South Carolina Space Grant Consortium
College of Charleston
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Grant Number: NNX10AM76H

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** Consortium is a Capability Enhancement Consortium funded at a level of **$660,000** for fiscal year 2010.

PROGRAM GOALS

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

South Carolina Space Grant Consortium Strategic Plan

April 4, 2008

Vision

The vision of the South Carolina Space Grant Consortium (SCSGC) 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 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 NASA SCSGC is committed to excellence in students and faculty research and to promoting STEM education and expanding 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 SCSGC.

Consortium Goals

The Consortium has six goals to accomplish its mission statement. All 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 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 and technology base throughout all levels of South Carolina education.
GOAL 6. To facilitate statewide communication of NASA opportunities and programs.

1. Consortium Management

GOAL: To facilitate statewide communication of NASA opportunities and programs.

Objective 1.1: (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 1.2: (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 1.3: (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 1.4: (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 1.5: (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 1.6: (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 1.7: (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 1.8: (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 1.9: (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.

2. Fellowship/Scholarship Program

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

Objective 2.1: (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 2.2: (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 2.3: (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 2.4: (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 2.5: (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 2.6: (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 2.7: (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.*

3. Research Infrastructure

Goal: 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 3.1: (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 3.2: (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 3.3: (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 3.4: (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 3.5: (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.*

4. Higher Education

Goal: 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 4.1: (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 4.2: (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 4.3: (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 4.4: (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 4.5: (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.*

5. K-12 (Precollege) Education/Public Service

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

Objective 5.1: (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 5.2: (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 5.3: (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 50th anniversary and will host a few talks promoting the launch of the international collaborative adventure, Moon Mineralogy Mapper.*

Objective 5.4: (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 5.5: (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, & 3)

All of our year 18 (2010-11) projects are still on-going except for our Palmetto Research Academy, Ballooning programs, and NASA Summer 2010 Internships. We have several anecdotes related to project completed and reported in 2010.

Outcome 1

Several Palmetto Research Academy students received awards of recognition for the work conducted over the summer at their Palmetto Research Academy sites. Herschel Roberts (from South Carolina State University) won first place in the Engineering and Physics Division at the Louis Stokes-South Carolina Alliance for Minority Participation research conference, where he presented the bioengineering work he conducted with his faculty mentor, Dr. Delphine Dean at Clemson University. Molly Towsend received both the Sigma Xi Award and the second place prize in her session Undergraduates II-Oral for the Palmetto Academy bioengineering research conducted with her faculty mentor Sakamuri Reddy.

In addition, we have student anecdotes as well:

Each Space Grant program that I have participated in has functioned to make me a more capable and competitive research scientist. For example, I likely wouldn't have been accepted into the NASA Academy without my incredible experience in the Palmetto Academy. My experience at Goddard Space Flight Center (GSFC) through the NASA Academy allowed me to research into a field I knew almost nothing about, formulate and execute my own experiments, analyze the results, and establish future experimentation. Without a doubt, this experience has made me even more prepared for my Ph.D. in bioengineering at Clemson starting Fall 2010. I loved my experience at Goddard so much that I have now made it my long-term goal to work at Goddard, another space center, or some other government laboratory upon the completion of my Ph.D. Certainly my participation in the Space Grant program has impacted both my education and life. (George Fercana - on 08/18/10, 2009 Palmetto Research Academy, 2010 Lunar and Planetary Science Academy).

One of our NASA internship awardees wrote: First, you funded my ability to go to Goddard 2 times, which was essential for my growth as a student of the sciences and engineering. At Goddard, surrounded by students and employees that love what I love, my passion for learning and growing in my field was renewed. So often, in school, academia becomes about grades, and the percentile I am in my class, and what my GPA is. But the reason why you even DECIDED to pursue that major, or what you want to do with it, why you want to continue, and what you're working towards gets lost in all the GPA calculations. Every time I go back to Goddard, I remember WHY I want to be an excellent engineer, and WHY I need to be at the top of my field and an expert in it. It's because that's what the Space program needs. To be able to be appropriately creative in the field, I need to have detailed knowledge of the foundational information in my field. Thank you guys so much for allowing me to be reminded of this. (Charreau Bell - on 03/02/11, 2010 NASA Center Internship Award, Clemson University - Graduate Administrative Assistant)

<u>Outcome 2: Educate and Engage: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers and faculty.</u>

In 2010, three 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. This objective provides curricular support resources that use NASA themes and content to a) enhance student skills and proficiency in STEM disciplines; b) inform students about STEM career opportunities; and c) communicate information about NASA's mission activities. For example, one educator developed math-related curriculum around hurricane frequency. The curriculum was adapted from a Windows to the Universe activity, utilizing NASA Sea Surface Temperature data. The student adapted this by building on the concept of global climate change and changes in hurricane intensity.

Also another student utilized a NASA International Space Station podcast demonstrating Newton's Laws of motion to introduce the concept and then worked with the NASA Newton Car to test these laws. The educator built upon this activity by applying this concept and tests to everyday life. The students had to discuss ideas for application of Newton's Laws. These activities are made available on the SC Space Grant education website so that they can be accessed by in-service teachers across the state, promoting NASA-related curriculum use in the K-12 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.

In 2010, two activities within the SC Space Grant program directly benefited Outcome 3, specifically Objective 3.1 – Resources. The two programs developed outreach components to provide informal education resources or tools that use NASA's unique content to connect NASA's missions to self-directed learners or to attract or retain individuals to STEM careers. For example, the High-Altitude Ballooning program attended the local Earth Day Festival to raise awareness of climate change as related to atmospheric measurements. The student awardees presented their designed experiments, discussed how it related to climate change, and then promoted NASA's missions measuring changes in atmospheric carbon dioxide, sea surface temperatures, and energy from the sun. Members of the general public were able to view a tethered balloon and understand the process of launching and recovering a high-altitude balloon. In addition, the Palmetto Research Academy interns are required to develop an outreach project. In 2010, they developed a series of public service announcements highlighting NASA and it accomplishments. The videos were shown at the Southeast Regional Space Grant Meeting and were very well received. The videos also have been sent, by request, to the Exploration Systems Mission Directorate at Kennedy Space Center to be included on the website. These types of outreach activities through our higher education programs promote NASA and STEM throughout the informal education arena and general public.

PROGRAM ACCOMPLISHMENTS

Consortium annual goals and objectives by outcome 1, 2 and 3:

> All of our programs are currently in progress and are scheduled to end on June 30, 2011 with the exception of Palmetto Academy, Ballooning, and NASA 2010 Internships. However, our entire research infrastructure and some of our higher education projects have received one-year no-cost extensions to complete their projects.

Outcome 1 – Employ and Educate – Fellowship and Scholarship (F/S), Research Infrastructure (RI-our program REAP) and Higher Education

- Through our student tracking program, we determined that 10 students took next step in FY10 (SG participation supported from FY06-FY10 funds):
    -6 are pursuing advanced degrees in STEM disciplines
    -2 accepted STEM positions in industry
    -2 accepted STEM positions in academia

Fellowships and Scholarship – In year 18 (2010/11) we funded 7 graduate students, 1 Kathy Sullivan (undergraduate) award, 6 undergraduate research awards, and 3 NASA Center internships with Yr 18 funds. We also funded 3 Pre-Service Teacher awards (discussed below under "precollege.")

Research Infrastructure - We funded 9 REAP projects for faculty for a total of $98,900. All projects are currently underway and we have received interim reports on their progress. These projects involve 15 student participants, ranging from post-docs to undergraduates, and include 4 females and 1 African American male, for a total of 5 underrepresented minorities.

Higher Education- This funding cycle provided for 10 Palmetto Academies due to Augmentation funding. Out of these 10 academies, 18 students participated in NASA mentored projects. In addition, three ballooning projects were awarded which included 7 students.

-25 Ballooning & PRA students were significantly supported from FY10 funds

-All students are currently enrolled in school.

Outcome 2 – attract and retain – precollege

We funded 3 pre-service teacher awards for a total of $9,000 to graduate and undergraduate students pursing an education undergraduate or graduate degree.

Outcome 3 –engage and inspire – public service/general public

-Our campus directors act as NASA representatives on their campuses and in their communities.

-The 2010 Palmetto Research Academy developed an outreach project in which the Academy interns developed a poster to be distributed to K-12 educators. The poster was comprised of numerous NASA images and then included information about NASA research on the back. In addition, the students developed several public service announcements focused on the NASA and the research and engineering, beneficial to the general public, begin conducted at NASA centers. These public service announcements were shown at the Southeast Regional Space Grant meeting and were well received as good publicity for NASA. Kennedy Space Center representatives actually asked to acquire the videos for showcasing on the NASA KSC website.

1. Consortium Management

GOAL: To facilitate statewide communication of NASA opportunities and programs.

Objective 1.1: (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 1.2: (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 (4 total). This objective was met.*

Objective 1.3: (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.*

Outcome *–This objective was met.*

Objective 1.4: (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 1.5: (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. We did not gain a new industry partner this year. However Boeing is currently building a facility to*

manufacture their DreamLiner aircraft. We plan on establishing a relationship with them in the near future.

Objective 1.6: (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 1.7: (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 1.8: (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 have worked very hard this past year to pay special attention to our HBCU institutions. The program manager and special projects manager visited these campuses and made presentations about our opportunities to students and faculty.*

Objective 1.9: (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 Consortium website was redesigned in 2005 so that evaluation data could be collected through online surveys and compiled for analysis by the Management Team. We hired the NSGF for longitudinal tracking.*

2. Fellowship/Scholarship Program

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

Objective 2.1: (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.*

Objective 2.2: (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 2.3: (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 (including Boeing, who is currently constructing a new site to build their Dreamliner aircraft in Charleston, SC).*

Objective 2.4: (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. Our projects are all currently in progress. We will know if this objective has been met next year upon receiving their final reports. All Palmetto Research Academy students have already made presentations about their research.*

Objective 2.5: (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. 9 went to females and 3 went to underrepresented minorities.

Objective 2.6: (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, 2007, 2008, and 2009 have been successfully tracked through their next step. 2010 awardees are still enrolled.*

Objective 2.7: (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.*

3. Research Infrastructure

Goal: 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 3.1: (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.

Objective 3.2: (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 3.3: (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.*

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 3.4: (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.. Five of the 13 Research Infrastructure participants were underrepresented minorities: 4 females and 1 African American male.*

Objective 3.5: (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.*

4. Higher Education

Goal: 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 4.1: (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 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 addition dissemination.*

Objective 4.2: (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 been met. ALL Palmetto Research Academy (HE) participants have been exposed to NASA research and have presented their projects.*

Objective 4.3: (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 4.4: (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.*

Outcome *–This objective has been met. Our Palmetto Academy HE programs involved 18 students, 5 were female and 2 were an underrepresented minority plus our Ballooning program, which included no females and 1 underrepresented minority. Our total HE programs, therefore, included 25 students, 5 of which were female and 3 were underrepresented minorities.*

Objective 4.5: (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.*

5. K-12 (Precollege) Education/Public Service

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

Objective 5.1: (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.*

Objective 5.2: (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 5.3: (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. *In 2010, the ballooning students participated in a local Earth Day event, showcasing the research being conducted as part of the high-altitude ballooning program. The student participants discussed the importance of atmospheric research to climate change and talked about the balloon launch and recovery process.*

Objective 5.4: (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. While we did not receive many female applicants, we do feel we made an impression on female undergraduate students in SC.*

Objective 5.5: (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.

NASA 2010 Education Priorities Accomplishments

- Authentic hands-on student experiences in science and engineering disciplines.
  Six of our programs in 2010 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 we support all involved hands-on NASA-scientist mentored research projects. Our REAP program this past year awarded 9 faculty projects which included 15 students. These students worked one-on-one with their faculty on NASA science. Palmetto Academy student participants participated in a broad range of NASA-related hands-on mentored research projects across the state. Finally, students who participated in the High Altitude Balloon program last year had to build and design their projects to be flown into a near-space environment, with the guidance of their faculty team mentor. Their critical thinking skills are improved upon by participation in these programs because they gain the ability to better problem-solve in a real-world situation.
- 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 addresses NASA's goals through an investigative, collaborative and educational approach to examining southeastern climate change impacts. The Institute will serve 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.

Advertising for this program began in the fall of 2010. The GIST program will take place in Summer 2011.
In addition, one of the pre-service teacher awardee lesson plans involved Climate Change and Hurricane Intensity.

- Diversity of institutions, faculty and student participation.
  We have added two institutions diversifying not only our applicant pool, but the type of institutions which make up our Consortium. The University of the Virgin Islands (HBCU) has been removed from probation and their students are now able to compete and participate in our programs and opportunities. The University of the Virgin Islands has over 2,600 graduate and undergraduate students. A new member institution joined SCSGC this past year. Presbyterian College, a small private liberal arts college, contacted us and our Consortium was excited to add them to our list of member institutions across SC and the Virgin Islands. Presbyterian College has about 1,200 students (50% of which are female) and is a Carnegie One Liberal Arts College.
- 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.

PROGRAM CONTRIBUTIONS TO PART MEASURES

- **Student Data and Longitudinal Tracking**:
  Total awards = 45; Fellowship/Scholarship = 20, Higher Education/Research Infrastructure =25; 16 of the total award represent underrepresented minority F/S funding (12 Caucasian females, 2 AA females, 2 AA males). During the FY10 program year 2 students have accepted STEM positions with Aerospace Contractors, 6 are pursuing advanced degrees in STEM disciplines, 2 accepted STEM positions in industry, and 2 accepted STEM positions in academia.

  For all students that were significantly supported in the period spanning FY06-FY10, 16 are pursuing advanced degrees in STEM disciplines, 1 accepted a STEM position at a NASA contractor, 6 accepted STEM positions in industry, and 7 accepted STEM positions in academia. The remaining students have not yet received the degree that they were pursuing while the received their Space Grant award.

We awarded 9 research awards to faculty through our Research and Education Awards program. Of those nine, 15 students are participating in projects. Five are underrepresented minorities including 4 females and 1 African American male. These students are not tracked since they do not receive significant support.

- **Course Development**:
  We awarded one curriculum development award in 2010. This award was given to develop and disseminate a tool for use in the classroom setting at a college level as well as informal education settings. Dr. Saul Adelman, from the Citadel, received a Curriculum Development award from SCSGC in Year 18 for his project, "Great Astronomical Images-II. Great Astronomical Images–II will provide a wide range of individuals with access to stunning high-resolution color (and false-color) astronomical imaging obtained by NASA's satellites and by ground-based observatories.

- **Matching Funds**: The ratio of NASA funds to matching funds 1 to 0.80 ($660K to $525,207), a small decrease from Year 17. The matching funds come from state member institutions through campus directors' time on Space Grant activities, institutional match for Graduate awardees, and through REAP and PRA awardees' required 1:1 institutional match for their research projects.

- **Minority-Serving Institution Collaborations**: Three new schools have joined (in 2006 and 2008) and are actively participating in all programs – Claflin University, Francis Marion University, and Lander University. The University of the Virgin Islands has been reinstated to our program and is now off of probation.

<u>IMPROVEMENTS MADE IN THE PAST YEAR</u>

-In 2009 Cyndi Hall, Ballooning and Palmetto Research Academy Project Director, was added as a full-time employee to run our Palmetto Research Academy and Ballooning programs. She has continued on with our programs and is currently managing a new program, won in 2010 with a Consortium Upgrade award, the Geospatial Institution for Students and Teachers in Climate Change (GIST).

- In 2010 Presbyterian College joined and is actively participating and invigorating our programs with new ideas and a fresh perspective. Francis Marion University and Claflin University joined in 2006 and Lander University in 2008 and are all still actively participating. At the end of 2009, the University of the Virgin Islands was reinstated into active membership with the SCSGC.

-Tara Scozzaro (Program Manager) and Cyndi Hall (Project Director) visited many campuses in the SCSGC to promote and advertise our programs. This was well received by all campus directors and attendees. In 2010, we have again received a record number of applications and proposals to our student and faculty programs.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

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