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 2013.

PROGRAM GOALS

All goals and objectives for the individual programs support the South Carolina Space Grant Consortium (hereafter SCSGC) strategic plan, created in April 2008, and submitted with our budget package.

Vision
The vision of the 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 SCSGC 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 SCSGC 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 SCSGC.
Consortium Goals
Six goals provide the nexus of our SCSGC 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: Science, Aeronautics, Human Exploration and Operations, and Space Technology
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 SCSGC provides specific, measurable, attainable, realistic, and timely (SMART) objectives with key indicators of success.

I. Consortium Management

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

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 again in 2006 and 2011. Relevant electronic communication is 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, earth and space science 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 is updated on a weekly basis to reflect new opportunities within and/or related to 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:** SCSGC serves as a clearinghouse for information on funding and research opportunities from NASA and other agencies that support STEM-related research and education, especially in areas of aerospace and earth and space science. All targeted announcements of opportunity released from NASA will be disseminated through electronic communication and the SCSGC website each year. The Management Team will 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 ensured in all aspects of the Consortium and participation by underrepresented groups will increase. NASA content or other STEM educational opportunities for faculty and students are expanded within the state.

Objective I.9: (Evaluation) The Management Team will continually monitor and seek to improve the quality and effectiveness of the SCSGC 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 2011 so that evaluation data could be collected through online surveys and compiled for analysis by the Management Team.
II. Fellowship/Scholarship Program

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:** SCSGC will forward NASA’s Annual Call for Fellowship/Scholarship applications to all higher education members and affiliates, and hold a competitive peer-review of submitted proposals for selection of awardees. Awards will reflect the diversity of the Consortium’s membership and statewide balance.

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

**Outcome indicators:** SCSGC will maintain or increase the number of SC students involved with NASA Center Internships; however this is based annually on the SCSGC budget from NASA. 100% will make a presentation at the SC Academy of Sciences (SCAS) meeting or at a national meeting. 100% will provide feedback to their Campus Director and make campus presentations.

Objective II.3: (Industry ties) SCSGC will 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) SCSGC will provide mentoring and professional development experiences to student researchers, which will develop skills that contribute to the future STEM 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) SCSGC will ensure funding for fellowships and scholarships to women, underrepresented minorities, and persons with disabilities through intensive marketing techniques (e.g., personal visits, direct faculty contacts, email) to encourage women and minority students to apply for funding.

**Outcome indicator:** Awards to women and minorities will equal or exceed previous year applicants. At least 15 student awards will be 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 SCSGC 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 Obj. I.9).

**Outcome indicator:** Adjustments are made to the SCSGC 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

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 and vision.

**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 and vision.

**Outcome indicator:** 50% submit proposals for a SCSGC 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:** SCSGC will support at least one planning trip to a NASA Center each year from SCSGC. Submit REAP Research Grant proposal within two years of the travel/planning 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 overall impact of the research infrastructure programs including implementation of an overall evaluation strategy (see Obj. I.9).

**Outcome indicator:** Adjustments will be made to the research infrastructure program to strengthen activities that are working and drop or improve activities that do not have the intended impact.
IV. Higher Education

**GOAL 1:** To increase access, understanding, development, and utilization of resources in four areas: science, aeronautics, human exploration and space technology; 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:** SCSGC will distribute announcements of opportunities for education and curriculum enhancement in NASA-related fields to faculty at member institutions.

**Objective IV.2:** (Student Research) Provide research opportunities where students gain hands-on knowledge of scientific methods and processes, gain understanding of the importance of teamwork and experience the exhilarating feeling of discovery. Spark student interest in continuing NASA-relevant research in graduate school and/or to 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 at SC Academy of Science or a national meeting within one year of award.

**Objective IV.3:** (Industry involvement) Establish and maintain linkages between SCSGC, 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 in South Carolina.

**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 Obj. I.9).

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

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

**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:** SCSGC will 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) SCSGC will increase the number of quality educators pursuing STEM education degrees.

**Outcome indicator:** SCSGC 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 query their use of NASA educational materials in the 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 2012, the SCSGC will host several statewide events to celebrate Space Grant’s 25th anniversary and will host educator workshops and a few talks promoting use of NASA data and current results from NASA’s missions.

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) SCSGC 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 Obj. I.9).

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

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

All Year 21 (2013-14) SCSGC projects are still on-going with the exception of the 2013 Palmetto Research Academy and NASA Summer 2013 Internships.

**Outcome 1: Employ and Educate – SCSGC will contribute to the development of the STEM workforce in disciplines needed to achieve NASA’s strategic goals**

- SCSGC directly addresses one of NASA’s overarching approaches, “Inspiring students to be our future scientists, engineers, explorers, and educators through interactions with NASA’s people, missions, research, and facilities” (2011 NASA strategic Plan) by fulfilling attracting and retaining faculty-mentored students in STEM disciplines. By including students in hands-on research projects, the SCSG program “…provides opportunities to participate in [the NASA] Mission, foster innovation, and contribute to a strong national economy,” (Strategic Goal 6) thereby improving retention of [those] students in STEM disciplines (Outcome 6.1).

- The SC Space Grant directly addresses all of the objectives from Outcome 1 through faculty (Objective 1.1, 1.4, and 1.5) and student (Objective 1.2 and 1.3) awards. In 2013, we funded
2 faculty for research support and infrastructure, 2 faculty for education research projects and 2 faculty for curriculum development. In addition, we funded 2 graduate students, 6 undergraduate students, 4 Minorities in STEM (MIST) awards and 2 NASA internships. The Palmetto Research Academy funded 4 faculty mentors and 8 students. The programs help educate students in NASA content and skill sets in preparation for future employment in a STEM-related field. One graduate stated:

“The Space grant helped me in my education and life in several ways. In relation to my education the space grant allowed me to have the very valuable experience as an undergraduate student to do research. This experience helped me to develop the research skills that have proven to be very valuable as a graduate student. Aside from education, being a space grant recipient has gained me much attention from young aspiring scientists within many of the public schools in my community. It feels great knowing that you have younger kids saying that they would like to do research just like me. By giving talks and being a role model to younger children, I believe the Space Grant program has allowed me to pay it forward by helping to lift others as I climb life’s ‘ladder.’” (Ankoma Anderson - on 03/23/12, 2008 Undergraduate Research Award Program, 2011 Graduate Fellowship Program, 2012 Graduate Fellowship Program, 2013 Graduate Research Assistantship).

Another of our Student Awardees said:

“The South Carolina Space Grant allowed me to participate in an internship at NASA Ames Research Center. Through this opportunity, I gained valuable experience in the field of bioengineering. I now understand what it's like to research in a lab full time and participate in government-funded research. These experiences will better prepare me for graduate school and my future career.” (Rachel Morrison - on 03/16/14, 2013 Undergraduate Research Award Program, Nanomedicine Lab, Department of Bioengineering, Clemson University - Undergraduate Research Assistant)

A third Student awardee noted:

“My doctoral research has been in the field of fluid dynamics. The laboratories that I taught during my PhD were aerodynamics labs for sophomore mechanical engineering students. I am currently applying to aerospace industries including NASA for a career after finishing my PhD in 5/2013.” (Leigh Herran - on 04/08/13, 2009 Palmetto Research Academy, 2010 Palmetto Research Academy, 3D Systems - Process Engineer)

• And an exciting success story from Dr. Frank Chen, USC Engineering professor:
In 2009, as a new junior faculty in Mechanical Engineering at the University of South Carolina, Dr. Fanglin (Frank) Chen proposed and was awarded $16K (Palmetto Research Academy) to develop unitized regenerative solid oxide fuel cell technology to support NASA’s planetary exploration missions, and $30K (Research and Education Awards Program)
to improve performance and durability of unitized regenerative solid oxide fuel cell via development of electrode com-positions and microstructures, both through the SC Space Grant Consortium and NASA EPSCoR Research Grant Pro-gram.

Dr. Chen carried results from these SCSGC funded studies forward to receive a NASA EPSCoR $750K award in 2010. *Building on the research results supported from the SC Space Grant Consortium’s initial $46K investment, as of 2013, Dr. Chen has been awarded more than $4M in research funds* from several agencies such as the Department of Energy, National Science Foundation, the Defense Advanced Research Projects Agency, the Air Force Research Laboratory, the US Army, and the Savannah River National Laboratory. Dr. Chen also received the 2013 *South Carolina Governor’s Award for Excellence in Scientific Research!* All of these accomplishments began with the initial $16K seed funding from the SC Space Grant Consortium.

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

- Unfortunately, due to sequestration and the associated drastic reduction in funding for 2013, we were unable to offer Pre-Service Teacher awards. While this program was successful, it received the fewest number of applications, therefore we have suspended this program until the previous funding level is restored and the Executive Board is able to discuss it further.

- In October, 2013 South Carolina Space Grant staff hosted a full day workshop for faculty and staff at Palmetto Scholars Academy (PSA) in North Charleston, SC. Palmetto Scholars Academy is a charter school, with curriculum specifically designed for gifted and talented students. As is often the case with gifted and talented schools, there is a large population of twice and thrice exceptional (2e or 3e) students. A 2e or 3e student is extremely gifted and talented with respect to academics and has one or more exceptionalities or disabilities. The disability may be physical or may be some challenge that affects their ability to learn. PSA classrooms are fully inclusive requiring teachers to provide engaging content while working with a variety of student needs ranging from the autism spectrum, cerebral palsy, to other more complex issues.

Students with special needs are held to the same National and State science, math and technology education standards as their peers. South Carolina requires that each public school hold a Professional Development workshop on special education with their teachers at least once a year. To more readily engage faculty and staff, administrators from Palmetto Scholars Academy requested a training and content delivery mechanism different than just a PowerPoint of who, what, when, where, why etc. SC Space Grant Director (Runyon) and Associate Director (Hall) hosted such workshops for seven years under the NASA Science Mission Directorate Broker/Facilitator program where they worked with educators and experts from exceptional classroom settings and organizations to identify what kinds of
educational materials are needed and which educational products would work best for their students.

During the PSA workshop, teachers, staff, parents and administrators reviewed the current laws and best practices for working with exceptional students and discussed their various experiences and particular student needs. The group then had a chance to work through three NASA science lessons and activities, selected by the teachers, while simulating several disabilities or exceptionalities with which they work in their classrooms. At the end of each activity, the group shared their observations and suggestions for modifications (outside of simulators). During the day, the workshop participants also had a chance to experience riding in a vehicle and eating lunch in simulators. This gave them a much better understanding for how their students may experience a school day and many great ideas and/or modifications that they may incorporate to facilitate their students’ learning.

Presenters: Dr. Cassandra Runyon and Ms. Cynthia Hall (SCSGC) and Dr. Debra Mihal, Director of Students Needing Access Parity (SNAP) at the College of Charleston.

Attendees: 15 teachers, staff and administrators from Palmetto Scholars Academy, 2 parents (of 2e and 3e students).

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.

**Formal Education**: The SCSGC is continuously working to build new partnerships with educators and administrators throughout SC. In addition to offering professional development opportunities for teachers, we are often invited to present during Professional Development workshops at the school and school district level. During these workshops or training sessions we have the opportunity to work one-on-one and/or in small groups with the teachers and can share NASA resources. When time permits we engage the participants in hands-on activities so that they are more familiar with what is available and how it will best fit in their curriculum. When needed, we work with the teachers to adapt the activities for the needs of their classrooms, thereby helping to facilitate access to NASA content and resources.

**Informal Education**: The SCSGC works closely with the SC State Museum, The Children’s Museum, The Halsey Institute of Art and the Lowcountry Hall of Science and Math. Through these informal education institutions we are able to share NASA’s exciting STEM content from the perspective, or lens, of their respective audiences. Recently, SCSGC partnered with The Halsey to offer an exhibit about the Moon: *Mapping the Moon: From Galileo to Google Moon*. We are currently working with the SC State Museum to help identify and secure NASA images, movies and artifacts of note that may be showcased in one or more of their new areas currently under construction: Telescope gallery, 4-D theater, planetarium.
and a dedicated NASA exhibit space. Grand opening is scheduled for late July, early August 2014. A soon-to-be educational partner, The Lowcountry Hall of Science & Math, provides specialty help for educators and researchers in STEM-related areas. Created by the Deans of the Schools of Science & Mathematics and Education & Human Performance at the College of Charleston, The Hall helps to connect ‘the person to the appropriate resources’. Through the Hall, the SCSGC has connections to the SC Homeschool network, other informal learning environments and upcoming STEM-related events for the public. Together, SCSG and The Hall promote STEM literacy and raise awareness of NASA’s mission and resources in the coastal counties, or Lowcountry, of South Carolina.

**SCSGC PROGRAM ACCOMPLISHMENTS**

All of our programs are currently in progress and are scheduled to end on June 25, 2014 with the exception of the NASA 2013 Internships and the Palmetto Research Academy. Our entire research infrastructure and some of our higher education projects have received one-year no-cost extensions to complete their projects.

The SCSGC annual goals and objectives address 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:**
  The National Space Grant Foundation is helping SCSGC track the progress of awardees. Based on data they have collected SCSGC is contributing to the development of a STEM workforce. Below are the statistics for students awarded a Fellowship or Scholarship (F/S), a Research Infrastructure (RI-our program REAP) or Higher Education award:

  - Percentage of students whom have taken their next step and have been successfully tracked though their next step vs last year of SG support.
    - 67% for 2006
    - 88% for 2007
    - 79% for 2008
    - 82% for 2009
    - 94% for 2010
    - 95% for 2011
    - 100% for 2012
    - n/a for 2013 – all participants still enrolled
    - 86% for 2006-2013

  - 92% of students significantly supported by went onto next steps in STEM disciplines

  - 30 students took next step in FY13 (SG participation supported from FY06-FY13 funds)
    - 4 are pursuing advanced degrees in STEM disciplines
    - 1 is seeking a STEM position
    - 2 accepted STEM positions at NASA contractors
    - 7 accepted STEM positions in industry
    - 1 accepted a STEM position in K-12 academia
7 accepted STEM positions in academia  
8 went on to positions in non-STEM disciplines

**Fellowships and Scholarships** – In Year 21 (2013/14), SCSGC funded 2 graduate students, 7 undergraduate research awards, 2 NASA Center internships, 4 Minorities in STEM (NEW) awards, and 8 Palmetto Academy student awardees.

**Research Infrastructure** - SCSGC funded 6 REAP faculty projects, for a total of $56,004. All projects are currently underway and we have received interim progress reports. These 6 projects involve 23 participants, ranging from collaborators to undergraduate students. Of the 12 participating students, there are 7 females and 1 African American. One of our faculty REAP awardees is a female African American and disabled service veteran.

**Higher Education** – SCSGC funded 4 faculty Palmetto Research Academy (PRA) projects at 4 different institutions across the state. 11 students participated at the different institutions. Projects ranged from earth science, biomedical science, bioengineering, chemistry, and materials science. 5 of the students were included in their mentors’ research publications; 1 patent was awarded; and 4 open source physics programs were developed. All of the PRA students and several faculty visited NASA Langley Research Center, hearing from scientists and engineers as well as participating in laboratory tours. The students interacted with NASA interns through the Langley Aerospace Research Student Scholars and the DEVELOP programs. One of the students wrote after attending:  
“The program has given me a greater appreciation for NASA and the work they do. It made me realize that a lot of everyday technology is something NASA has been using for some time period” (J. Bunch, University of South Carolina).

2013 Palmetto Research Academy (PRA) awardees include:
- Dr. Adem Ali, College of Charleston, *Evaluating water quality parameters and assessing algal bloom dynamics in the coastal waters of South Carolina using hyper – and multispectral sensors aboard NASA’s space vehicles*
- Dr. Jeffrey Anker, Clemson University, *Developing Optical Strain Gauges for Passive Remote Strain Sensing*
- Drs. Scott Argraves and Jamie Barth, Medical University of SC, *Biomedical Issues Regarding Space Travel*
- Dr. Frank Chen, University of SC, *Advanced Solid Oxide Cell Technology to Support NASA’s Planetary Exploration Missions*

- **Outcome 2: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty:**

SCSGC participated in many events that contributed to Outcome 2 through educational opportunities for students, teachers and faculty, administrators and STEMinterested staff such as guidance counselors. Examples of some of these activities are:
SCSGC Supported the **Palmetto Scholars Academy’s participation in the Mission 4 Student Spaceflight Experiments Program (SSEP)**. The Palmetto Scholars Academy (PSA) is a SC Charter School serving the gifted & talented and exceptional students, grades 6 – 12. Starting in March 2013, students began a brainstorming process with the help of mentors from the National Oceanic and Atmospheric Administration (NOAA) and SCSGC. Students chose topics to research and formed groups. Students spent days analyzing and researching their topics. For students who desired more research and writing time, “Above & Beyond Sessions” were offered after school and on weekends. Space and Naval Warfare Systems Command (SPAWAR) personnel, as well as SCSGC and College of Charleston students and faculty members served as mentors to the PSA students during these sessions, which enabled them to fully develop their ideas. Although “Above & Beyond” sessions were optional, 6-30 students attended each session.

Seventy-eight proposals were received in this school-wide implementation of the SSEP. Proposal writers at the Scientific Research Corporation (SCIRES) selected three finalists by means of a confidential, blind process. The three selected proposals were submitted to the National Center for Earth and Space Science Education (NCESSE), and leaders from the NCESSE selected a proposal for spaceflight. The finalist proposal posed the following question: *How does microgravity affect the oxidation of iron in a saltwater solution?* The experiment flew aboard the International Space Station in February 2014 and was recently returned to the students for analysis. Ground-truth experiments (the controls) were run concurrently at PSA by the student investigators.

**SC Space Grant presented several NASA-related topics to pre-service teachers as part of a course on *Earth Science for Teachers*.** Content and activities were presented much as we would for an in-service educator professional development, helping to raise awareness of NASA’s unique capabilities (Objectives 2.1 and 2.3) and that NASA’s STEM resources are readily accessible and can be modified to accommodate students with different learning styles and disabilities. This pre-service educator PD equipped soon-to-be formal educators with the skills and knowledge to attract and retain students in STEM disciplines. One of the pre-service teachers is hearing-impaired, and provided many helpful suggestions for working with students who are deaf or hearing impaired.

**SC Space Grant will again be presenting NASA content and resources to a class this summer (2014); *Planetary Science for Teachers*.** The pre-service teacher with a hearing impairment mentioned above will participate.

**SCSGC is also supporting the College of Charleston’s participation in the National Solar Spectrograph Competition (NSSC) for 2014**: We are supplying a SC team with $2,000 for expenses to compete in the NSSC held at Montana State University in Bozeman, Montana in May 2014. In 2013, the SC team won first place in the “Best Science” Category. The 2014 team, involving 6 students, one of whom has a disability, intends to study the light reflected off of Venus and Jupiter to determine the composition of the upper atmosphere for each planet.
For the past five years, our Director, a Geology professor, has co-taught the NASA Mission Design class with Dr. Jon Hakkila, College of Charleston (CofC) Campus Director and Professor of Physics and Astronomy. For this two-semester course, undergraduate science students at CofC are teamed with senior undergraduate engineering students at the University of Alabama – Huntsville. Once divided into fire-walled teams, the students work closely together to design a fully competitive space exploration mission to the selected destination for that year. This year it is Venus. Next year it will be Europa. Space Grant helps connect the students to NASA mission resources, including aerospace-related scientists and engineers from NASA and industry.

The science students must define their science goals and objectives based on those outlined in NASA’s Strategic Plan and by the Mission Directorates. They must also identify specific instruments, data and measurements they will need to achieve the goals and objectives and define a baseline and threshold mission. The engineering students must design the spacecraft and mission architecture so that it supports their respective science team. Together, the teams write a full proposal and defend their final concepts in front of an august review board that includes scientists and engineers from NASA and related industries. Throughout the process, the students learn patience, how to communicate effectively – both oral and written, how to work as a team and more.

Former undergraduate students involved in this course have all gone on to pursue a STEM-related career. Many of the science students have gone on to graduate school for a Masters and Ph.D., have done internships with NASA Centers or related industry, or are now working in a STEM-related job. Most of the engineering students are offered jobs in a STEM-related position upon graduation; some with NASA, many with other federal agencies and industry.

**Outcome 3: Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA’s mission:**

In SC, 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 SCSGC developed several new partnerships to broaden awareness of NASA STEM-related opportunities for faculty and staff (Objective 3.1). Palmetto Scholars Academy (PSA) became an Educational Partner in 2013. Trident Technical College and the SC State Museum were added as Educational Partners in 2012, and Orangeburg-Calhoun Technical College in 2012. Trident Technical College is the largest two-year technical college in the state, with more than 17,000 traditional and non-traditional curriculum students. Orangeburg-Calhoun Technical College has 3400 students. Students from both schools have a wide variety of educational goals, from personal enrichment to career development to university transfer. Through these partnerships, students and faculty at the technical schools are eligible for all SCSGC programs.
The SC State Museum, an informal education venue, has four large floors devoted to the disciplines of art, history, natural history and Earth and space science/technology, providing educational environments that entertain, inspire imagination and creativity, and enrich the lives of visitors. In addition, they are currently building a state-of-the-art planetarium, 4-D theater, dedicated NASA-room, and installing a 12” telescope for public viewing nights. Through this partnership, the SCSGC and SC State Museum hosted an educator professional development opportunity (Objective 3.2) integrating a statewide engineering design challenge, using the next generation science standards and aeronautics as a focus. Aspects of this professional development were filmed by SC ETV to be broadcast to more than 12,000 classrooms in the U.S.

The SCSGC annual objectives and outcomes of success are:

I. Consortium Management (Goals 2 and 6)

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 or by the deadline. This objective was met.

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** – Unfortunately, we were only able to support 2 student internships at a NASA Center in 2013. This is a direct result of funding restrictions, the 2013 Continuing Resolution and Sequestration causing many NASA programs to cancel or reduce their offerings for this summer period. We did host the 2013 National Space Grant Director’s meeting in Charleston, SC. While NASA officials were restricted from travel and could not attend (again, due to Sequestration and travel restrictions), the meeting was a success. 13 of our 15 Campus Directors attended and were able to meet many other scientists and engineers in their fields. Several new research projects were spawned from this meeting. Additionally, more than 20 undergraduate and 15 high school students attended and/or presented.

The internship portion of this objective was not fully met due to the lack of available NASA center internships in 2013. However, the relationship-building 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** – The SC Space Grant team revised its Bylaws in 2012 to reflect the diverse interests of the member institutions, NASA and the state. Specifically, two educational partners, 2 technical colleges, and a state museum, were voted into the consortium. We are talking with the Lowcountry Hall of Science & Math, The Children’s Museum of the Lowcountry, and The Halsey Institute of Art about becoming an Educational Partner.

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** – The SC Space Grant team met with federal senators and congressman, incorporated the President’s Co-STEM report, and developed a plan around the state’s needs, especially with the arrival of Boeing, Google, and other industry to the state.

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** – In 2013 SC Space Grant was invited to present at the Boeing/SC Research Authority Small Business Innovation Research Workshop. Through this workshop, SC Space Grant began developing relationships with small aerospace/aeronautical businesses in the region. Discussions regarding a joint project with the SC Research Authority unmanned drones effort are underway. While this objective has not been met directly, the much needed relationship building with SCRA and their partners has “set the ball in motion” for a faculty or student internship with industry. We are still in contact with those at Boeing and hope to implement a joint program in the near future.

In addition, following discussion with the SC Sea Grant Consortium, who jointly funds the Kathryn Sullivan Scholarship, the scholarship was modified to reflect a need observed by both consortia. The Kathryn Sullivan scholarship is now a research-based graduate fellowship. Further, in support of the joint sponsorship, the applicants are required to show relevance to both NOAA and NASA. While we did not have any qualified applicants in 2013, we did have a very well qualified awardee for Year 22 2014/15.

**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:** The SCSGC website is updated on a weekly basis to reflect new opportunities within NASA.

**Outcome** – Our Program Manager has assumed the role of social media manager. She
updates the newly created SC Space Grant Page and posts at least one a day on Facebook. She has also created a LinkedIn account for SCSGC and we have joined Twitter (but don’t yet use it much). In addition, the consortium website is currently getting a face-lift to be more user-friendly. It is updated on a weekly basis to reflect new opportunities within NASA. This year, the consortium implemented a student spotlight area, where SC students who are making strides in STEM are highlighted. In addition, the media relations office at the College of Charleston developed several videos highlighting SC Space Grant and the faculty and students participating in our programs. A list of videos/news articles are below:

SC Space Grant – General Information about the Program: [http://www.youtube.com/watch?feature=player_embedded&v=bVB0NIdywBo](http://www.youtube.com/watch?feature=player_embedded&v=bVB0NIdywBo)
Laura Stevens – Undergraduate Awardee: [http://www.youtube.com/watch?v=HFLPvF8M7gA](http://www.youtube.com/watch?v=HFLPvF8M7gA) and [http://news.cofc.edu/2012/11/19/undergraduates-professor-discover-new-extrasolar-planet/](http://news.cofc.edu/2012/11/19/undergraduates-professor-discover-new-extrasolar-planet/)

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* – The SC Space Grant website updates its education opportunities on a weekly basis providing faculty and educator’s access to NASA programs, workshops, webinars, and more. In addition, the consortium forwards all NASA STEM-related opportunities from other SG consortia to our affiliates.

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** – We are continually working with our HBCUs/MSIs. In addition, this year, we added a technical college, Trident Technical College, as an educational partner and have begun discussions with other technical/community colleges in the state to incorporate their students and faculty into our programs. We are currently writing a proposal with Trident Technical College in response to NASA CAN, “Competitive Opportunity for Partnerships with Community Colleges and Technical Schools.”

**This objective was met.**

**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** – We review our entire program annually to ensure that we are meeting our overarching goals and objectives and ensure that our awardees are adequately tracked. The NSGF provides data from our longitudinal tracking. Updating our website is part of our annual review. We received comments and suggestions for our members as well as from our student awardees.

**This objective was met.**

**II. Fellowship/Scholarship Program (Goal 4)**

**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** – Campus visits, Virtual Skype presentations 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 Program Award applicants and the Palmetto Research Academy Faculty applicants are reviewed both externally and internally to ensure fair distribution of funds.

**This objective was met.**

**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** – In 2013, SC Space Grant funded 2 students to participate in NASA Center internships, including Marshall and Langley. The students have either presented at a national meeting or at their host institution. There was a lack of programs in summer 2013 due to Sequestration. This, along with a decrease in funding, led to a much smaller numbers of NASA Center Internships hosted by SCSGC.

**This objective was not 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 to support research through SCSGC each year.

**Outcome** – We only had students at NASA centers for internships. However, we are working on developing relationships with industry as mentioned above (Objective I.5). **This objective was not met.**

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** – Our projects are all currently in progress. As such, our students have not met the milestone of graduating from college or continuing on to graduate school. Based on past data, however, 92% of our students significantly supported by SC Space Grant from 2006-2013 went onto next steps in STEM disciplines. The presentation and publication rate is also not known at this time. However, all students are required to present, which typically entails an abstract submission with their mentor. We will know if this objective has been met next year upon receiving their final reports. **We anticipate meeting this objective.**

All of our students are required to present at a regional or national meeting as part of their SCSGC award acceptance. One meeting that many students attend is the South Carolina Academy of Sciences (SCAS). The SCSGC co-sponsored the 2013 SCAS meeting. Students and faculty will be presenting, either orally or through a poster, and we will also have a representative present to discuss Space Grant and our activities. We have decided that we partner with SC Sea Grant and, together, we will host a Student Research Conference in 2014 for current awardees.

Objective II.5: (Diversity) Ensure funding for fellowships and scholarships to women, underrepresented minorities, and persons with disabilities by utilizing intensive marketing techniques (e.g., 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** – In 2013, A Minorities in STEM Research Fellowship was implemented. Overall, the SCSGC awarded 23 student awards, 5 of which were awarded to females and 3 of which were awarded to underrepresented minorities. Two awardees reported having a disability. **This objective was not met.**

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 an advanced degree.
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. 86% of our student awardees from 2006-2012 have been successfully tracked through their next step, 100% from 2012.

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 Obj. I.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 – We review our programs, policies and applications annually. This year, 2013, the SCSGC updated its Bylaws and future revisions are in process. This objective has been met.

III. Research Infrastructure (Goal 3)

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 – In 2012, ten awards were funded from 7 different institutions, the University of SC, College of Charleston, Coastal Carolina University, Clemson University, The Citadel, Claflin University, and the University of the Virgin Islands. Awardees and their projects include:

- Dr. Adam Hoover, Clemson University, Portable Hardware for Sensorimotor Adaption
- Dr. John Chadwick, College of Charleston, Mapping and Modeling Olympus Mons Subsidence Using Lava Flows as Paleo-Slope Indicators
- Dr. John Wagner, Clemson University, Pilot Testing K-12 Climate Change Investigations
- Dr. Bradley Smith, University of South Carolina, Effects of NASA’s STEM Program on Middle School Students’ Academic Performance
- Yuanyuan Peng, Claflin University, Development of Coursework to Support Curriculum Development in Applied Mathematics at Claflin University
- Dr. Narcrisha Norman (Ron Beasley), Clemson University, Renewable Energy Technologies Application and Prediction: RETAP Earth and Beyond

The six projects are all currently in progress. We will know if this objective has been met 60 days after completion of their project when we receive their final reports. It is
anticipated that we will meet this objective. At this interim reporting time, these 6 REAP awards have resulted in; 1 presentation, 4 publications, 2 NASA partnerships and 2 course curricula.

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** – Our projects are all currently in progress. We will know if this objective has been met next year upon receiving their final reports. For numbers, see above Outcome III.1. **It is anticipated that SSGC will fully meet this objective upon completion of the projects.**

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** – Through a NASA EPSCoR award, 11 faculty, previously funded with Space Grant and/or NASA EPSCoR, have traveled to NASA centers to meet with NASA scientists regarding future collaborative efforts. Most of these trips have involved a student traveling as well, providing them a unique experience at NASA. The remaining SCSGC REAP travel awardees traveled during the spring 2013. **This objective has been met.**

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** – SCSGC visited several campuses to promote each program. In addition, we hosted Skype presentations for faculty and students at each campus for those interested in learning more about our programs and opportunities. Special attention was paid to recruiting women and underrepresented minorities for our competitive programs. Of the 12 students who participated in the REAP program, 7 were female and 1 was an underrepresented minority. 58.3% of our students participating in a REAP program were either female or an underrepresented minority. Of the 11 non-student researchers, there were two females, one of which is an African American service disabled veteran. **This objective has been met.**

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 Obj. 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** – We require interim and final reports from all REAP PI’s. These reports must be very detailed and include all necessary information to complete our annual reporting
to NASA HQ. Final reports are required before final invoice payment will be made. These data are compiled on an annual basis and are distributed to our campus directors for review upon receipt of final reports. In all reports we require information on participants, current project status, a list of conferences, presentations, publications, patents, grant proposals submitted and/or funded, new technology and intellectual property, and improvements to SC’s research and development as a direct result of their SCSGC REAP awards. These data help inform our program components – what we need to modify, what is working well, etc. This objective has been met.

IV. Higher Education (Goal 1)

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 – We actively act as conduits of information regarding opportunities for the higher education community. Emails are sent out on a daily basis to distribution lists and to campus directors for additional dissemination. New in 2013 – we post information every workday on our Facebook page. The information posted varies from general NASA news, NASA opportunities, South Carolina-specific NASA news and/or opportunities through our SC Space Grant and SC NASA EPSCoR programs. In addition, our website is updated weekly with information from these resources. Student spotlights change monthly. Our Program Manager also posts activities, information and opportunities on the SCSGC Facebook site at least once each day. This objective has been met.

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 – The Palmetto Research Academy involved 4 sites, all of which were linked to NASA-relevant research or used NASA data. In addition, the PRA students and several faculty traveled to the NASA Johnson Space Center to learn more about research being conducted throughout NASA. Students met with NASA scientists and engineers and toured several facilities. In addition, all of the PRA students shared their research at a final presentation ceremony. Many students have also presented at various national and regional conferences. This objective has been met.

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 year the SC Space Grant was invited to present at the Boeing/SC
Research Authority Small Business Innovation Research Workshop. Through this workshop, SC Space Grant began developing relationships with small aerospace/aeronautical businesses in the state. Discussions regarding a potential joint project with the SC Research Authority unmanned drones effort are ongoing. This objective has not yet been met but is currently underway.

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 – The 2013 Palmetto Academy Program supported 8 white males. We were disappointed in the number of applications as well as the lack of diversity in applications in 2013. One of the PA faculty is an African male and another non-student participant was a white female. This objective has not been met.

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 Obj. 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 – 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. Through both of these mechanisms, SCSGC is able to modify its higher education program to ensure it is meeting all goals. Finally, the Associate Director is in constant communication throughout the summer with faculty and students (via a listserv) to discuss potential issues or successes. This objective has been met.

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

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 – We distribute information on a daily basis to our contacts throughout the state and through contacts in Education departments on our member campuses. We also advertise through our Educational partners. In addition, we advertise activities, promote programs and distribute NASA news through our SCSGC Facebook page, which is updated 5 days/week and our website, which is updated weekly. This objective has been met.

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. SCSGC will also inquire about their using NASA educational materials in their classrooms.

**Outcome** – Due to a decrease in funding, we were not able to support this program in 2013. Our budget was reduced by 40% and this was one program that has suffered because of that reduction. As a result we have temporarily suspended this program pending further discussion. **This objective was not met.** At our next SCSGC meeting, we will discuss and edit the Outcome Indicator for this objective.

**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** – SCSGC hosted and/or participated in many public events in support of NASA (see below). **This objective has been met.**

- The SCSGC main office staff participated in the **College of Charleston Lady Cougars STEM Education Day** was held on Feb. 27, 2014. There were just over 1,500 4th – 8th grade students and teachers in attendance. SCSGC ran a hands-on and demonstration booth. The kids were able to use Oreo Cooking to create the various stages of the moon.

- **Charleston STEM Festival**, Feb. 8, 2014: The Charleston STEM Festival brought awareness of the wonders of hands-on science, technology, engineering and math (STEM) to the Lowcountry community. This event was hosted at the College of Charleston. Children and families explored exhibits and interactive demonstrations hosted by the collaborating organizations as well as local industries, non-profits and educational institutions in the area. 200 attended this rainy-day event.

- **11th Annual Charleston County First Day Festival**, SCSGC set up a booth in August 2013 at the Charleston County First Day Festival. The 6,233 attendees included students and their families. They received information and engaged in educational, interactive activities from many exhibitors. The First Day Festival allowed the community to come together to celebrate the beginning of the new school year. Children and their families were able to receive a backpack full of school supplies, visit the SC Aquarium, take a boat ride in the harbor, learn about healthy lifestyles, and play in the Kids Zone. One important part of the 11th Annual First Day Festival was the school supplies that were handed out to thousands of children. This year, 41 organizations and businesses collected supplies to pack 4,000 First Day Festival string backpacks. Packing and sorting events were held at the Charleston County Government Building, at the Mayor’s Office for Children, Youth, and Families, and at the Maritime Center.

- **Back to School STEM Educator Fair for Richland One and Lexington Two School Districts**, SC State Museum, Columbia, SC, September 12, 2013. SCSGC set up an information table
for the approximately 100 teachers who attended this event. A NASA video greeting was shown as well as a StarLab Planetarium Show, Guided Tours and showings of the Exploration of Science and Technology Galleries.

- The main office staff attended and managed a demonstration table at the Charleston Riverdogs Professional Baseball Team Education Day on April 9, 2014. Over 6,000 K-12 students attended this event. This event was hosted to raise awareness about Science, Math and Technologies. Booths were set up by many organizations from the Charleston area and from within SC.

- Sedgefield Middle School, Goose Creek, SC, SC Space Grant Presentation, March 8, 2014. SCSGC made a presentation to an 8th grade class about fossil fuels, planetary science and potential travel to Mars. The students loved the discussion about traveling to Mars and became very excited about NASA’s future. There were over 115 students in attendance.

- Science Night, Charleston Charter School for Math and Science, April 8, 2014. SCSGC gave an invited presentation and three hands-on demonstrations for the students and parents of this new, small school specializing in STEM. There were 400 students in attendance with one or both of their parents and siblings.

- Exploration Station 2013 Exhibits, San Francisco, CA during the American Geophysical Union (AGU) conference—SCSGC was an exhibitor at this event in December 2013. There were over 450 attendees. One parent commented “The most amazing part of this was that we could talk to actual scientist about the exhibits. Their passion and knowledge is contagious!”

**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** – We visited each campus (in person or through virtual presentations through Skype) to promote our programs. Special attention was paid to recruiting women and underrepresented minorities to apply for our competitive programs.

- We have created a new program called MIST, **Minorities in STEM** specifically designed to engage, inspire, educate and share STEM-related research opportunities for underrepresented minorities. All MIST activities are hands-on mentored research experiences designed to immerse the student in a research area of interest to them working side by side with a mentor. We were able to support 4 underrepresented students through this new program.

- In addition, we participated in the **Girls in Science Day, SC State Museum, June 2013.** Approximately 200 middle school girls attended this event. SCSGC sponsored and hosted a booth of hands-on activities and interactive demonstrations related to STEM. **This objective has been met!**
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 Obj. 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 – We are constantly evaluating our programs and making necessary adjustments to better our programs and participant experiences. When possible and appropriate, we have pre- and post-tests to assess effectiveness and content acquisition. This year we developed a needs assessment for middle- and high-school educators across the state. Upon receiving IRB (Institutional Review Board) approval, the survey was sent to educators across the state. We received feedback on what types of professional development are needed – not just desired - from a content and pedagogical perspective. This aided the SCSGC in the design of two workshops for educators. Pre- and post-tests are provided during any SG workshops. This objective has been met.

PROGRAM CONTRIBUTIONS TO NASA EDUCATION PERFORMANCE MEASURES

- Student Data and Longitudinal Tracking:
  Total awards = 23; Fellowship/Scholarship = 15, Higher Education/Research Infrastructure = 8; 4 of the total award represent underrepresented minority F/S funding. During the FY13 program year 4 students are pursuing advanced degrees in STEM disciplines, 1 is seeking a STEM position, 1 accepted a STEM position at a NASA contractor, 7 accepted STEM positions in industry, 1 accepted a STEM position in K-12 academia, 7 accepted STEM positions in academia, and 8 went on to positions in non-STEM disciplines. The remaining students have not yet received the degree that they were pursuing while they received their Space Grant award.

  In addition, we funded 6 research awards to faculty through our Research and Education Awards Program. Within those REAP projects, 12 students are participating in research. 7 are female and 1 is African American. These students are not tracked since they do not receive significant support.

- Minority-Serving Institutions:
  This year, the SCSGC continued nurturing our relationships with the statewide community/technical college system. Many of these are minority-serving institutions. This relationship building will aid our consortium in assessing which institutions may become potential partners in the future. In addition, through our NASA EPSCoR Minority Serving Institution Award, we have developed 3 new contacts. Two of these have become SCSGC Educational Partners. SCSGC now includes all participants of this program in all announcements regarding all Space Grant opportunities.

- NASA Education Priorities:
Authentic hands-on student experiences in science and engineering disciplines

- Four of our programs in 2013 involved hands-on mentored research experiences for students. Our Undergraduate Research Awards, Graduate Fellowships, and the Palmetto Research Academy 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 6 faculty projects which included 15 students, 8 faculty and 3 other participants. These students worked one-on-one with their faculty on NASA science as well.

- For the past five years, our Director, a Geology professor, has co-taught the NASA Mission Design class with Dr. Jon Hakkila, College of Charleston (CoC) Campus Director and Professor of Physics and Astronomy. For this two-semester course, science students at CoC are teamed with senior undergraduate engineering students at the University of Alabama – Huntsville. Once divided into fire-walled teams, the students work closely together to design a fully competitive space exploration mission to the selected destination for that year. This year it is Venus. Next year it will be Europa. Space Grant helps connect the students to NASA mission resources, including aerospace-related scientists and engineers from NASA and industry.

Former undergraduate students involved in this course have all gone on to pursue a STEM-related career. Many of the science students have gone on to graduate school for a Masters and Ph.D., have done internships with NASA Centers or related industry, or are now working in a STEM-related job. Most of the engineering students are offered jobs in a STEM-related position upon graduation; some with NASA, many with other federal agencies and industry.

- Our Director, Dr. Runyon is a senior thesis mentor for a rising senior at Academic Magnet High School. Each student at Academic Magnet must write and defend a senior thesis as a requirement to graduate. Mr. Bruce’s research question is: “Influence of Education and Knowledge on Perception and Support for Future Space Exploration Missions.” Upon graduation, he will be attending Clemson University for materials science and architecture, with the dream of becoming an architect for NASA.

Engage middle school teachers in hands-on curriculum enhancement capabilities

SCSGC understands that students (young and old) learn in a variety of ways. As such, when we present and/or host an event for teachers, whether pre-service or in-service, we are sure to present our material via several modes and to include fun, hands-on activities that will engage them in the STEM content. Examples of this are:

- During the Professional Development workshop at Palmetto Scholars Academy (PSA), teachers (many of whom teach grades 5 – 9), administrators, staff and parents had a chance to work through three NASA science lessons and activities selected by the teachers while simulating several disabilities or exceptionalities with which they work in their classrooms. At the end of each activity, the group shared their observations and suggestions for
modifications (outside of simulators). During the day, the workshop participants also had a chance to experience riding in a vehicle and eating lunch in simulators. This gave them a much better understanding for how their students may experience a school day and many great ideas and/or modifications that they may incorporate to facilitate their students’ learning. Reports from the teachers and administrators six months after the workshop indicate that they have incorporated ideas and concepts shared during the workshop in their classrooms resulting in more engaged students.

- SC Space Grant presented several NASA-related topics to pre-service teachers as part of a course on *Earth Science for Teachers*. Half of the students in the class are planning to teach middle school. Content and activities were presented much as we would for an in-service educator professional development, helping to raise awareness of NASA’s unique capabilities (Objectives 2.1 and 2.3) and that NASAs STEM resources are readily accessible and can be modified to accommodate students with different learning styles and disabilities. This pre-service educator PD equipped soon-to-be formal educators with the skills and knowledge to attract and retain students in STEM disciplines. One of the pre-service teachers is hearing-impaired, and provided many helpful suggestions for working with students who are deaf or hearing impaired.

- SC Space Grant will again be presenting to a class this summer (2014); *Planetary Science for Teachers*. The pre-service teacher with a hearing impairment mentioned above will participate.

**Summer opportunities for secondary students on college campuses**

- Our Director, Dr. Runyon is a senior thesis mentor for a rising senior at Academic Magnet High School. Each student at Academic Magnet must write and defend a senior thesis as a requirement to graduate. Mr. Bruce’s research question is: “Influence of Education and Knowledge on Perception and Support for Future Space Exploration Missions.” Upon graduation, he will be attending Clemson University for materials science and architecture, with the dream of becoming an architect for NASA. While doing his research, Andrew often comes to the College of Charleston. We will also be touring the aerospace research facilities at Clemson and the University of South Carolina.

- SCSGC staff often participate in conversations with prospective students when they visit our respective campuses. When time permits, we also offer tours of the research facilities.

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

- The SCSGC continues to develop and nurture its relationships with the statewide community/technical college system. Trident Technical College and Orangeburg-Calhoun Technical College became educational partners within the SCSGC in 2012. We continue talking with Denmark Technical College (a current MSI awardee) about SCSGC and our competitive programs that would be available for their students and faculty should they...
join. We now include this potential educational partner in all announcements regarding Space Grant opportunities.

- We are currently working with the Technical Schools in SC to write a proposal in response to the recently released CAN; “Competitive Opportunity for Partnerships with Community Colleges and Technical Schools.”

- SC State University Physics professor and SCSGC Campus Director, Dr. Jennifer Cash, will be teaching an on-line course in **Calculus-based Physics** this summer (2014). Students are being recruited from both SC State University and Orangeburg-Calhoun Technical College. Realizing that there were not enough students at either school to be able to offer this course affordably, but between the two schools there were enough, administrators and Dr. Cash cleverly created this new on-line course. NASA STEM content will be used as practical examples for physics problems.

**Aeronautics Research**

- At this time, the SCSGC is in discussion with the Boeing-Charleston facility as well as the SC Research Authority (SCRA) to develop joint internships for students and faculty. Our Associate Director made a presentation at a joint Boeing/SCRA SBIR/STTR conference in February 2013. Through this meeting, she was able to develop several relationships with small aeronautical businesses in the region, especially in SC. Since then, we have had several meetings with SCRA administrators and partners and provided contacts for NASA’s Technology Directorate.

- We are working with the newly established McNAIR Center housed at the SCRA facility adjacent to the University of South Carolina campus. In the Spring of 2013, our Director, and Associate Director, and the Director of Education at the SC State Museum (an Educational Partner) travelled with the McNAIR Executive Director and the Vice Provost and V.P. for Research at the University of South Carolina to NASA Langley. At Langley, the SC group met with cadre of engineers, scientists and educators to brainstorm potential projects and programs that would be mutually beneficial to SC and NASA. We are currently writing several joint proposals based on discussions from this meeting.

- One of the PRA projects focused on developing a suborbital telescope camera engineering test-bed to fly aboard the XCOR Aerospace’s Lynx spacecraft. The Citadel team successfully developed a mounting system for their telescope, as well as a design (and prototype) for a payload box for their electronics. The team developed a power system for use in-flight and also developed a control box that allows them to take video and snapshots, and allows both manual and automated advancing of the filter wheel. The PRA team fitted a guide camera to the system as well. Basic function testing was verified at the XCOR facility in Mojave, California.

**Environmental Science and Global Climate Change**

One Palmetto Academy site focused on environmental science:
Dr. Adem Ali at the College of Charleston worked with students to develop a comprehensive dataset containing water quality and radiometric measurements from a diverse set of locations along the Long Bay coastline. A common trend in the data suggests that discharge from freshwater inlets, primarily Winyah Bay and North Inlet, are likely sources of sediments, nutrients and organic materials. Higher concentrations of chlorophyll-a, suspended matter and dissolved organic material were measured at stations adjacent to, or directly south of these freshwater sources. These sources, along with submarine groundwater discharge are considered to be likely sources of terrestrially-derived nutrients that affect water quality in the Long Bay Area. This collected data was used to develop a novel ocean color monitoring technique that employs multivariate regression modeling.

Two of our Faculty REAP awards focused on Environmental Science and/or Climate Change:

- At Clemson University, Dr. John Wagner conducted an Education Research project entitled “Pilot Testing K-12 Climate Change Investigations”. The goal of the project is to add several ‘climate change’ related activities to existing sets of curriculum materials already in common use in many South Carolina K-12 classrooms. The SE MAPS program utilizes topographic maps, satellite imagery, and other remotely-sensed images as a framework for interdisciplinary, inquiry-based activities interrelating landscapes and landforms with historical and cultural trends. The existing SE MAPS activities address primarily earth-science and geography curriculum standards at several grade levels (primarily 3rd, 7th, 8th, and high-school environmental science classes). The existing classroom activities were all written before 2002 and climate change was not a priority issue at that time. A group of three Clemson University undergraduate Environmental Engineering majors has been working for several months to design new activities, focused on climate change, for teachers to use with the existing cartographic products. These students are receiving one unit of academic credit for their work. Three activities have already been completed and a fourth is in progress. We are partnering with a Science teacher at Blue Ridge High School in Greenville County to pilot test these activities in his classroom. Once we get feedback from the teacher, we will revise/edit the lessons to conform to ‘best practice’ guidelines and post the lessons on the website of the South Carolina Earth Science Teachers Association for free download.

- Also at Clemson University, Dr. Narcrishna Norman and Dr. Donald Beasley worked on a REAP project entitled, “Renewable Energy Technologies Analysis & Predictions: RETAP Earth and Beyond.” This research project’s goal is to teach the concept of Renewable Energy Technology (RET’s) on Earth and beyond, analyzing and developing predictive mathematical model concerning the efficiency of RET’s in extreme environments and introducing the concept of RET’s on Earth and other celestial Bodies to the K-Grey community.

Diversity of Institutions, faculty, and student participants

- Of our 15 member institutions, four are HBCU’s and of our 4 Educational Partners 2 are Technical Colleges, 1 is an informal institution/museum and 1 is a K-12 Gifted and Talented school. Each of our affiliate institutions serves underrepresented communities. Of our 15 member institution campus directors, 4 are female, 1 is African American and 3 are Asian.
From the Educational Partners, the liaisons include 1 African American female, 1 white female and 2 white males. Among our main office staff, 2 are white females (and we had a 3rd through December, 2013 when our Assistant Director left). Our current office assistant is an African American female with a STEM undergraduate degree. As a Consortium, we strive to have a diverse pool of qualified applicants for all of our programs. We continue to work closely with minority programs like McNair Scholars and the SC Alliance for Minority Participation on each campus to make sure that we reach as many underrepresented students as possible. In 2013 we funded a diverse group of students, ranging in gender, ethnicity, exceptionalities/disabilities, experience and education level and STEM disciplines.

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 support new and early career faculty and put them on a track toward working on large NASA-related research grants. For example, a new faculty receives a $2k travel award, then an $8k research initiation award and then a $30k research grant through our programs over the course of three years. This stepping-stone, or ladder, approach to becoming immersed in NASA research has proven successful in SC, often leading to much larger NASA EPSCoR grants. For example, four previous Space Grant REAP/PRA awardees received $750K NASA EPSCoR grants (3 in 2009 and 2010, 1 in 2012). As such, we encourage new faculty to apply for all of our programs to begin climbing their ladder of success. As a ladder of success, Dr. Jim Ritter in USC’s Chemical Engineering department proposed, in 2004, to investigate robust process simulators for absorption technology through SCSGC’s REAP program. He was funded at $6K, conducted his research, and in 2008 was awarded $30K from the much larger research grant program through SCSGC and NASA EPSCoR. Using his findings from these small awards, Dr. Ritter collaborated in 2009 with Vanderbilt and won NASA EPSCoR's $750K research award. As of 2011, he has submitted two winning proposals to WR Grace and INGEMCO that began with this initial Space Grant funding. SCSGC’s initial $36K investment has resulted in more than $490K in research funds for SC!**

**Two success stories that demonstrate the impact Space Grant is having in SC are:**

**Dr. Jeffrey Anker, Clemson University:**
Two Palmetto Academy awards in 2010 & 2011 ($50K) to Dr. Anker, an Assistant Professor at Clemson, led to the development of a chemical sensor used to facilitate point-of-care diagnostics during extended space travel. Subsequent student discoveries and design modifications of the sensor led to a two-year $100,000 pilot project funded by Clemson’s Center for Biomedical Excellence (COBRE) to study bone healing using luminescent tension indicating orthopedic screws and plates.

In addition to biomedical applications, the team realized that such non-invasive strain measurements are essential to materials testing and monitoring of structural deformation in a wide variety of instruments, structures, and vehicles used by NASA. With these applications in mind, a team of Palmetto Academy students in 2012 and 2013 (~$35K) designed strain-indicating stickers that changed their color according to the mechanical
strain on the structure. **Two of the undergraduate students were listed as inventors on a patent application based on this work!**

- **Dr. Frank Chen, University of South Carolina:**
  In 2009, as a new junior faculty in Mechanical Engineering at the University of South Carolina, Dr. Fanglin (Frank) Chen proposed and was awarded $16K (Palmetto Research Academy) to develop unitized regenerative solid oxide fuel cell technology to support NASA’s planetary exploration missions, and $30K (Research and Education Awards Program) to improve performance and durability of unitized regenerative solid oxide fuel cell via development of electrode com-positions and microstructures, both through the SC Space Grant Consortium and NASA EPSCoR Research Grant Program.

  Dr. Chen carried results from these SCSGC funded studies forward to receive a NASA EPSCoR $750K award in 2010. **Building on the research results supported from the SC Space Grant Consortium’s initial $46K investment, as of 2013, Dr. Chen has been awarded more than $4M in research funds** from several agencies such as the Department of Energy, National Science Foundation, the Defense Advanced Research Projects Agency, the Air Force Research Laboratory, the US Army, and the Savannah River National Laboratory. **Dr. Chen also received the 2013 South Carolina Governor’s Award for Excellence in Scientific Research!** All of these accomplishments began with the initial $16K seed funding from the SC Space Grant Consortium.

**IMPROVEMENTS MADE IN THE PAST YEAR**

At the end of FY12, Dr. Cassandra Runyon was voted in as Director of SCSGC. Cynthia Hall served as Associate Director from Dec. 2012 until Dec. 2013 and is no longer working with SCSGC. However, Ms. Hall accepted a position as Director of the Lowcountry Hall of Science and Math. During this short period of time since she left the SCSGC main office team, SCSGC has worked with the Lowcountry Hall on numerous STEM outreach activities (listed in this report.) We hope that the Lowcountry Hall will also become an Educational Partner. Tara Scozzaro serves as the project manager. And, we moved into brand new office space that better accommodates the needs of our programs. Since this time, the SCSGC has been rejuvenated. The SCSGC reorganized the executive board and continued with the two subcommittees to evaluate gaps, successes and needs within the consortia. For the first time ever, SCSGC Initiated a significant presence at the premier student STEM conference in SC; the SC Academy of Sciences (SCAS). Overall, the SCSGC has become more involved in the national space grant network; the Director was selected as a National Space Grant Alliance board member and was re-selected as the Science Mission Directorate space grant representative Co-lead. She now also serves on the new NASA Center Internship board. Through this involvement, we have been able to communicate more effectively within the national network. In 2013, as a SC Space Grant Consortium representative, Dr. Runyon was a judge for the National Solar Spectrograph Competition hosted by Montana State University and will be judging again in 2014.
In October 2013, SCSGC was pleased to host the National Space Grant Meeting in Charleston, SC. This meeting was a wonderful way for our Consortium to highlight our programs and network with our peers. Many commented on what a great meeting it was despite the lack of NASA personnel in attendance (due to Sequestration and the Federal Shutdown).

The Palmetto Scholars Academy, Orangeburg-Calhoun Technical College, SC State Museum and Trident Technical College have been approved as educational partners. They will help develop new strategies for the Consortium and participate in educational opportunities of interest. We continue to talk and work with Denmark Technical College with the intent of them becoming an Educational Partner. In addition, we continue discussions with Boeing SC, the SC Research Authority, Google Charleston and other potential STEM industry partners. We will continue to build relationships over the next fiscal year.

Since its inception, the focus for SCSGC has been higher education. However, in the last two years, we have been working with more middle- and high-school teachers and programs to enhance and promote STEM education in SC. The educator professional development opportunities we offer and/or participate in help to diversify our portfolio of activities and inspire the next generation of STEM leaders. We continue to leverage funding and resources by partnering with our neighbor space grant affiliates for these educator professional development opportunities.

Finally, the SCSGC main office has served as a broker for many affiliates and partners within the Consortium. The team has assisted with proposal writing for various NASA programs related to STEM education and research, budget development, and resource sharing. We help connect interested researchers –both student and faculty – with the appropriate NASA Center and/or resource.

**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. Member institutions include:

- 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). Educational Partners include:

- South Carolina State Museum, informal education
- Trident Technical College, Charleston, SC
- Orangeburg-Calhoun Technical College, Orangeburg, SC
- Palmetto Scholars Academy, Charter school for the Gifted & Talented, Charleston, SC

The National Space Grant Office requires two annual reports, the Annual Performance Data Report (APD) and the Office of Education Performance Measurement System (OEPM) report. The former is primarily narrative and the latter data intensive. Because the reporting timeline cycles are different, data in the two reports may not necessarily agree at the time of report submission. OEPM data are used for official reporting.