

South Carolina Space Grant Consortium at the College of Charleston

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Affiliate members include Benedict College, Coastal Carolina University, Claflin University, Clemson University, Francis Marion University, Furman University, Lander College, the Medical University of SC, South Carolina State University, The Citadel, the University of South Carolina, Wofford College and the University of the Virgin Islands (on probation).

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 is a Capability Enhancement Consortium funded at a level of \$410,000 for fiscal year 2007.

Program Relevance to NASA: Space Grant consortia build human capital and research expertise to support NASA programs and missions, expand NASA's expertise and educational networks, and bring knowledge and awareness of space to a broad range of constituents in every state. Each of our competitive program awardees **MUST** demonstrate a direct link to current NASA-related projects and have a written description of how their proposed project is related to NASA. This includes all of our student awards, our higher education/REU programs and all of our faculty research projects, funded through SCSGC REAP (Research and Education Awards Project).

Program Benefits to the State:

South Carolina's economic plan calls for increased research in high-tech fields such as engineering, biotechnology, information sciences, and nanotechnology. A major obstacle for South Carolina's economic growth is the lack of a trained workforce capable of working in these and other high-tech fields. Crucial in developing South Carolina's workforce is strengthening research activities on college campuses. This consortium provides funds to faculty researchers and students (graduate and undergraduates) to conduct research on NASA related projects. This consortium's emphasis on funding competitive research to support NASA's mission and goals increases the potential numbers of well-trained persons that can further South Carolina's economic development. Furthermore, SCSGC efforts support the training of women and minority students in sciences and engineering.

Program Goals:

Mission Statement: The consortium exists to implement the National Space Grant Act of 1988 in South Carolina. Within the larger context of national science and technology initiatives, we promote activity in research, education, and public service related to the NASA mission. The Consortium has six goals to accomplish its mission statement. All of our research, education, and public outreach programs fulfill one or more of the goals listed below.

GOAL 1. To increase access, understanding, development, and utilization of resources in four areas: space science, Earth system science, biological sciences and aeronautics.

GOAL 2. To encourage cooperative programs among colleges and universities, state organizations, business and industry, and pre-college interests.

GOAL 3. To enhance interdisciplinary research, education and public service activities.

GOAL 4. To recruit and train students, educators, and professionals, especially women and underrepresented groups.

GOAL 5. To promote a strong science, mathematics and technology base throughout all levels of South Carolina education.

GOAL 6. To facilitate statewide communication of NASA opportunities and programs.

Program Accomplishments:

In 2007 we awarded over \$372,000 in faculty and student awards. We supported 13 faculty research projects with SCSGC (and SC NASA EPSCoR Funding), 2 REU programs and 23 student fellowships and scholarships. Within these projects, 76 students were supported: 23 fellow/school awards, 14 students in REU's/Higher Education, 39 in research infrastructure. Of the 76 students that SCSGC projects supported (with any award amount) in these programs, 40.8% were females and 23 of the 76, or 30.3%, directly funded students were underrepresented minorities.

Research Infrastructure - REAP - The SCSGC provided \$192,000 in direct research funding from Space Grant and (NASA EPSCoR) and received \$224,700 in matching funds to further the faculty's research. The programs funded 13 faculty awards: 5 from research-intensive universities (4 from Clemson, and 1 from MUSC) and 8 from predominately undergraduate colleges (1 from C of C, 2 from Coastal Carolina University and 5 from Claflin University (HBCU)).

Higher Education - REU - The overall objective of the SCSGC-REU program is to increase interest among South Carolina students in pursuing aerospace-related careers. Our mentored SCSGC-REU site advanced NASA's research agenda and raised NASA's profile in the SE region. In 2007 there were two REU programs: one at MUSC - NASA Space Grant REU In Bioastronautics 2007 and another at Clemson - 2007 South Carolina Space Grant REU in Advanced Materials.

Student Accomplishments:

We awarded 23 student awards in 2007 with SCSGC base funds. Each awardee from fell/school and REU's are required to make at least one presentation about their research project. Every year we hear more and more success stories from previously funded students. Below are just a few to share with you.

Graduate Success Story!!

Two previous Year 14 Graduate Fellowship awardees received fellowship support from a grant won by Ted Bateman at Clemson University. Both students, Eric Bandtra and Jeff Willey, received SCSGC Fellowship awards for their projects tied to Radiation-Induced Bone Loss. Dr. Ted Bateman received \$2 million in grants to study radiation-induced bone loss. Both the National Institutes of Health (NIH) and a branch of NASA, the National Space Biomedical Research Institute (NSBRI), are primary contributors of funds to the study as a result of its two-dimensional application. Related grant support includes a fellowship from NASA's Kennedy Space Center for graduate student Eric Bandtra (a Year 14 SCSGC Graduate Fellowship Awardee) to study space radiation and bone loss. Senior graduate student Jeff Willey (another Year 14 SCSGC Graduate Fellowship Awardee) has received a post-doctoral fellowship from NSBRI to support his continued research with radiation-induced bone loss at Clemson and Wake Forest universities.

Undergraduate Success Story!

Justin Moore, a Furman University senior double major in physics and computer science, was awarded 2nd prize in the undergraduate student paper competition at the Association for Computing Machinery Mid-southeast conference in November. According to the program chair there were more than 40 student papers submitted. Justin received a South Carolina Space Grant Consortium Year 15 Undergraduate Student Research Fellowship to support this research which was jointly supervised by Professor Bill Baker in physics department and Dr. Hayden Porter (Furman Campus Director). Justin's research is on star cluster formation in the presence of dark matter as well as developing parallel algorithms and dynamically formed computer clusters to work with large numbers of stars. Justin's research resulted demonstrated an increased the performance by over 1500 times over an initial parallel implementation in Mathematica. He has also developed a 3D stereoscopic interactive visualization of cluster formation that can be run in the Computer Science Department's 3D theater and is developing a version that can be displayed in the planetarium that was recently installed in the new Townes science building complex at Furman University. Justin expects to be attending graduate school next year.

Kathy Sullivan Fellowship Success Story!

Ms. Caroline Yount, our Year 14 Kathy Sullivan Awardee, graduated from Clemson University in 2007 with a degree in Physics. She is currently enrolled at Vanderbilt University in the Masters of Science Medical Physics Program. Medical Physics is an applied branch of Physics devoted to the application of concepts and methods from Physics to the diagnosis and treatment of human diseases.

NASA Student Internship Success Story!

Stephen Strickland (Wofford sophomore double major in Physics and Mathematics, Emphasis in Computational Science), one of our Year 15 SCSGC internship awardees, won Second Place in the Student Research Contest of the 2007 Consortium for Computing Sciences in Colleges Southeastern (CCSC-SE) Conference. Based on a poster presentation and other criteria of excellence, CCSC-SE referees selected five finalists to give full presentations of their work and from these selected the top three winners. Stephen's poster and talk, "An Examination of Martian Topographical Dichotomy Using SHARAD Data and an Analysis of Martian Gullies for Future Campaigns," were on his summer internship research at NASA's Jet Propulsion Laboratory in Pasadena, California. His poster is on display in Wofford's Olin Foyer. He also gave a talk at Wofford on his research.