

Georgia Space Grant Consortium
Georgia Institute of Technology
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PROGRAM DESCRIPTION

The National Space Grant College and Fellowship Program consists of 52 state-based, university-led Space Grant Consortia in each of the 50 states plus the District of Columbia and the Commonwealth of Puerto Rico. Annually, each consortium receives funds to develop and implement student fellowships and scholarships programs; interdisciplinary space-related research infrastructure, education, and public service programs; and cooperative initiatives with industry, research laboratories, and state, local, and other governments. Space Grant operates at the intersection of NASA's interest as implemented by alignment with the Mission Directorates and the state's interests. Although it is primarily a higher education program, Space Grant programs encompass the entire length of the education pipeline, including elementary/secondary and informal education. The Georgia Consortium is a Designated Consortium funded at a level of \$575,000 for fiscal year 2012.

PROGRAM GOALS

The proposed programs were designed to reflect the geographic, gender and ethnic demographics of Georgia. The target goals for all programs will represent the demographics of the State of Georgia, as well as the enrollment of students in colleges and universities according to the National Center for Educational Statistics (Underrepresented Groups – 36.33% which is a decrease from previous years and %, Women – 59.8% which is an increase from previous years).

Outcome 1

The programs being conducted by the GSGC consist of providing research opportunities that enhance students' research capabilities and prepare them for STEM employment. Programs are directed at the undergraduate and graduate level with a strong focus on underrepresented groups in their freshman and sophomore years.

Outcome 2

Hands on research, seminars, and professional development workshops capturing all STEM subjects will be conducted throughout the state. Greater

emphasis is being placed on collaborations to reach a greater number of faculty and students in Georgia.

Outcome 3

Large scale events for informal science education organizations will continue to be conducted at our member institutions planetariums and science centers.

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

Outcome 1

Georgia Space Grant Fellows

The GSGC continues to fund graduate students at Georgia Tech, the University of Georgia and Georgia State. Other affiliates including Columbus, Kennesaw, Savannah, Mercer and North Georgia fund undergraduates or a combination of undergraduate and graduate students. The fellowship awards successfully reflect the demographics of the state population, but also the relationship between the HBCU members and majority institutions. This past fall, former Morehouse student Christian Braneon received his Ph.D. from Georgia Tech. Dr. Braneon was a dual degree student.

Outcome 2

Student Opportunities

- The Georgia Tech University Student Launch Team place 19th in the annual competition partially sponsored by the GSGC. The decrease was due to a cut in funding. The USLI team's funding has been fully restored by the GSGC so the team will again reach their previous rankings.
- The annual Black Graduate Student annual technical conference was funded by the GSGC. This program provided students with an opportunity to present technical papers and posters; network with industry and government professionals; and provide opportunities for further collaborations and internships. This past year the Black Graduate Student association collaborated with the Society for Hispanic Engineers to help the GSGC with goals of working with Hispanic organizations in Georgia.

Outcome 3

Informal Education

- The Museum of Aviation in Warner Robins, Georgia, was able to increase its general public outreach programs with new support from the GSGC. The Museum of Aviation has been the preeminent museum in Georgia for aerospace and space related activities.

- Orbit Education presented a program "Beyond the Space Shuttle" that was largely informational and to let future students and teachers know that there is a future for "space". This program will be an annual event.
- The STEM Agenda continued with enrolling informal educators throughout the state so that they could share information and resources; participate in joint grant writing, and collaborate on projects. The STEM Agenda now has 15 information education programs listed as members. For the first time there is a statewide initiative to recognize informal education providers.

PROGRAM ACCOMPLISHMENTS

Outcome 1

Title: Fellows Applied Leadership Program

GSGC MEMBER: Dr. Army Lester, Kennesaw State University

Description: Leadership program to help Kennesaw Space Grant Fellows develop skills for success in STEM.

Metric: 15 Fellows complete the 10 week program

Results: Achieved

Title: Georgia State University Fellows

GSGC MEMBER: Dr. Doug Gies, Georgia State University

Description: GSGC funds support Ph.D. students in Astronomy and Physics

Metric: 2-3 students funded

Results: Achieved

Title: The Machine Intelligence and Robotics Laboratory (MIRL)

GSGC MEMBER: Mercer University

Description: Lab to develop state-of-the-art unmanned vehicles that are flexible and robust. This lab allows research in remote exploration, hazardous reconnaissance, cooperative search, and cooperative swarm behavior. MIRL also creates an environment for students to get hands-on experience, experiment, and design with minimal cost and almost no delay in obtaining parts. The laboratory includes work benches, major robotic equipment, sensors, actuators, rapid prototyping capabilities consumable materials, and large open floor space for experiments.

Metric: 50-75 participants

Results: Achieved Metrics. 61 members and 8 projects underway

Title: Externships

GSGC MEMBER: All GSGC affiliates

Description: Externships are an effective alternative to more costly and more time intensive internships, but with equal impact. The Externship Program is limited to STEM companies in the State of Georgia.

Metric: Preparation and development of full scale program. For the first year the metric is 5-9 undergraduate students.

Results: Program is being revised and currently students are working in internships.

Title: Georgia Astronomer's Meeting

GSGC MEMBER: Georgia Tech

Description: The annual meeting of the Georgia Regional Astronomers (GRAM) was held this past November and included professionals from industry and academia, along with students and general public. This year's event was hosted by Georgia Southern University.

Metric: 75 participants in the November conference

Results: Achieved metrics.

Title: NASA Space Academies and Internships

GSGC MEMBER: Georgia Tech

Description: Internship opportunities for undergraduate and graduate students at NASA field Centers.

Metric: 4-6 students funded to attend Academies/NASA internships

Results: 2 students funded (Marshall and Langley).

Title: Industry Aerospace Internships

GSGC MEMBER: SpaceWorks Enterprises, Inc.

Description: Summer internship experiences related to spaceflight. SpaceWorks Engineering, Inc. (SEI) is an aerospace engineering concept design and systems analysis focusing on next-generation space transportation systems, future technologies, human and robotic exploration of space and emerging space markets and applications for government and commercial clients.

Metric: 4 students successfully complete industry internship annually

Results: 6 students completed internship

Title: Mars Desert Research Stations (MDRS)

GSGC MEMBER: Georgia Tech

Description: This is an annual program which the GSGC has co-sponsored for the past 10 years. The Mars Desert Research Station (MDRS) is one of four simulated Mars habitats in the world, built and managed by the Mars Society.

Metric: A team consisting of 8-15 members travels to the research station to study and conduct research

Results: 14 students successfully participated.

Title: Space Grant Fellows

GSGC Member: All GSGC members

Description: Qualified undergraduate and graduate students pursuing STEM are eligible for scholarship/fellowship funding

Metric: 20 students

Results: Funding of students in progress. Results will exceed metrics in the total number of overall students, as well as the total number of female students and students from underrepresented groups.

Title: Open Robotics Lab for Undergrad/Grad students

GSGC MEMBER: Albany State University

Description: Hands on research, rapid prototyping, tinkering and experiments for the purpose of motivating students.

Metric: 20 students

Results: Exceeded metrics.

Title: Professional Conference for Students

GSGC MEMBER: Columbus State University

Description: Opportunity for student to present their research at a professional conference

Metric: 5 participants

Results: Exceeded metrics.

Title: Each one Teach One

GSGC MEMBER: Armstrong Atlantic State University

Description: Undergraduate students are paired with high students for the purpose of mentoring and tutoring underrepresented students interested in STEM

Metric: 25 students

Results: Exceeded metrics. 32 participants

Title: Universities Student Launch Initiative

GSGC MEMBER: Georgia Tech

Description: The GSGC has supported the USLI endeavor in the past and are working with students to develop a payload for the upcoming launch. The project engages students in scientific research and real-world engineering processes with NASA engineers.

Metric: Developing a new team and submitting a proposal for acceptance

Results: Students successfully completed rocket and place 4th in overall competition.

Title: Student Autonomous Unmanned Vehicle Competition

GSGC MEMBER: Dr. Anthony Choi, Mercer University

Description: Five students will participate in a student Autonomous Unmanned Vehicle Competition.

Metric: 5 students participated in completion.
Results: Achieved

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Title: Wearable Interface

GSGC MEMBER: Georgia Tech

Description: Georgia Tech College of Computing's School of Interactive Computing and the College of Architecture's School of Industrial Design will offer the course Mobile and Ubiquitous Computing (MUC). Students in MUC form groups based on project interests, but each team working on the NASA Wearable Interface Project should consist of at least one industrial design graduate student, one human centered computing graduate student, and some number of undergraduate industrial design and computer science students. These interdisciplinary teams will work towards creating a modular wearable interface system with feedback from Cory Simon and NASA experts. Student groups will visit Johnson Space Center with their projects and present them to a team of specialists to receive feedback

Metric: Student teams visit JSC and develop Wearable Interface

Results: Achieved

Outcome 2

Title: Robotics Workshop for Middle and High School Teachers

GSGC MEMBER: Dr. Anthony Choi, Mercer University

Description: This workshop is co-sponsored by Boeing for the 2nd year.

Teachers design robots as part of in-service workshops that are designed so that teachers can train students in their classrooms during the school year.

Metric: 20 teachers participate in workshops

Results: Exceeded

Title: Professional Development for Teachers

GSGC MEMBER: Orbit Education

Description: In service programs for Georgia Teachers using NASA content and adhered to Georgia Standards for STEM.

Metric: 10 workshops and 35 teachers per session

Results: 250 teachers completed workshops to date. Program still in progress.

Title: Georgia STEM Day

GSGC MEMBER: Orbit Education

Description: Opportunity for teachers who have attended Professional Development to network, share progress, and enroll in new courses.

Metric: 100 -200 teachers attend

Results: 175 teachers attended.

Title: Fort Valley Cooperative Development Program

GSGC Member: Fort Valley State University

Ninth-grade academy. The 9th-grade academy is an annual program held during the third and fourth weeks in the summer. The two-week academy exposes students to instruction in STEM by teachers who infuse each lesson with NASA content. In mathematics, the students study algebra and geometry; in engineering, each student works on a hands on project to teach them real world applications; and in the geology class, the students focus on the geological formation of Stone Mountain (Atlanta, GA) and study the geologic features of this massive granite rock and relate it to planets in the solar system. The final week culminates with a tour of space related research and hands on activities at Georgia Tech.

Metric: 25 students attend MSEA program

Results: 25 students attended the 2 week program

Title: NASA Fellows Pre-college Outreach

GSGC MEMBER: Dr. Army Lester, Kennesaw State University

Description: Space Grant Fellows are provided opportunities to teach pre-college students. Fellows work with students to make STEM more understandable and meaningful. The program has several components including visits to the K-12 schools; college visits for pre-college students; mentoring; tutoring; and field trips.

Metric: 16 high school students and 8 college students participate in program. 100% of the students were from underrepresented groups.

Results: Achieved

Title: Albany State University Lego Program

GSGC MEMBER: Dr. Atin Sinha, Albany State University

Description: One Day Workshop in ASU Engineering Laboratory performing projects with LEGO Next programmable robots, CNC lathe, SolidWorks CAD programming and understanding principles of flight in a subsonic wind tunnel

Metric: 12 students from underrepresented groups participate

Results: Achieved

Title: Annual Bridge Building Competition
GSGC MEMBER: Dr. Atin Sinha, Albany State University
Description: Bridge Building Competition for high school students to design and develop bridge with strict constraints.
Metric: 42 students participated
Results: Achieved

Title: Science, Engineering and Mathematics (SEM) Career Fair
GSGC MEMBER: Georgia Tech
Description: The GSGC provided support for an annual SEM Career Fair for high school students interested in pursuing STEM in college. The fair targeted students from underrepresented groups. Companies in attendance included Lockheed Martin, the CIA, Delta Airlines, and Scientific Atlanta.
Metric: Targeted – 200 students
Result: 85 students, 19 parents and/or administrators

Title: Science Writing Challenge
GSGC MEMBER: University of Georgia
Description: High School participants learn the importance of scientific writing in a competitive, and motivation summer program which includes hands on science projects to stimulate the imagination
Metric: 27 students
Results: Achieved metrics.

Title: Summer Mentoring of High School Science Teachers
GSGC MEMBER: University Georgia
Description: Local teachers are paired with a faculty mentor in the college of sciences
Metric: 20 teachers
Results: Achieved metrics.

Outcome 3

Title: Performance Learning Center
GSGC MEMBER: Mrs. Jacquelyn Whitt and Dr. Army Lester, Kennesaw State University
Description: The Performance Learning Center is a program for at-risk youth. The Learning Center chooses 15 students to participate in a STEM Academy at Kennesaw State University.
Metric: 15 students attend and complete Academy
Results: Achieved. Fifteen students attended and completed.

Title: Georgia STEM Agenda
GSGC MEMBER: Georgia Tech

Description: The STEM Agenda will bring together all non-traditional STEM stakeholders in the State to develop a collaborative network that will strengthen and improve outreach in the State. This program was an outcome of the Georgia team that collaborated on the first Summer of Innovation proposal.
Metric: Development of network and scheduling of webinars
Results: Achieved. Ongoing enrollment of members.

Title: Physics Demo Night and NASA Nights
GSGC MEMBER: University of West Georgia
Description: Community event for ages 6 and up to engage and inspire in STEM.
Metric: 100-300 participants
Results: Exceeded metrics. 325 participants

Title: Georgia Southern Planetarium Education and Outreach
GSGC MEMBER: Georgia Southern University
Description: Community event for ages 6 and up to engage and inspire in STEM.
Metric: 100-300 participants
Results: Achieved

Title: Development of an Education Radio Telescope
GSGC MEMBER: North Georgia College and State University
Description: Undergraduate students work on radio telescope for public observation.
Metric: 100-300 participants
Results: Exceeded metrics.

Title: High Altitude Research Program
GSGC MEMBER: Georgia Tech and the SMART Academy
Description: Weather and environmental balloon launches for students in urban and rural area of Georgia. Student will be from underrepresented groups.
Metric: 200 students
Results: Achieved metrics.

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Diversity:
The GSGC has 5 minority serving affiliate institutions, and partnered with Agnes Scott College, which is 100% female.

All GSGC programs target the diversity of the State which is 36.33% underrepresented groups and 59.8% female.
- Minority-Serving Institutions:

Clark Atlanta University, Spelman College (100% female), Morehouse College, Savannah State University, and Fort Valley State University. Specific programs are listed under program accomplishments.

- NASA Education Priorities:

The GSGC programs engage middle school teachers throughout the State in curriculum enhancement activities. In particular, Affiliate member Orbit Education works with Kennedy Education to infuse NASA content into activities. Annually, Orbit Education reaches over 1,000 middle school teachers. Other affiliates are also actively engaged in working with middle school teachers. The Museum of Aviation, as a partner, provides additional opportunities to engage with middle school teachers through intensive, NASA infused in-service workshops.

Funding of undergraduate and graduate students to attend NASA Space Academies; participate in USLI and other NASA related experiences; attend technical conferences; and work in internships that allow for real life problem solving are an integral part of GSGC programs. The proposal submitted in 2010 and subsequent progress reports demonstrate the GSGC commitment to students who will be entering the workforce in STEM fields.

IMPROVEMENTS MADE IN THE PAST YEAR

The GSGC continues to have annual meetings with all affiliates and the Advisory Board. The meetings rotate to different locations throughout the state so that affiliates can each highlight their programs. The next meeting is scheduled for the fall of 2013.

The GSGC expanded the fellowship programs by offering Georgia Space Grant Consortium Dean's Fellows in the Georgia Tech College of Engineering and the College of Science.

Application processes for fellowships and program requests are on the GSGC website and submission is 100% electronic.

Newsletters are quarterly and will soon be completely electronic and interactive.

Policies and procedures developed in 2009 are ongoing, which include ensuring the accuracy and timelessness of reporting; and assuring that programs adhere to the 2010-2014 GSGC Strategic Plan and improvement plan

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Consortium Structure/Network

The GSGC consists of 18 affiliate institutions listed below by geographic regions and with characteristic information listed. Two other non-affiliate partners joined in consortium activities this past fiscal year, including the Museum of Aviation (non-profit) in Warner Robins, Georgia; and Agnes Scott College (4 year college with 100% female institution) in Decatur, Georgia.

Atlanta Metropolitan Area

- Clark Atlanta University (HBCU, undergrad and graduate programs, co-director is a former Space Grant Fellow, focus area is collaborative engineering research with majority institutions that lead to NASA careers)
- Georgia Institute of Technology (Lead institution, undergraduate and graduate, focus areas - funding students for advanced degrees in STEM, collaborative research with HBCUs, providing workforce development opportunities for students)
- Georgia State University (undergraduate and graduate, focus area - funding students for Ph.D.s in Astronomy)
- Kennesaw State College (undergraduate and graduate, focus areas - providing scholarships and funding undergrad students to work in STEM outreach programs with K-12 students, and mentoring programs for students in STEM)
- Morehouse College (HBCU, all male, undergraduate only, co-director is a former Space Grant Fellow, focus areas - workforce development, research opportunities for students, and collaborations with other institutions)
- Orbit Education (nonprofit, focus areas - in -service and pre-service teacher training using NASA content materials)
- SpaceWorks Engineering, Inc. (Industrial Affiliate, provides internship opportunities)
- Spelman College (HBCU, all female, undergrad, acting co-director is a former Space Grant Fellow, focus areas – encouraging females students to pursue STEM, hands-on research opportunities and workforce development)

Central Georgia

- Mercer University (undergrad and graduate programs, focus areas – undergraduate research)

- Fort Valley State University (HBCU, Land Grant, focus area – enrichment programs for Pre-college and undergraduates that encourage them to pursue STEM fields for employment or for advanced degrees)

Central West Georgia

- Columbus State University (undergrad, grad, focus on astronomy, space and earth sciences, working in conjunction with the Coca Cola Space Science Center)

North Georgia

- North Georgia College and State University (undergrad and grad, focus area is astronomy, and observatory programs)

East Georgia

- University of Georgia (largest institution, Land Grant, undergraduate and graduate programs, focus area is using NASA technology in agricultural applications, agricultural engineering, chemistry, geology)

Southeast Georgia

- Albany State University (HBCU, undergrad and graduate programs, focus areas – providing research opportunities for undergrads, participation in ballooning activities with other Space Grants, collaborating with other HBCUs and majority institutions, bridge building and other hands on programs for high school students)
- Armstrong Atlantic State University (undergrad, co-director is a former Space Grant Fellow, focus areas – undergraduate research, mentoring for Pre-college, workforce development for students, collaborative research)
- Savannah State University (HBCU, undergrad, co-director is a former Space Grant Fellow, focus area is providing research opportunities and scholarships for students as well as collaborative programs)
- Georgia Southern University (undergrad and grad, focus – informal education via the university operated observatory)

West Georgia

- University of West Georgia (undergrad and graduate programs, focus – undergrad research, planetarium shows for pre-college and informal educators)

The 18 consortium affiliates each have unique programs that are run by an Affiliate Co-Director, who is responsible for submitting proposals, accurate and timely reporting, and participation as needed in the decision making for GSGC. Affiliate Co-Directors are the representative/ambassadors of the GSGC on their campuses and are encouraged to publicize and promote consortium activities.

The GSGC Advisory Board is integral to the success of the Externship Program and has provided leadership support in the development of this innovation new initiative. The Board is equally important in recommending strategies and continually providing input for consortium success in this 5 year renewal period.

The National Space Grant Office requires two annual reports, this 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.