Kentucky Space Grant Consortium
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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 Kentucky Space Grant Consortium is a Designated Program funded at a level of $730,000 for fiscal year 2008.

PROGRAM GOALS

KSGC Fellowship/Scholarship Program

Purpose and Goal: The purpose and goal of our Research Infrastructure Program is for faculty to provide research experiences for students, thus developing and increasing capabilities of Kentucky researchers at all levels in our contributing to the aerospace workforce.

Objectives of our Fellowship/Scholarship Program are:

- Increased numbers of people training for the workforce in space-related fields
- Effective preparation based upon research experiences for the students

KSGC Research Infrastructure Program

Objectives of our Research Infrastructure Program are:

To use our research infrastructure to enhance the aerospace workforce in Kentucky, through:

- Increased numbers of Kentucky student and faculty aerospace-related researchers
- Connection of Kentucky research efforts to NASA interests and researchers
- Enhanced competitiveness of Kentucky researchers for NASA and other funding

KSGC Education Programs

- Using elements of NASA's direction as motivational features in our activities
- Preparing members of the aerospace workforce to support NASA's direction

KSGC Precollege Program

Purpose and Goal: The purpose and goal of our Precollege Program is to enhance teachers' abilities to provide hands-on learning activities that present standards-based content in ways that inspire students' interest in STEM subjects and STEM careers.

Objectives of our Precollege Program are:

- Increased numbers of in-service teachers prepared for hands-on STEM teaching with NASA-based subjects and materials
- Increased numbers of pre-service teachers prepared for hands-on STEM teaching with NASA-based subjects and materials

KSGC Higher Education Program

Purpose and Goal: Higher Education is the ultimate arena for refining career directions and developing students' fullest abilities to become part of the aerospace workforce of the future. In addition to our mentored research opportunities for individual students in Fellowship, Scholarship, and Research Infrastructure projects, we provide targeted higher education workforce development projects that *involve teams of students* in projects beyond the traditional disciplinary bounds of the curriculum and of individual-

based research. The goal of the program is to attract, motivate, and prepare students for technological careers in support of NASA, its missions, and its research efforts. We reach outstanding Kentucky students to provide experiential learning directed specifically toward personal preparation for entering the aerospace workforce. The program provides an effective ***interface*** between the education "pipeline" and the workforce consumers -- NASA, its contractors, and its principal investigators.
Objectives of our Higher Education Program are:

- Increased numbers of students training for the STEM workforce
- Development of student experience with interdisciplinary, team-based, mission-oriented aerospace projects supporting the direction of NASA

KSGC Public Service Program
Purpose and Goal: The overall purpose and goal of our Public Service Program is to enhance the public's awareness of science and technology and of NASA- and aerospace-related research and applications.
Objective: Our objective is to provide opportunities for broad *involvement* of the public with NASA- and aerospace-related topics and results.

PROGRAM/PROJECT BENEFIT TO OUTCOME (1,2, OR 3)

Information in this section demonstrates and gives an overview of how our consortium is contributing to the three outcomes. The student comments are from students who were supported during FY08.

These student comments are from a student whose projects are contributing to both

- **Outcome 1:** *Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals (Employ and Educate) because she is a Fellowship student and*
- **Outcome 3:** *Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission (Engage and Inspire)because she is our KY Ambassador for the International Year of Astronomy.*

When asked, "How did participation in these programs impact your education and life?" the following comment was given:
"Provided important contacts in the industry and expense money (in additional to the stipend)." (Karen Collins, 2006 Space Grant Fellowship, 2007 Space Grant Fellowship, 2008 Space Grant Fellowship)

When asked, "What role have you played in the aerospace industry since graduation?", the following comment was given:
"Moved into PhD program after Masters degree." (Karen Collins, 2006 Space Grant Fellowship, 2007 Space Grant Fellowship, 2008 Space Grant Fellowship)

The "important contacts" include international contacts who enhance her KY Ambassadorship for the International Year of Astronomy. She has special contacts in Australia with whom she operates a telescope there remotely from Kentucky. It will also be used in International Year of Astronomy events.

These student comments are from a student whose projects are contributing to both

- **Outcome 1***: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals (Employ and Educate) because she is a Fellowship student and*
- **Outcome 2**: *Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty (Educate and Engage) because her work is related to both Precollege and Higher Education.*

"I am currently a math and physics teacher at Fleming County high. I have just recieved another fellowship to build a Space Science course for high school with the efforts to prepare and supply students to the KySpace program with the intent to build a workforce of aerospace-ready graduates in Kentucky. The course is designed to be a box product that is easily received and taught by physics teachers across the state." (Jennifer Carter, 2006 Space Grant Fellowship, 2006 KySat Scholarship/Internship, 2007 Space Grant Fellowship, 2008 Space Grant Fellowship)

Her endeavors contribute to Fellowships as a Fellow, Higher Education Workforce Development with her focus on the KySpace KySat, and Precollege with the high school course development.

With respect to *Outcome 3: Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission (Engage and Inspire)*, we co-sponsored an event with Dr. Roger Launius, Smithsonian Air and Space Curator and former NASA Historian. Our promotion of the event is credited for the record attendance at our Barnes and Noble Community Hall. The involvement helped build linkages between formal (the university) and informal education providers of both the Library and Barnes and Noble. We also can reap benefit for *Outcome 1: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals (Employ and Educate)* because the door is now open for special Kentucky Space Grant Consortium Internships at the Smithsonian Air and Space Museum.

PROGRAM ACCOMPLISHMENTS

The following bullets demonstrate the progress that our consortium is making in achieving our program goals in:

Achievements and progress related to our Fellowship/Scholarship, Higher Education and Research Infrastructure programs follow for:

- **Outcome 1***: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals: (Employ and Educate)*

KSGC Fellowship/Scholarship Program

- Diversity: 11.1% minority (target 10%)
- Diversity: 55% female (target 50%)
- Percentage of students who are Still Enrolled In Current Degree Program for FY2008 and have been successfully tracked.
  100% for 2008
- Percentage of students whom have taken their next step and have been successfully tracked though their next step vs last year of SG support.
  100% for 2006
  100% for 2007
- Eighteen (18) students received Scholarship/Fellowship awards (target 11)
- 100% retained to graduation so far (target 95%)
- 100% of graduates entering advanced studies or STEM employment (target 90%)

KSGC Research Infrastructure Program

- Ten (10) faculty and students (target 10) supported in five (5) research infrastructure projects
- Five (5) collaborations with NASA (target 5)
- $221,589 in follow-on funding at more than our target of two times a return on our investment of $59,000.
- Thirteen (13) publications/presentations

KSGC Education Programs

- Using elements of NASA's direction as motivational features in our activities
- Preparing members of the aerospace workforce to support NASA's direction

KSGC Higher Education Program

- Twenty-five (25) students participating (target 25)
- Twenty (20) student interactions with NASA or contractors (target 20)
- 100% of participants retained or graduated (target 95%)
- 100% of graduates applying for NASA/aerospace employment or pursuing advanced degrees in aerospace-related fields (target 90%)

Discussion of achievements for Precollege programs for:

- **Outcome 2**: *Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty: (Educate and Engage)*

KSGC Precollege Program

- Two (2) workshops awarded (target 2)
- Twenty (20) teachers intensely trained (target 20)

KSGC Public Service Program

Achievements and progress of General Public and External Relations program for:

- **Outcome 3:** *Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission: (Engage and Inspire)*
- Public Service number reached still 7,232 (target 5,250)

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Longitudinal Tracking: Two (2) students who were significantly supported in 2008 are under-represented and under-served students. Eleven (11) students who were significantly supported in 2008 are female. For all students who were significantly supported in 2008, three (3) students are working while pursuing their degrees, with one (1) at an aerospace contractor, one (1) in a university, and one (1) in a K-12 academic institution, and the remaining fourteen (14) are still pursuing their degree. In these difficult economic times more students are seeking employment earlier and beginning work while continuing their degree.

  For all students who were significantly supported in the period spanning FY06-FY08, 2 students graduated and are pursuing advanced STEM degrees, 1 student is working for a NASA contractor, and 1 is working in a STEM position at non-K-12 academic institution. The remaining students have not yet received the degree that they were pursuing while the received their Space Grant award.

- Course Development: The Systems Engineering course at the University of Kentucky was revised and given both semesters in the 2008 – 2009 academic year. A high school course is being developed around the KySpace KySat workforce development project.

- Matching Funds: The ratio of funds leveraged by NASA program funding support is 1:1.

- Minority-Serving Institutions: We are very pleased to announce that Kentucky State University, our HBCU affiliate, has signed a partnership development agreement with us.

IMPROVEMENTS MADE IN THE PAST YEAR

A significant improvement was made last year by adding the use of the Ad Astra scheduling program for Planetarium scheduling and slide card hardware. We will have excellent demographic data on the participants.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Kentucky Space Grant Consortium Network

Institution
Location
Description

Bellarmine University Louisville
Private
Comprehensive University

Centre College
Danville
Private Liberal Arts College

Eastern Kentucky University
Richmond
Public Comprehensive University

Kentucky Science & Technology
Lexington
Non-profit Organization

Kentucky State University
Frankfort
Public Comprehensive Univ./HBCU

Morehead State University
Morehead
Public Comprehensive University

Murray State University
Murray
Public Comprehensive University

Northern Kentucky University
Highland Hgts.
Public Comprehensive University

Thomas More College
Crestview Hills
Private Liberal Arts College

Transylvania University
Lexington
Private Liberal Arts University

Tribo Flow Separations, LLC
Lexington
Industry

University of Kentucky
Lexington
Public Doctoral Granting University

University of Louisville
Louisville
Public Doctoral Granting University

Western Kentucky University
Bowling Green
Public Comprehensive University

KSGC member institutions and their programs provide fundamental support for strengthening the STEM education base in Kentucky and for the direction of NASA through a spectrum of strategic program elements.