Florida Space Grant Consortium
University of Central Florida
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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 **Florida Space Grant** Consortium is a Designated Consortium funded at a level of **$845,000** for fiscal year 2010.

PROGRAM GOALS

FELLOWSHIPS & SCHOLARSHIPS

1. Enable students to pursue careers in the space program – whether through graduate, undergraduate, or Community College technical training.

   SMART Objective – On an annual basis, at least 20 undergraduate and/or technical training awards and 3 graduate fellowships will be competitively awarded to students who wish to pursue space/aerospace/aeronautics training. At least six of these awards will be offered to minority candidates and at least 8 to female students. At least 70% of awardees will continue to the next step in their chosen STEM disciplines (academia/NASA/industry).

This goal positively impacts NASA Education Objectives: 1.1; 1.2; 1.3; 1.5.

2. Facilitate Space-Related Research Symposia for students, NSA engineers and FSGC awardees

   SMART Objective – By March 2014, facilitate at least two Space-Related Research Symposia within the State of Florida that specifically target graduate student participation involving at least 12 students and 10 mentors.

This goal positively impacts NASA Education Objectives: 1.1; 1.2; 1.4; 1.5; 2.1; 2.3; 3.2

RESEARCH INFRASTRUCTURE

1. Support NASA related interdisciplinary research projects emphasizing work-force development with undergraduate and graduate students.

    a. **SMART Objective** – On an annual basis, at least 12 research projects will be competitively awarded. At least three of these research project awards will be awarded to a minority serving institution and/or include minority participation. At least 12 undergraduate or graduate students will be supported by the projects, including at least 5 women and 4 under-represented minorities

This goal positively impacts NASA Education Objectives: 1.2; 1.3; 1.4; 1.5; 2.3; 3.2.

2. Foster collaboration among NASA engineers, Florida university faculty and industry partners.

    a. **SMART Objective** – By March 2014, facilitate at least two Space-Related Research Symposia within the State of Florida that specifically target NASA engineers, Florida university faculty and industry partners.

This goal positively impacts NASA Education Objectives: 1.1; 1.5; 2.1; 2.3; 3.2.

HIGHER EDUCATION

1. Provide undergraduate students with opportunities for interdisciplinary hands-on experiences in team-based student launch activities and student pay-load development programs to better understand STEM concepts as they relate to space exploration.

    a. **SMART Objective** – On an annual basis, involve at least 100 students, representing a minimum of five Florida-based higher education institutions, including at least one minority serving institution, in collaborative space-based interactive learning experiences.

This goal positively impacts NASA Education Objectives: 1.2; 1.3; 1.4; 1.5; 2.3.

PRE-COLLEGE EDUCATION

Contribute space-related resources and training to help increase the number of K-12 teachers who:

1. Use space-related curricula resources to motivate more students to pursue advanced math and science courses.

    a. **SMART Objective** – On an annual basis, conduct and/or facilitate space-related pre-service and in-service teacher training opportunities focused on space-related math and/or science curricula. A minimum of 50 Florida teachers per year will attend this training.

This goal positively impacts NASA Education Objectives: 1.2; 1.3; 1.4; 2.1; 2.3; 3.2.

INFORMAL EDUCATION (GENERAL PUBLIC)
Contribute space-related resources to help increase the number of citizens who are aware of:

1. How the application of math and science enable or enhance common activities, NASA's contributions to our standard of living (beyond Velcro®), and NASA's mission.

    a. **SMART Objective** – On an annual basis, collaborate with Florida museums and/or science centers to facilitate/conduct engaging space-related learning events held in public venues. A minimum of two events per year will be held. At least 200 members of the public will attend one or more of these events per year.

This goal positively impacts NASA Education Objective: 3.2.

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

Outcome 1 (employ and educate)

It allowed me to network with a diverse group of people, within my field and in related fields. With the Space Grant matching funds, I travelled around the world presenting my research, and meeting others that do similar work. I formed relationships with people and organization that will be valuable for my future academic and professional career. As part of a team, I contributed to refining a prototype electrodynamic dust shield that can be used on devices and vehicles in lunar and martian exploration. (Stacy Ann Irwin - on 03/15/11, 2010 Space Grant Research Award, Florida Institute of Technology - Graduate Research Assistant)

It presented me with great research experience in the field of exoplanet transit research. And the opportunity to create a document for other students to do the same research more easily at Florida Tech. (Crystal Lynn Latham - on 02/18/11, 2010 Space Grant Research Award, University of Vermont - Graduate Research Assistant)

The Space Grant has impacted my education and impact tremendously. My involvement in the Florida University Nano-SATellite (FUNSAT) design competition guided my pursuits to continue my graduate education. Numerous times has the Space Grant provided opportunities for me while I have shared my experiences with others. I have been a member of the University of Florida small satellite program and have participated in several aerospace industry events ranging from conferences, STEM education events, and talks. Recently, the FSGC appointed me as an ambassador. I am currently working on a personal report from my involvements which resulted my passion in space and education. I am planning to submit to the NASA GSRP for my PhD research and broader impact on STEM education. (Dante Buckley - on 03/13/11, 2010 NASA Academy/Higher Education, Alachua County Public Schools - High School Science Teacher)

The valued impact of this opportunity on my career goals cannot be put into words. It made the difference between just another graduate project, and being nationally recognized. I have done a number of tasks. My introductory experience began with the Air Force, at the Composites Laboratory. After that I became a consultant materials engineer for a number of companies designing high strength dual use materials. At that time, I began graduate training in composite hybrid nano materials for space applications, as well as medical applications. (Angelo Karavolos - on 02/08/10, 2009 Space Grant Fellowship, 2010 Space Grant Fellowship, NTB Technologies and Associates Inc - Research Technology)

Dillon Sanchez, a FSGC fellow from Embry-Riddle Aeronautical University is now working with Space X.

Jason Dunn, a FSGC scholar from the University of Central Florida, attended Singularity University at NASA Ames Research Center. This is what he had to say "This was of course made possible with the support of FSGC to cover part of my tuition. Those 10 weeks turned out to be the most beneficial, eye-opening experience of my life. I was introduced to hundreds of new friends, turned on to some very cool futuristic ideas and technologies, and have since become more focused on my life purpose. Thank you for the early support!". After leaving SU he became the founder of a new company that was a spin off from their team project at SUI. Made in Space is a company aimed at bringing the rapid advancements of 3D printing technology to space. To leverage additive manufacturing to help solve some of the biggest problems the space industry is currently facing. They are now looking into ways of 're-inventing' manufacturing for space in a manner that is much more economical and sustaining for long term development of the solar system. Last year, Jason was also offered a position as Project Engineer with Moon Express, a new contender in the Google Lunar X PRIZE, one which has the investor backing to actually make the mission possible. His final comments are "Life has been great and I have been extremely busy with my new endeavors. It's hard not think back on the support I received from FSGC over the years, the support that has most certainly got me to where I am today. And for that I am forever grateful. If there is ever any way I can help FSGC continue to thrive please do not hesitate to contact me."

PROGRAM ACCOMPLISHMENTS

Outcome 1 (employ and educate)

- 12 students took next step in FY10 (SG participation supported from FY06-FY10 funds)
    - 2 are pursuing advanced degrees in STEM disciplines
    - 2 accepted positions at NASA
    - 7 accepted STEM positions in industry
    - 1 went on to a position in a non-STEM discipline

- 74 students significantly supported from FY10 funds
    - 51 in Fellowship & Scholarships
    - 23 in Higher Education/Research programs

Fellowships and Scholarships

Under FSGC's Space and Aeronautics Internship Program, we were able to place 10 student interns at the Kennedy Space Center and 30 students at Florida affiliate universities and colleges. Also, 5 students were supported by FSGC to the NASA Academy program.

- students significantly supported from FY10 fellowship and scholarship
  - 40 Scholarships
  - 6 graduate fellows
  - 5 NASA Academy
- Funded 6 graduate fellows (1 under-represented minority and 1 disabled). – met our fellowship goal for underrepresented minorities but did not meet our gender goals
- Funded 45 scholars. 10 of them interned at the Kennedy Space Center and 30 at our affiliate universities and 5 at other NASA centers. 29 students were under-represented minorities and 19 were women. This was well above our goals for both under-represented minorities and gender. To compensate for the lack of minorities under the scholarship program last year, we have aggressively worked with our affiliates to recruit more under-represented minorities through the undergraduate student program at smaller institutions.

SMART Objective – On an annual basis, at least 20 undergraduate and/or technical training awards and 3 graduate fellowships will be competitively awarded to students who wish to pursue space/aerospace/aeronautics training. At least six of these awards will be offered to minority candidates and at least 8 to female students. At least 70% of awardees will continue to the next step in their chosen STEM disciplines (academia/NASA/industry).
FSGC has awarded 6 graduate fellowships, and 45 scholarships. A total of 30 students were under-represented minorities and 19 were women

Higher Education

Students from are working on senior design projects such as the design of a sub-orbital Hybrid Rocket, balloon payload, cubesat, Moon buggy, and NASA University Student Launch Initiative (USLI). Students from universities and community colleges are working on student collaborative projects like the nano-satellite design competition, hybrid-rocket design competition and balloon launches. Details of our higher education programs are as follows:

Senior Design and Competitions; FSGC has supported 7 senior design projects involving 29 students at the University of Miami, Embry-Riddle Aeronautical University, and Bethune Cookman University. In addition, FSGC supported 27 students in 5 student teams from 3 universities participating in the University Space Launch Initiative program, Moonbuggy Competition, and Microgravity Flights.

Hybrid Rocket Competition: 87 students in 9 teams from 5 universities and 1 community college took part in this competition. The objective of the competition is to build and launch a hybrid powered rocket. There are two categories of competition to choose from. The first category consists of launching a hybrid rocket to the maximum altitude. The second category challenges the teams to fly their rocket closest to 2000 feet in altitude.

FLOSAT: The goal of the program is to have a flight ready 1U CubeSat satellite built and ready to be launched in 2013. The satellite will be designed and built in three years. The program will take place in two phases. Phase A is a student design program in which groups will design, build and test subsystems of the CubeSat. Completed prototypes of the CubeSat subsystems will be flown as a weather balloon payload as part of the subsystem testing. Winners of Phase A will be invited to apply for Phase B which is integration of all the subsystems into a flight ready CubeSat. Two rounds of Phase A competition will occur, the first is during the 2010-2011 academic year and the second during the 2011-2012 academic year. After Phase B in 2013, we will have a fully tested flight ready FSCG CubeSat satellite that will be ready for flight when an opportunity is provided. The CubeSat satellite is to be designed for space flight with a 6 month lifetime. However for Phase A, a prototype test unit will be flown in a balloon environment with parts applicable for a balloon flight. 7 students from 2 universities are taking part in this project

Undergraduate Academy: The workshops, sponsored by FSGC, Lockheed Martin, and Space Florida provide the building blocks necessary to advance education goals, as well as assist students entering the space / science workplace. Students are engaged in stimulating science and math activities as well as offer exciting opportunities to meet key employers and scientists from the Kennedy Space Center and Cape Canaveral Air Force Station (CCAFS) workforce. A challenging, workshop itinerary provides the students with real-world science and engineering projects. Under the supervision of Dr. Larry Chew (FSGC) and Mr. Bob Eppig (FSGC) they develop problem solving skills –a necessary function for cutting-edge technology and development. 48 students from 9 universities and 1 community college took part in three 5-day workshops. In addition FSGC and Space Florida hosted 13 students from Claflin University in South Carolina for a three day Academy.

UNESCOSAT

Students from UCF and FIT are developing 2 remote sensing payloads, under the United Nations Satellite Program. These payloads will be launched on a Russian satellite in December of 2011. The UNESCO satellite (including launch vehicle) is being sponsored by Russia to commemorate the 50th anniversary of Yuri Gagarin becoming the first person to travel into space. At this time, there are 2 students from the Florida Institute of Technology (FIT) and 3 students from the University of Central Florida (UCF) involved in this program. Weekly meetings have been initiated to facilitate communication and monitor work assignments. The Florida Space Institute (FSI), a consortium of a series of Florida colleges and universities, is developing an imaging payload that will collect five photographic images of the Earth (unfiltered, blue-, green-, red-, and near infrared-

filtered) and then downlink the data to a requesting ground station. The data will be analyzed as part of a Geographical Information System (GIS) for land-cover classification, both spatially and temporally. Over time, trends will show changes in land use, and agricultural yields. Two separate microbial payloads are being developed by students at the Florida Institute of Technology. One has a goal of examining the effects of Shewanella MR- 1 in a microgravity environment to determine if they could be used on future long term space missions. The second experiment will study the viability of extremophile bacteria in the microgravity and radiation environment of space.

Squids In Space

UF researcher, Dr. Jamie Foster along with students from the University of Florida and Merritt Island High School are assessing the impact of microgravity on beneficial bacteria associated with the normal development of animal tissues. The experiment will be flown to the International Space Station on the shuttle flight STS-134. The objective is to examine the impact of microgravity on the normal developmental time line between the symbiotic bacterium *Vibrio fischeri* and the host squid *Euprymna scolopes* and the goal is to see whether by removing gravity as a constant, we can determine whether there are new insights into animal-bacterial interactions that might otherwise be obscured. At present, 2 women, one from Merritt Island High School, FL and one from the University of Florida are participating in the project. This project will also involves high school students from the Milton Academy in Boston, MA. Students from these institutions assist in the development and analysis of the microgravity experiments.

SMART Objective – On an annual basis, involve at least 100 students, representing a minimum of five Florida-based higher education institutions, including at least one minority serving institution, in collaborative space-based interactive learning experiences. *200 students from 10 universities, including 1 HBCU and 1 Hispanic serving institution, and 2 community colleges are participating in Higher Education Projects*

Research Infrastructure

Florida Space Research Program: In 2010, FSGC has funded 13 space research and education grants under the Florida Space Research Program (FSRP) totaling of $679K (including matching of $469K) in funding to selected recipients. The FSRP combines both Federal and State funds for projects that diversify Florida's space industry and research efforts, while also supporting aerospace workforce development statewide. The program is comprised of three categories – The Space Education & Training Program, Space Exploration & Spaceport Technical Development, and Space-Based Research and Payload Development. The State of Florida and Space Florida have been significant contributors to the Florida Space Research Program for five years. The FSRP 2010 awardees include eight Florida universities: the University of Florida, University of Central Florida, Florida Institute of Technology, Embry Riddle Aeronautical University, Florida Gulf Coast University, University of Miami, University of South Florida and two additional Florida educational entities – The Astronaut Memorial Foundation's and 4 Frontiers. A total of 45 proposals were received. Each submission was independently evaluated by a team of experienced professionals from Kennedy Space Center, other NASA centers and Grant Consortia located throughout the U.S. In 2010 16 students were

directly funded through 13 research grants. **3 students were under-represented minorities.**

At the time of writing this report, Space Florida will be providing another $125K for research awards. There was a delay in announcing the extra funds for the research program because the Florida Governor had not selected a full Board of Director's for Space Florida. With this extra funds, we will support 5 more projects from 5 universities (UF, UCF, UM, ERAU, USF). The matching will be $173K

ASTREC: FSGC is an industry advisory board member for Advanced Space Technologies Research & Engineering Center (ASREC). ASTREC is an Industry/University Cooperative Research Center (I/UCRC) sponsored by the National Science Foundation program to develop a long-term partnership between academia, industry, and government. ASTREC is a university consortium comprised of the lead university, University of Florida (FSGC Affiliate) and the site university, North Carolina State University (NC Space Grant affiliate). The mission of the ASTREC is to advance, develop and promote research into the principles and technology of responsive, cost efficient satellite systems through research, development, education, and technology exchange among academic, industry, and government entities. Along with FSGC the other members of the ASTREC Industry Board are Space Florida, Harris Corporation, Lockheed Martin, CISCO, NASA-LaRC, Institute for Human and Machine Cognition (IHMC), National Reconnaissance Office, Air Force Research Laboratory, Space and Missile Defense Command, and the Advanced Vehicle Research Center.

Puerto Rico Cubesat Project: The goal of the project is to demonstrate the deployable boom in space flight as one of the subsystems on a small satellite being developed in a multi-university/multi-country collaboration led by Interamerican University at Bayamon, Puerto Rico. The anticipated launch date for the Puerto Rico small satellite is March 2013. The proposed research will be on the modeling, characterization and experimental validation of deployable boom dynamics for small satellite form-factors. The motivation of this research is the need for deployable structures/mechanisms that enable greater functionality of small satellites through provision of dynamically-controlled deployment of small satellite payloads. To address this need, a collaborative team of researchers from the University of Florida, KTH Royal Institute of Technology and AFRL/RVSV has been formed. 4 students are participating in this project, 3 are under-represented minorities and 2 females

SMART Objective – On an annual basis, at least 12 research projects will be competitively awarded. At least three of these research project awards will be awarded to a minority serving institution and/or include minority participation. At least 12 undergraduate or graduate students will be supported by the projects, including at least 5 women and 4 under-represented minorities.
We have supported 14 research projects involving 20 students, including 6 under-represented minorities and 6 women.

Outcome 2 (Educate and Engage)

Pre-college programs

STS-125 Teacher workshops: STS-125: The Hubble Telescope Restored program is a space and technology education program designed for Florida's K-12 teachers and conducted in partnership with the Astronauts Memorial Foundation (AMF), NASA KSC, and the Lowry Park Zoo. 21 educators representing 9 Florida School districts participated in the 3-day professional development program with an emphasis on aerospace and digital technologies based on the STS-125 shuttle mission. We did receive evaluations from the educators and the evaluations were very positive.

Reach for the Stars Rocket Competition: In Memory of Kenneth and Mildred Gammons, Founders of the Gammons Charitable Foundation, "the Today's Astronauts program helps school children find their way to becoming tomorrow's doctors, lawyers, teachers and of course astronauts". The Gammons Foundation and the Helping Kids Reach for the Stars Rocketry Program have joined together through the Florida Space Grant Consortium to bring rocketry to schools and kids in need. 108 students from 9 schools in Florida participated in this program. 11 teachers were also involved in the project.

Digital Space Workshop: The Astronauts Memorial Foundation (AMF) will provide professional development training for 20 teachers from the Miami Dade County Area. This will include filming, editing, preparing and distributing film clips of participants conducting various science experiments as lead by NASA Education. These film clips will be used as a basis for a completed video project developed by each teacher. AMF will provide direct training in an introductory session held at the Kennedy Space Center. This will also include providing a prominent guest speaker; Astronaut Bob Springer or Astronaut Mike McCulley. The major training components will take place in the Miami area and will be completed in a 2-day training session. AMF will develop and teach the curriculum, travel to the teaching site and set-up all equipment, provide a comprehensive manual to each participant, provide video cameras, microphones and all needed computer equipment for participants use. Participants will design, create, edit and complete a digital video project using video obtained during this program. One full-day will be spent learning how to manipulate the video software (Adobe Premiere Elements 9).Collaborative learning, hands-on activities, and lecture are combined to provide participants a well-rounded project based program. Filming, editing, titles, transitions, making music clips, and adding narration will all be covered in day one. In the second day of training, participants will be guided in actually creating their own digital video movie.AMF instructors will also film, edit, design and create a sample training video and make this video available via YouTube.

SMART Objective – On an annual basis, conduct and/or facilitate space-related pre-service and in-service teacher training opportunities focused on space-related math and/or science curricula. A minimum of 50 Florida teachers per year will attend this training. *We will be supporting 52 teachers, after the completion of the final workshop in June.*

Outcome 3 (Engage and Inspire)

Starshine at East Gainesville: As part of an ongoing effort to reach out to the community, the University of Florida MAS Outreach Initiative in the Department of Astronomy hosted "Stars Shine on East Gainesville," a celebration of art, science and culture, at 6:30 p.m. Friday at the Martin Luther King Center, in Gainesville, FL. Participants will be able to view the night sky with telescopes, participate in art projects and learn about the ASTREC small satellite project. Sponsors for the event were the National Science Foundation through a grant to Stephen Eikenberry and Reba Bandyopadhyay in the department of astronomy; NASA Florida Space Grant Consortium; University of Florida Music and Arts for Science; ASTREC; Gainesville Gaviatas; UF School of Music; College of Fine Arts; and Cotton Club. About 350 students and their parents attended the event

SSEP: The Student Spaceflight Experiments Program (SSEP), launched June 2010 by the National Center for Earth and Space Science Education in partnership with NanoRacks, LLC, is a remarkable U.S. national Science, Technology, Engineering, and Mathematics (STEM) education initiative that gives up to 3,200 middle and high school students (grades 5-12) across an entire school district the ability to design and propose real experiments to fly in low Earth orbit, first aboard the final flights of the Space Shuttle, and then on the International Space Station. FSGC is supporting grade 8 students from Crystal Lake Middle School in Broward county. The students from the school submitted 3 proposals for consideration. The selection committee selected the project Apples in Space. The selected team consists of 3 students and one teacher. For the experiment, the students are going to allow two apple seeds to germinate, one on the shuttle and one on earth in controlled conditions. After the germination process and both seeds are back on earth, they will be planted. They will be grown in the exact same conditions with the same water intake and sunlight. Their growth will be closely recorded and compared. After they have grown a reasonable amount of time, their height will be compared, as well as their pH levels.

Newspaper in Education: Girl Scouts of West Central Florida has partnered with the St. Petersburg Times Newspaper in Education program and The Saunders Foundation Inc. to bring fun activities and important resources surrounding science, technology, engineering and math (STEM). It is estimated that 5 million people work directly in science, engineering and technology – more than 4 percent of the work force according to the National Science Board. This relatively small group of workers is considered to be critical to economic innovation and productivity, and early interest in STEM subjects in school is critical to long-term career planning by students in these areas. By 2018, STEM jobs will grow 34 percent according to the U.S. Department of Labor, but the number of qualified U.S. STEM candidates during this time is projected to increase by only 14 percent. The goals in bringing students, teachers and parents this educational resource are to:

- help bridge that gap in local schools by increasing awareness around the importance of early interest in STEM school subjects and careers and providing sample STEM activities for the classroom and at home
- offer opportunities and resources for further involvement, and

- highlight female role models who are paving the way in STEM careers for girls today.

NASA FSGC has supported this cause by sponsoring the newspaper supplement along with the Saunders foundation and the St. Petersburg Times Newspaper in Education program. This supplement reached over 25,000 readers in the St. Petersburg area. One of the STEM career models for young girls highlighted in the newspaper insert was Laura Seward, a FSGC supported graduate student from the University of Central Florida

USA Science and Engineering Fair: The Department of Astronomy at the University of Florida collaborated with the UF College of Engineering (CoE) to host a booth at the USA Science and Engineering Festival on October 23 and 24, 2010 in Washington, DC. The primary purpose of the booth was to highlight the Astronomy and Engineering programs at UF with particular emphasis on how the two are collaborating. One feature of all of the USASEF booths was the hands-on nature of many of the activities offered to the attendees. The Astronomy/Engineering booth provided the public with the opportunity to build Galileoscopes; these are small telescopes modeled after the one Galileo used. They served to demonstrate a range of physical principles that are important in the design of optical systems. Festival attendees who build one of the Galileoscopes were be given the option of taking it home to use for astronomical observations. About 5000 people stopped by the UF booth, which was partly sponsored by FSGC

SMART Objective – On an annual basis, collaborate with Florida museums and/or science centers to facilitate/conduct engaging space-related learning events held in public venues. A minimum of two events per year will be held. At least 200 members of the public will attend one or more of these events per year.
About 800 participants attended 3 informal science events
NASA 2010 Education Priorities:

- Authentic, hands-on student experiences in science and engineering disciplines – the incorporation of active participation by students in hands-on learning or practice with experiences rooted in NASA-related, STEM-focused questions and issues; the incorporation of real-life problem-solving and needs as the context for activities. *FSGC has 3 major hands-on student experiences in STEM. We start with the Academy program where freshman and sophomores from various universities and disciplines (science and engineering) get a chance to assemble payloads that are launched in weather balloons. The second is the Hybrid Rocket Competition where students design and build a hybrid rocket which is then launched in April. Finally, for juniors and seniors, FSGC manages the Florida Satellite program where students design and built a cubesat. In addition, FSGC supports a number of senior design projects that are relevant to NASA and also supports teams that participate in NASA competitions such as the Moonbuggy, USLI, and reduced gravity flights.*
- Engage middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. Capabilities for teachers to provide authentic, hands-on middle school student experiences in science and engineering disciplines (see above). *FSGC is engaging middle school teachers from South Florida in a workshop at the Kennedy Space Center*

Exploration Station conducted by educators from the Educators Resource Center. The workshop will also be followed up with additional training in Miami

- Community Colleges – develop new relationships as well as sustain and strengthen existing institutional relationships with community colleges. *In Florida, most of the community colleges are now 4-year colleges. FSGC works closely with Brevard Community College and Tallahassee Community College with their students participating in our internship programs and student hardware projects. 3 other community colleges that we worked with, namely Broward Community College, Santa Fe Community college, and Miami Dade Community College have all become 4 year colleges. We have maintained strong relationship with these 3 colleges. We are working with Broward College on student hardware experiments. Students from Miami Dade College will be visiting FSGC and Kennedy Space Center to get a feel of NASA KSC engineering projects. Students from Santa Fe College are participating in our Academy Program and FSGC will be working with Santa Fe College this summer on an Informal Science project*
- Diversity of institutions, faculty, and student participants. *FSGC has been successful in involving students and faculty from all its university affiliates*.
- Enhance the capacity of institutions to support innovative research infrastructure activities to enable early career faculty to focus their research toward NASA priorities. *Through the Florida Space Research Program, jointly sponsored by FSGC and Space Florida, we have awarded 14 faculty seed funding for research focused on NASA priorities.*

PROGRAM CONTRIBUTIONS TO PART MEASURES

- **Longitudinal Tracking:**
  Student Data and Longitudinal Tracking: Total awards = 74; Fellowship/Scholarship = 51, Higher Education/Research Infrastructure = 23; 58% of the total award represent underrepresented minority F/S funding. During the FY10 program year 2 are pursuing advanced degrees in STEM disciplines, 2 accepted positions at NASA, 7 accepted STEM positions in industry, and 1 went on to a position in a non-STEM discipline.

  For all students that were significantly supported in the period spanning FY06-FY10, 19 are pursuing advanced degrees in STEM disciplines, 5 accepted STEM positions at NASA contractors, 4 accepted positions at NASA, 15 accepted STEM positions in industry, 1 accepted a STEM position in academia, and 4 went on to positions in non-STEM disciplines. The remaining students have not yet received the degree that they were pursuing while they received their Space Grant award

- **Course Development:**N/A

- **Matching Funds:** (Total: $680.5K): Required Matching is $610K. Matching Ratio is 1.15
  - Lead Institution: $75K

- Affiliates:$566K
- State Government: $1.5K
- Industry: $15K
- Other: $23K

- **Minority-Serving Institutions:**
  Florida has 3 minority-serving institutions, Bethune Cookman University, Florida A&M University(FAMU) and Florida International University (FIU). FSGC has made direct contacts with faculty from Bethune Cookman University. As a result we were able to support 20 students from Bethune Cookman with scholarships that supplemented their presidential scholarships. FSGC also supported couple of senior design projects at Bethune Cookman University. FSGC has also been working closely with Dr. Morrison Obeng from the Bethune Cookman University Computer Science department for submission of proposals to NASA under the MUREP program. Students from FIU participate in our Academy and we also supported a student from FIU to Langley for an internship. Senior design teams from FIU are also being supported by FSGC. We are supporting an intern from FAMU for an internship at Langley but have not counted him in this report as the internship will begin in June. FAMU will host the Fall 2011 meeting of the FSGC Advisory Board.

IMPROVEMENTS MADE IN THE PAST YEAR

We have definitely improved on our awards to undergraduate students who are under-represented minorities. This was due to active interactions with faculty at Bethune Cookman university (HBCU university). This is the first time that we have been able to support a substantial number of students from this university. We now have great participation from 2 of the HBCU's in Florida, Florida International University and Bethune Cookman University. We are now trying to improve the participation from students in the other HBCU, Florida A&M University. We do support a few students from that university but it is very limited. We are also involved with a small research oriented industry (4 Frontiers). Students from a couple of universities are involved in designing a sounding rocket for that company. The FSGC Director is joining the Central Florida STEM Council to be involved in strategic planning for K-12 education statewide. FSGC is also actively engaging school teachers from South Florida through a workshop that will be conducted in June.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Listed below are all of FSGC's affiliates. FSGC awards are all competitive and awards are given to the respective PI's in their institution. The affiliate institution is responsible for sending final reports and all other relevant documentation to the FSGC offices.

Bethune-Cookman University (4-year college awarding exclusively baccalaureate degrees): Bethune-Cookman University is a historically Black, United Methodist Church-related college offering baccalaureate degrees.

Embry-Riddle Aeronautical University (University awarding baccalaureate and master's degrees): Embry-Riddle Aeronautical University, a private university, teaches the science, practice, and business of the world of aviation and aerospace.

Eckerd College (4-year college awarding exclusively baccalaureate degrees): Eckerd College is a private, coeducational college of liberal arts and sciences. Eckerd College is one of only 40 schools listed in Loren Pope's Colleges That Change Lives. In 2003, Eckerd was named one of 13 Institutions of Excellence in the First College Year by the Policy Center on the First Year of College. Eckerd College is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award the Bachelor of Arts and Bachelor of Science degrees.

Florida Atlantic University (University awarding degrees up through the Ph.D): Florida Atlantic University is the first public university in southeast Florida and the first in America designed for upper division students only. FAU is earning a reputation as a top research institution in areas ranging from biomedicine and biotechnology to ocean engineering and coastline security.

Brevard Community College (Community/Junior College awarding associate degrees): Situated on Florida's Space Coast, BCC has four integrated campuses – in Cocoa, Melbourne, Palm Bay and Titusville – an aerospace program at the Kennedy Space Center and a Virtual campus. An accredited institution, BCC is recognized as one of America's leading community colleges for quality in instruction, organization, and its innovative and leading-edge programs. It was one of the first community colleges in the country to offer the AA degree online.

Florida Gulf Coast University (4-year college awarding baccalaureate and graduate degrees): FGCU, a member of the State University System of Florida, is a comprehensive university created to address the educational needs of the rapidly growing Southwest Florida population. Florida Gulf Coast University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award associate, baccalaureate, master's, and doctoral degrees. In addition, the university is actively seeking accreditation for the undergraduate engineering programs in the U.A. Whitaker School of Engineering, its Bachelor of Science in Social Work, its Bachelor of Science in Resort and Hospitality Management, and its Bachelor of Science in Clinical Laboratory Science.

Florida Institute of Technology (University awarding degrees up through the Ph.D): Florida Institute of Technology is an independent technological university that provides quality education, furthers knowledge through basic and applied research, and serves the diverse needs of our local, state, national and international constituencies. FIT is the only independent, technological university in the Southeast, A Barron's Guide "Best Buy" in College Education, listed among America's best colleges in U.S. News & World Report and named one of the nation's top 13 technological institutions in the Fiske Guide to Colleges.

Florida International University (University awarding baccalaureate and master's degrees, Hispanic Serving Institute): Florida International University is Miami-Dade County's first public, four-year university. FIU is ranked first in the nation among four-year colleges for awarding bachelor's and master's degrees to Hispanic students in the 2008 survey conducted by the Hispanic Outlook in Higher Education Magazine. FIU is the youngest university to have been awarded a chapter of Phi Beta Kappa, the nation's oldest and most distinguished academic honor society.

Florida State University (University awarding degrees up through the Ph.D): Florida State University's 16 colleges offer more than 300 undergraduate, graduate, doctoral, professional and specialist degree programs, including medicine and law, covering a vast array of disciplines critical to society today. FSU is a comprehensive, residential and coeducational institution of over 33,000 students located in Tallahassee, Florida.

Florida A&M University (University awarding degrees up through the Ph.D.; Historically Black College or University). Florida A&M University offers 108 undergraduate degrees in 64 undergraduate programs and 60 graduate degrees in 32 graduate programs (includes 1 professional and 7 doctoral degrees) within its 12 Schools and Colleges.The doctor of philosophy is offered in the College of Pharmacy and Pharmaceutical Sciences, College of Education and FAMU/FSU College of Engineering.

University of Central Florida – Lead University: (University awarding degrees up through the Ph.D). UCF has 12 colleges, including the newly established College of Medicine, and College of Graduate Studies. More than 50,000 students attend classes on UCF's main campus and its 11 regional campuses located throughout Central Florida. UCF offers 223 degree programs, it has become an academic and research leader in numerous fields, such as optics, modeling and simulation, engineering and computer science, business administration, education, science, hospitality management and digital media

University of Florida: (University awarding degrees up through the Ph.D): The University of Florida is a major, public, comprehensive, land-grant, research university. The state's oldest, largest and most comprehensive university, Florida is among the nation's most academically diverse public universities. With more than 51,000 students, Florida is now one of the five largest universities in the nation. It is one of only 17 public, land-grant universities that belongs to the Association of American Universities.

University of Miami (University awarding degrees up through the Ph.D): The University of Miami is the largest, most comprehensive private research university in the southeastern United States with a well-earned reputation for academic excellence. Nearly 15,000 undergraduate and graduate students from every state and more than 140 nations around the world call UM home during the academic semester. With more than 9,400 full- and part-time faculty and staff, UM is the second largest private employer in Miami-Dade County. The University's 12 colleges and schools, along with the Division of Continuing and International Education, offer 114 bachelor's, 104 master's, 57 doctoral and four professional areas of study.

University of North Florida: (University awarding baccalaureate and master's degrees): The University of North Florida is a comprehensive public urban university whose mission is to educate students through a broad array of undergraduate and select graduate programs. UNF

cultivates a learning environment that supports intellectual curiosity, academic achievement, and personal growth. This goal is supported by a strong academic curriculum comprised of 56 undergraduate, 27 masters, and 3 doctoral degree programs in the liberal arts and professional fields.

University of South Florida: (University awarding degrees up through the Ph.D): The University of South Florida is the second largest university in the southeast and among the top 20 largest in the nation. It is one of the nation's top 63 public research universities and one of 39 community engaged public universities as designated by the Carnegie Foundation for the Advancement of Teaching. The University offers 219 degree programs at the undergraduate, graduate, specialist and doctoral levels, including the doctor of medicine.

University of West Florida: (University awarding baccalaureate and master's degrees): UWF is a member of the State University System of Florida. The university offers undergraduate degrees in 50 different areas with 107 specializations, master's degrees in 24 different areas with 56 specializations, two specialist degrees and a doctorate in education with seven specializations. Long celebrated for its caring, nurturing approach to helping

Astronauts Memorial Foundation (Private 501(c)(3) not-for-profit organization): The Astronauts Memorial Foundation honors and memorializes those astronauts who have sacrificed their lives for the nation and the space program by sponsoring the national Space Mirror Memorial, and by implementing innovative educational technology programs. AMF is a private, not-for-profit organization approved by NASA to build and maintain two major facilities at the John F. Kennedy Space Center's Visitor Complex.

Kennedy Space Center (Federal Center): KSC is the NASA center of excellence for launch and payload processing systems as well as the lead center for acquisition and management of expendable launch vehicle services and payload carriers. Located at the Cape Canaveral Spaceport in Florida, KSC handles the checkout, launch and landing of the Space Shuttle and its payloads.

Orlando Science Center (Science Museum): Orlando Science Center offers hands-on fun for all ages through engaging interactive exhibits, live programming, giant-screen films, school field trips and school-break camps. The science Center conducts the Informal Science program of FSGC

Space Florida (State/Local Government): Space Florida is the public-private partnership responsible for promoting and developing Florida’s aerospace industry. Space Florida was created by the Florida Legislature to sustain Florida’s position as the global space leader. As declared in its mission statement, Space Florida drives State economic development across the global aerospace enterprise. Space Florida provides 4125K for the FSGC research program and along with FSGC sponsors the undergraduate Academy program