

New York 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 New York Space Grant Consortium is a Designated Consortium funded at a level of \$785,000 for fiscal year 2009.

PROGRAM GOALS

In FY2009 the New York Space Grant (NYSG) had three SMART goals/objectives related to NASA Education Outcomes 1 and 2 (specifically Fellowship/Scholarship, Higher Education, and Research Infrastructure programs):

1. The percentage of NYSG minority student awardees shall meet or exceed the enrollment percentage in NY higher education institutions, using National Center of Education Statistics (NCES) published data as a benchmark.
2. The percentage of NYSG female student awardees shall meet or exceed the percentage of STEM bachelor's degrees awarded to females nationwide, using statistics from the National Science Foundation's special tabulations of NCES data as a benchmark.
3. NYSG shall strive for 90% or more of students receiving significant awards to take the next step to STEM employment or STEM advanced degrees upon graduation, based upon data obtained from longitudinal tracking of significant awardees.

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

Examples of NYSG benefits to Outcomes 1 and 2 (Higher Education): NYSG and industrial affiliate Lockheed Martin ran a student competition for undergraduate engineering majors to intern at a Lockheed Martin facility during summer 2009. The student selected for this program thrived during the NYSG internship; by the time he graduated the following year, he was offered (and accepted) a full-time position at

Lockheed Martin and a spot in the company's Engineering Leadership Development Program. An underrepresented minority student benefited from a progression of NYSG-sponsored opportunities throughout his undergraduate career at City University of New York (CUNY) York College and post-baccalaureate experience (Bridge to the PhD program) at Columbia University. He was accepted to all four astronomy graduate programs to which he applied (a noteworthy accomplishment in a year when many astronomy departments had fewer slots than usual), and will begin working on his PhD at the University of Washington in the fall.

Examples of NYSG benefits to Outcome 2 (Precollege): Several NYSG affiliates provided professional development and training opportunities to educators that resulted in deeper content understanding and confidence in teaching STEM disciplines. For example, the Sciencenter and Colgate University conducted separate hands-on workshops for K-12 teachers to improve their understanding of astronomical phenomena and inquiry-based instruction. A variety of student-based programs engaged and retained students in STEM disciplines, such as the State University of New York (SUNY) Buffalo's involvement with the Buffalo-area Engineering Awareness for Minorities (BEAM) program. NYSG funds supported a portion of the BEAM summer program for post 10th- and 11th- grade students who are interested in engineering – these students worked on research projects mentored by SUNY Buffalo faculty and graduate students.

Example of NYSG benefits to Outcome 3 (Information Education): NYSG sponsored the Exhibits Project Manager from the Museum of Science and Technology (MOST) to attend the RockOn 2009 workshop in which participants build a scientific payload and launch it on a sounding rocket at NASA Wallops Flight Facility. This opportunity enhanced the MOST staff member's skills and proficiency in STEM disciplines, and was particularly conducive to his duties coordinating and executing the Central NY Rocket Team Challenge, which engaged student teams from 24 school districts in designing, building, and launching their own rockets.

PROGRAM ACCOMPLISHMENTS

During FY2009 the New York Space Grant Consortium conducted many programs that contributed to NASA Education Outcomes in the following ways:

Outcome 1 [Fellowship/Scholarship, Higher Education, and Research Infrastructure programs] – Diverse opportunities to attract and retain undergraduate and graduate students in NASA-related STEM disciplines were provided by all active NYSG higher education institutions. In addition, as a result of NYSG's FY2009 Competition for Research Funding and Higher Education Enhancement Funding, a total of eight projects were supported at five different institutions (Columbia University, Cornell University, Rensselaer Polytechnic Institute, Rochester Institute of Technology, and Union College). These interdisciplinary projects included research on spaceflight dynamics at the microscale, novel techniques for data visualization, liquid fuel combustion in space-based environments, and investigating the Milky Way Galaxy's structure using 150 Teraflops of computing power from public volunteers. This competition seeded or matured NASA-related research at those institutions, enabling the principal investigators to establish new collaborations, build prototypes, and attract other funding sources for future work.

Outcome 2 [Higher Education] – During summer 2009 NYSG sponsored four students’ participation in the NASA Academies at Ames, Goddard, and Marshall, plus seven students’ Space Grant internships at Goddard, Jet Propulsion Laboratory, Kennedy Space Center, Langley Research Center, and Marshall Space Flight Center. Lockheed Martin also sponsored an NYSG summer intern to work at one of its facilities. NYSG supported student travel to participate/present at scientific/professional conferences and to conduct special research projects (e.g., run experiments on NASA’s reduced gravity aircraft and at the Mars Desert Research Station). Undergraduate students at CUNY Medgar Evers College worked with faculty on hands-on projects such as monitoring/analyzing ozone levels using high-altitude balloons, while Colgate University students developed astronomy education and outreach modules for a state-of-the-art digital dome/planetarium. Space Grant funds supported the creation of 2 new courses and the revision of 2 existing courses in aerospace engineering and environmental sciences/remote sensing at Syracuse University and Union College.

Outcome 2 [Precollege] – In FY2009 NYSG supported both teacher development and student-based precollege projects. Teacher development opportunities focused on improving K-12 teachers’ knowledge and skills in astronomy/space science and engineering/robotics topics, in addition to training school teachers on inquiry-based instruction and integrating literacy with science lessons. Precollege student-based projects covered a wide range of STEM topics and levels of involvement. Examples of short-duration projects: researching and designing travel brochures to destinations within the universe for an International Year of Astronomy contest, a conference for middle school females to participate in hands-on STEM activities and learn from female scientist role models, and a Bridge Build’em and Bust’em event. Examples of long-duration projects: the aforementioned BEAM summer program at SUNY Buffalo and the Central New York Rocket Team Challenge run by MOST and Syracuse University.

Outcome 3 [Informal Education] – The majority of the Informal Education projects supported by NYSG in FY2009 were to educate and engage the general public in NASA’s missions/research and a wide variety of STEM topics. For example, an event celebrating the 40th anniversary of the Apollo 11 landing included a faculty panel discussion open to the public and hands-on science activities for children, an exhibit with hands-on science activities and NASA curricular support materials was staffed for three days at the New York State Fair, and Columbia University in New York City hosted 39 events including public lectures, stargazing sessions, sidewalk astronomy, and Family Astro events that capitalized on the International Year of Astronomy. NYSG also funded the MOST Exhibits Project Manager along with a Syracuse University graduate student to participate in the RockOn 2009 workshop at NASA Wallops Flight Facility.

During FY2009 NYSG made the following progress towards meeting its SMART goals/objectives:

1. The percentage of NYSG minority student awardees shall meet or exceed the enrollment percentage in NY higher education institutions. The 2007 NCES data show that for New York State, 34.3% of the students enrolled in degree-granting

institutions were minorities including Asians and Pacific Islanders. However, NASA does not consider Asians to be underrepresented in STEM fields. Therefore our adjusted target, using United States 2000 Census data on Pacific Islander versus Asian populations to estimate minority enrollment excluding Asians, is 26.6%. In FY2009 the percentage of underrepresented minority students who participated in NYSG fellowship/scholarship, higher education, and research infrastructure projects was 19.1%. We did not meet our goal for underrepresented minority participation this year.

2. The percentage of NYSG female student awardees shall meet or exceed the percentage of STEM bachelor's degrees awarded to females nationwide. Using statistics from the National Science Foundation's special tabulations of NCES data on bachelor's degrees awarded to females in engineering and physical sciences as a benchmark, our goal is that at least 38% of awardees are female. In FY2009 the percentage of female students who participated in NYSG fellowship/scholarship, higher education, and research infrastructure projects was 38%. Hence we met this goal.

3. NYSG shall strive for 90% or more of students receiving significant awards to take the next step to STEM employment or STEM advanced degrees upon graduation. Based upon data obtained from longitudinal tracking of NYSG significant awardees, of the 48 significant awardees who have graduated, 41 are pursuing STEM advanced degrees or are employed in STEM positions, 5 are seeking STEM employment, and 2 are in non-STEM pursuits. Therefore for this reporting period, the percentage of significant awardees who have taken the next step to STEM advanced degrees or STEM employment is 85%, close but not meeting our goal. The economy might be exerting some negative effect, as 5 of the 48 graduates (nearly 10%) are seeking STEM jobs.

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Longitudinal Tracking: 157 higher education students participated in NYSG programs during FY2009; of these students, 54 participated in fellowship/scholarship programs while 103 participated in higher education and research infrastructure programs. Of the total FY2009 participants, 30 were underrepresented minority students. Of the 48 longitudinally tracked students that graduated/completed degree programs since their NYSG involvement, 29 are pursuing STEM advanced degrees, 2 are employed in STEM positions within NASA and aerospace industry, 4 are employed in non-aerospace STEM positions, 6 are employed in STEM positions by universities and other educational institutions, 5 are seeking STEM employment, and 2 have taken their next step in a non-STEM field.
- Course Development: Space Grant funds supported the creation of 2 new courses and the revision of 2 existing courses in aerospace engineering and environmental sciences/remote sensing at Syracuse University and Union College.
- Matching Funds: For FY2009, the ratio of NYSG non-federal matching funds to NASA Space Grant funds (excluding the \$200,000 in fellowships/scholarships funds not requiring a match) was 1.17%.
- Minority-Serving Institutions: Three NYSG affiliates are minority-serving institutions: CUNY City College of New York, CUNY Medgar Evers College, and

CUNY York College. While SUNY Stony Brook is not a minority institution, NYSG is partnered with its Louis Stokes Alliance for Minority Participation (LSAMP) program to provide underrepresented minorities with NASA-related research opportunities. The NYSG affiliate director at Medgar Evers collaborates a great deal with other minority-serving institutions on projects related to her NYSG-supported MECSAT program, thus expanding the impact of Space Grant funding.

IMPROVEMENTS MADE IN THE PAST YEAR

In FY2009 NYSG added one more higher education affiliate: SUNY Binghamton. With the sixth largest undergraduate engineering enrollment in New York State, SUNY Binghamton has numerous ties to the New York State Foundation for Science, Technology and Innovation (NYSTAR) and local high-technology industry. The new affiliate director is engaged in human-in-the-loop flight and ground vehicle simulation research, which is an interdisciplinary area not already represented within our board of affiliate directors.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

1. **Alfred University**, Alfred, NY [*highly residential, Master's I, private*] undergraduate research and F/S
2. **Barnard College**, New York, NY [*highly residential, Baccalaureate - Liberal Arts, private*] **institution serving primarily women**, undergraduate research and F/S
3. **CUNY City College of NY**, New York, NY [*primarily nonresidential, Master's I, public*] **Minority Serving Institution**, graduate research and F/S
4. **CUNY Medgar Evers College**, Brooklyn, NY [*primarily nonresidential, Baccalaureate - General, public*] **Minority Serving Institution**, undergraduate research and F/S, student ballooning program (MECSAT)
5. **CUNY York College**, Jamaica, NY [*primarily nonresidential, Baccalaureate - General, public*] **Minority Serving Institution**, undergraduate research and F/S
6. **Clarkson University**, Potsdam, NY [*highly residential, Doctoral/Research - Intensive, private*] undergraduate and graduate research and F/S
7. **Colgate University**, Hamilton, NY [*highly residential, Baccalaureate - Liberal Arts, private*] undergraduate research and F/S, precollege projects
8. **Columbia University**, New York, NY [*highly residential, Doctoral/Research - Extensive, private*] undergraduate research and graduate F/S, informal education
9. **Cornell University**, Ithaca, NY [*primarily residential, Doctoral/Research - Extensive, private and public (land grant)*] **NYSG lead institution**, undergraduate research and F/S and higher education projects, graduate F/S, other consortium-wide projects such as summer internship programs, precollege and informal education
10. **Lockheed Martin**, Owego, NY – Aerospace industry affiliate providing student internships.

11. **Manhattan College**, Bronx, NY [*highly residential, Master's I, private*] No active Space Grant projects during FY2009.
12. **Polytechnic Institute of New York University (formerly Polytechnic University)**, Brooklyn, NY [*primarily nonresidential, Doctoral/Research - Intensive, private*] undergraduate and graduate research and F/S, precollege
13. **Rensselaer Polytechnic Institute**, Troy, NY [*highly residential, Doctoral/Research - Extensive, private*] undergraduate and graduate research and F/S
14. **Rochester Institute of Technology**, Rochester, NY [*highly residential, Master's I, private*] graduate research and F/S, precollege
15. **Sciencenter**, Ithaca, NY – Non-profit informal education affiliate, precollege.
16. **SUNY Binghamton**, Binghamton, NY [*highly residential, Doctoral/Research - Extensive, public*] undergraduate research and F/S
17. **SUNY Buffalo**, Buffalo, NY [*primarily residential, Doctoral/Research - Extensive, public*] undergraduate and graduate research and F/S, precollege
18. **SUNY Geneseo**, Geneseo, NY [*highly residential, Master's I, public*] undergraduate research and F/S
19. **SUNY Stony Brook**, Stony Brook, NY [*highly residential, Doctoral/Research - Extensive, public*] **NYSG is partnered with the LSAMP program which runs minority-focused projects**, undergraduate research and F/S
20. **Syracuse University**, Syracuse, NY [*highly residential, Doctoral/Research - Extensive, private*] undergraduate research and F/S, curriculum development, involved in precollege and informal education with the Museum of Science & Technology (MOST) in Syracuse.
21. **Union College**, Schenectady, NY [*highly residential, Baccalaureate - Liberal Arts, private*] undergraduate research and F/S, precollege
22. **University of Rochester**, Rochester, NY [*highly residential, Doctoral/Research - Extensive, private*] graduate research and F/S