

Delaware Space Grant Consortium  
University of Delaware

Dr. Dermott J. Mullan  
(302) 831-1094  
<http://www.delspace.org>

**Affiliates:**

Delaware State University  
Dover, DE

Delaware Technical and Community College, Jack F. Owens Campus  
Georgetown, DE

Delaware Technical and Community College, Stanton Campus  
Newark, DE

Delaware Technical and Community College, Terry Campus  
Dover, DE

Delaware Technical and Community College, Wilmington Campus  
Wilmington, DE

Swarthmore College  
Swarthmore, PA

University of Delaware  
Newark, DE

Villanova University  
Villanova, PA

Wilmington University  
New Castle, DE

**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 Delaware Space Grant Consortium (DESGC) is a Program Grant 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.

Faculty and students at the University of Delaware have ongoing collaborations with scientists and engineers at various NASA centers: Goddard, Johnson, Glenn, Ames, JPL, and Langley. In 2007, one of those collaborators, a Lab Chief from GSFC, served as an external examiner on the PhD thesis defense of DESGC Fellow Ben Breech.

**Program Benefits to the State:** Undergraduate students in Delaware who would not otherwise have had access to scholarships to help with tuition during the academic year have benefited from DESGC, especially students at Delaware Technical and Community College (DTCC), the 2-year community college in the State, with four campuses distributed throughout the State. DTCC, which has no endowment, typically does not award scholarships, so DESGC has been able to materially aid a pool of students in STEM disciplines who might otherwise not have been able to afford college. (During our last Fall Symposium, parents of one of our awardees mentioned that they could not have afforded to send their son to college without DESGC assistance.) Awards have been made to students on 3 of the 4 DTCC campuses, including students in the southern (more rural) region of the state. Awards have also been made to students at Wilmington University, a private institution where typically students are not offered much scholarship assistance.

Also of benefit to undergraduates in Delaware, DESGC has awarded summer undergraduate research funding which has opened up access for students to labs and computational facilities with faculty members in engineering, physics, astronomy, and geography, not only in Delaware, but also at NASA Centers (Ames, Goddard). DESGC supported interns in engineering and in senior design courses have graduated and found jobs with (among others) ILC Dover, the maker of space-suits and air-bags for NASA.

As regards graduate students, DESGC fellowships have allowed DE students in Engineering, Marine Studies, Biomechanics, Physics/Astronomy, and Geography to devote full-time attention to research for up to 2 years, thereby accelerating their entry into the workforce. The study and monitoring of the environmental health of Delaware's wetlands and coastal waters have been the subjects of various MS and PhD studies by DESGC fellows in Geography and Marine Studies.

As regards research infrastructure development, the Applied Optics Center at Delaware's HBCU (Delaware State University) has benefited from DESGC support to provide research access to undergraduate and graduate students on campus.

As regards professional development of teachers, DESGC-funded programs have enabled teachers to bring new and innovative science units into various grade levels in the State, in line with state and national standards in STEM and geography.

**Program Goals:** Utilize NASA funds to serve students and teachers in the State of Delaware in a variety of educational and training projects in areas which are related to STEM-G. At the college level, provide fellowships and scholarships to students attending 2-year and 4-year colleges throughout the State and to aid in professional development of STEM-G related educators. Enhance research opportunities on and off-campus, during the academic year and summer. Recruit and provide support for the education and training of professionals especially women, underrepresented minorities, and persons with disabilities for careers in fields which will meet NASA's needs in the 21<sup>st</sup> century.

**Program Accomplishments:** Some key accomplishments of Delaware Space Grant over the past year include: (a) we awarded a larger number of graduate fellowships including a full-year stipend than ever before (6.5); (b) among the DESGC fellows, we achieved a higher proportion of minority awards than ever before (75% female); (c) we awarded a larger number (11) of tuition scholarships to undergraduates than ever before; (d) the distribution of scholarships among our affiliates was broader than we had previously achieved, with awards going to 6 of our 9 affiliate institutions; (e) during Summer 2007, DESGC supported more students in summer research than ever before (12 undergraduates, 1 graduate student (GS2) [in addition to the grad fellows]); (f) among the summer students, DESGC supported for the first time an exceptional minority high school student (African-American female) who built a radio antenna in the Department of Physics and Astronomy at the University of Delaware to monitor radio bursts from meteors; (g) provided support for the Rocket Payload program at DTCC, where students in Electronic Technology design and construct payloads to be launched in rockets at the annual Rocket Launch event at Cape Henlopen State Park; (h) out of a total number of 32 DESGC awards to students in 2007, 38% were female, and 62% were male; (i) the representation of underrepresented minorities among our awardees was 22%, which is in excess of the national census statistics for minorities in our State; (j) a DESGC-supported research infrastructure project in Marine & Earth Studies produced 2 patents – “Subsurface Thermal Structure from Satellite Remote Sensing” and a “Cloud Free Vegetation Index”; (k) a DESGC-sponsored research project at DE's HBCU resulted in several publications and presentations at national conferences; (l) 10 Teacher enhancement programs in the State, which received DESGC support, were attended by more than 300 Delaware educators.

**Student Accomplishments:** (a) In 2007, DESGC support for research infrastructure at our HBCU, including grad student support, resulted in the successful completion of an MS in Physics by an African-American student. (He has since gone on to Penn State for PhD work.); (b) A grad fellow in Physics completed his *first* PhD in 2007: he is currently working on a *second* PhD in computer science; (c) A grad fellow in Marine Studies continued her studies of a dangerous plant which is encroaching on DE's wetlands: phragmites destroys other plant life; (d) the first contact between DESGC and NASA/Ames was made in 2007 by a DE-funded student who attended the robotics academy there; (e) DESGC sponsors a Fall Research Symposium to highlight and recognize all of the student researchers who have been supported during the preceding academic year/summer: a NASA/GSFC official attended in 2007 for the first time.