

FY 2018 Year 4 Extension Annual Performance Document

Kansas Space Grant Consortium Lead Institution:

Director: L. Scott Miller
Telephone Number: 316-978-6334
Consortium URL: <http://www.nasainkansas.org>
Grant Number: NNX15AJ97H

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 Kansas Space Grant Consortium is a Program Grant Consortium funded at a level of \$132,479 for fiscal year 2018.

It is important to note that Kansas is one year out of phase with most other states in Space Grant activities. The current award start date is 2015, but activities started one year later in 2016. In addition, the reporting for Kansas was out of phase in past years. As a result, this document outlines only eight months of efforts. Perhaps as important, it only covers a spring and summer semester. Outcomes for the typically busy fall semester is not included.

In coordination with NASA grant staff, the Year-4 funding request was adjusted to a lower than normal (\$413,000) level with the specific intent to get the consortium into sequence. As a result, Kansas anticipates completing planned state and affiliate activities at the same time as all the other states, in June 2020.

B. PROGRAM GOALS:

The following program goals were outlined in the grant proposal. Participation levels should resemble the Kansas underrepresented and female student enrollment percentages, which are 17% and 55%, respectively. Goals include actively involving women, underrepresented minorities, and persons with disabilities in all aspects of the programs.

NASA Internships, Fellowships, and Scholarships (NIFS) Program Goals

The goals include providing undergraduate and graduate student fellowships, internships, and scholarships that support STEM education. The specific goals consist of the following.

- Competitively fund eight (8) consortium students participating in NASA center internships.
- Competitively fund four (4) consortium students with STEM fellowships.
- Competitively fund thirty-four (34) students with STEM scholarships

Higher Education (HE) Project Goals

The goals include supporting students and groups participating in NASA-relevant experience-based activities. These may be multidisciplinary, multi-institution, and competitive projects. This also includes enhancement of university STEM faculty, academic program, and/or course content development, especially at non-PhD granting universities. The specific goals consist of the following.

- Competitively fund at least six (6) university student teams who participate in statewide, national, or international STEM-related competitions each year.
- Annually fund at least one (1) university to perform STEM academic program or course development, especially at non-PhD granting universities.
- Engage and support over two-hundred (200) students in consortium HE projects.

Research Infrastructure (RI) Project Goals

The goals include providing modest funding to support NASA-relevant research opportunities, especially for students and new faculty members who need assistance and have not yet become established researchers. The specific goal follows.

- Annually fund at least ten (10) students to work on NASA-relevant research projects or with the aerospace industry.

Precollege Education (PE) Project Goals

The goals include enhancing precollege student education by providing STEM workshop training for teachers (especially middle school) and precollege students. This typically involves a collaboration between education and STEM departments. Another goal is to assist in the development of instructional content (such as lesson plans, technology, etc.) that use emerging NASA-development technology. The specific goals consist of the following.

- Annually fund two (2) statewide teacher workshops that support at least fifteen (15) precollege, middle-school, STEM teachers.
- Support two (2) affiliate-level teacher workshops that engage at least thirty (30) STEM teachers.
- Offer at least two (2) STEM workshops for at least forty-five (45) precollege students.

Informal Education (IE) Project Goals

The goals include stimulating the public interest in STEM. This may be in providing information and activities to increase public appreciation for the direct and indirect benefits of NASA-sponsored research. The specific goal follows.

- Annually fund, at modest levels, experiences involving at least two-thousand (2000) people from the general public, highlighting STEM and NASA-related interests.

Diversity of Participation Goals

This goal applies to all aspects of the consortium's activities. The consortium will attract, support, and retain women, underrepresented minorities, and persons with disabilities in all activities. This

will be done by working closely with existing campus units to involve persons in these groups. The specific goals consist of the following.

- The annual program participation levels should resemble the Kansas underrepresented and female student enrollment percentages (i.e., 17% and 55%, respectively)
- Involve at least four (4) women, underrepresented minorities, or persons with disabilities in consortium management and administration.

Minority Serving Institution Goals

Haskell Indian Nations University is a member of the consortium. This minority-serving institution will add to the diversity of the state's STEM workforce. The specific goals consist of the following.

- Maintain the Haskell affiliate representative's involvement in consortium management.
- Support at least five (5) Haskell students each year with funds for STEM related experiences.
- Annually support at least three (3) Haskell faculty with funds for professional development.
- Support the development or enhancement of at least one (1) STEM related course or academic program every two years at Haskell.
- Engage, collaboratively, at least two (2) Haskell students or faculty yearly in activities.

C. PROGRAM/PROJECT BENEFITS TO PROGRAM AREAS:

The Kansas Space Grant Consortium's NIFS, Higher Education, and Research Infrastructure programs affected a large number of students. These activities were experiential and gave the students unique opportunities to become involved in activities outside of the classroom. This year, 146 students participated in these programs through support available from this grant, and 104 students received direct funding. Of the direct funded students, underrepresented minorities made up 9.6% of the total participants and females made up 36.5% of these participants. Some comments made by three (3) of the program participants are included below.

Student: Elizabeth Aikman

Program Element: Cosmosphere (KCSC) NIFS Program

Mentor: Brad Nuest

Project: Counselor for Summer Camps

Student's Comment: I loved my time at the camps when I was in middle school. I wanted to give back to a program that did so much for me. I want to be able to share this awesome learning experience with new campers to hopefully get them more interested in STEM fields.

Student: Brittany Hollerbach

Program Element: Kansas State University (KSU) Higher Education Program

Mentor: Katie Heinrich

Project: Conference Travel for SciComm 2018: A Conference on Effective Science Communication

Student's Comment: The 2018 SciComm Conference was an incredible learning experience. The goal of those that work in science communication is to break down the barriers to communicating and understanding science by providing scientists with different methods of communication. I heard from researchers about their best practices and suggestions for sharing their research both with the scientific community and the general public.

Student: Lilia Marquez

Program Element: Wichita State University (WSU) Research Infrastructure

Mentor: John Laffen, Walter H. Beech Wind Tunnel Director

Project: Employed at the WSU Walter H. Beech Wind Tunnel

Student's Comment: I am very satisfied with my experience. I have met many customers from around the nation and have gotten to see so many projects that make me feel proud to have supported. I have enjoyed meeting other NASA employees and getting to see the scope of their organization.

In addition to supporting students, this grant resulted in one (1) STEM-related academic program or course developments and one (1) proposal being funded through NSF Noyce Grant Consortium. Five (5) new partnerships were developed; two (2) between affiliates of Kansas Space Grant Consortium, one (1) with a local zoo, one (1) with the local public school district, and one (1) with a local non-profit organization that works with people with visually impairments. Twelve (12) student teams were supported in their efforts to participate in various competitions.

Two (2) precollege education activities were arranged for the local school district. In addition, one (1) teacher high-altitude ballooning workshop was held with eleven (11) participants. All eleven (11) of these teachers developed classroom projects based on the material in this workshop. In total 18 elementary-level, 60 middle school, and 140 high school students were indirectly supported by this workshop. Below is a comment from one (1) of the teachers.

Attendee: Robert Hageman

Program Element: Statewide Teaching Workshop/Precollege Education

Workshop Leader: Paul Adams

Workshop Name: High-Altitude Ballooning Workshop 2018

Workshop Location: Fort Hays State University (FHSU)

Attendee's Comment: Students will get a hands-on experience in engineering and science, can analyze data using technology and mathematics, and in turn should be able to communicate their findings. This is exactly what we need our students to be doing.

In addition, three (3) informal education events were held leading to one thousand one hundred forty (1,140) participants from various age groups.

D. PROGRAM ACCOMPLISHMENTS:

- NASA Internships, Fellowships, and Scholarships (NIFS):
 - During summer 2017, four (4) students from the Kansas Space Grant Consortium were funded to intern at NASA centers. During summer 2018, that number increased to eight (8) students. (+)
 - One (1) student was funded with a STEM fellowship. (-)
 - Thirty (30) students were funded with STEM scholarships. (-)
- Higher Education projects:
 - Funding was provided for twelve (12) university student teams to participate in statewide, national, or international STEM-related competitions during this year. (+)
 - One (1) non-PhD granting university (PSU) made improvements to a course during the reporting period. (+)
 - Eighty-three (83) students were supported in consortium HE projects. (-)

- Research Infrastructure projects:
 - Twenty (20) students were funded to work on NASA-relevant research projects. (+)
- Precollege projects:
 - One (1) statewide level teacher workshop was funded during this year. (-) All attendees incorporated the material into their classrooms, reaching a total of two hundred eighteen (218) elementary-level, middle school, and high school students. Eleven (11) teachers attended the workshop. (-)
 - Zero (0) affiliate-level teacher workshops were held. (-)
 - Three (3) STEM events were held (+) at two (2) universities for a total of two hundred forty-seven (247) precollege students. (+)
- Informal Education projects:
 - Two (2) universities held informal education projects involving one thousand one hundred forty (1,140) participants from the general public. This is below the goal of two thousand (2000) but does not include STEM and NASA-related projects done every day at the Kansas Cosmosphere and Space Center. (-)

E. PROGRAM CONTRIBUTIONS TO NASA EDUCATION PERFORMANCE GOALS:

- **Diversity:**
 - Of the one hundred forty-six (146) students participating in NIFS, Higher Education, and Research Infrastructure Projects, nine (9) were underrepresented. This results in 6% underrepresented which was below the goal of 17%. This result was adversely affected by the fact that Haskell Indian Nations University did not have any activities during this reporting period. As noted below, the HINU affiliate representative just returned from a sabbatical. (-)
 - Of the one hundred forty-six (146) students participating in NIFS, Higher Education, and Research Infrastructure Projects, forty-five (45) were female, which was 31%. This was below the goal of 55%. (-)
 - The consortium administration consists of the Director, Associate Director (female), Program Coordinator (female), one (1) part-time Administrative Assistant (female), and three (3) part-time student assistants (all female). This results in six (6) females active in consortium administration. (+)
- **Minority Serving Institution Collaborations:**

Three years ago, the affiliate representative at Haskell Indian Nations University (HINU) took a two-year sabbatical. During her time away from HINU, NASA Space Grant activities were not sustained. Last summer, HINU once again became an active affiliate. However, for the current reporting period, which covered the spring and summer semesters, HINU did not have any activities.

 - HINU did not have Kansas Space Grant Consortium activity this reporting period. (-)
 - Zero (0) students and faculty were supported and no activities were done. (-)
 - Zero (0) courses were developed or enhanced. (-)

- **Office of Education Annual Performance Indicators:**

- API 3.3.3: STEM-18-1 104
- API 3.3.5: STEM-18-5 0

F. IMPROVEMENTS MADE IN THE PAST YEAR:

Kansas Space Grant Consortium exceeded many of its goals, even though this reporting period covered only eight months and not a full year. This is notable considering that three (3) of the affiliates did not have activities to report on during this reporting period.

As was outlined in the Program Description section, Year-4 funds were lowered in a coordinated effort to get Kansas in sequence with other states. Additionally, this report only addresses eight months (a spring and summer semester) of activities. A number of affiliates are most active in the fall semester.

While the consortium sustained the NIFS and research infrastructure programs, there was a notable increase in funding for student teams, with twelve (12) teams being supported with an average of six (6) students in each. These teams prepared for both state- and national-level STEM competitions and these projects led to many students having a hands-on design experience.

There was an increase in precollege education activities, with two hundred forty-seven (247) students being directly influenced. There was also a teacher workshop, and all eleven (11) attendees took the material back to their classrooms, reaching another two hundred eighteen (218) precollege students.

The consortium has done well forming new partnerships. Two (2) partnerships were formed between affiliates, with a solar-car competition being organized for their students and an event organized to display work to the public, one (1) affiliate formed a partnership with the local zoo to hold an informal education activity, one (1) affiliate worked with the local public school district to hold two (2) precollege workshops, and one (1) affiliate worked with a local non-profit to hold a summer camp for students with visual impairments. All of these partnerships are expected to be sustained in future years.

G. CURRENT AND PROJECTED CHALLENGES:

There are several challenges at this time.

- Reporting for Informal Education events needs to be refined and completed to get a more accurate representation of the general public participation numbers. It is apparent that it is difficult for all affiliates to get an accurate participation count during these types of activities. Actual involvement is likely higher than reported (the affiliates tend to be conservative in reporting).
- The affiliates will continue to focus on increasing participation of underrepresented, female, and disabled students by improving recruiting methods. An increased effort to inform students of opportunities is planned.
- Haskell Indian Nations University (HINU) is once again an active affiliate in the Kansas Space Grant Consortium, but did not have any activities during this reporting period. The

consortium administration will continue with efforts to re-integrate HINU and offer support for activities. We anticipate HINU will return to its past form of making substantial contributions to consortium outcomes.

- Efforts will be made to inform students within the consortium about NASA center summer internships in order to increase the number of applications submitted.

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

There are currently eight affiliates with various activities planned for this grant. The activities proposed by each affiliate are listed here, while more detail about each may be found in the original grant proposal.

Emporia State University (ESU)

ESU has approximately 7000 students, with four major colleges. It is non-PhD granting.

- NIFS (Scholarship) project element: NASA Scholars Program (NSP)
- HE project element: Interdisciplinary Planetarium Content Development
- RI project element: Graduate Student Research Projects
- PE project elements: Master It Scholarship, Si Se Pueda
- IE project element: Peterson Planetarium Community Outreach Program

Fort Hays State University (FHSU)

FHSU has approximately 9000 students, with four major colleges. It is non-PhD granting.

- NIFS (Scholarship) project element: FHSU NASA KSGC Scholars Program
- HE project element: Undergraduate Research Experience
- RI project element: Undergraduate Research Experience
- IE project element: Pre-college Design Team

Haskell Indian Nations University (HINU)

HINU is a U.S. Bureau of Indian Affairs Native American University with approximately 1000 students. It is non-PhD granting.

- HE project element: HINU HE Support Program

The Kansas Cosmosphere and Space Center (KCSC)

KCSC is a world-class space science museum and education center.

- NIFS (Scholarship) project element: Scholarships for Camp Counselors
- PE project elements: Teacher Workshop Program, Mars Rescue Mission, Space Junk
- IE project element: Camp Scholarships for Underrepresented Middle and High School Students

Kansas State University (KSU)

KSU is a STEM institution with approximately 23,000 students. It is PhD granting.

- NIFS (Scholarship) project element: Summer Undergraduate Research Opportunity Program (SUROP)
- HE project elements: NASA Senior Design Project, Summer Undergraduate Research Opportunity Program (SUROP) Cosmosphere Experience, Aero Design Team, AUVSI Team, Graduate Student Travel Grants
- IE project elements: Nuclear Reactor Tours and Education, Insect Zoo

Pittsburg State University (PSU)

PSU has approximately 7000 students, with four major colleges of Arts and Sciences, Business, Education, and Technology. It is non-PhD granting.

- NIFS (Scholarship) project element: Undergraduate Leadership and Innovation (ULI) Project
- HE project elements: Rover Challenge, Embedded Systems Application, Aerospace Program Support

University of Kansas (KU)

KU is a STEM institution with approximately 30,000 students and 18 major colleges. It is PhD granting.

- NIFS (Fellowship) project element: Graduate Bridge (GB) project
- NIFS (Scholarship) project element: Diversity Program
- HE project elements: Research Experience for Undergraduates (REU), Enhancing Experiential Learning in the Curriculum (EELC), Student Teams in Experiential Learning Projects (STEP)
- RI project elements: Graduate Student Research Support (GSRS) Project, Undergraduate Student Research Support (USRS) Project
- IE project element: Experiential Learning Pathways (ELP)

Wichita State University (WSU)

WSU is a STEM institution with approximately 15,000 students. It is PhD granting. It includes the National Institute for Aviation Research.

- NIFS (Internship) project element: WSU Internship Program (WIP)
- NIFS (Fellowship) project element: Experimental Aerodynamics Fellowship (EAF)
- HE project elements: Jump Start Program (JSP), Experiential Learning Projects (ELP), Design/Build/Fly and Wichita Rocket Club (WRC) Team Support, Near Space Launch Program (NSLP)
- RI project element: Graduate Student Research Support (GSRS) Project, Jump Start Program (JSP)
- IE project element: Summer Camp for Women and Underrepresented Middle School Students

Consortium-wide Program

- NIFS (Internship) project element: NASA Center Internship Program (NCIP)