

South Carolina Space Grant Consortium  
College of Charleston  
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<http://scspacegrant.cofc.edu/>  
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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 South Carolina Space Grant Consortium (SCSGC) is a Capability Enhancement Consortium funded at a level of \$430,000 for fiscal year 2011.

## **PROGRAM GOALS**

\*All goals and objectives for the individual programs are within our strategic plan, created 4/08, and submitted with our budget package.

### **Vision**

The vision of the South Carolina Space Grant Consortium (hereafter SC Consortium) is to expand opportunities for all South Carolinians through education, research, and public service in NASA-related science, technology, engineering and math (STEM) disciplines.

### **Mission**

The SC Consortium exists to implement the National Space Grant Act of 1988 in South Carolina. Within the larger context of national science and technology initiatives, we promote activity in research, education, and public service related to the NASA mission.

### **Values**

The SC Consortium is committed to helping students and faculty excel in NASA STEM-related research and to promoting and expanding STEM education and outreach projects across the state of South Carolina. We specifically seek to include underrepresented groups in all of the programs and activities supported by the SC Consortium.

### **Consortium Goals**

Six goals provide the nexus of our SC Consortium mission statement. Each of our research, education, and public outreach programs fulfill one or more of the goals listed below.

- GOAL 1.** To increase access, understanding, development, and utilization of resources in four primary areas: Space Science, Earth System Science, Biological Sciences and Aeronautics.
- GOAL 2.** To encourage cooperative programs among colleges and universities, state organizations, business and industry, and pre-college interests.
- GOAL 3.** To enhance interdisciplinary research, education and public service activities.
- GOAL 4.** To recruit and train students, educators, and professionals, especially women and underrepresented groups.
- GOAL 5.** To promote a strong science, mathematics, engineering and technology base throughout all levels of South Carolina education.
- GOAL 6.** To facilitate statewide communication of NASA opportunities and programs.

To address each of these goals, the SC Consortium provides specific, measurable, attainable, realistic, and timely (SMART) objectives with key indicators of success.

### **I. Consortium Management**

**SC GOAL 6 & 2:** To facilitate statewide communication of NASA opportunities and programs; To encourage cooperative programs among colleges and universities, state organizations, business and industry, and pre-college interests.

**Objective I.1:** (Reporting) The Management Team will provide timely reporting and responses to NASA Headquarters regarding Consortium operations and finances.

*Outcome Indicator: All reports will be submitted on time and in accordance with NASA guidelines.*

**Objective I.2:** (National Network) The Management Team will work to strengthen relationships with NASA Centers, the national Space Grant network, and the state's NASA EPSCoR Program.

*Outcome Indicators: Each year at least three students will participate in an internship program at a NASA Center and all faculty research projects are required to have a strong relationship with NASA scientists at one of the NASA Centers. The SCSGC Director and/or Program Manager will be present at biannual national Space Grant meetings. The SCSGC Director and Program Manager also serve as the Director and Program Manager for the SC NASA EPSCoR Program.*

**Objective I.3:** (Consortium Network) The Management Team will faithfully represent the diverse interest and resources of the Consortium member institutions and affiliates.

*Outcome Indicators: The roles and responsibilities of Consortium Management, member institutions, and all categories of affiliate organizations were established with the inception of the SCSGC and were updated in 2004 and then again in 2006. Relevant electronic communication sent to all member institutions, affiliates, and interested parties, as appropriate.*

**Objective I.4:** (State government) The Management Team will ensure that Consortium programs are aligned with state and federal priorities.

*Outcome Indicators: Members of the Management Team provide annual reports to representatives of state and federal government on Consortium activities.*

**Objective I.5:** (State industry) The Management Team will foster interaction between the Consortium and state industries involved in aerospace and related technologies.

*Outcome indicator: Facilitate at least one student or faculty project with an*

*industry partner in South Carolina.*

**Objective I.6:** (Link to public) The Management Team will seek to maintain and improve the effectiveness of the Consortium as the link between the public and NASA in the state.

*Outcome indicator: Consortium website was completely redesigned in 2005 and is updated on a weekly basis to reflect new opportunities within NASA.*

**Objective I.7:** (Increase resources) The Management Team will pursue opportunities to increase the resources available to the Consortium, to broaden participation within the state, to collaborate with other state Consortia in areas of mutual interest and capability, and to assure long-term sustainability.

*Outcome indicator: Serve as a clearinghouse for information on funding opportunities from NASA and other agencies that support STEM-related research and education, especially in areas of aerospace and earth and space science. At least 50 targeted announcements of opportunity will be disseminated through electronic communication and website each year. Coordinate submission of proposals to NASA and other agencies on projects in STEM research and education. Encourage collaborative proposals each year to NASA or other agencies.*

**Objective I.8:** (Diversity) The Management Team will ensure diversity in all Consortium programs and activities by seeking to include women, underrepresented minorities, and persons with disabilities.

*Outcome indicator: Diversity will be modeled in all aspects of the Consortium and participation by underrepresented groups will increase. NASA content or other STEM educational opportunities are expanded at these underrepresented institutions.*

**Objective I.9:** (Evaluation) The Management Team will continually monitor and seek to improve the quality and effectiveness of the state program.

*Outcome indicator: In consultation with the Campus Directors, the Management Team will continue to determine appropriate data collection and evaluation procedures that are consistent with available resources. The Consortium website was redesigned in 2005 so that evaluation data could be collected through online surveys and compiled for analysis by the Management Team.*

## **II. Fellowship/Scholarship Program**

**SC Goal 4:** To recruit and train students, educators, and professionals, especially women and underrepresented groups.

**Objective II.1:** (Competitiveness) Ensure the fair distribution of funds to member universities and educational affiliates.

*Outcome indicator: Annual Call for Fellowship/Scholarship applications at all higher education members and affiliates, competitive review, and selection of awardees. Awards reflect the diversity of the Consortium's membership and statewide balance.*

**Objective II.2:** (NASA Center ties) Offer hands-on, tangible research experiences to student research fellowship awardees at NASA Centers.

***Outcome indicators:** SCSGC will note an increase of SC students involved with NASA Center Internships. 100% will make a presentation at the SC Academy meeting or at a national meeting. 100% will provide feedback to their Campus Director and make campus presentations.*

**Objective II.3:** (Industry ties) Offer hands-on, tangible research experiences to student research fellowship awardees at aerospace and related science and technology industries.

***Outcome indicator:** At least one student will receive supplemental funding through SCSGC each year.*

**Objective II.4:** (Mentoring and professional development) Provide mentoring and professional development experiences to student researchers, which will develop skills that contribute to the future workforce.

***Outcome indicator:** 100% of awardees graduate from college, 100% make a presentation at the SC Academy of Science or at a National meeting within a year of receiving the award, 80% produce a paper or abstract with their mentors within a year of receiving the award, and 50% continue on to graduate school and pursue a NASA-related discipline.*

**Objective II.5:** (Diversity) Ensure funding for fellowships and scholarships to women, underrepresented minorities, and persons with disabilities by utilizing intensive marketing techniques (personal visits, direct faculty contacts, email) to encourage women and minority students to apply for funding.

***Outcome indicator:** Awards to women and minorities equal or exceed previous year applicants. At least 15 student awards awarded annually within underrepresented groups.*

**Objective II.6:** (Longitudinal tracking) All students who have received significant fellowship or scholarship assistance from SCSGC will be longitudinally tracked through first employment or beginning of advanced degrees.

***Outcome indicator:** Continue arrangements with National Space Grant Foundation to include SCSGC in the longitudinal tracking system so that students funded can continue to be tracked in subsequent years at least through first-employment.*

**Objective II.7:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the fellowship and scholarship programs in conjunction with its implementation of an overall evaluation strategy (see 1.9).

***Outcome indicator:** Adjustments are made to the fellowship and scholarship program to strengthen activities that are working and drop or improve activities that are not having the intended impact.*

### **III. Research Infrastructure**

**SC Goal 3:** To enhance interdisciplinary research, education and public service activities; to encourage cooperative programs among colleges and universities, state organizations, business and industry, and pre-college interests

**Objective III.1:** (Research proposals) Increase the number of research proposals submitted by SCSGC institutions in fields aligned with NASA's mission.

***Outcome indicator:** At least eight research awards are distributed among appropriate SCSGC institutions each year. 100% of the REAP recipients submit proposals to NASA or another federal agency within two years. 50% of the REAP*

*recipients submit new proposals which are funded within two years. 100% of the REAP recipients give presentations and submit papers within a year after the end of the grant. 80% of the presentations and papers include students*

**Objective III.2:** (Research support) Support new and developing research, especially multidisciplinary and collaborative projects, in fields aligned with NASA's mission.

*Outcome indicator: 50% submit proposals for a REAP Research Grant or similar program. 100% of the REAP recipients develop presentations and papers within two years. 80% of the presentations and papers include students.*

**Objective III.3:** (Collaborations) Build research collaborations both within and outside the state.

*Outcome indicator: At least one planning trip to a NASA Center supported each year from SCSGC. Submission of REAP Research Grant proposal within two years of the award.*

**Objective III.4:** (Diversity) Increase the participation of women and underrepresented groups in statewide research programs and facilitate their subsequent entry into STEM careers.

*Outcome indicator: SCSGC will sponsor activities that encourage women and students from underrepresented groups to enter STEM careers.*

**Objective III.5:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the research infrastructure programs in conjunction with its implementation of an overall evaluation strategy (see 1.9).

*Outcome indicator: Adjustments are made to the research infrastructure program to strengthen activities that are working and drop or improve activities that are not having the intended impact.*

#### **IV. Higher Education**

**SC Goal 1:** To increase access, understanding, development, and utilization of resources in four areas: space science, Earth system science, biological sciences and aeronautics; to enhance interdisciplinary research, education and public service activities.

**Objective IV.1:** (Curriculum and NASA content) Contribute aerospace and space and earth science materials to the higher education community in South Carolina.

*Outcome indicator: Distribute announcements of opportunities for education and curriculum enhancement in NASA-related fields to faculty at member institutions.*

**Objective IV.2:** (Student Research) Provide opportunities where students gain hands-on knowledge of scientific methods and processes, gain understanding of the importance of teamwork, experience the exhilarating feeling of discovery, spark an interest in continuing NASA-relevant research in graduate school, and enter the STEM workforce by working on NASA-related endeavors.

*Outcome indicator: 100% of the participants are exposed to current NASA research and 100% make presentations about their research experience.*

**Objective IV.3:** (Industry involvement) Establish and maintain linkages between SCSGC and higher education and industry in South Carolina by encouraging educational partnerships between the state's academic institutions and private industry.

*Outcome indicator: At least two collaborative proposals will be funded, promoting partnerships between industry and academic affiliates.*

**Objective IV.4:** (Diversity) Increase the participation of women and underrepresented

groups in all aspects of SCSGC's higher education program.

*Outcome indicator: SCSGC will sponsor activities that encourage women and students from underrepresented groups to enter STEM careers.*

**Objective IV.5:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the higher education programs in conjunction with its implementation of an overall evaluation strategy (see 1.9).

*Outcome indicator: Adjustments are made to the higher education program to strengthen activities that are working and drop or improve activities that are not having the intended impact.*

## **V. K-12 (Precollege) Education/Public Service**

**SC Goal 5:** To promote a strong science, mathematics and technology base throughout all levels of South Carolina education

**Objective V.1:** (NASA dissemination) Contribute aerospace and space and earth science materials to the formal and informal education communities in South Carolina.

*Outcome indicator: Distribute announcements of opportunities for education and curriculum enhancement in NASA-related fields to formal and informal educators across the state; Maintain and update the SCSGC website to provide opportunities and information to formal and informal education groups as well as the general public*

**Objective V.2:** (Pre-service Educators) To increase the number of quality educators pursuing STEM education degrees.

*Outcome indicator: Pre-Service awardees will be tracked to see how many complete their degree programs and become science and math teachers in SC. At least two awardees will pursue a career teaching STEM fields. SCSGC will also inquire about their using NASA educational materials in their classrooms.*

**Objective V.3:** (Science and education events) The SCSGC will support activities of scientific discovery across the state and will support NASA's commitment to renewing a spirit of exploration and discovery and will use the excitement of space exploration to promote this policy to the general public.

*Outcome indicator: SCSGC staff will develop and host opportunities to promote NASA throughout the state of South Carolina. In 2008, the SCSGC will host several statewide events to celebrate NASA's 50<sup>th</sup> anniversary and will host a few talks promoting the launch of the international collaborative adventure, Moon Mineralogy Mapper.*

**Objective V.4:** (Diversity) Increase the participation of women and underrepresented groups in all aspects of SCSGC's pre-college/general public program.

*Outcome indicator: SCSGC will sponsor activities that encourage women and students from underrepresented groups to enter STEM careers.*

**Objective V.5:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the pre-college/public service programs in conjunction with its implementation of an overall evaluation strategy (see 1.9).

*Outcome indicator: Adjustments are made to the pre-college/public service program to strengthen activities that are working and drop or improve activities that are not having the intended impact.*

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

All of our year 19 (2011-12) projects are still on-going except for our Palmetto Research Academy, Ballooning programs, and NASA Summer 2011 Internships. The Palmetto Research Academy funding from Year 19 will be utilized in the Year 20 cycle due to timing of the acquisition of funds. We have several anecdotes related to projects completed and reported in 2011.

### Outcome 1: Employ and Educate – Contribute to the development of the STEM workforce in disciplines needed to achieve NASA’s strategic goals

David Weiss, a geology undergraduate student, took an Introductory Planetary Geology course and a NASA mission design class at the College of Charleston. He became excited about planetary science and decided to strive for the astronaut program. David was accepted for a Goddard Space Flight Center Internship through the Lunar and Planetary Science Academy in 2011 where he studied Martian basalts. David presented his research at two national conferences – American Geophysical Union and Lunar and Planetary Science Conference. As a result of his growing knowledge and experiences, David was selected for the prestigious position as a field Crew Chief at the Mars Desert Research Station in late 2011/early 2012. After graduation in 2012, David is going to an internship at the Jet Propulsion Laboratory and then on to Brown University for graduate school. He is a wonderful example of how our space Grant opportunities have helped educate and employ a future NASA scientist!

### Outcome 2: Educate and Engage – Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers and faculty.

In 2011, two pre-service teacher fellowships were awarded. The pre-service teachers applicants developed curriculum components around NASA-related themes directly benefiting Outcome 2, Objective 2.3 – Curricular Support Resources. For example, Ms. Janet Wager prepared a lesson plan so that students will understand how comets develop, where they come from, what they are made of and what their orbital patterns are. The overall goal of her project was not to just teach but to intrigue students so they become interested in space and continue to learn and explore astronomy outside classroom.

### Outcome 3: Engage and Inspire – Build strategic partnerships and linkages with STEM formal and informal education providers that promote STEM literacy and awareness of NASA’s mission.

To address more diverse audiences, the SC Consortium was involved in a unique partnership among the College of Charleston’s School of Science and Math and the School of the Arts, as the team facilitated the development of an exhibit, which showcased lunar observations and analyses. The exhibit, From the Moon: Mapping and Exploration opened in November 2011 and closed in March 2012, with visits from several thousand individuals, school groups and organizations. Patrons explored historic and rare artifacts, including a display sample from Apollo 15 and uncommon lunar meteorites. The exhibit also included early observations from Galileo to M3 and current observations from ongoing NASA lunar missions, such as GRAIL. The exhibit was paired with tactile activities, lesson plans and professional development opportunities. The lesson plans are multidisciplinary, including standards not only in science and math but also in the fine arts and history. They have also been vetted with teachers specializing in working with students with unique learning styles and/or special needs. One attendee to the

From the Moon exhibit stated that he learned more in the hour he spent in the museum than he learned in his entire lifetime. This exhibit impacted many individuals, engaging them in NASA's mission.

## PROGRAM ACCOMPLISHMENTS

All of our programs are currently in progress and are scheduled to end on June 1, 2012 with the exception of the NASA 2011 Internships. However, our entire research infrastructure and some of our higher education projects have received one-year no-cost extensions to complete their projects.

The SC Consortium annual goals and objectives by NASA Education Outcomes 1, 2 and 3:

- **Outcome 1:** *Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals:*  
Fellowship and Scholarship (F/S), Research Infrastructure (RI-our program REAP) and Higher Education

Through our student tracking program, we determined that 30 students took the next step in FY11 (SG participation supported from FY06-FY11 funds)

- 1 is pursuing an advanced degree in a STEM discipline
- 16 accepted STEM positions in industry
- 2 accepted STEM positions in academia
- 1 went on to a position in a non-STEM discipline

Fellowships and Scholarship – In year 19 (2011/12) we funded 7 graduate students, 1 Kathy Sullivan (undergraduate) award, 7 undergraduate research awards, and 3 NASA Center internships with Yr 19 main budget funds (plus an additional 3 NASA center internships with Augmentation funds). We also funded 2 Pre-Service Teacher awards (discussed below under “precollege.”)

Research Infrastructure - We funded 7 REAP faculty projects, for a total of \$99,446. All projects are currently underway and we have received interim reports on their progress. These projects involve 25 participants, ranging from post-docs to undergraduates, including 5 female student participants.

Higher Education - Due to the timing of acquisition of funds, our main HE program, Palmetto Academy, funding will be used this summer (2012) and, therefore, we do not have any data to report at this time.

- **Outcome 2:** *Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty:*  
We funded 2 pre-service teacher awards for a total of \$6,000 to graduate and undergraduate students pursuing an education undergraduate or graduate degree. In addition, the SC Consortium aided Sally Ride Science in an Educator Institute, "Visit the Moon," on October 22, 2011. Over 50 educators from across the United States, but specifically from South Carolina, participated. The SC Consortium team (Interim Director and Associate Director) hosted sessions on the Geology of the Moon, Lunar & Meteorite Certification and provided

hands-on sessions using NASA data and mission activities (e.g., M3/Chandrayaan-1, LRO/LROC/ LCROSS, GRAIL).

- **Outcome 3:** *Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission:* Our campus directors act as NASA representatives on their campuses and in their communities, providing information, regarding NASA activities to media and the general public. The SC Consortium Interim Director was instrumental in designing the "From the Moon: Mapping and Exploration" exhibit, which opened November 2011; both the Interim Director and Associate Director provided opportunities for undergraduate students to develop content in order to be docents for the exhibit. Several thousand students and members of the general public explored the moon, including Galileo's early observations, Apollo 15, NASA's current missions, and Google 's interactive Moon.

The SC Consortium annual objectives and outcomes of success are:

### **I. Consortium Management**

**SC GOAL 6 & 2:** To facilitate statewide communication of NASA opportunities and programs; To encourage cooperative programs among colleges and universities, state organizations, business and industry, and pre-college interests.

**Objective I.1:** (Reporting) The Management Team will provide timely reporting and responses to NASA Headquarters regarding Consortium operations and finances.

*Outcome Indicator: All reports will be submitted on time and in accordance with NASA guidelines.*

**Outcome** – All reports, proposals and requests were submitted early.

**Objective I.2:** (National Network) The Management Team will work to strengthen relationships with NASA Centers, the national Space Grant network, and the state's NASA EPSCoR Program.

*Outcome Indicators: Each year at least three students will participate in an internship program at a NASA Center and all faculty research projects are required to have a strong relationship with NASA scientists at one of the NASA Centers. The SCSGC Director and/or Program Manager will be present at biannual national Space Grant meetings. The SCSGC Director and Program Manager also serve as the Director and Program Manager for the SC NASA EPSCoR Program.*

**Outcome** –More than three students did participate (6 total) with over 50 applying for NASA internships. The Director attended both the Fall and Spring National Meeting. This objective was met.

**Objective I.3:** (Consortium Network) The Management Team will faithfully represent the diverse interest and resources of the Consortium member institutions and affiliates.

*Outcome Indicators: The roles and responsibilities of Consortium Management, member institutions, and all categories of affiliate organizations were established with the inception of the SCSGC and were updated in 2004, 2006, and again in 2012. Relevant electronic communication sent to all member institutions, affiliates, and interested parties, as appropriate.*

**Outcome** –This objective was met.

**Objective I.4:** (State government) The Management Team will ensure that Consortium programs are aligned with state and federal priorities.

*Outcome Indicators: Members of the Management Team provide annual reports to representatives of state and federal government on Consortium activities.*

**Outcome** – This objective was met.

**Objective I.5:** (State industry) The Management Team will foster interaction between the Consortium and state industries involved in aerospace and related technologies.

*Outcome indicator: Facilitate at least one student or faculty project with an industry partner in South Carolina.*

**Outcome** – This objective was not met. The SC Consortium has a longstanding relationship with the SC Sea Grant Consortium. Currently there is a joint scholarship with them. However, it is purely a scholarship and not a project. However with NASA's focus on climate and earth science activities, we are discussing possibilities of a joint project in the future. In addition, we have begun discussions with appropriate individuals at Boeing with the intention of developing a joint internship activity.

**Objective I.6:** (Link to public) The Management Team will seek to maintain and improve the effectiveness of the Consortium as the link between the public and NASA in the state.

*Outcome indicator: Consortium website was completely redesigned in 2005 and is updated on a weekly basis to reflect new opportunities within NASA.*

**Outcome** – This objective was met.

**Objective I.7:** (Increase resources) The Management Team will pursue opportunities to increase the resources available to the Consortium, to broaden participation within the state, to collaborate with other state Consortia in areas of mutual interest and capability, and to assure long-term sustainability.

*Outcome indicator: Serve as a clearinghouse for information on funding opportunities from NASA and other agencies that support STEM-related research and education, especially in areas of aerospace and earth and space science. At least 50 targeted announcements of opportunity will be disseminated through electronic communication and website each year. Coordinate submission of proposals to NASA and other agencies on projects in STEM research and education. Encourage collaborative proposals each year to NASA or other agencies.*

**Outcome** – This objective was met.

**Objective I.8:** (Diversity) The Management Team will ensure diversity in all Consortium programs and activities by seeking to include women, underrepresented minorities, and persons with disabilities.

*Outcome indicator: Diversity will be modeled in all aspects of the Consortium and participation by underrepresented groups will increase. NASA content or other STEM educational opportunities are expanded at these underrepresented institutions.*

**Outcome** – This objective was met. We are continually working with our HBCUs and have recently begun discussions with the statewide technical/community college system to incorporate their students and faculty into our programs.

**Objective I.9:** (Evaluation) The Management Team will continually monitor and seek to

improve the quality and effectiveness of the state program.

**Outcome indicator:** *In consultation with the Campus Directors, the Management Team will continue to determine appropriate data collection and evaluation procedures that are consistent with available resources.*

**Outcome** –This objective was met. We review our entire program annually to ensure that we are tracking our awardees adequately. The NSGF provides data from our longitudinal tracking.

## **II. Fellowship/Scholarship Program**

**SC Goal 4:** To recruit and train students, educators, and professionals, especially women and underrepresented groups.

**Objective II.1:** (Competitiveness) Ensure the fair distribution of funds to member universities and educational affiliates.

**Outcome indicator:** *Annual Call for Fellowship/Scholarship applications at all higher education members and affiliates, competitive review, and selection of awardees. Awards reflect the diversity of the Consortium's membership and statewide balance.*

**Outcome** –This objective was met. Campus visits and emails were sent out numerous times by the main office and by the campus directors at each individual institution to be disseminated on their campuses. In addition, the Research Grant Award applicants and the Palmetto Research Academy Faculty applicants are reviewed both externally and internally to ensure fair distribution of funds.

**Objective II.2:** (NASA Center ties) Offer hands-on, tangible research experiences to student research fellowship awardees at NASA Centers.

**Outcome indicators:** *SCSGC will note an increase of SC students involved with NASA Center Internships. 100% will make a presentation at the SC Academy meeting or at a national meeting. 100% will provide feedback to their Campus Director and make campus presentations.*

**Outcome** –This objective was met.

**Objective II.3:** (Industry ties) Offer hands-on, tangible research experiences to student research fellowship awardees at aerospace and related science and technology industries.

**Outcome indicator:** *At least one student will receive supplemental funding through SCSGC each year.*

**Outcome** –This objective was not met. We only had students at NASA centers for internships. However, we are working on developing relationships with industry.

**Objective II.4:** (Mentoring and professional development) Provide mentoring and professional development experiences to student researchers, which will develop skills that contribute to the future workforce.

**Outcome indicator:** *100% of awardees graduate from college, 100% make a presentation at the SC Academy of Science or at a National meeting within a year of receiving the award, 80% produce a paper or abstract with their mentors within a year of receiving the award, and 50% continue on to graduate school and pursue a NASA-related discipline.*

**Outcome** –This objective has not been met at this time. Our projects are all currently in progress. We will know if this objective has been met next year upon receiving their final reports.

**Objective II.5:** (Diversity) Ensure funding for fellowships and scholarships to women, underrepresented minorities, and persons with disabilities by utilizing intensive marketing techniques (personal visits, direct faculty contacts, email) to encourage women and minority students to apply for funding.

*Outcome indicator:* Awards to women and minorities equal or exceed previous year applicants. At least 15 student awards awarded annually within underrepresented groups.

**Outcome-**We did not meet this objective, but were closer than last year. We awarded 20 student awards. 7 went to females and 2 went to underrepresented minorities.

**Objective II.6:** (Longitudinal tracking) All students who have received significant fellowship or scholarship assistance from SCSGC will be longitudinally tracked through first employment or beginning of advanced degrees.

*Outcome indicator:* Continue arrangements with National Space Grant Foundation to include SCSGC in the longitudinal tracking system so that students funded can continue to be tracked in subsequent years at least through first-employment.

**Outcome** – This objective was met by continuing the longitudinal tracking program with the National Space Grant Foundation office. 100% of our student awardees from 2006-2010 have been successfully tracked through their next step. 2011 awardees are still enrolled.

**Objective II.7:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the fellowship and scholarship programs in conjunction with its implementation of an overall evaluation strategy (see 1.9).

*Outcome indicator:* Adjustments are made to the fellowship and scholarship program to strengthen activities that are working and drop or improve activities that are not having the intended impact.

**Outcome** –This objective has been met. We review our programs, policies and applications annually. This year, the SC Consortium updated its Bylaws.

### **III. Research Infrastructure**

**SC Goal 3:** To enhance interdisciplinary research, education and public service activities; to encourage cooperative programs among colleges and universities, state organizations, business and industry, and pre-college interests

**Objective III.1:** (Research proposals) Increase the number of research proposals submitted by SCSGC institutions in fields aligned with NASA's mission.

*Outcome indicator:* At least eight research awards are distributed among appropriate SCSGC institutions each year. 100% of the REAP recipients submit proposals to NASA or another federal agency within two years. 50% of the REAP recipients submit new proposals which are funded within two years. 100% of the REAP recipients give presentations and submit papers within a year after the end of the grant. 80% of the presentations and papers include students.

**Outcome** –The status of meeting this objective is unknown. Our projects are all currently in progress. We will know if this objective has been met 60 days after completion of their project, upon receiving their final reports. We awarded 7 REAP projects this year.

**Objective III.2:** (Research support) Support new and developing research, especially multidisciplinary and collaborative projects, in fields aligned with NASA's mission.

*Outcome indicator:* 50% submit proposals for a REAP Research Grant or similar program. 100% of the REAP recipients develop presentations and papers within two years. 80% of the presentations and papers include students.

**Outcome** – The status of meeting this objective is unknown. Our projects are all currently in progress. We will know if this objective has been met next year upon receiving their final reports.

**Objective III.3:** (Collaborations) Build research collaborations both within and outside the state.

*Outcome indicator:* At least one planning trip to a NASA Center is supported each year from SCSGC. Submission of REAP Research Grant proposal within two years of the award.

**Outcome** – The status of meeting this objective is unknown. Our projects are all currently in progress. We will know if this objective has been met next year upon receiving their final reports.

**Objective III.4:** (Diversity) Increase the participation of women and underrepresented groups in statewide research programs and facilitate their subsequent entry into STEM careers.

*Outcome indicator:* SCSGC will sponsor activities that encourage women and students from underrepresented groups to enter STEM careers.

**Outcome** – This objective has been met. We visited campuses to promote our programs. Special attention was paid to recruiting women and underrepresented minorities to apply for our competitive programs. Three of the 14 Research Infrastructure student participants were female.

**Objective III.5:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the research infrastructure programs in conjunction with its implementation of an overall evaluation strategy (see 1.9).

*Outcome indicator:* Adjustments are made to the research infrastructure program to strengthen activities that are working and drop or improve activities that are not having the intended impact.

**Outcome** – This objective has been met. We require final reports from all participants. These reports must be very detailed and include all necessary information to complete our annual reporting back to NASA HQ. These reports are compiled on an annual basis and are distributed to our campus directors for review upon receipt of final reports.

#### **IV. Higher Education**

**SC Goal 1:** To increase access, understanding, development, and utilization of resources in four areas: space science, Earth system science, biological sciences and aeronautics; to enhance interdisciplinary research, education and public service activities.

**Objective IV.1:** (Curriculum and NASA content) Contribute aerospace and space and earth science materials to the higher education community in South Carolina.

*Outcome indicator:* Distribute announcements of opportunities for education and curriculum enhancement in NASA-related fields to faculty at member institutions.

**Outcome** – This objective has been met. We actively act as conduits of

information about opportunities for the higher education community. Emails are sent out on a daily basis to distribution lists and to campus directors for additional dissemination.

**Objective IV.2:** (Student Research) Provide opportunities where students gain hands-on knowledge of scientific methods and processes, gain understanding of the importance of teamwork, experience the exhilarating feeling of discovery, spark an interest in continuing NASA-relevant research in graduate school, and enter the STEM workforce by working on NASA-related endeavors.

*Outcome indicator: 100% of the participants are exposed to current NASA research and 100% make presentations about their research experience.*

**Outcome** –This objective has not been met. Due to the timing of acquisition of funds, the Palmetto Research Academy funds were not utilized in Year 19, and so are being carried over for use in Year 20 Palmetto Research Academy, held summer 2012.

**Objective IV.3:** (Industry involvement) Establish and maintain linkages between SCSGC and higher education and industry in South Carolina by encouraging educational partnerships between the state’s academic institutions and private industry.

*Outcome indicator: At least two collaborative proposals will be funded, promoting partnerships between industry and academic affiliates.*

**Outcome** – This objective has not yet been met. We are working to obtain industry partners.

**Objective IV.4:** (Diversity) Increase the participation of women and underrepresented groups in all aspects of SCSGC’s higher education program.

*Outcome indicator: SCSGC will sponsor activities that encourage women and students from underrepresented communities*

**Outcome** –This objective has been met. Although the funds for Year 19 Palmetto Research Academy are being carried over, selections have been made for Year 20. Our Palmetto Research Academy HE programs will involve 20 students, 4 are female and 2 are underrepresented minorities. Also, 2 of the 20 are students from statewide technical colleges, performing research in a 4-year institution for the first time.

**Objective IV.5:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the higher education programs in conjunction with its implementation of an overall evaluation strategy (see 1.9).

*Outcome indicator: Adjustments are made to the higher education program to strengthen activities that are working and drop or improve activities that are not having the intended impact.*

**Outcome** - This objective has been met. We require final reports from all participants. These reports must be very detailed and include all necessary information to complete our annual reporting back to NASA HQ. In addition, the Palmetto Research Academy has a specific evaluation to assess successful aspects or weaknesses of the program design.

## **V. K-12 (Precollege) Education/Public Service**

**SC Goal 5:** To promote a strong science, mathematics and technology base throughout all levels of South Carolina education

**Objective V.1:** (NASA dissemination) Contribute aerospace and space and earth science materials to the formal and informal education communities in South Carolina.

***Outcome indicator:** Distribute announcements of opportunities for education and curriculum enhancement in NASA-related fields to formal and informal educators across the state; Maintain and update the SCSGC website to provide opportunities and information to formal and informal education groups as well as the general public.*

**Outcome** – This objective has been met. We distribute information on a daily basis to our contacts throughout the state and through contacts in Education departments on our member campuses.

**Objective V.2:** (Pre-service Educators) To increase the number of quality educators pursuing STEM education degrees.

***Outcome indicator:** Pre-Service awardees will be tracked to see how many complete their degree programs and become science and math teachers in SC. At least two awardees will pursue a career teaching STEM fields. SCSGC will also inquire about their using NASA educational materials in their classrooms.*

**Outcome** – This objective has not yet been met. Our awardees are still enrolled in their classes.

**Objective V.3:** (Science and education events) The SCSGC will support activities of scientific discovery across the state and will support NASA's commitment to renewing a spirit of exploration and discovery and will use the excitement of space exploration to promote this policy to the general public.

***Outcome indicator:** SCSGC staff will develop and host opportunities to promote NASA throughout the state of South Carolina.*

**Outcome** – This objective has been met. The SC Consortium aided the Sally Ride Educator Institute in developing and facilitating a lunar institute with over 50 educators, introducing them to the most current NASA lunar mission data. In addition, the SC Consortium aided in the design and development of a lunar exhibit, showcasing unique artifacts from NASA lunar missions, including a rock sample from Apollo 15. The exhibit reached several thousand students and members of the general public through an intense and highly engaging advertising campaign. Finally the SC Consortium participated in MoonFest, an all day hands on festival for learners of all ages to open the exhibit.

**Objective V.4:** (Diversity) Increase the participation of women and underrepresented groups in all aspects of SCSGC's pre-college/general public program.

***Outcome indicator:** SCSGC will sponsor activities that encourage women and students from underrepresented groups to enter STEM careers.*

**Outcome** – This objective has been met. We visited each campus to promote our programs. Special attention was paid to recruiting women and underrepresented minorities to apply for our competitive programs. Within the Sally Ride Educator Institute, over 85% of the participants were female.

**Objective V.5:** (Evaluation) The Consortium will develop methods to document, measure, and assess the impact of the pre-college/public service programs in conjunction with its implementation of an overall evaluation strategy (see 1.9).

***Outcome indicator:** Adjustments are made to the pre-college/public service program to strengthen activities that are working and drop or improve activities that are not having the intended impact.*

**Outcome** – This objective has been met. We are constantly evaluating our programs and making necessary adjustments to better our opportunities.

## PROGRAM CONTRIBUTIONS TO PART MEASURES

- **Student Data and Longitudinal Tracking:**  
Total awards = 20; Fellowship/Scholarship = 20, Higher Education/Research Infrastructure = 0; 2 of the total award represent underrepresented minority F/S funding (1 AA male and 1 Hisp. Male). During the FY11 program year 1 student is pursuing an advanced degree in a STEM discipline, 16 accepted STEM positions in industry, 2 accepted STEM positions in academia, and 1 went on to a position in a non-STEM discipline. The remaining students have not yet received the degree that they were pursuing while they received their Space Grant award.

We awarded 7 research awards to faculty through our Research and Education Awards program. Within those seven REAP projects, 14 students are participating in research. Three are females. These students are not tracked since they do not receive significant support.

- **Diversity:**  
Of our 15 member institutions, four are HBCU's and an additional two others are minority-serving institutions. Of our 15 member institution campus directors, 6 are female, 2 are African American and 2 are Asian. As a Consortium, we strive to have a diverse pool of qualified applicants for all of our programs. We work closely with the minority programs on each campus to make sure that we reach as many underrepresented students as possible.
- **Minority-Serving Institutions:**  
This year, the SC Consortium began developing relationships with the statewide community/technical college system. Many of these are considered minority serving. In addition, we have begun to make contacts with 4-year minority serving institutions in the state to determine what, if any, NASA-related research they are conducting. This relationship building will aid our consortium in assessing which institutions could be potential partners in the future.
- **NASA Education Priorities:**  
Authentic hands-on student experiences in science and engineering disciplines.  
Four of our programs in 2011 involved hands-on mentored research experiences for students. Our Undergraduate and Graduate Fellowship programs allow for a student to work directly with a faculty mentor at a member institution on a NASA-related research project. The NASA Internships involve hands-on NASA-scientist mentored research projects. Our REAP program this past year awarded 7 faculty projects which included 14 students. These students worked one-on-one with their faculty on NASA science

Engage middle school teachers in hands-on curriculum enhancement capabilities.

The SC Consortium aided the Sally Ride Educator Institute in developing and facilitating a lunar institute. Out of around 50 participants, more than half of those were middle-school. The Lunar Institute offered an innovative approach to professional development with hands-on workshops, activities, and information that teachers can take back to the classroom.

Community Colleges – develop new relationships as well as sustain and strengthen existing institutional relationships with community colleges.

This year, the SC Consortium began developing relationships with the statewide community/technical college system. With funds from Year 19, the Palmetto Research Academy in Year 20 will incorporate two students from technical/community colleges. The applicants have been selected and will conduct NASA-related research within a 4-year institution. In addition, we are discussing a new program within the SC Consortium to encourage students and faculty at 2-year institutions to become involved with NASA data.

Aeronautics Research

At this time, the SC Consortium is in discussions with the Boeing Charleston facility to develop a joint internship for students or faculty.

Environmental Science and Global Climate Change.

In 2010, we were awarded a Consortium Development Award for a new program, GIST, the Geospatial Institute for Students and Teachers in Climate Change. This program addressed NASA's goals through an investigative, collaborative and educational approach to examining southeastern climate change impacts. The Institute served as an immersive and integrated multidisciplinary exposure and training for students with various backgrounds and career aspirations, specifically those centered on climate change-related geographic information systems (GIS), remote sensing and education. The GIST program was a success and results were reported in our Consortium Development Competition report.

Enhance the capacity of institutions to support innovative research infrastructure activities to enable early career faculty to focus their research toward NASA priorities.

Our faculty REAP program is designed to help set up new and early career faculty with a track toward working on large NASA-related research grants. We have seen new faculty receive a \$2k travel award, then an \$8k research initiation award and then onto a \$30k research grant through our programs. This stepping stone approach to becoming immersed in NASA research has proven successful. For example, in 2010, two previous Space Grant REAP awardees received \$750K NASA EPSCoR awards. We encourage new faculty to apply for all of our programs.

## IMPROVEMENTS MADE IN THE PAST YEAR

In FY11, Dr. Mitchell Colgan, SC Consortium Director, stepped down and Dr. Cassandra Runyon was nominated as Interim Director. She has been voted in by the SC Consortium, but is still awaiting the final approval from NASA Headquarters. Dr. Runyon is a well-respected Planetary Geologist with strong, long-lasting ties to NASA, and has an exceptional working knowledge of this Consortium, the National Space Grant Consortium, and NASA's education and science programs. Dr. Runyon was the director of the Southeast Regional Clearinghouse

(SERCH), a collection of Space Grant state consortia that were engaged in Education/Public Outreach for NASA's Office of Space Science. Dr. Runyon was in-charge of the Education/Public Outreach effort for the *Moon* Mineralogy Mapper (M3) instrument, which flew on Chandrayaan-1s, India's first mission to the Moon. Upon approval by Headquarters, Dr. Runyon will be a great asset to the SC Consortium.

Cynthia Hall, who was the Special Projects Director, has recently been named the Associate Director. She will take on some additional duties and responsibilities, specifically overseeing the development of new programs and the acquisition of additional funds and leveraging opportunities.

This year, the SC Consortium was approached by two informal education institutions, the SC State Museum and the Children's Museum of the Lowcountry, acquiring about partnerships. The SC State Museum has been approved as an educational partner, in which they will participate in developing new strategies for the Consortium as well as in participating in educational opportunities of interest. We will be investigating other potential partners in the upcoming year.

## **PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION**

### **Member Institutions:**

The Campus Director will act as the primary point of contact for the dissemination of NASA resources and Space Grant funding opportunities to the faculty and students at their institution, as well as to educators and the general public in their respective region. In addition, they are responsible for reviewing faculty and student proposals, submitting an annual budget and report to the main office and other administrative duties.

Benedict College, private, liberal arts College, HBCU  
Coastal Carolina University, public, liberal arts College  
The Citadel, public military College  
Claflin University, independent, liberal arts College, HBCU  
Clemson University, research-one University  
College of Charleston, public, liberal arts College  
Francis Marion University, public, liberal arts minority-serving institution (40%)  
Furman University, private, liberal arts College  
Lander University, public, liberal arts University, minority-serving institution (24%)  
Medical University of South Carolina, research-one medical University  
Presbyterian College, private, liberal arts College  
South Carolina State University, land-grant public College, HBCU  
University of South Carolina, research-one University  
University of the Virgin Islands, public, liberal arts, HBCU  
Wofford College, independent, liberal arts College

### **Educational Partners:**

Educational partners are formal education communities, such as K-12 educators, community and technical colleges, subsets of larger 4-year institutions, etc., as well as informal education communities, such as museums, science centers, planetariums, who are interested in sharing and / or promoting NASA-related STEM to their students, faculty, and staff. Educational partners do not directly receive support funding from the

SC Space Grant Consortium; however they are eligible to apply for specific funding opportunities where applicable (e.g., scholarships, fellowships or research awards designated for formal or informal education communities).

South Carolina State Museum, informal education