District of Columbia Space Grant Consortium
American University
Richard Berendzen
(202) 885-2755
http://wwwDCSpaceGrant.org

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 District of Columbia Space Grant Consortium (DCSGC) is a Program Grant Consortium funded at a level of $712,000 for fiscal year 2008.

PROGRAM GOALS

The DCSGC proposed the following goals for FY 08-09:

Fellowship/Scholarship Programs

Goal 1: To competitively provide at least 31 scholarships to undergraduate students in STEM disciplines
Goal 2: To competitively provide at least 9 scholarships to graduate students in STEM disciplines
Goal 3: To provide 21 scholarships to female and/or underrepresented minority students
Goal 4: To provide 9 scholarships to students with disabilities
Goal 5: To match students with faculty and NASA mentors on research projects
Goal 6: To retain and graduate 80%-95% of the students in STEM disciplines
Goal 7: To have 95% of the students seek or attain STEM employment
Goal 8: To competitively provide 2 fellowships to faculty in STEM disciplines
Goal 9: To provide 1 fellowship to a female and/or underrepresented minority faculty member
Goal 10: To integrate NASA's SMD into STEM courses at American University (AU)

Higher Education Programs

Goal 1: To develop and implement 2 new STEM undergraduate courses in astronomy
Goal 2: To develop and implement a new STEM undergraduate course at an HBCU
Goal 3: To develop and implement a new senior capstone STEM course at a deaf university
Goal 4: To competitively provide at least 2 internships to undergraduate students majoring in STEM disciplines
Goal 5: To competitively provide at least 2 internships to graduate students majoring in STEM disciplines
Goal 6: To provide 2 internships to female and/or underrepresented minority students
Goal 7: To retain and increase the number of students pursuing STEM degrees
Goal 8: To expose NASA and STEM research and mentoring opportunities to 130 undergraduate students
Goal 9: To provide NASA mission related robotics and ballooning activities to 40 students in physics, earth science, and space science courses
Goal 10: To competitively provide 2 summer fellowships at NASA Goddard Space Flight Center (GSFC) to faculty members
Goal 11: To engage faculty in STEM-related research projects
Goal 12: To improve the ability of faculty to compete for NASA research and development work
Goal 13: To create new linkages between DC universities and NASA GSFC

Research Infrastructure Programs

Goal 1: To work with Wolfrum Research to distribute Mathematica licenses to minority STEM faculty members
Goal 2: To distribute ChemDraw software to minority undergraduate and graduate students
Goal 3: To upgrade laboratories with new digital measurement devices and other resources
Goal 4: To support minority faculty members and students

Goal 5: To attract and retain students in STEM disciplines via improved lab resources

Precollege Programs
Goal 1: To competitively award 3 scholarships to high school students to pursue STEM degrees at DC universities
Goal 2: To award 1 scholarship to a minority high school student to pursue a STEM degree at a DC university
Goal 3: To increase the number of high school students pursuing degrees in STEM-related fields in DC universities
Goal 4: To engage high school students in hands-on STEM-related projects and coursework
Goal 5: To competitively award 2 scholarships to teachers
Goal 6: To train teachers (including teachers of deaf students) in hands-on STEM-related projects
Goal 7: To support minority teacher training in the District
Goal 8: To involve teachers and students in NASA-sponsored projects and activities
Goal 9: To effectively collaborate with key personnel in the DC Public Schools (DCPS)
Goal 10: To collaborate with NASA Centers

Public Outreach Programs
Goal 1: To inform an audience of educators and the general public about DCSGC programs and activities
Goal 2: To inform an audience of students, educators, and the general public about NASA and aerospace industry career opportunities
Goal 3: To expose students to preparing and presenting the results of their research projects to their peers, educators, and the general public
Goal 4: To engage students, faculty, and the general public through hands-on, STEM-related, NASA activities
Goal 5: To inform the general public about NASA space exploration missions
Goal 6: To target students and the general public in concentrated minority areas

PROGRAM/PROJECT BENEFIT TO OUTCOME
The following anecdotes highlight students and projects supported so far in FY 08-09:

Outcome
Dr. Sherali Zeadally, a professor of computer science and the PI of a DCSGC program at the University of the District of Columbia (UDC), contributes the success of a very competitive $104,000 equipment grant he was awarded from Cisco Systems, Inc. to his experience and work running DCSGC activities at UDC. He feels that the fact that he already had a NASA Space Grant award gave him the edge he needed to win the competition. He also is a finalist for a sizable grant from the University of California (Los Angeles) RFID Consortium, and will soon submit a proposal to support the research currently being undertaken by NASA's Space Operations Mission Directorate in Delay Tolerant Networking. He attributes his involvement in these additional grants to the confidence the DCSGC has shown in his work.

Katie Heasley, an undergraduate student, wanted a degree in language study before she participated in the INSPIRE workshops held in conjunction with a physics course at the University of Maryland (UMD). She said that her experience made her realize how much she loves physics, and she is now a physics major. She plans to continue participating in INSPIRE even after the course ends, and to purchase the next generation INSPIRE receiver kit when it becomes available.

Cedric Boyd, a graduate student in computer science at UDC who received a DCSGC scholarship for his work on a secure network research project, was able to use his research experience to solve problems at the IT company where he works, saving the company's clients a lot of money and greatly impressing his employer.

Dr. Shing Fung, a mentor in NASA GSFC's Heliophysics Science Division who supervised the research of a DCSGC intern in 2008, was so impressed with the student's quality of work that he has offered to mentor any students we are able to send his way.

PROGRAM ACCOMPLISHMENTS

The DCSGC has made the following progress so far on its FY 08-09 goals:

Fellowship/Scholarship Programs

So far, 15 scholarships have been awarded to undergraduate students in STEM disciplines at AU, CUA, GU, George Washington University (GWU), and UDC. Other scholarship programs are underway, and approximately 16 more scholarships are expected to be awarded to undergraduate students in the coming months. So far, 4 scholarships have been awarded to graduate students in STEM disciplines at GU, Georgetown University (GTU), GWU, and UDC. Other scholarship programs are underway, and approximately 5 more scholarships are expected to be awarded to graduate students in the coming months. So far, 8 scholarships have been awarded to female and/or underrepresented minority students. Other scholarship programs are underway, and approximately 13 more scholarships are expected to be awarded to female and/or underrepresented minority students in the coming months. Since one of the DCSGC's HBCU affiliates has not yet announced its scholarship recipients for the year, the percentage of minority students is currently well below the DCSGC's average. So far, 6 scholarships have been awarded to students who are deaf or hard of hearing. Other scholarship programs are underway, and approximately 3 more scholarships are expected to be awarded to students with disabilities in the coming months.

Nineteen students from AU, CUA, GU, GTU, GWU, and UDC were matched with faculty and NASA mentors on various research projects.

It is still too early to tell what percentage of the students will be retained and graduated in STEM disciplines or what percentage will seek or attain STEM employment, but the students have been added to the DCSGC longitudinal tracking database for annual follow-up.

The DCSGC is developing a program that will help integrate NASA's Science Mission Directorate into STEM courses at AU in Fall 2009. Two faculty members will receive fellowships, and the DCSGC expects to award at least one of the fellowships to a female and/or underrepresented minority faculty member.

Higher Education Programs

An undergraduate earth science course that incorporates ballooning activities, an undergraduate chemistry course that incorporates microcontroller activities, and an undergraduate physics course that incorporates ROV activities in the lab have been developed at GU. INSPIRE workshops have been incorporated into an undergraduate physics course at UMD. Two undergraduate courses in astronomy are being prototyped at DC-area universities (Marymount University (MU) and George Mason University (GMU)) in anticipation of their incorporation at Trinity University (TU) in DC. One of them is still in early development phase, but the other has already been implemented at MU. Sixty-five students have participated so far in the other course, 46 of who were female, and 60% of who were minority. One student has a disability. An earth and space science course was developed at Howard University (HU), an HBCU. Two minority students participated in the course in the Fall 2008 semester, and the course will be repeated in Fall 2009. In addition, a new course in space weather is being implemented at HU for the Fall 2009 semester. A new two-semester senior capstone course in biology was developed and implemented at GU. So far two students have taken the course. More students are expected to take the course next semester.

One undergraduate student completed a two-semester internship at The INSPIRE Project, Inc. At least one more undergraduate student will be interning at NASA or industry in Summer 2009. One graduate student completed a two-semester internship at NASA GSFC. At least one more graduate student will be interning at NASA or industry in Summer 2009. It is expected that both internships will be filled by students who are female and/or of an underrepresented minority.

Fifteen undergraduate students participated in the Astronaut Jones Robotics Program, which exposes students to NASA research and prepares them for advanced degrees or careers in STEM. Nineteen undergraduate students participated in an INSPIRE workshop at UMD that was incorporated into a physics course. Thirty-six students participated in earth science, chemistry, and physics courses at GU that included robotics and ballooning activities. It is expected that DCSGC-supported courses will reach at least 60 more undergraduate students in the coming semester.

The DCSGC is currently accepting applications for its faculty fellowship program, and will award NASA GSFC summer fellowships to 2 faculty members in the coming months. The DCSGC expects to award at least one of the fellowships to a female and/or underrepresented minority faculty member. In addition to engaging faculty in STEM-related research through these upcoming fellowships, faculty members this year participated in STEM-related research projects through INSPIRE workshops, new courses, upgraded laboratories, and by mentoring student researchers.

A DCSGC PI at GU used her experience and release time running DCSGC activities to get grants from NSF that will allow her to mentor 2 interns in her biology lab this summer. A DCSGC PI at UDC used his experience running DCSGC activities to get a grant from Cisco Systems, Inc. and to apply for two other grants.

A student from GTU participated in a two-semester internship at NASA GSFC. The student's NASA mentor was so impressed that he offered to mentor any future interns we send his way. NASA GSFC scientists participated in the INSPIRE workshops in the UMD physics course, including two prominent members from the Heliophysics Science Division. In addition, the Director of Planetary Science from NASA HQ participated in the workshops. The DCSGC expects to support at least two more student internships at NASA GSFC this summer, as well as two faculty fellowships, further strengthening linkages between DC universities and NASA GSFC.

Research Infrastructure Programs

Mathematica licenses were distributed to twenty minority STEM faculty members, and ChemDraw software was distributed to approximately 40 minority undergraduate and graduate students at HU. In addition, HU laboratories were upgraded with a new FTIR spectrometer, a new small spectrometer, and 20 GChem apparatus sets, and enhanced by a new experiment involving quantum dots. Approximately 200 minority students and faculty in GChem and 30 minority students and faculty in PChem used the upgraded laboratories, which help attract and retain students in STEM disciplines.

Precollege Programs

The DCSGC is currently accepting applications from high school students to pursue STEM degrees at DC universities, and will award 3 scholarships in the coming months. The DCSGC expects to award at least one of the fellowships to an underrepresented minority student. This will increase the number of high school students pursuing degrees in STEM-related fields in DC universities.

S.M.A.R.T., Inc. sponsored a solar viewing session for teachers and students from the Howard University Middle School of Mathematics and Science and a solar eclipse viewing session for teachers and students at the Roswell Brooks Elementary School, both schools with high minority populations. Activities included such hands-on, NASA-related research projects as developing and using a solar telescope. The DCSGC is working on getting the teachers to incorporate lessons into their coursework. The opportunity is being advertised to teachers for the Fall 2009 semester, and the DCSGC expects to award tuition scholarships to 2 K-12 teachers. The 2008 GLOBE workshop was cancelled due to low turnout, but one teacher and two students from the Model Secondary School for the Deaf attended the Botball robotics workshop. The DCSGC is currently accepting applications from high school science teachers for scholarships to attend Space Camp in Huntsville, AL for valuable teacher training they can bring back to their classrooms, and will award 2 scholarships in the coming months.

The DCSGC established a close relationship with Michael Kaspar, the Director of Science for the DCPS, who assists in advertising opportunities to DCPS science teachers. DCSGC affiliates work directly with schools such as the Howard University Middle School of Mathematics and Science on various projects. And finally, the DCSGC will be working with the DCPS system to undertake a bold new initiative to establish a NASA DCSGC Teacher of the Year Award. The DCSGC needs to further develop collaborations between the DCPS and the local NASA Centers.

Public Outreach Programs

Through community activities being developed for the Solar System Ambassadors Program and community visits by NanoExpress, a large van that introduces visitors to nano science and technology through hands on projects and demonstrations, the DCSGC has reached hundreds of members of the general public in concentrated minority areas of DC. These activities and demonstrations are instrumental in informing the public about DCSGC programs, NASA and aerospace opportunities, and NASA missions.

Plans are underway for a DCSGC conference in late spring where students and faculty members will be able to present their DCSGC-sponsored research and experiences to their peers, educators, and members of the general public.

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Longitudinal Tracking: Since 2006, the DCSGC has awarded scholarships to sixty-four students in the fellowship/scholarship category (including current year awardees). Twenty-eight of the awards went to underrepresented minority students. Ten of the awards went to students with disabilities. Twenty-eight of the awards went to female students. Forty-five of the students are still enrolled in their current degree program, five have graduated and are pursuing advanced STEM degrees, two have graduated and are seeking STEM employment, two are employed in STEM as aerospace contractors, two are employed in STEM in non-aerospace positions, two are employed by NASA, three are employed in STEM higher education academic fields, and one is employed in a non-STEM field. There are two students we have temporarily lost track of because of outdated contact information or who have not responded to our most recent survey, and we are still in the process of tracking them down. All of the students we support are in the DCSGC longitudinal tracking database and are monitored for progress through an annual survey.

- Course Development: So far, the DCSGC supported the development and revision of nine courses targeted at the STEM skills needed by NASA. The courses include a two-semester senior capstone biology course, an undergraduate earth science course that incorporates ballooning activities, an undergraduate chemistry course that incorporates microcontroller activities, and an undergraduate physics course that incorporates ROV activities in the lab at GU; INSPIRE workshops incorporated into an undergraduate physics course at UMD; an earth and space science course and a space weather course at HU; and 2 undergraduate astronomy courses that are being prototyped at DC-area schools in anticipation of their incorporation at TU.

- Matching Funds: The DCSGC leveraged $603,814 in matching funds, for a ratio of .85:1, or 85 cents for every NASA dollar.

- Minority-Serving Institutions: All three of DC's minority serving institutions are affiliates of the DCSGC: Howard University, Southeastern University, and the University of the District of Columbia. All three have received support over the years, and so far in FY 08-09, the DCSGC supported students and activities at HU and UDC. The DCSGC also is in discussions with the Arizona Space Grant Consortium to facilitate relationships between the AZSGC and faculty members at HU.

IMPROVEMENTS MADE IN THE PAST YEAR

The DCSGC made several improvements and adjustments over the past year, including: updating its Strategic Plan with input from all DCSGC affiliates; redesigning its website; hiring a student assistant; conducting an internal Affiliate Survey to collect affiliate input on DCSGC policies/procedures, meetings, etc.; and working with new affiliate representatives at Catholic University, George Washington University, and the University of the District of Columbia.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

The following institutions are DCSGC affiliates: American University; Aries Scientific; Catholic University; Gallaudet University; Georgetown University: George Washington University; Howard University; NASA Alumni League; S.M.A.R.T., Inc.; Southeastern University; INSPIRE Project, Inc.; Trinity Washington University; and University of the District of Columbia