



# 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

DEPUTY PROGRAM MANAGER:  
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INDIANA SPACE GRANT CONSORTIUM LEAD  
INSTITUTION:  
PURDUE UNIVERSITY

INDIANA SPACE GRANT DIRECTOR:  
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COOPERATIVE AGREEMENT/GRANT NUMBER:  
NNX15AI07H S009

**ACTIVITY/PROGRAM 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 Indiana Space Grant Consortium is a Designated Consortium funded at a level of \$760, 000 for fiscal year 2020.

**ACTIVITY/PROGRAM GOALS:** (Bulleted list)

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

INSGC has developed the following SMART Objectives for the 2020-2024 program cycle:

- Over 90% of NASA Internship and Fellowship significant awardees who receive INSGC funding will report increased research capacity and competency as a result of their awards.
- At least 8 presentations will be made at Hoosier Association of Science Teachers, Inc (HASTI), increasing teacher awareness and K-12 engagement (Goal 3.0) outcomes.
- Students who participate in INSGC hands-on, higher education (Goal 1.0) programs will demonstrate average increases in: a) interest in STEM study and careers, b) understanding of NASA programs, and c) perception of leadership skills.
- At least 50% of student participants who graduate after participation in INSGC Goal 1.0 and Goal 2.0 programs will seek employment with NASA, aerospace and other contractors, universities, or other educational institutions.
- Over 60% of reporting student participants involved in Goal 3.0 programs will show
- increased interest in STEM study and careers.
- At least 50 underrepresented minority (URM) and underserved students will participate in INSGC-funded, hands-on Goal 1.0 and Goal 2.0 activities; the percentage of URM students funded by INSGC will exceed baselines for college-attendance population in Indiana.
- Over 2500 persons will be served through voluntary participation and visits to INSGC affiliates for Goal 3.0 programs each year of the program cycle (including Indiana Days of Space events), with over 10,000 persons served during the 2023-2024 program year (due to Indiana Eclipse 2024).

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**ACTIVITY/PROGRAM CONTRIBUTIONS TO PERFORMANCE GOALS (PG)  
AND SUCCESS CRITERIA**

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**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.

***Response to PG 3.3.3 and PG 3.3.3 Success Criteria goes here:***

INSGC exceeded the national average of diversity in internships, fellowships, and other student engagement opportunities. Participants in higher education research and internship programs were 65% female, and 70% URM. Indiana does not have four-year higher education institutions with Minority Serving Institution (MSI) status and significant production of STEM undergraduates. Among the college degree-seeking population in Indiana in 2018, approximately 10.2% were African Americans, 7.2% were Hispanics, 0.2% were Native American or Pacific Islander, and 2.8% were multiracial.

Plans for partnering with selected non-INSGC MSIs and large-scale, multi-consortium networks to extend impact of INSGC strengths and unique opportunities (including the 2024 Eclipse) are currently underway. INSGC will also reach out as a partner and supporter for other Space Grant consortia and affiliates to extend our impact and the benefits of our research opportunities and hands-on project capabilities.

Current and planned activity includes on-campus internships supporting competitively awarded projects at affiliates, research and engagement internships, and summer internships for partnering minority serving institution students. For instance, MSI Morgan State University (Maryland) has begun a partnership with PUWL to develop a new Aeronautics and Astronautics program. This new program provides opportunities for Morgan State students to conduct academic year or summer research with Purdue faculty as the Morgan State curriculum and capstone design project emphases are developed. An additional planned activity involves URM students and affiliate faculty in mentoring, career planning and STEM skill enhancement activities.

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

**PG 3.3.3 Success Criteria:** Achieve milestone(s) in the implementation of performance assessment and evaluation of STEM engagement investments. Milestone: Award one competitive agreement to conduct a multi-year, third-party, project-level evaluation of the National Space Grant College and Fellowship Project.

***Response to PG 3.3.4 and PG 3.3.4 Success Criteria goes here:***

INSGC is not currently participating in the evaluation effort. However, we look forward to collaborating with the project in the future.

**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 3.3.3 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)

***Response to PG 3.3.5 and PG 3.3.5 Success Criteria goes here:***

INSGC has made a concerted effort in the past few years to increase the number of publications and presentations completed and reported each year. These efforts have resulted in a significant increase in publications by our project PIs. This year, in spite of challenges associated with Covid-19, INSGC reported an increase in publications, with authorship including faculty and students. Travel and in-person meeting restrictions have reduced the number of presentations that have been completed, but as adaptations to virtual meetings has increased we anticipate this returning to the previous upward trend. The ability to report publications after the funded year would increase these numbers due to the fact that many publications are submitted after the project is completed.

**ACTIVITY/PROGRAM ACCOMPLISHMENTS: (250 – 500 words)**

This year INSGC formed a Strategic Planning working group led by Dr. Whitaker to develop much needed updates of our Mission, Vision, and Values statements. The working group met several times over the summer and early fall, and completed the statements before our INSGC Fall Telecon. The statements were presented at the telecon and adoption was voted on by all affiliate directors. The revised statements are as follows:

*Mission Statement:*

INSGC facilitates and funds education and research, builds a diverse and inclusive STEM workforce, and promotes NASA to the public.

*Vision Statement:*

INSGC aspires to bring NASA's mission and resources to your life, education and work in Indiana.

*Values Statement:*

INspiration

INclusion

INnovation

INtegrity

INSGC received a record number of proposals for research funding and student opportunities related to the NASA mission this year. We have funded research opportunities in many varied disciplines including microbiology, 3D printing of lunar habitats, planetary science, and human physiology in space. We funded internship opportunities for undergraduate and graduate students which, while they were forced to be virtual this year, still provided interaction with NASA centers and personnel, and we were able to provide internship opportunities with our informal education affiliates.

Several projects were able to consider scale in new ways this year. A case in point is Purdue Space Day, which has been considering scaling their successful program for several years and had developed plans and materials to allow other universities to build a program. However, the Covid-19 situation forced the program to be operated virtually this year, and allowed the organizers to expand their scope and interact with students from multiple states and even internationally, vastly extending the impact of the program.

Many of our projects had to make unexpected adjustments this year. As an example, one of our projects was researching a way to allow local and state officials to better plan their mitigation and response activities as well as update their local hazard mitigation and response plans utilizing a combination of geospatial data such as parcels and building footprints, and non-spatial data such as the Indiana Department of Local Government Finance's (DLGF) assessor data. The project was struggling due to a change in their research partner's availability. The INSGC Central Office, by virtue of relationships developed over past years, was able to help them refocus and find a new partnership to allow them to complete their research in an even more effective manner. This research will help not only the State of Indiana, but ultimately will have far-reaching implications in hazard mitigation. As an added bonus, more undergraduate and graduate students were able to contribute to this research than originally planned, thereby increasing the long-term impact of this project.

**ACTIVITY/PROGRAM IMPROVEMENTS MADE IN THE PAST YEAR:**

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

Due to the major changes in operation for all of our affiliates (and everyone else), this year was challenging and provided many opportunities for quick thinking and helping others. One implementation of our award process that was new this year was a check in with all prospective PIs before sending their award letters to ensure that they had plans in place to be able to execute their project under the new regulations enacted by local government, academia, and industry partners. We were able to help PIs think through possibilities and make the necessary changes to their proposals including online aspects, such that they and we were more confident in the successful execution and outcomes of all awarded projects. It also led to stronger relationships within our consortium.

The INSGC central office has been operating off campus, and so have our lead institution business office and all other business offices. Dr. Whitaker and Ms. Verissimo have proactively been reaching out to our affiliate directors and PIs to check in, see how everyone is doing, keep track of impacts at different institutions, and help where we can. We also instituted office hours via Webex on a weekly basis, so that students and faculty can meet with us quasi face to face on a drop-in basis to ask questions, bounce off ideas, and see a friendly face. This practice will continue even once we are able to meet in person, as it has allowed more contact with our affiliate institutions than previously possible.

**ACTIVITY/PROGRAM PARTNERS AND ROLE OF PARTNERS IN ACTIVITY EXECUTION:**

*Bulleted list or table. May include description of how partners were involved in the project activity.*

The INSGC office engages the Affiliates to discuss and contribute to the strategies of the consortium. All Affiliates have voting rights and responsibilities approving strategic directions and Consortium program decisions discussed at Affiliate Meetings. Affiliate meetings are held twice per year, once in person (held virtually this year), and once via telecon.

Academic Affiliates

- Purdue University – Lead Institution
- Purdue University Northwest
- Purdue University College of Tech at Columbus
- Anderson University
- Ball State University
- Indiana State University
- Taylor University
- Indiana University – Bloomington
- Purdue University Fort Wayne
- University of Evansville
- Indiana University Purdue University Indianapolis
- University of Southern Indiana
- Valparaiso University
- Trine University

Outreach Affiliates

- Children’s Museum of Indianapolis
- IMAX Theater
- Challenger Learning Center of Northwest Indiana
- Indiana State Museum
- Ethos, Inc.
- Evansville Museum
- Science Central
- Terre Haute Children’s Museum
- Conner Prairie

Corporate Affiliates and Partners

- StratoStar Systems
- Near Space Launch
- ISTEM-Purdue University
- Indianapolis Symphony Orchestra
- Indiana FIRST

**CURRENT AND PROJECTED CHALLENGES:**

Indiana Space Grant affiliates run the full gamut of adaptations to the COVID-19 pandemic, with some fully in session, some fully virtual, and some adopting a hybrid model. The central office is hearing positive stories of these adaptations, particularly from our academic affiliates. The most negative impacts are being felt at our outreach affiliates, who have taken quite a hit financially. They are adapting and providing much needed and appreciated resources in their communities, but due to diminished attendance they are struggling financially. These impacts are not directly related to INSGC or our programs, which are running as planned, but will impact our affiliates both now and in the future.

As the effects of the pandemic hopefully ease over the coming year, we will continue to proactively engage with our affiliates to ensure that plans are in place to adapt to changing protocols and maximize the successful impacts of our programs. Projects selected for the coming year will have plans in place to operate either in person or virtually as conditions dictate. Our office will continue to support our affiliates and strengthen our network.

*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.*

**REFERENCES (optional – include only if needed):**

(APA style reference list)

NA