS), and remote sensing data, analysis and interpretation to help with local needs," says Steve Umberger, director of the

Virginia Cooperative Extension. The program will also work with educational outreach programs for pre-college teachers and students through 4-H and VSGC educational programs.


The worldwide market for geospatial technologies, which is currently estimated at \$5 billion, is projected to have annual revenues of \$30 billion by 2005, according to a NASA 2001 report. Geospatial tools such as GIS allow users to precisely define any location on the face of the earth and then to add layers of information to describe what is at that location. It is a way to combine data from many sources about a specific area and to display it in a map format.

Agricultural uses of GIS include property boundaries, crop and soil analysis, precision farming, and management. City and state planners use GIS to decide where to put new roads and developments and how they will affect the environment.

GIS is used for management of coastal resources, homeland security, and law enforcement. Ultimately, GIS technology provides a basis for better understanding and improved stewardship of natural resources and public services. It also provides important decision making tools to enhance the economy and quality of life.

The new program is funded through a NASA grant administered by the Virginia Space Grant Consortium. Virginia Tech and the George Mason University-led VA-MAGIC initiative are also providing substantial resources. Supported by NASA's Stennis Space Center, VA-MAGIC works

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to provide tools and training that apply NASA data to specific problems.

John McGee has been hired as the geospatial Extension specialist at Virginia Tech to serve as a statewide resource for Extension agents, state agencies, local governments, and other end users. He will be organizing workshops to help them learn how to apply geospatial technologies and data to solve local problems. McGee says, “The Extension agents will be our key link to local community needs.”

“The program is part of a NASA National Space Grant Program initiative that has established programs in ten other states besides Virginia,” explains Mary Sandy, Virginia Space Grant Consortium director. “Other supporters include the Virginia Community College System, Virginia Sea Grant, and the Virginia Geographic Information Network.”

Virginia Tech partnering organizations include the university’s Department of Forestry in the College of Natural Resources, and the College of Agriculture and Life Sciences. NASA Langley Research Center, NASA Goddard Space Flight Center and NASA Stennis Space Center are participating on the project’s Advisory Committee.

“All of the partners,” notes Sandy, “share the vision of how geospatial data and tools can improve resource management and yield economic and social benefits.”

McGee, who holds a Ph.D. from the University of Massachusetts in regional planning, has worked with several Extension and outreach projects in the United States as well as internationally. He served as the assistant coordinator with the Virginia Geographic Information Network, the lead public agency in the Commonwealth for spatial data and GIS. McGee has held a faculty position at Eastern Kentucky University, organized geospatial workshops for local professionals, and most recently taught at the International School in Addis Ababa, Ethiopia.

Paige Baldassaro, the program’s geospatial applications developer, previously worked at The Institute for Scientific Research, Inc., in Wheeling, West Virginia. She is experienced in integrating virtual reality and high-resolution geospatial data and using hyperspectral remote sensing data to identify pollution pathways. Baldassaro holds master degrees in geology and geography from Virginia Tech.

Virginia Space Grant Consortium Hosts Two Workshops for Grades 4-12 Educators in Conjunction with the Virginia Association of Science Teachers Conference in Portsmouth

Hands-on workshops to learn how to use hand-held global positioning systems (GPS) units and geographic information systems (GIS) in the classroom were conducted on November 14 at the Virginia Association of Science Teachers conference in Portsmouth. The workshops, sponsored by the Virginia Space Grant Consortium as part of its OVERspace (Observing Virginia's Environmental Resources from Space) program, provided models for classroom integration of GPS and GIS in a wide range of subjects to meet the new Virginia Standard of Learning .

A few examples presented to the Educators on how to use GIS in the classroom included:

- Earth Science:** Analyzing Earth's geology layers and changes in Earth over time;
- Social Studies:** Provinces of Virginia and sites of discovery and settlement;
- Mathematics:** Modeling, analysis, prediction and problem solving;
- Biology:** Using medical geography to track the spread of diseases;
- Biology/
Environmental Science:** Mapping activities of the watersheds and analyzing patterns; drought and wetland issues;
- Earth Science/
Oceanography:** Changes in water temperatures, depths, storm prediction, habitat tracking.



OVERspace teacher training workshops will be conducted throughout the year. For more information or to schedule a workshop, contact us at vsgc@odu.edu or (757) 766-5210.

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