

THE NATIONAL SPACE GRANT COLLEGE & FELLOWSHIP PROGRAM

FISCAL YEAR 2020 ANNUAL PERFORMANCE REPORT (APR)

FUNDING SOURCE:
OFFICE OF STEM ENGAGEMENT
SPACE GRANT

MANAGING ORGANIZATION:
NASA HEADQUARTERS OFFICE OF STEM ENGAGEMENT

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DELAWARE SPACE GRANT CONSORTIUM
LEAD INSTITUTION:
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COOPERATIVE AGREEMENT/GRANT NUMBER:
80NSSC20M0045

ACTIVITY DESCRIPTION: (100 – 250 words)

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 is a Program Grant Consortium funded at a level of \$760,000 for fiscal year 2020.

ACTIVITY GOALS: (Bulleted list)

State the Consortium Goals and Objectives from your base proposal and augmentation proposal. The objectives should express quantitative targets when appropriate.

- Promote a strong STEM education base from elementary through secondary levels while preparing teachers in those grade levels to become more effective at improving student academic outcomes; enhance K-12 teachers' abilities to make students aware of education and career opportunities in STEM areas; use DESG and NASA resources to contribute to professional development of K-12 teachers. Target: Increase by 2 the number of Delaware teachers who attend development programs offered by DASEF to 62 teachers; sponsor 3 teachers at LiftOff.
- Contribute to the solving of Mission Directorate challenges; continue RID funding to improve research infrastructure so the awardees can eventually propose to national agencies for larger research grants; increase the number of research proposals submitted to national competitions in the state of Delaware. Target: submit at least 1 research proposal from DE in response to all NASA EPSCoR Research solicitations (CAN, ISS, and Rapid Response).
- Recruit and train U.S. citizens, especially women, underrepresented minorities, and persons with disabilities, for careers in aerospace science and technology; award internships, fellowships and tuition awards to deserving Delaware students who demonstrate familiarity with NASA's mission; facilitate the process of student access to DESG programs by means of a DESG website and online applications; increase diversity in DESG student awards. Target: award at least 1 undergraduate tuition award on at least 5 affiliate campuses; award at least 1 graduate fellowship to a student at Delaware's HBCU; ensure at least 3 underrepresented minority students participate in summer research.
- Space Grant consortia are expected to develop innovative and integrated plans to advance aerospace knowledge and expand related activities; enhance access to quality instruction and research experiences offered in STEM-related fields on the DESG affiliate college campuses; support attendance at RockOn and RockSat-C programs at NASA's Wallops Flight Facility through affiliate campuses and senior design or student projects. Target: increase the number of teams of 3 students/faculty that attend RockOn to 3 teams of 3; support 2 teams of 4 students to participate in RockSat-C projects.

ACTIVITY CONTRIBUTIONS TO PERFORMANCE GOALS (PG) AND SUCCESS CRITERIA

List appropriate FY 2020 PGs and Success Criteria and write a brief description of the project activity's contribution to each.

PG 3.3.3: Provide opportunities for students to engage with NASA's aeronautics, space, and science people, content, and facilities in support of a diverse future NASA and aerospace industry workforce.

PG 3.3.3 Success Criteria: Meet or exceed the national average in two of the four categories of student diversity for NASA STEM enrollees in internships, fellowships, or other student engagement opportunities. Diversity Categories: (1) students across all institutional categories and levels (as defined by the U.S. Department of Education), (2) racially or ethnically underrepresented students (Hispanics and Latinos, African Americans, American Indians, Alaska Native, Native Hawaiians and Pacific Islanders), (3) women, and (4) persons with disabilities at percentages that meet or exceed national averages for science and engineering enrollees, as determined by the most recent, publicly available data from the U.S. Department of Education's National Center for Education Statistics.

In FY20, 32.3% of DESGC's Internships, Graduate Fellowships, and Undergraduate Tuition Awards were awarded to racially or ethnically underrepresented students, and 54.8% were awarded to women.

PG 3.3.4: Enhance the effectiveness of education investments using performance assessment and evaluation-driven processes.

PG 3.3.4 Success Criteria: Discuss how the Consortium has or plans to implement evaluation-driven processes to assess the overall impact of the Consortium and its activities.

DESGC currently implements several tracking and evaluation methods to assess the quality and successes of its programs. These include presentation of supported research and educational activities by students, teachers and mentors at the Annual Research Symposium, which provides feedback to students and supported teachers on their activities while also providing the DESGC advisors, associated directors and affiliate representatives with information on the performance of its programs.

The Research Symposium (last year done virtually), as well as annual meetings of the advisory board and associate directors, also provide ongoing opportunities for exchange of suggestions and fine-tuning procedures at an organizational level.

With regard to assessment of its activities to promote diversity, the DESGC now has several years of experience involving sponsorship of Diversity and Inclusion activities under guidance of an Associate Director for Diversity. This position is currently held by Dr. Dwight Higgin, who has been very active in designing and carrying out virtual meetings for recruitment, emphasizing diversity. Hired only last spring (and under difficult circumstances due to the pandemic), Dr. Higgin is developing quantitative measures for assessment of the impact of these activities, including quantitative measures such as attendance statistics. We also are continuing our practice of tracking the progress of students subsequent to their support by DESGC, as they progress in their education and careers.

PG 3.3.5: Provide opportunities for students to contribute to NASA’s aeronautics, space, and science missions and work in exploration and discovery.

PG 3.3.5 Success Criteria: Number of paper presentations and peer-reviewed research publications (and beginning in FY2021 to include student proposed solutions and products) resulting from STEM engagement investments. (Target number is 1,300)

This year, DESGC’s Internships and Graduate Fellowships resulted in a total of 19 paper presentations and peer-reviewed research publications.

NOTE: For the following categories, complete if applicable to your base award. If not applicable, indicate “Not Applicable”.

BASE AWARD ACCOMPLISHMENTS: (250 – 500 words)

- Promote a strong STEM education base from elementary through secondary levels while preparing teachers in those grade levels to become more effective at improving student academic outcomes; enhance K-12 teachers' abilities to make students aware of education and career opportunities in STEM areas; use DESG and NASA resources to contribute to professional development of K-12 teachers. Although several in-person teacher development programs have been postponed due to Covid-19, all Delaware educators (public, private, parochial) continue to be sent mailings to include the latest updates from the Aerospace Resource Center on Earth and Space Science, and standard-based activities and lessons to enhance and enrich curriculum.
- Research Infrastructure Development (RID) projects:
RID funding was reestablished in FY16 and continues through the FY20 award period. To date in FY20, one RID award has been distributed. More awards are planned but have been delayed due to Covid-19. This year, Delaware has received awards for several NASA EPSCoR programs: a CAN, an ISS, and two Rapid Response projects. Proposals are being submitted in response to each of this year’s solicitations.
- NASA Internships and Fellowships (NIF):
In FY20, six graduate fellowships were awarded: 50% were awarded to women, and one award went to a student at Delaware’s HBCU. Eleven undergraduate tuition awards were distributed: 55% to women and 45% to underrepresented minority students. Fourteen students were sponsored in summer research, including two students at NASA Centers, and two students were sponsored in a fall research project. The awards were distributed across Delaware State University (HBCU), University of Delaware, Villanova University, Wesley College, Wilmington University, NASA Headquarters, and NASA Langley Research Center.
- Higher Education projects:
Covid-19 has delayed the 2020 RockOn Workshop and RockSat-C launch. Six participants were registered to participate in the summer 2020 RockOn Workshop; however, the workshop was postponed and is expected to be held virtually in summer 2021. Two student teams worked on RockSat-C projects, and the launch is postponed until summer 2021.

NCAS AND SPACE GRANT PILOT ACCOMPLISHMENTS (If applicable): (250 – 500 words)

Not Applicable

BIG Idea FY2020 ACCOMPLISHMENTS (If applicable): (250 – 500 words)

Not Applicable

FIRST NATIONS LAUNCH (If applicable): (250 – 500 words)

Not Applicable

ACTIVITY IMPROVEMENTS MADE IN THE PAST YEAR:

(e.g. activity management, cost efficiencies) (100 – 250 words)

Dr. Dwight Higgin, Assistant Professor in UD's Associate in Arts Program, has been appointed Associate Director of Diversity and Inclusion. In spite of Covid-19 restrictions, this fall Dr. Higgin has held four virtual outreach events to students within the jurisdiction. He is also participating as a member in UD's Department of Physics and Astronomy Committee on Climate, Diversity, Equity and Inclusion.

ACTIVITY PARTNERS AND ROLE OF AFFILIATES IN ACTIVITY EXECUTION:

Bulleted list or table. Should include a brief description of how affiliates were involved in the project activity.

4-year Academic Institutions:

- The lead institution of DESGC is the University of Delaware (UD). UD is classified by the Carnegie Foundation for the Advancement of Teaching as a doctoral university with highest research activity, a designation accorded to just 2.5% of the more than 4,600 degree-granting institutions in the USA. UD has 18,221 undergraduate students and 4,164 graduate students enrolled, and offers bachelor degrees in all STEM subject areas. Many of the DESGC graduate fellows are UD students from a variety of colleges: Arts & Sciences (Departments of Chemistry and Physics & Astronomy), Engineering (Departments of Chemical, Computer, Electrical, Materials Science, and Mechanical), and Earth, Ocean & Environment (Oceanography). UD undergraduates from a variety of colleges have benefitted from DESGC-funded tuition awards and summer research opportunities. Researchers in various colleges (Engineering, Earth, Ocean & Environment, Arts & Sciences, Agriculture & Natural Resources) and the Delaware Biotechnology Institute (DBI) have benefitted since 2005 from DESGC Research Infrastructure (RID) Funds.
- Delaware State University (DSU), an HBCU, has 4,602 undergraduate students, 452 graduate students, and offers bachelor degrees in at least one STEM area. The undergraduate student body is 73% underrepresented minorities. In FY20, four DSU undergraduate students were awarded

DESGC tuition awards, and one DSU graduate student was awarded a DESGC graduate fellowship.

- Wilmington University (WilmU) (13,266 undergraduate students, 7,240 graduate students) offers a range of bachelor degrees that includes one or more of the STEM disciplines. WilmU's undergraduate student body is 66% female and 34% underrepresented minorities. In FY20, three (all underrepresented minority) undergraduate students participated in summer research sponsored by DESGC. Three students were registered for the RockOn Workshop at Wallops Flight Facility (postponed due to Covid-19).
- Wesley College, an MSI with over 1,035 undergrads, offers a range of bachelor degrees in the STEM disciplines. 47% of the undergraduate student body are underrepresented minorities, and 52% are female. In FY20, three Wesley students were awarded DESGC tuition awards, and two participated in summer research sponsored by DESGC.
- Swarthmore College, with 1,641 undergrads, offers bachelor degrees in several STEM areas. The student body is 21% underrepresented minorities and 51% female.
- Villanova University is a DESGC affiliate in southeastern Pennsylvania with 6,865 undergraduate students and 3,983 graduate students. The student body is 53% female. In FY20, DESGC supported one student in summer research.

2-year Academic Institution

- Delaware Technical Community College (DTCC) has a total of 13,660 students on four campuses distributed widely across the State. The average student body includes 39% underrepresented minorities and 65% female. In FY20, three DTCC students were registered for the RockOn Workshop at Wallops Flight Facility (postponed due to Covid-19).

Non-Profit Affiliate

- DASEF (Delaware AeroSpace Education Foundation) is an enterprise founded in 1989 by Dr. Stephanie Wright (at one time, Delaware's Teacher in Space) to create an exceptional learning environment that inspires children and their families with an appreciation of the Earth and its place in the universe. DASEF has contributed to the academic development of over 601,600 students, educators, and the general public through the delivery of context-based activities consistent with current aerospace research and development. Many youth, through DASEF experiences, have been inspired to pursue the sciences, technology, engineering, and mathematics.

Industrial Affiliates

- ILC Dover LP (makers of space suits for NASA) and Northrop Grumman (formerly Orbital ATK, Inc.) supply active members to DESGC's Advisory Board. Air Liquide Advanced Technologies U.S. LLC in Newark DE is our newest industrial affiliate. Activities of these board members

include reviewing applications for DESGC Graduate Fellowships and providing a detailed statistical analysis of the results to ensure a lack of bias among reviewers. Another Advisory Board member, Dr. Aaron Owens, is retired and continues to represent the DuPont Company.

CURRENT AND PROJECTED CHALLENGES:

Identify any current or projected challenges in the implementation or execution of activities. Explain how the management team is working to address the challenges identified and/or how National Program Staff can assist.

We have in past years worked towards securing participation by the campuses of Delaware Technical Community College (DTCC) in DESGC activities by meeting with several faculty from DTCC campuses. Getting such participation continues to be a challenge.

Although there has been significantly increased participation by underrepresented groups in application for Space Grant activities, we continue to feel that there is room for additional improvement and we accept this as a challenge going forward.

REFERENCES (optional – include only if needed):

(APA style reference list)