Iowa 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 Iowa Space Grant Consortium is a Designated Consortium funded at a level of $785,000 for fiscal year 2009.

PROGRAM GOALS

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

Fellowships and Scholarships

GOAL 1 – Continue to implement a $172,000 competitive Scholarship/Fellowship program state-wide that is effective at retaining students in STEM fields and meets all of NASA's requirements.

Objective 1a – Ensure that the underrepresented minority and women population of the awardees meets the NASA requirement of 8.4% (U.S. Department of Education tables) minorities and 50% women. Metric = Minority status..

Objective 1b – Ensure that all awardees are actively involved in Higher Education research within the base program on their respective campus. Metric = awardee survey

Objective 1c – Ensure that awardee retention in STEM exceeds that of the general STEM student population at their institution. Metric = retention data from awardees and affiliates.

GOAL 2 – Continue to implement a $14,000 scholarship program for outstanding seniors at the State Science and Technology Fair of Iowa (SSTFI) that has a positive impact on the retention of students in STEM.

Objective 2a – Ensure that all senior entrants are aware of the ISGC awards. Metric = entrant survey.

Objective 2b – The majority of awards will be to students who participated in SSTFI in prior years. Metric = awardee survey.

Objective 2c – Ensure that awardee retention in STEM exceeds that of the general STEM student population at their post-secondary institution. Metric = retention data from awardees and affiliates.

GOAL 3 – Implement a $14,000 scholarship program for a Minority Serving Institution (MSI) that is linked with the base programs at one or more academic affiliates.
Objective 3a – The MSI program will result in new product development at the MSI. Metric = reports, publications and proposals produced by the MSI.
Objective 3b – The MSI awardees will continue in STEM education beyond the one-year award. Metric = awardee survey.
Objective 3c – An evaluation of the MSI program will show positive results to both the host ISGC base program(s) and the MSI. Metric = Director, Campus Coordinator and Base Program Manager analysis of the program products, student participation level, and follow-on activities.

Higher Education
GOAL 4 – Continue the development of competitive, self-sustaining base programs at each academic affiliate campus that combine active research with student involvement.
Objective 4a – Each base program will produce publications and non-ISGC proposals each year. Metric = reports, publications and proposals produced by the base programs.
Objective 4b – Each base program will develop a NASA collaboration that did not exist before the base program was established. Metric = survey.
Objective 4c – Each base program will generate cash or in-kind match to the NASA funding provided. Metric = matching funds report.

GOAL 5 – Increase Iowa participation in technical competitions
Objective 5a – The funding competition will generate requests from academic affiliates and other Iowa post-secondary sources. Metric = applicant data.
Objective 5b – Each funded team will generate cash or in-kind match to the NASA funding provided. Metric = matching funds report.

Research Infrastructure
GOAL 6 – Continue to develop the previously selected interdisciplinary research project to receive sustained ISGC funding and build a sustainable capability in the State with the capability to support the NASA mission.
Objective 6a – The Asteroid Deflection Research Program selected in the Program Year 19 (2008) competition will produce publications and non-ISGC proposals each year. Metric = reports, publications and proposals produced by the research program.
Objective 6b – The research program will develop a NASA collaboration that did not exist before the ISGC research program was established. Metric = survey.
Objective 6c – The research program will generate cash or in-kind match to the NASA funding provided. Metric = matching funds report.

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

Precollege
GOAL 7 – To engage more precollege organizations in the state-wide Partner Schools program.
Objective 7a – The Partner schools will continue to actively utilize NASA content and ISGC professional development services beyond the first year of participation. Metric = survey of past participants.

Objective 7b – The former NASA Explorer Schools will continue to participate as ISGC Partner Schools beyond the term as an Explorer School. Metric = survey of Explorer Schools.
Objective 7c – The majority of Partner School trained teachers will offer at least two professional development programs in the first year and at least one in the subsequent years. Metric = survey of past participants.

GOAL 8 – To ensure sustained Iowa representation in the National Junior Academy of Science program.
Objective 8a – The majority of Iowa Junior Academy of Science (IJAS) senior entrants will be aware of ISGC support for the national competition. Metric = survey of senior entrants.
Objective 8b – The IJAS endowment will continue to grow to sustain the national competition participation program. Metric = endowment bank deposits and earnings report.
Objective 8c – The majority of IJAS winners will study in STEM fields at ISGC academic affiliate universities. Metric = survey of past winners.

GOAL 9 – To conduct state-wide STEM professional development, pre-service and in-service training for formal and non-formal educators working in kindergarten through 12th grades.
Objective 9a – All Iowa schools will be aware of the ISGC STEM professional development services available. Metric = survey of Iowa schools.
Objective 9b – Significant participation from non-formal organizations such as science museums, clubs, and home school groups will be reached each year. Metric = annual report.
Objective 9c – The E-SET staff will maintain technical proficiency by attending at least one NASA workshop. Metric = annual report.

GOAL 10 – To effectively manage the State Science and Technology Fair of Iowa (SSTFI).
Objective 10a – Participation in the SSTFI will continue to increase. Metric = annual report.
Objective 10b – Home school participation will continue to increase. Metric = annual report.
Objective 10c – The SSTFI endowment will continue to grow from earnings and sponsor-ships. Metric = annual report.

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).*

General Public
GOAL 11 – To support STEM nonformal educational programs that enhance public awareness of NASA missions and general scientific literacy for Iowa.
Objective 11a – Use non-federal funds to support STEM programming on Iowa Public Television (IPTV) that will reach at least 20,000 Iowans and that is consistent with other ISGC education objectives in that it uses NASA content and meets the informal education requirements. Metric = annual report.
Objective 11b – Competitively generate sufficient high-quality proposals from the ISGC affiliates to conduct one or more effective informal education projects in Iowa. The review and ranking of the entries is to be done by the affiliates in an attempt to meet the NASA requirements. Metric = number of high quality proposals generated and the annual report from any funded affiliates.

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

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

Fellowships and Scholarships:

"The NASA Space Grant has allowed me to join an incredible research laboratory and has opened up the opportunity to explore ideas that have furthered the field of science. I am so appreciative to have been a recipient, I encourage anyone to apply for such a scholarship." Bridget Shields, undergraduate scholarship awardee, Drake University.

"I am currently working under Dr. Eliot Winer and Dr. Amy Kaleita in the Virtual Reality and Applications Center as an undergraduate researcher for the Program for Space-borne and Earthbound System Sustainability base program. I love learning about the environment and have always been interested in studying sustainability, so am happy to have the opportunity to work in this program. I have learned a lot about the graduate research environment and have already made many connections to graduate students and faculty in the lab. I plan to continue working with Dr. Winer and Dr. Kaleita during my upcoming years at ISU and am excited for the opportunity to grow as a well-rounded engineer." Kristin Crawford, FY2008 undergraduate scholarship awardee, current graduate student, Iowa State University (ISU).

"The Iowa Space Grant Consortium has opened many doors to me by relieving the pressure of paying for school. I have been able to focus on my research without having to worry about finding a part time job that takes up time and energy. Getting the chance to work on research while still an undergrad has been an exciting experience and very beneficial for future jobs. In fact, the Iowa Space Grant research was an important addition to my resume when I was hired for my summer job. I am extremely grateful to the NASA Iowa Space Grant Consortium for the opportunities I have been able to take advantage of during my undergraduate education." Susan Meerdink, undergraduate scholarship awardee, University of Northern Iowa (UNI).

All four SSTFI awardees remain in STEM disciplines. At the University of Iowa (UI) Samantha Skaar is a science education major, and Ryan Warnke, a mathematics major. At ISU, Andy Goeb is pursuing biology. At the UNI, Elizabeth Meyer is pursuing two degrees, mathematics and accounting.

"The scholarship from the ISGC to attend a GIS workshop at the UNI was the highlight of my 2009 school year! Besides rekindling my interest in science and math, I learned valuable skills that will help me with research projects and the Nebraska Indian Community College (NICC) and prepare me for future jobs. Upon completion of my Natural Resources Associates at NICC, I plan on pursuing a bachelor degree in a science-related field. UNI and their Remote Sensing degree are definitely at the top of my list!" Jeramie Key, undergraduate scholarship awardee, NICC.

Higher Education:

Contributions from the UI base program include scientific advancements in environmental modeling and training of students for STEM careers. Field measurements and numerical models were performed in 2009 by the Papanicolaou team to estimate quantities of Total Belowground

Carbon Allocation (TBCA) using a mass balance equation for three representative land uses, viz. corn, soybeans, and prairie bromegrass for CRP (Conservation Reserve Program) of an agricultural Iowa sub-watershed, located within the Clear Creek Watershed (CCW). Previous studies have been conducted primarily in forest settings to quantify TBCA, where several terms regarding the carbon content in the mass balance equation are often neglected since forests remain generally undisturbed, non irrigated or fertilized. Our research examines for the first time the impact of intensive tillage practices, water-driven soil erosion/deposition, and high usage of fertilizer on TBCA in agricultural settings. The first high-resolution model of atmospheric carbon dioxide in Iowa was completed, and several months of 2008 were simulated using the VPRM-WRF, adapted for Iowa by Carmichael, Stanier, and students. The original model was developed at NCAR / NOAA and collaborating academic institutions.

A highlight of the UI program was the continued development in the undergraduate and graduate researchers in the IMCANS program. Four of five IMCANS undergraduate scholars gave posters at the UI College of Engineering research open house. One poster (that of Kelsey Coulter and Nick Petrich) was selected to be one of five undergraduate research projects shared with President Sally Mason during her college tour in spring 2010. Several IMCANS participants graduated and are pursuing graduate school or are employed in technical fields.

In May 2009, Amy Kaleita, the ISU base program manager traveled to the NASA Goddard Space Flight Center in Greenbelt, Maryland with several program students to give presentations of their work on assessment of spatiotemporal patterns of soil moisture and to meet with NASA scientists to discuss collaboration. This lead to some innovative proposals submitted for funding or being written currently, in the area of environmental monitoring and multi-dimensional/multi-temporal data synthesis and analysis.

Iowa Space Grant also supported technical competitions. For example, Drake base program students participated in the 14th Annual Iowa Physiological Society meeting undergraduate student competition, 2 May 2009 in Des Moines, Iowa. They also won first place in the Iowa Trauma Resident Competition, Iowa City, Iowa 23 October 2009. The project advanced to the regional 32nd Annual Advances in Trauma, American College of Surgeons, Committee on Trauma, Region 7, Resident Paper Competition, 11-12 December 2009 in Kansas City, Missouri. One team from ISU participated in the MAVRIC (Mars Analog Vehicle for Robotic Inspection and Construction) competition and caught the eye of *Popular Mechanics* magazine that published an article on the competition and included two pictures of the ISU Rover and team. ISU also sent a team to participate in the USLI (Universities Space Launch Initiative) in Huntsville, Alabama.

Research Infrastructure:
The ISGC supported the new Asteroid Deflection Research Center (ADRC). The center's PI, Dr. Bong Wie, sought out opportunities to spread the word about ISGC's NEO (Near Earth Object) project to the international NEO research community. He served on the planning committee for the 1st International Academy of Astronautics Planetary Defense Conference held in April 2009 in Granada, Spain, and presented a technical paper on ISGC's NEO research project. At the 60th International Astronautical Congress in Daejeon, Korea, in October 2009, PI presented the John V. Breakwell Memorial Lecture, "Astrodynamic Fundamentals for Deflecting

Hazardous Near-Earth Objects," and technical papers with two of his graduate students. Furthermore, the PI has actively been developing a collaborative research project plan with Dr. David Dearborn at Lawrence Livermore National Laboratory. The ADRC contributed 100% non-federal matching funds to this project.

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

Precollege:
The ISGC Partner Schools program and the ISGC professional development program engaged in the following:
Harlan Community School District, a partner school, collaborated with Shelby County Extension to bring NASA learning experiences to the school district. The partners have been working to use NASA as the centerpiece for an out of school STEM program for youth. The Shelby County Extension Council has approved a job description for a 4-H Afterschool Coordinator who will work in the Harlan Schools to lead STEM activities. This position will be a major piece in fulfilling the vision that The ISGC Partners have been working toward. The Extension Council seems very committed and excited about the possibilities associated this programming. A Memorandum of Understanding between the Extension Council and the Harlan Community School District has been developed to make sure things are as clear as possible in moving forward together on this. The NASA vision and ISGC support has moved this project to the stage of implementation for reaching youth with STEM opportunities.

ISGC worked with NASA Explorer School Coordinator Jennifer Reed-Taunton of Marshall Space Flight Center. Ms Reed-Tauton, who worked a NASA exhibit at Science Night in a Harding Middle School that included a moon rock, had an encounter with a student and his parents. A young Hispanic boy was translating information about the moon rock for his parents. When the father spotted the photo of astronaut Jose Hernandez in an ISS calendar that Reed-Taunton had given him, she explained that Hernandez's parents were migrant farm workers and that he had worked hard, become an engineer and then an astronaut.

"The family was amazed and the boy looked at me and said, 'So there's hope for me too?'" recalled Reed-Taunton. "I said, 'Of course there is hope for you—you can be anything you want.' I told him that he would have to send me his autograph some day when he becomes a famous astronaut."

ISGC Partner School teachers Chris Boldt and Barbara Schmid of Council Bluffs learned of a shortage of young people interested in America's space program when they attended the Aerospace Education Conference at the Kennedy Space Center in 2008. With this in mind, the duo decided to spend the $5,000 in prize money they won for the 2009 H.H. "Red" and Ruth H. Nelson Family Foundation Excellence in Teaching Award to address this problem. Using the award, the partners engaged Andrew Chaikin, motivational space expert and author, to visit with more than 500 students at Longfellow and Pusey schools during a two-day stay.

The two teachers also sponsored field trips for the two schools to the Strategic Air and Space Museum in Ashland, Neb. In addition, they purchased space suits for the K-2 classrooms and a Star Lab portable planetarium from AEA 13.

The National Junior Academy of Science for 2009 included 70% female participants. Although no minorities participated, competing participants came from five different Iowa schools. The sustainability of the event continues to improve from their growing endowment.

This year the SSTFI sent four student finalists through financial sponsorship funded by Monsanto to the Intel ISEF in San Jose, California.

Avanthi Sai Ajjarapu from Ames High School was awarded a second award in the category of Energy and Transportation of $1500 for her project entitled "Levoglucohol: Engineering Ethanologenic *E. coli* for Levoglucosan Utilization." In addition, Avanthi also received a United States Army award in the form of a $1000 US. Savings Bond and a gold medallion based on the quality and content of her research. Drexel University in Philadelphia, Pennsylvania awards eight full tuition scholarships that align with Drexel's curriculum. Avanthi was awarded one of these scholarships in the amount of $150,000. The Florida Institute of Technology is the only private technological University in the southeastern United States. Florida Tech, located on the Space Coast near Kennedy Space Center offers full tuition scholarships of $12,500 per year that are renewable annually. Avanthi was also a recipient of this scholarship.

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).*

The ISGC supported programs at three general public affiliates: National Mississippi River Museum and Aquarium (NMRMA), the Grout Museum District, and the Science Station.

With the support of ISGC, the National Mississippi River Museum & Aquarium created content and curriculum for new, innovative water education exhibits based on principals of earth science. Rivers to the Sea brings the science, technology and engineering of the rivers of America to an annual audience of over 300,000 people, including those who live along river banks and drink from river waters. Funding was used to create content which utilizes satellite imagery and other visual and technical information from NASA, achieving the Museum's and NASA's common goals.

PROGRAM ACCOMPLISHMENTS

NOTE: Please refer to metrics specified for each goal in Program Goals section beginning on page one.

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

Fellowships and Scholarships

GOAL 1 – Continue to implement a $172,000 competitive Scholarship/Fellowship program state-wide that is effective at retaining students in STEM fields and meets all of NASA's requirements.

Accomplishments: Funded a total of 27 competitive awards (24 undergraduates and 3 graduates) with 3.7% to underrepresented minority students and 33.3% to women. This represents a failure to meet *Objective 1a* for minorities and women. A new focus by the new ISGC director is necessary to address this weakness. *Objective 1b* is met since 100% of higher education students participate in research. *Objective 1c* is met since 100% of the awardees are still involved in STEM fields.

GOAL 2– Continue to implement a $14,000 scholarship program for outstanding seniors at the State Science and Technology Fair of Iowa (SSTFI) that have a positive impact on the retention of students in STEM.

Accomplishments: Funded four awards with 50% to women in FY2009. *Objective 2a* is met since by survey 65% of the senior entrants were aware of the ISGC awards. *Objective 2b* cannot be determined quantitatively this year. The survey will be updated for the next year, however, based on our experience we believe a majority of the seniors have participated in previous years. *Objective 2c* is met since 100% of the awardees are still enrolled in STEM fields.

GOAL 3 – Implement a $14,000 scholarship program for a Minority Serving Institution (MSI) that is linked with the base programs at one or more academic affiliates.

Accomplishments: *Objective 3a* is met since NICC now offers GIS training on campus via remote hookup to UNI. *Objective 3b* is met since of the two awardees, one that attended the UNI GIS/GPS workshop hosted by the base program PI plans to transfer to a four-year STEM program to continue his education in STEM. The student is considering the ISGC academic affiliate: UNI. *Objective 3c* is met since the NICC staff believes that the new GIS offerings are valuable and the UNI base program manager values the new participants and potential new UNI attendees.

Higher Education

GOAL 4 – Continue the development of competitive, self-sustaining base programs at each academic affiliate campus that combine active research with student involvement.

Accomplishments:

Objective 4a is met as follows:

- Reports and publications: Six at Drake, 14 at ISU, 14 at UI, and six at UNI.
- Proposals: Five at ISU, one at UI, and two at UNI.

Objective 4b - New collaborations have been established with the following base programs:

- Drake with NASA Johnson Space Center, and Iowa Methodist Medical Center
- ISU with NASA Goddard Space Flight Center, USDA-ARS Hydrology and Remote Sensing Lab & Water Management and Conservation Research Unit, Iowa Soybean Association, University of British Columbia.
- UI with NASA Ames Research Center, Goddard Space Flight Center, National Center for Atmospheric Research, and ISU.
- UNI with NASA Ames Research Center, Goddard Space Flight Center, NGA-DOD, John Deere, and University of Maryland.

Objective 4c - the match requirement is met and reported in the FY2009 Performance Data Expenditure Summary.

In addition to the above Objectives data, students involved in the base programs include the 27 scholarships and fellowships (reported above), with eight funded students, plus one unfunded student participant. Of these, there were two undergraduates, seven graduates, and 22.2% were women (2 of 9).

It worthy of note that a new base program, "Enhancing Remote Sensing Education in Iowa" was competitively awarded at the University of Northern Iowa after the successful graduation of the previous base program. The highlights of the new base program include 1) an industry partnership developed with John Deere to work on precision farming and remote sensing areas, 2) successful training for NICC tribal colleges students and faculty, 3) three undergraduate students research presentations at national meetings, 4) successfully received several research grants, and 4) new connections developed with NASA Ames Research Center.

GOAL 5 – Increase Iowa participation in technical competitions
Accomplishments: *Objective 5a* is met since competitions were supported by teams described under Program Benefit Higher Education section above from Drake, and the interdisciplinary teams from ISU that participated in the MAVRIC in Hanksville, Utah and the USLI in Huntsville, Alabama. *Objective 5b* is met in that both the ISU MAVRIC team and the USLI team generated additional non-federal matching funds.

This effort has been discontinued for PY21 (2010) due to underutilization and requests for such funding will be considered by the director on a case by case basis from National Space Grant Foundation funds.

Research Infrastructure
GOAL 6 – Continue to develop the previously selected interdisciplinary research project to receive sustained ISGC funding and build a sustainable capability in the State with the capability to support the NASA mission.
Accomplishments: *Objective 6a* is met in that the PI of the ISGC funded NEO program within the new ADRC produced 15 publications or presentations at multiple meetings, and submitted three non-ISGC proposals. *Objective 6b* is met with two new collaborations, one at Lawrence Livermore National Lab, and one at Sandia National Lab. *Objective 6c* - the match requirement is met and reported in the FY2009 Performance Data Expenditure Summary.

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

Precollege
GOAL 7 – To engage more precollege organizations in the state-wide Partner Schools program.
Accomplishments: The ISGC Partner School Program continued in program year 20 with a workshop at Kennedy Space Center held in July 2009. The workshop was held in partnership with Space Education Initiatives Inc. and included teachers from Wisconsin, Nevada, Arkansas, and Iowa as well as participants sponsored by the Civil Air Patrol. Partner School teachers also

attended the Space Exploration Educators Conference held at Space Center Houston in cooperation with Johnson Space Center in February. ISGC also invited Presidential Awards for Excellence is Mathematics and Science teaching to join the Partner school program and attend the NASA workshops which added an additional district.

Current Partner School districts – 27; ISGC Partner Teachers – 62 trained and still active in education. This represents 7.5% of the 362 Iowa school districts. This meets the *Objective 7a* metrics. *Objective 7b* metrics are met in that 50% of NASA Explorer Schools in Iowa continue to participate as ISGC Partner Schools. *Objective 7c* is met since it is estimated that 80% of Partner School trained educators continue to offer professional development at their institutions.

GOAL 8 – To ensure sustained Iowa representation in the National Junior Academy of Science program.
Accomplishments: Sent three high school students to the American Junior Academy of Science meeting in San Diego, California. The three students were selected based upon their poster contest results from a variety of STEM research projects conducted in 2009. Twenty students vied for the chance to compete nationally. This represents participation from five mostly rural high schools across Iowa. The metrics for *Objective 8a* cannot be determined this year since we did not complete the planned survey of senior entrants. *Objective 8b* is met since the Iowa Academy of Science (IAS) made another annual deposit, bringing the endowment account balance to: $30,370. *Objective 8c* was not met as the IAS has not collected this information.

GOAL 9 – To conduct state-wide STEM professional development, pre-service and in-service training for formal and non-formal educators working in kindergarten through 12th grades.
Accomplishments: Conducted statewide professional development, pre-service and in-service training for ISGC program year 20. The ISGC has also done independent in-service trainings for schools and partnering groups such as area education agencies. Professional development was also provided for the statewide home-school association coordinators to familiarize them with ISGC educational support, curriculum, and science pedagogy. ISGC continues providing pre-service/in-service teacher professional development in cooperation with NASA centers. Trainings conducted to date – 42; Teachers reached – 888 (Pre-service and in-service). This represents 22% of the 4084 assigned science teachers in Iowa. This meets the requirements of *Objective 9b & 9c.* An effective means of surveying all Iowa schools has not yet been developed for *Objective 9a.*

GOAL 10 – To effectively manage the State Science and Technology Fair of Iowa (SSTFI).
Accomplishments: ISGC Associate Director for Education worked with SSTFI staff and participating teachers to raise awareness of the ISGC awards and conducted a survey concerning the structure of the ISGC scholarship award process. The 2010 SSTFI saw an increase in senior participants by 26 % thereby meeting the metrics of *Objective 10a. Objective 10b* was not met due to a withdrawal of participation by a major home school group in Iowa. *Objective 10c* was met by the establishment of the new SSTFI endowment.

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).*

General Public

GOAL 11 – To support STEM nonformal educational programs that enhance public awareness of NASA missions and general scientific literacy for Iowa.

Accomplishments: Non-federal matching funds were used to sponsor several NOVA programs and other science-related programs to promote scientific literacy of the general public thereby meeting the metrics of *Objective 11a*. Three competitively selected awards were provided to outreach affiliates in the state for informal education activities: "Rivers to the Sea" at the National Mississippi River Museum and Aquarium; "Outreach to Space" and "Museum in a School" at the Grout Museum District; and "Outreach to Space" at the Science Station thereby meeting the metrics of *Objective 11b*.

PROGRAM CONTRIBUTIONS TO PART MEASURES

- Longitudinal Tracking: Total awards = 49; Fellowship/Scholarship = 33, Higher Education = 9, Research Infrastructure = 7; 3 of the total awards were to underrepresented minorities; and 14 of the total awards were to women. Of the total FY2009 awardees, 33 remain enrolled in their current STEM degree programs, eight are seeking advanced STEM degrees, one is seeking STEM employment, and seven are currently employed in STEM careers.
- Course Development: No courses were developed as a result of ISGC funding
- Matching Funds: ISGC generated $1,354,005 of match to $585,000 of NASA funds requiring match or 2.315 to 1.
- Minority-Serving Institutions: Since there are no minority-serving institutions in Iowa, the ISGC established a program with the NICC to allow students to compete for scholarships to attend a Geospatial workshop at UNI and to complete a research project at their institution. The first workshop was a week-long session held in August 2009 that provided an introduction to Geographic Information Systems (GIS) and Global Positioning Systems. Two students from NICC came to the UNI to have hands-on experience as they learned how to use GIS and Garmin GPS units. The week concluded with a small class project in which the students collected GPS data on a local watershed and imported the data into ArcGIS to make a map and analyzed them. They later presented results from their project to the director at the NICC campus in the fall of 2009. One of the two students has decided to study in a STEM degree field at a four-year institution.

IMPROVEMENTS MADE IN THE PAST YEAR

The most significant change at the ISGC is the retirement of Dr. William J. Byrd as director after 19 years at ISU. With this retirement came a new director and change of lead institution, UNI. The full impact of these changes has yet to be seen, but generally such changes bring new energy, fresh ideas and perspective.

Programmatically, the addition of a new MSI program with NICC is a big improvement since no MSI's exist in the state of Iowa. This first year was successful and the second year is well underway. We expect that this will be a long-term relationship benefiting NICC and the State of Iowa.

Also in this year, the executive committee approved the addition of a new outreach affiliate, Putnam Museum & IMAX Theatre in Davenport, Iowa effective 1 April 2010. This will give ISGC and NASA an increased presence in a major population center in Southeastern Iowa.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Note that the list of ISGC affiliates below does not mean that each affiliate is active in some specific project each year. Their participation varies as research topics and themes vary from year-to-year. Specific involvement in the current program year is listed in italics.

1. Ames Laboratory of the U.S. Department of Energy (Federal lab)
2. Drake University (Private four-year university) - *Executive Committee member, base program management, scholarship and fellowship selections, ESMD internship participants*
3. Grout Museum District (Science Museum) - *Informal education competition winner*
4. Iowa Academy of Science (Non-profit organization) - *Iowa Junior Academy of Science poster competition*
5. Iowa Aviation Promotion Group (Non-profit organization) - *Informal education competition participant*
6. Iowa Department of Education (State government) - *Partner Schools program, State Science and Technology Fair of Iowa*
7. Iowa Department of Natural Resources (State government)
8. Iowa Department of Transportation - Office of Aviation (State government) - *Informal education competition participant*
9. Iowa State University (Public PhD-granting university)- *Lead institution, Executive Committee member, base program management, scholarship and fellowship selections, research infrastructure project continuation, National student competition participant*
10. National Mississippi River Museum and Aquarium (Science museum)- *Informal education competition winner*
11. National Lab for Agriculture & the Environment (Federal lab)
12. Rockwell Collins (Industry)
13. Science Center of Iowa (Science museum) - *Informal education competition participant*
14. Science Station (Science museum) - *Informal education competition winner*
15. Softronics Limited (Industry) - *Research support*
16. University of Iowa (Public PhD-granting university) - *Executive Committee member, base program management, scholarship and fellowship selections*
17. University of Northern Iowa (Public Masters-granting university) - *Executive Committee member, base program management, scholarship and fellowship selections*