

## MARYLAND SPACE GRANT CONSORTIUM

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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 Maryland Space Grant Consortium is a Designated Program Grant Consortium funded at a level of **\$730,000** for fiscal year 2008.

### PROGRAM GOALS

#### **SCHOLARSHIPS AND FELLOWSHIPS**

**GOAL I:** To offer financial support to those higher education students enrolled in Maryland institutions that wish to pursue a career in math, science, engineering, technology, or other space-related field. Objective #1: The MDSGC Scholarship Committee will continue to recruit qualified students for need-based scholarships among the six degree-granting institutions in the consortium, *viz.*, JHU, MSU, UMCP, TU, UMES, and HCC. Objective #2: The Scholarship Committee will continue to emphasize the recruitment of students from groups underrepresented in STEM disciplines. Objective #3: Continue to use the MDSGC Observatory, which is located on the roof of the Bloomberg Center for Physics and Astronomy on the Homewood campus of JHU, for student training and public outreach.

#### **HIGHER EDUCATION**

**GOAL II:** Provide higher education students with opportunities to enhance their education in STEM areas and to promote their entry into aerospace related disciplines. Programs that provide relevant hands-on experience will be given high priority. Objective #1: Continue to support and enhance the MDSGC Balloon Payload Program (BPP) that provides students with access to near-space. Objective #2: Provide strong support to internship programs for undergraduate and graduate students on an ongoing basis, either through direct funding or through partnerships with organizations such as GSFC. Objective #3: Support a portfolio of programs that recruits students to STEM related studies and retains their interest to the point that it eventually carries over into employment in STEM careers in general, and especially careers needed by NASA and the

aerospace community. Objective #4: Continue to develop MDSGC capabilities and procedures to conduct longitudinal tracking of students who have received significant support from MDSGC, in order to determine the efficacy of our programs.

### **RESEARCH INFRASTRUCTURE**

**GOAL III:** Support projects that provide opportunities for students to participate in aerospace-related research. Objective #1: Provide funding for programs that directly support students in gaining aerospace-related research experience. Objective #2: Ensure that research opportunities are made available to a diverse group of highly qualified students.

### **PRE-COLLEGE**

**GOAL IV:** Support programs that provide substantive training to Maryland teachers that allow them to incorporate NASA-related content into effective teaching strategies. Objective #1: Facilitate the delivery of training that develops teacher's skills in the use of, and access to, earth and space science related data and discoveries, which will then inspire students to pursue careers in science, technology, engineering, and mathematics (STEM). Objective #2: Explore concepts for funding new ways of providing teacher training, including new partnering relationships and different delivery mechanisms such as distance learning or online course. Objective #3: Provide additional opportunities beyond the current earth and space science certification program for providing current content knowledge to in-service teachers.

**GOAL V:** Support programs that provide Maryland teachers with effective STEM teaching materials that are aerospace related and address Maryland core learning goals. Objective #1: Support the development and dissemination of materials that can be used for teacher in-service training and student classroom activities to enhance and expand student understanding of aerospace science, technology, and engineering.

**GOAL VI:** Provide pre-college students with opportunities to enhance their education in STEM areas and to promote their entry into aerospace related higher education studies. Objective #1: Support programs that foster the recruitment and retention of pre-college students in STEM-related studies. Objective #2: Support programs that enhance the development of capabilities in STEM education in Maryland. Objective #3: To serve Maryland well, MDSGC programs must be accessible to all the students, throughout the state, and at all institutions. Objective #4: Foster collaboration between Maryland schools and the Maryland Space Grant Consortium.

### **OUTREACH**

**GOAL VII:** To foster outreach programs that bring NASA STEM activities and results to the general public. Objective #1: Support activities that further the goals of NASA and MDSGC at informal science institutions, such as science centers, planetaria, and public observatories. Objective #2: Support programs in Maryland that foster life-long learning. Objective #3: Maximize the leverage of MDSGC resources by collaborating with planned or ongoing outreach activities that allow us to reach a wide public audience. Objective #4: Sponsor public events relating to space exploration that enhance the

general understanding and appreciation of astronomy, earth, and space science, engineering, mathematics, and technology Objective #5: Support existing public lectures and events by providing funding to bring in a targeted audience that might otherwise not be able to attend.

## **EXTERNAL RELATIONS**

**GOAL VIII:** To extend the network of Consortium membership, sponsors, and partners to generate a wider impact for MDSGC programs and activities. Objective #1: Develop a process for maintaining a broader network of past and present participants of MDSGC programs. Objective #2: Enhance the value to partners and sponsors of MDSGC activities, so that each can see that they have made a meaningful contribution in terms of their own vision and mission for education as well as that of MDSGC. Objective #3: Maintain a strong relationship between organizations sharing MDSGC goals by involving each in substantive ways with the work of MDSGC, so that the whole is truly greater than the sum of its parts.

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

**Outcome 1:** University of Maryland College Park students successfully flew a payload on a NASA HASP balloon flight. This Program, which was led by the student manager for the MDSGC Balloon Payload Program is a direct result of the experience that the students gained in the MDSGC program.

**Outcome 1:** A quote from a student supported by MDSGC:

The Space Grant program allowed me the necessary monies to buy textbooks, supplies, and helped pay for my tuition. This allowed me to continue my courses and receive my AA Degree in GST. I am now a returning student, currently enrolled in the Mathematics program here at HCC. My goal is to obtain a Math Degree. (Blake Ohman, 2005 Space Scholars Program, 2006 Space Scholars Program, 2007 Space Grant Scholarship, 2008 Space Grant Scholarship)

**Outcome 1:** A graduate student at the University of Maryland Eastern Shore who has received support under the AIRSPACES program completed his master's degree and has begun work in the aerospace field.

### PROGRAM ACCOMPLISHMENTS

**Outcome 1:** 38 students significantly supported from FY08 funds: 37 in Fellowship & Scholarships; 1 in Higher Education/Research programs. 14 students took next step in FY08 (SG participation supported from FY06-FY08 funds): 6 went to graduate school in STEM disciplines; 4 went to work for NASA contractors; 2 went to work in a STEM positions for non-NASA contractors; 1 went to work for NASA; 1 went to work in a STEM position at a non K-12 Academic institutions

In meeting MDSGC Goal I, Objectives 1 & 2, the Scholarship Committee continued to successfully recruit a diverse group of students in STEM majors relevant to NASA. This past year 73% of the students supported via the Scholarship Committee were from

underserved minorities and 35% were female. The Scholarship Committee is continuing to push scholarship recipients to pursue other NASA student opportunities, especially in applying for student internships. Several scholarship recipients have been successful in their applications. Some of these students have volunteered their time to speak to scholarship students to excite them about the NASA opportunities.

Objective 1 (MDSGC Goal II, Objectives 2 & 3): The Summer Aerospace Workforce Development Research Internship Program was again a success this year. We had a record number of 19 interns placed with aerospace contractors. The mentor for 2/3 of the students indicated that they would like the students back the next year and/or would like to hire them upon graduation. Two of the students from this program became John Mather Nobel Scholars, as well.

Objective 1: MDSGC support of the AIRSPACES program for remote sensing used for precision agriculture studies at the University of Maryland Eastern Shore has produced a number of papers and conference presentations. As the result of a presentation at an American Society of Engineering Education conference, the Principal Investigator, Prof. Abhijit Nagchaudhuri, was invited to present this program at the 7<sup>th</sup> Global Colloquium on Engineering Education in Cape Town, Republic of South Africa.

Objective 2: The earth and space science certificate program at John Hopkins University, which receives support from MDSGC, reorganized after the loss of key personnel, and is responding to an external reviewer's report. A program coordinator has been hired.

Objective 2: MDSGC and the National Federation of the Blind have submitted a joint proposal to the Maryland Space Business Roundtable for support of Youth Slam 2009. This will bring 200 blind students to the University of Maryland College Park campus this summer for a week of hands-on science and engineering activities.

Objective 3: MDSGC hosted this year's Mid-Atlantic Regional Space Grant meeting in Baltimore. There were 48 attendees.

#### PROGRAM CONTRIBUTIONS TO PART MEASURES

- **Longitudinal Tracking:** For those students that were significantly supported from FY 08 funds, all 38 of them are still enrolled in the degree that they were pursuing while they received their Space Grant award. For all students that were significantly supported in the period spanning FY06-FY08, 6 students graduated and are pursuing advanced STEM degrees, 4 students are working for NASA contractors, 2 students accepted STEM positions in industry, 1 is working at a NASA center, and 1 is working in a STEM position at non-K-12 academic institutions. The remaining students have not yet received the degree that they were pursuing while they received their Space Grant award. Of the students supported in 2008, 19 (50%) of them were from underserved minorities. Of the students supported in 2008, 9 (24%) of them were female.
- **Course Development:** The MDSGC Balloon Payload Program has been made an integral part of the freshman aerospace engineering course at the University of Maryland College Park.
- **Matching Funds:** In the current reporting period (which ends February 28), MDSGC has received \$857,736 in matching funds.

- **Minority-Serving Institutions:** Two of the ten members of the MDSGC are HBCUs. They are both fully engaged members of MDSGC, as are all of the member institutions. Noteworthy during the current reporting period was a group effort involving MDSGC, University of Maryland College Park, University of Maryland Eastern Shore, and Morgan State University to submit a proposal to the NASA Minority Serving Institution Partnership Development Competition opportunity.

#### IMPROVEMENTS MADE IN THE PAST YEAR

An important effort for MDSGC this past year has been to revamp its Earth and Space Science Teacher Training program. The project has been moved under new management at Johns Hopkins University, viz., the College of Education's Interdisciplinary Studies Department. During 2007 MDSGC commissioned an independent external review team from TERC to evaluate the program and we are currently assessing their recommendations and implementing those that were deemed advisable. The course content is being reviewed and brought into better alignment with recent changes in the Maryland Core Learning Goals for earth and space science. In addition, MDSGC has hired a program coordinator to oversee the program in general, with special attention to recruiting of teachers. The teachers who will be supported in the future will be targeted at the grade levels for which the content is most needed, in order to meet the Maryland state testing requirements.

#### PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Johns Hopkins University – Lead Institution  
 Hagerstown Community  
 Johns Hopkins University Applied Physics Laboratory  
 Morgan State University  
 Space Telescope Science Institute  
 Towson University  
 United States Naval Academy  
 University of Maryland Center for Environmental Science  
 University of Maryland College Park  
 University of Maryland Eastern Shore

All of the members are actively involved with MDSGC. Each institution has a member on the Program Committee, which reviews proposals for funding and advises the program. Each institution provides a senior staff member who serves on the Oversight Committee, which meets annually to review the program with the Director. Scholarships are provided to students at JHU, HCC, MSU, TU, UMCP, and UMES, all of which have members on the scholarship committee who are actively engaged in recruiting and selecting students.

MDSGC works closely with NASA GSFC on many programs, including internships such as NASA Academy, SIP, APL, and SAWDRIP (which MDSGC supports at the program level, as well). Representatives from GSFC's Education Office participate in the Program Committee.