

The National Space Grant Office requires two annual reports, the Annual Performance Data Report (APD – this document) 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.

Mississippi Space Grant Consortium
University of Mississippi
Dr. Nathan Murray
(662) 915-1187
Consortium URL: <http://ms.spacegrant.org//>
Grant Number: NNX10AJ79H

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 Mississippi Space Grant Consortium is a Designated Consortium funded at a level of \$575,000 (base) for fiscal year 2014.

PROGRAM GOALS

The Mississippi Space Grant Consortium (MSSGC) has three major goals for FY2014-2015 as part of the 5-year Strategic Plan developed to support NASA in pursuit of their education goals and also to detail the Mississippi Space Grant Consortium mission. The MSSGC mission is to (1) be a gateway to science, technology, engineering and mathematics (STEM) careers and activities for students and programs throughout all levels of education; (2) enhance aerospace and aerospace-related research opportunities at undergraduate and graduate levels; (3) inspire STEM students to pursue STEM careers; (4) empower the state's general public and community leaders through contributions to scientific literacy; and (5) nurture innovation that is Mississippi centric and globally aware. The Mississippi Space Grant Consortium is a statewide network of sixteen MS Universities and Community Colleges; aerospace-related industries and public service institutions providing opportunities for Mississippians, especially those from underrepresented groups, to understand and participate in NASA's aeronautics and space program by supporting and

enhancing science, technology, engineering and mathematics education, research and outreach programs. The three goals for MSSGC are:

A. “Encourage” – Encourage and inspire students, particularly those from underrepresented groups, to pursue careers in Science, Technology, Engineering and Mathematics. Program areas: Student support (scholarships, mentoring), Teacher training (Affiliate Workshops, Teacher Conference, Mini-Grants, K-12 Outreach (Fellowships, Hardware programs). B. “Enhance”- Enhance and nurture a science-based workforce for Mississippi and the Nation. This support includes scholarships, fellowships, and internships with aerospace and aerospace-related industries and NASA Centers, as well as hands-on research experiences, and student rocket and balloon hardware programs. Program areas: Student support (scholarships, fellowships, student research opportunities), Internships (NASA, industry for student and community college faculty), Research & Engineering (Hardware programs, Research Infrastructure). C. “Enlighten” - Contribute to the general scientific literacy of the population. Program areas: Community outreach (Affiliate Programs); Public Relations (information dissemination, publicity, networking).

MSSGC Objectives: Specific, Measurable, Appropriate, Realistic, Timely

In support of Goal A “Encourage”; At the K-12 Level: A1. Seventy five percent of teachers participating in a MSSGC-sponsored event, such as the Teacher Workshop, will agree with the statement, “The material presented in the workshop will make me a more effective math/science teacher.” A2. Seven out of eight teachers working with MSSGC Fellows will agree with the statement, “The fellow’s presence in my classroom has inspired some of my students to pursue further study in the STEM fields who may otherwise have not.” At the Community College/Undergraduate Level: A3. Eighty percent of undergraduate students participating in a MSSGC-sponsored program will agree with the statement, “This program has reinforced my desire to obtain a degree in math, science or engineering.” A4. On average annually, 12 individuals will graduate with a STEM degree from MSSGC affiliates each year with the assistance of an MSSGC program and will either enter the aerospace-related workforce or will enter a graduate program in a STEM field. A5. Seventy five percent of students participating in MSSGC-sponsored mentoring programs will agree with the statement, “Participation in this program has helped me complete my STEM degree.” At All Levels: A6. The diversity of the MSSGC-sponsored student awardees will meet or exceed the national percentages as determined by the most recent, publicly available data from the U.S. Department of Education’s National Center for Education Statistics for a minimum of two of the following four categories: (1) students across all institutions, (2) racially or ethnically underrepresented students, (3) women, and (4) persons with disabilities. According to the most recent data from NCES, Mississippi leads the nation in the African American percentage of total fall enrollment in degree granting institutions. In support of Goal B “Enhance”: B1. Each year, eighty percent of students participating in the MSSGC intern programs will agree with the statement, “My participation in this internship position has reinforced my desire to work for NASA or a NASA-related company.” B2. At least one new significant (~ \$100K/yr) contract or grant will be awarded each year to a MSSGC affiliate investigator based on work initiated with MSSGC funding. B3. Each year, seventy five percent of the students participating in a MSSGC funded Research and Engineering program will report they are more likely to pursue or to continue to pursue a STEM career. In support of Goal C “Enlighten” C1.

Seventy five percent of participants at MSSGC-sponsored educational program will agree with the statement, “The material presented in his program has increased my awareness of current science or math issues.” C2. Eighty percent of MSSGC affiliates will agree with the statement, “The MSSGC office has kept my campus abreast of relevant NASA and Space Grant opportunities and announcements.”

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

MSSGC FY14 (Base) funded a total of 72 students: 42 scholarships and fellowships, and 16 RI students and 14 HE students. All students are currently still enrolled at their institutions. This summer, 6 students will be funded for internships. (Selections are being made at this time.) Of these 72 awards, 29 were made to underrepresented minority students (40.2%) and 42 awards to female students (58%). This is close to the MSSGC benchmark of 43.3% for underrepresented and over the 40% benchmark for females. These percentages will be revised once the NASA Centers’ and industry internship have been selected and the USM awards reported. (IES/US Dept of Education stats: MS minority enrollment average of 43.3%: (Outcome 1)

- The MSSGC Fellowship awardees must complete a K-12 outreach component. MSSGC Fellowship program continues with excellent evaluations from K-12 teachers. (Outcomes 1 & 2)
- NASA/MSSGC Students: Tracking comments:
 - “The Mississippi Space Grant's sponsorship of my summer at NASA Academy helped me decide what part of the space industry I wanted to enter, helped me decide to go to graduate school immediately after graduation, and exposed me to new parts of the industry. Since graduating with a Masters in Astrodynamics, I have been working at a.i. solutions on contract to NASA's Goddard and Johnson centers, developing software solutions to flight dynamics analysis and visualizations problems. (Barton Michael, 2011 NASA Center Internship/Glenn Academy) Outcome 1
 - The grant has made me more involved with local schools, specifically 6-8th grade, to promote STEM and give a personal perspective on the life of an engineer. I have taken the opportunity since my grant to discuss projects with teachers and plan programs for career day talks. It helped me to see the need for STEM and ways to help locally. (Jonathan Rudd, 2012 MSSGC Fellowship-Mississippi State) Outcome 1 + 2 + 3
 - Participation in the NASA Space Grant has had a very positive impact on both my educational and outreach pursuits. The fellowship has allowed me to extend my research collaboration with professional engineers. The K-12 outreach component has allowed me to share my experiences with local students and inspire them to pursue engineering careers as they near the finish of their remedial studies. (Kenneth Moser, 2013 MSSGC Fellowship) Outcome 1 + 2
- MSSGC continues to fund the student-led rocket, balloon and small satellite programs at MSU. (Outcome 1)
- MSSGC hosted a middle school STEM workshop for in-service teachers in collaboration with the UM Center for Mathematics and Science Education. This 2-day workshop had 65 MS middle school teachers and included sessions with the NASA Outreach Educator from NASA/Stennis. (Outcome 2)

- MSSGC funded scholarship/fellowship, higher education, K-12, General Public programs at the sixteen MSSGC affiliates. These various programs are conducted by the Campus Coordinator at the MSSGC Affiliate and are all pre-approved by the MSSGC Director. Detailed descriptions are included in the next section. (Outcome 1, 2, & 3)

PROGRAM ACCOMPLISHMENTS

The majority of Mississippi Space Grant's educational programs include scholarships and fellowships, mentored research, Higher Education projects (Outcome 1), K-12 Teacher workshops, and mini-grants (Outcome 2) related to Space Grant program objectives. Our public service programs (Outcome 3) are performed in conjunction with our affiliates' public programs at Meridian Community College and Itawamba Community College..

Outcome 1: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals MSSGC FY14 (Base) funded a total of 72 students: 42 scholarships and fellowships, and 16 RI students and 14 HE students. All students are currently still enrolled at their institutions. This summer, 6 students will be funded for internships. (Selections are being made at this time.) Of these 72 awards, 29 were made to underrepresented minority students (40.2%) and 42 awards to female students (58%). This is close to the MSSGC benchmark of 43.3% for underrepresented and over the 40% benchmark for females. These percentages will be revised once the NASA Centers' and industry internship have been selected and the USM awards reported. These percentages will be revised once the NASA Centers' and industry internship have been selected and the USM awards reported. (IES/US Dept of Education stats: MS minority enrollment average of 43.3%: (Outcome 1)

- *FY 2014 MSSGC goals A & B met; MSSGC objectives A.3, A.4, A.5, A.6, B.1, B.3 met. FY 2014 programs included:*

1. MSSGC Graduate Research Fellowship Program

MSSGC awarded nine \$17,000 fellowships for the 2014-15 academic year. MSSGC Grant Fellows are also required to be a resource person to a teacher in one of their graduate institution's neighboring K-12 schools for ten hours per week. Each Fellow attended a one day training workshop at UM in August to provide guidance for K-12 instruction. The applicant also had to describe their graduate research project and how it relates to NASA interests.

2. Affiliates' Fellowship and Scholarship Programs:

- Alcorn State University: Scholarship: ASU funded ten scholarships.
- Jackson State University Scholarships/Fellowships: JSU funded five scholarships.
- Mississippi Delta Community College Scholarships: Two students were funded.
- Mississippi State University: MSU funded thirteen students in Aerospace Engineering, Rocket Team leaders and Astronautics.
- Mississippi University for Women Scholarship: Three scholarships were funded.
- Northwest Mississippi Community College Scholarship: One scholarship awardee was selected by NMCC STEM faculty.
- University of Southern Mississippi Scholarship: USM funds ten scholarships for physics, mathematics or Computer Science students.

3. Research Infrastructure Programs:

- MSSGC Research Infrastructure Program: three RI awards were funded for FY14.

- Affiliates' Research Infrastructure Programs: Delta State University, Jackson State University, MS University for Women, University of Southern MS and MS State University funded small RI projects.

4. Industry and NASA Centers' Internships: Currently, in-process for selection.

Outcome 2: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty. (Educate and Engage)
FY2014 MSSGC Goals 1 & 2 met; MSSGC objectives A.1, and A.2 met; FY2014 Programs included:

1. MSSGC Annual MSSGC Teachers Conference The workshop was held January 16 + 17, 2015 at the University of MS. Over 65 middle school teachers attended, with speakers from the Consortium and its partners presenting topics in mathematics and science. Evaluation of each speaker as well as the entire workshop was conducted. Overall, this workshop was evaluated as excellent by participants.

2. Affiliate Programs/ Higher Education and K-12/Space Grant funds:

Delta State University: Higher Education: DSU funded two DSU faculty to attend workshops and/or professional development seminars designed to enhance their teaching skills or to gain current information on an emerging science or technology. Hinds Community College: Higher Ed/K-12: HCC awarded (2) undergraduate students to serve as mentors for former and newly recruited participants in the Minority Science and Engineering Improvement Program. These students work closely with mathematics, science, and/or computer science instructors as project/classroom/laboratory assistants. The student mentors provide career choice information, tutoring and assistance with special assignments including science projects. Coahoma Community College

Higher Education: CCC funded 3 students who mentor and tutor other CCC students in math, science and/or computer science. Itawamba Community College Higher Education: ICC funded a student assistant to support science faculty in the development of videos, software, and on-line instructional materials. The student assistant also serves as a tutor for science students needing assistance. Meridian Community College Higher Education: MCC funded a mentoring program, providing a stipend for a computer lab assistant. The student is available for MCC students who need tutoring in the areas of biology and chemistry. Mississippi Gulf Coast Community College Higher Education: MGCCC funded students involved in the cooperative internship with the Gulf Coast Research Laboratory working with an instructor and a student centered project. Mississippi State University: MSSGC continues to fund the student-led rocket and balloon programs at MSU as described in the Higher Education Section. The K-12 outreach activities are also outlined: MSSGC funds and MSU Space Grant scholars are also supporting high altitude balloon flights by two MS middle schools. MSU/Rocket Program: The "Space Cowboys" K-12 outreach component: This rocket team has reached over 1,000 middle school students by a variety of programs. The rocket team conducted a middle school rocket launch challenge that engages students throughout the state. Students build and fly rockets and share their activities with all of the other participants via a website. Other rocket team outreach activities included presentations and hands-on demonstrations to over 18 middle schools. Additional MSU Space Grant/K-12 projects: MSU funds tours of the MSU engineering laboratories for approximately 200 high school students. Hands-on activities are included on these tours. Most of these high school students are underrepresented minorities. Mississippi Valley State University Higher Education: MVSU provided funds

for four students and two faculty member to conduct research on student achievement in the local schools in Leflore County (95% underrepresented minorities) and to establish baseline data for placement of MVSU students in college mathematics courses. Pearl River Community College Higher Education: PRCC funded a collaborative project with the Alpha Omega Science Club and for all students at PRCC, speakers for science lectures and conference presentations. K-12: PRCC/SG provided funds for the MCTM/PRCC Mathematics Competition held annually on campus. Also, PRCC/SG funded two area high school science teachers to attend NASA workshops. University of Southern Mississippi Higher Education: USM funded a spring “Innovative Computing Solution Competition.” Students are encouraged to contact local businesses, medical and industrial communities for projects. This goal is to encourage students and motivate their innovation in developing computer solutions and programs in the working environment. Presentations are judged by the School of Computing Faculty.

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

FY 2014 MSSGC goal 3 met; MSSGC objectives C.1 & C.2 met. FY 2014 programs included:

1. MSSGC Administrative Office: Increasing the dissemination of NASA and Space Grant activities and information is a continuing focus for the consortium's central office. Eric Day, on contract with the National Space Grant Foundation, serves as the MSSGC Webmaster. The task of dissemination is currently achieved through a variety of mechanisms including email distribution lists, a World Wide Web page, and mailings. NASA announcements and opportunities, as well as other announcements applicable to our shared NASA/consortium goals, are routinely distributed via our email lists and Web page. The consortium's Web site at <http://www.ms.spacegrant.org> is updated bi-monthly with consortium information, funding opportunities, conference and workshop announcements, and educational links, as well as numerous other links to science, math, and engineering information.
2. Itawamba Community College and Meridian Community College each funded a “Backyard Astronomy Program” presented by the Rainwater Observatory.

PROGRAM CONTRIBUTIONS TO PART MEASURES

- **Diversity:** Diversity is a priority of the MSSGC and a topic on agendas for the Campus Coordinators Meetings. The MSSGC consists of 16 affiliates; each campus has a MSSGC Campus Coordinator. The diversity breakdown of the MSSGC Campus Coordinators is 8 males, 8 females; 4 African American, 11 Caucasian and 1 other. All public HBCUs and the one public university in the state historically for women are MSSGC affiliates. Benchmarks for diversity for students’ awards have historically been met by the MSSGC.
- **Minority-Serving Institutions Collaborations:** All five public Mississippi HBCU’s are an active part of the MSSGC. (See Outcomes 1, 2, 3 for descriptions of HBCU’s activities.) MSSGC has also partnered with the two private Mississippi HBCU’s in the state: Rust College and Tougaloo College. (Both have been recipients of RI awards in previous years.)
- **NASA Education Priorities:**

- Authentic, hands-on student experiences: MSU Rocket Program, High Altitude Balloon Project, and Small Satellite project were funded for FY14. In addition, students involved with the Research Infrastructure projects are all involved in hands-on research in a variety of STEM areas.
- Engage Middle School teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise: The MSSGC Teacher Conference is held each year in January for 2 days, for math and science middle school teachers. Over 65 MS science and math middle school teachers attended this year. MSSGC partnered with UM/Center for Math and Science Education to host this Conference. MSSGC Affiliates also hosted teacher workshops in their areas.
- Summer opportunities: No programs funded at this time.
- Community Colleges: MS Community Colleges are an integral part of the MSSGC. They represent eight of the fifteen affiliates and are an active component of the Consortium. (See Community College activities described in prior section.)
- Aeronautics research: MSU/AE Department continues research in a RI project funded last year.
- Environmental Science and Global Climate Change: No awards for this topic were funded (or received) this year.
- Enhance the capacity of institutions to support innovative RI activities to enable early career faculty to focus their research toward NASA priorities: The MSSGC Research Infrastructure competition/call for proposals states-“preference is given to projects that are related to NASA, have a strong interdisciplinary team, include new faculty, directly involve students and involve a NASA Center or Enterprise or an aerospace-related company.”

IMPROVEMENTS MADE IN THE PAST YEAR

- Following the retirement of Dr. Peter Sukanek, Dr. Nathan Murray was appointed MSSGC Interim Director in September, 2014. He was formally appointed MSSGC Director, January 17, 2015 by the MSSGC Affiliates and approval by the Mississippi Research Consortium and NASA Headquarters/Office of Education.
- The team returned from the 2014-2015 NASA AIAA Rocket Competition with a second place overall finish, out of 40 other colleges and universities. The team won first place for their 2013-2014 educational engagement activities where they reached 2000 students (elementary - high school).

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Academic Affiliates

The University of Mississippi (UM): Public PhD degree-granting research university and lead institution for the NASA Space Grant Program. Dr. Nathan Murray is a Research Scientist II, Aeroacoustics, National Center for Physical Acoustics and a Research Assistant Professor of Mechanical Engineering and serves as the Director of the MSSGC and UM/MSSGC Campus Coordinator.

The University of Southern Mississippi (USM): Public PhD degree-granting research university. Dr. Patricia M. Biesiot, Associate Dean, College of Science and Technology and is the MSSGC Campus Coordinator.

Mississippi State University (MSU): Public PhD degree-granting research university. Dr. Keith Koenig is a Professor of Aerospace Engineering and the MSSGC Campus Coordinator.

Jackson State University (JSU/HBCU): Public PhD degree-granting research university. Dr. Maria Begonia is a Professor of Biology and the MSSGC Campus Coordinator.

Alcorn State University (ASU/HBCU): Public degree-granting university. Dr. Noland Boyd, Chemistry Professor is the MSSGC Campus Coordinator.

Delta State University (DSU): Public PhD degree-granting university. Dr. Charles Smithhart is a Professor in the Dept. of Biological and Physical Sciences and is the MSSGC Campus Coordinator.

Mississippi University for Women (MUW): Public degree-grant university. Dr. Joshua Hanes is a Mathematics Professor and is the MSSGC Campus Coordinator.

Mississippi Valley State University (MVSU/HBCU): Public degree-grant university. Dr. Raymond Williams is a Mathematics Professor and is the MSSGC Campus Coordinator.

Coahoma Community College (CCC/HBCU): Associate degree-granting community college. Angela Reynolds is an Instructor in the Dept of Math, Science and Computer Science and is the MSSGC Campus Coordinator.

Hinds Community College (HCC/HBCU): Associate degree-granting community college. Dr. M. Cathryne Jackson is the Chair for the Mathematics & Natural Science Division and is the MSSGC Campus Coordinator.

Itawamba Community College (ICC): Associate degree-granting community college. Dr. Betsy Chesnutt is a Physics and Engineering Instructor and the MSSGC Campus Coordinator.

Meridian Community College (MCC): Associate degree-granting community college. Dr. Angela Carraway is a Chemistry Instructor and the MSSGC Campus Coordinator.

Mississippi Delta Community College (MDCC/HBCU): Associate degree-granting community college. Amy Biles is a Physical Science Instructor and the MSSGC Campus Coordinator.

Mississippi Gulf Coast Community College (MGCCC): Associate degree-granting community college. Mr. Steve Manis is a Science Instructor and the MSSGC Campus Coordinator.

Northeast Mississippi Community College (NEMCC): Associate degree-granting community college. Mr. Patrick Eaton is the Development Officer and is the MSSGC Campus Coordinator.

Pearl River Community College (PRCC): Associate degree-granting community college. Dr. Aleta Sullivan is a Science Instructor and the MSSGC Campus Coordinator.

Industrial Partners: NVision Solutions, Inc., Lockheed Martin Space Systems Company, LogLinear Group, LLC, Radiance, Inc., Innovative Imaging and Research

Government Partners: NASA/Stennis Space Center, NASA/Johnson Space Center, NASA/Marshall Flight Space Center, NASA/Langley, NASA/Glenn, NASA/Ames, Jet Propulsion Laboratory, NASA/ Kennedy Space Center

Educational Partners: Rainwater Astronomy and Planetarium, UM/Center for Math and Science Education, Enterprise for Innovative Geospatial Solutions (EIGS), Mississippi Science Teachers Association, Mississippi Educational Broadcasting, Rust College (private HBCU), Tougaloo College (private HBCU)

The student number/information will be revised when additional reporting information is collected and reported into the NASA/OEPM system.