

FY 2018 Year 4 Extension Annual Performance Document

IL Space Grant Consortium Lead Institution:

Director: Philippe Geubelle (till Jan. 2019); Joshua Rovey (beginning Feb 2019)

Telephone Number: 217-244-8048

Consortium URL: <https://isgc.aerospace.illinois.edu/>

Grant Number: NNX15AI05H

Lines of Business (LOBs): NASA Internships, Fellowships, and Scholarships;
STEM Engagement; Institutional Engagement; Educator Professional
Development

A. 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 IL Space Grant Consortium is a Designated Consortium funded at a level of \$760,000 for fiscal year 2018.

B. PROGRAM GOALS:

NASA Internships, Fellowships and Scholarships

Goal 1: Provide scholarships and fellowships to students at ISGC academic institutions.

Objective:

- S:** Through a competitive process, award fellowships and scholarships to a diverse population of recipients across the consortium.
- M:** Achieve at least the minimum target percentage of underrepresented recipients (31.9%) and women recipients (40%).
- A:** Provide \$199k (in 2018) in scholarships and fellowships, in accordance with Section 1.2 of Amendment No. 1 to the 2015 - 2018 NASA Training Grant Announcement.
- R:** Scholarship/fellowship recipients will be selected through the existing centralized system of application and selection.
- T:** Objectives to be achieved during the time period of the grant.

Goal 2: Scholarship recipients will go on to pursue graduate school or employment in STEM.

Objective:

S: Ninety percent of scholarship recipients will enter graduate school or STEM employment at their “next educational step” (66% employment specifically at NASA, aerospace companies, universities or other educational institutions).

M: Scholarship and fellowship recipients will be followed through longitudinal tracking.

A: Goal is in alignment with the Space Grant Program objective to train US citizens for careers in aerospace science and technology.

R: Based upon past tracking, 90% is a reasonable objective.

T: Objective to be achieved during the time period of the grant.

Goal 3: Geographic diversity is achieved in the awarding of fellowships/scholarships.

Objective:

S: Awards are made to every ISGC academic institution.

M1: Applications are received from every ISGC academic institution.

M2: Each ISGC academic institution receives at least two awards.

A: Target is appropriate due to the geographic and characteristic diversity of the ISGC academic institutions.

R: Target is achievable as ISGC Selection Committee is aware of and supports the goal.

T: Goal is achieved in each year of the grant.

Goal 4: Support undergraduate student experience with NASA scientists and engineers.

Objective:

S: Support ISGC student participation in NASA Center internships.

M: At least two NASA Center summer interns from ISGC academic institutions will be supported in 2018.

A: The goal is in alignment with NASA Institutional Engagement Line of Business, Goal 1 – Capacity.

R: Past record supports that at least two NASA Center internship applicants from ISGC institutions will be selected by the Centers.

T: At least two ISGC interns will be supported during summer 2018. Interns will be supported in summer 2018 according to available funds and NASA Center selection.

Higher Education

Student Projects

Goal 1: Provide interdisciplinary educational activities outside of the classroom for students to develop their STEM knowledge and skills.

Objective:

S: Support authentic hands-on design/build/operate projects for students at ISGC institutions.

M: Provide support for at least five projects in a variety of areas: aeronautics, high-altitude ballooning, high-powered rocketry and space robotics.

A: Goal is in alignment with NASA Institutional Engagement Line of Business, Goal 2 - Content.

R: Projects in aeronautics, astronautics and robotics are already established.

T: Five projects will be in operation and will be supported in FY 2018.

Research Infrastructure

Undergraduate Research Programs

Goal 1: Support undergraduate research programs/assistantships in aerospace engineering and science at ISGC academic affiliates.

Objective:

S: Continue to support research opportunities for undergraduates at ISGC institutions.

M: ISGC will support at least six undergraduate research programs at ISGC academic institutions.

A: The National SG Program has established undergraduate research as one of its key goals.

R: ISGC has a strong track record of supporting undergraduate research programs at six affiliates over the past three years.

T: Objective is achievable within the grant period.

Goal 2: Undergraduate research program participants will continue on to STEM graduate studies or enter a STEM career.

Objective:

S: Ninety percent of undergraduate research program participants will enter graduate school or STEM employment at their “next educational step” (66% employment specifically at NASA, aerospace companies, universities or other educational institutions).

M: All undergraduate participants will be followed through longitudinal tracking.

A: Goal is in agreement with NASA Strategic Objective 2.4 – Advancing STEM education and the workforce pipeline.

R: ISGC students have a strong track record of continuing with STEM employment following school.

T: Ninety percent objective is realistic based upon past data.

Research Seed Grants

Goal 3: Assist faculty in obtaining funds for research in areas of interest to NASA.

Objective:

S: Establish research seed grants to allow the award recipients to obtain the preliminary results needed to support larger proposals to other federal or non-federal funding agencies.

M: At least one of the awardees will successfully apply for a larger research grant based on preliminary work completed as part of a seed grant.

A: Goal is in alignment with Space Grant emphasis to “enhance capacity of institutions to support innovative research infrastructure activities to enable early career faculty to focus their research toward NASA activities.”

R: Goal and metric are reasonable based on past performance.

Pre-College

Goal: Improve the STEM attitudes and knowledge of pre-college teachers.

Objective:

S: Offer teacher-training aligned with education standards in STEM areas relevant to NASA in geographically diverse areas of the consortium.

M: Scores on post-knowledge and attitude surveys demonstrate improvement.

A: Programs in alignment with STEM Engagement Line of Business – Experiential Learning Opportunities.

R: Trained staff resources are in place at ISGC institutions to develop and offer the programs.

T: Pre-college program resources are in place to offer programs in 2018.

Informal Education

Goal: Provide science/engineering-based programs to the public, including rural communities.

Objective:

S: Offer two informal education programs in both Chicago and Rockford that will reach at least 50,000 individuals.

M1: Institutions keep attendance counts of the number of participants in all of these programs.

M2: At least one informal education program will focus on rural Illinois communities.

A: Goal and objective is in alignment with Space Grant Program objective to “Encourage interdisciplinary training, research and public service programs related to aerospace.”

R: Adler and Discovery have the expertise to organize and implement these programs.

T: Programs will take place during FY 2018.

C. PROGRAM/PROJECT BENEFITS TO PROGRAM AREAS:

Fellowships/Scholarships: ISGC made significant advances in the number of awards made to female applicants. Our percentage was 13% over the target rate.

Research Infrastructure: Continued to support strong undergraduate research programs. Encouraging to see number of students at Chicago State (an MSI) that are involved with faculty in research.

Pre-College: The number of pre-college teachers who in STEM training workshops at the Discovery Center Museum and the MSEE program at DePaul continues to grow. In 2018, there were 117 teachers.

D. PROGRAM ACCOMPLISHMENTS:

- NASA Internships, Fellowships, and Scholarships (NIFS):
- ❖ Through a competitive process, award fellowships and scholarships to a diverse population of recipients across the consortium.
 - Achieve at least the minimum target percentage of underrepresented recipients (31.9%) and women recipients (40%).
 - Awarded 15 fellowships and 26 scholarships across 9 of 9 active academic institutions in ISGC. No applications were submitted from one of the affiliates.
 - Exceeded our target percentages for women (53.7%) and came up slightly short for underrepresented minority students (29.2%).
- ❖ Awards are made to every ISGC academic institution.
 - Applications are received from every ISGC academic institution.

- Received applications from 9 universities. Awarded 15 fellowships and 26 scholarships across 9 of 9 active academic institutions in ISGC.
- ❖ Support ISGC student participation in NASA Center internships
 - At least two NASA Center summer interns from ISGC academic institutions will be supported in 2018.
 - No students were selected for NASA Center internships and academies.
- Higher Education projects:
- ❖ Support authentic hands-on design/build/operate projects for students at ISGC institutions.
 - Supported six authentic hands-on design/build/operate projects for students at ISGC institutions. Three teams for the Midwest high-powered rocket, high-altitude ballooning, DBF aircraft for competition, autonomous robot for Mars competition, SL rocket, construction of full-size aircraft.
- Research Infrastructure projects:
- ❖ Continue to support research opportunities for undergraduates at ISGC institutions.
 - ISGC will support at least six undergraduate research programs at ISGC academic institutions.
- ❖ 79 undergraduate students were supported by 6 affiliates (7 programs) in intern/research assistant positions.
- Precollege projects:
- ❖ Offer teacher training aligned with education standards in STEM areas relevant to NASA in geographically diverse areas of the consortium.
 - Eight teachers participated in Masters of Science in Science Education degree program offered at DePaul. 109 teachers attended Discovery Center teacher education workshops.
- Informal Education projects:
- ❖ Offer two informal education programs in both Chicago and Rockford that will reach at least 50,000 individuals.
 - Programs offered by Adler and Discovery Center Museum reached approximately 74,700 participants.
 - Space-related science outreach programs conducted by Bradley University students and faculty reached 9,677 children and adults.

E. PROGRAM CONTRIBUTIONS TO NASA EDUCATION PERFORMANCE GOALS:

Include summary data for the bulleted list below:

- **Diversity:** 29.2% of F/S recipients underrepresented minorities and 53.7% females All of the ISGC affiliates, except CCC, were involved in ISGC activities. The affiliates are scattered throughout the state, include informal education institutions and universities, both PhD-research universities and non-PhD colleges

- **Minority Serving Institution Collaborations:** Chicago State University continues to be an active member of ISGC. One of our new affiliates, City Colleges of Chicago, is a system of community colleges and is an MSI. We are working to incorporate CCC into our programs.
- **Office of Education Annual Performance Indicators:**
 - o API 3.3.3: STEM-18-1 98
 - o API 3.3.5: STEM-18-5 8

F. IMPROVEMENTS MADE IN THE PAST YEAR:

We have added two new affiliates, NIU and CCC. CCC is the first community college in ISGC. Many of the students at CCC are underrepresented minorities.

Slowly improving in the number of hands-on student projects: UIUC, Northwestern, and Adler.

G. CURRENT AND PROJECTED CHALLENGES:

We continue to have problems collecting info on publications and proposals. It is a timing issue. Publications and proposals come months or years after projects have been supported. Will need to develop a system to improve the situation.

H. PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION:

University of Illinois at Urbana-Champaign

PhD-granting research university

Lead institution for ISGC

Public, land-grant institution

ISGC activities: management; undergraduate research; scholarships and fellowships; seed grants; course development; hands-on student projects

Illinois Institute of Technology, Chicago

PhD-granting research university

Private university

ISGC activities: undergraduate research; scholarships and fellowships; seed grants; course development

Northwestern University, Evanston

PhD-granting research university

Private university

ISGC activities: undergraduate research; scholarships and fellowships; seed grants; course development, teacher training

The University of Chicago

PhD granting research university

Private university

ISGC activities: undergraduate research; scholarships and fellowships

Southern Illinois University Edwardsville

Master's-granting university (professional degrees in medical fields)
Public institution
ISGC activities: seed grants; scholarships and fellowships; course development

University of Illinois at Chicago
PhD granting research university
Public institution
ISGC activities: undergraduate research; scholarships and fellowships; seed grants

DePaul University, Chicago
Master's granting university
Private institution
ISGC activities: scholarships; K-12 teacher training; undergraduate research; seed grants

Bradley University, Peoria
Master's granting university
Private Institution

Discovery Center Museum, Rockford
Educational and recreational institution
Not-for-profit
ISGC activities: K-12 teacher training; informal education program

Northern Illinois University, DeKalb
PhD-granting university
Public institution
ISGC activities: undergraduate research; scholarships and fellowships; seed grants; informal education program

City Colleges of Chicago
Associate degree granting colleges
Seven colleges in system
Public institution
ISGC activities: hands-on undergraduate student projects

ISGC activities: scholarships; seed grants; K-12 teacher training

Chicago State University, Chicago
Master's granting university
Public institution
Recognized as a MSI
ISGC activities: undergraduate research; scholarships; seed grants; course development

Adler Planetarium & Astronomy Museum, Chicago
Planetarium, education and research institution
Not-for-profit
ISGC activities: seed grants; K-12 teacher training; higher education programs; informal education programs