NASA Idaho Space Grant Consortium
Lead Institution – University of Idaho
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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 NASA Idaho Space Grant Consortium is a Designated Consortium funded at a level of **$845,000** for fiscal year 2010.

PROGRAM GOALS

In order to consistently evaluate the Idaho Space Grant Consortium annually, the vision, mission and goals of the strategic plan are used as a guide for all programs developed and facilitated through the ISGC.

The vision of the Idaho Space Grant Consortium is to be the voice of NASA in the state of Idaho. To achieve this vision, the mission of the ISGC is to use a strong and active constituent base to provide easily accessible, highly flexible programs that focus on current and ongoing NASA initiatives that will benefit researchers, K-12 teachers, K-16 students, industry, the general public, the state of Idaho and ultimately, NASA.

To achieve the ISGC vision and mission, the ISGC identified the following goals: (1) maintain an active statewide network of universities, colleges, industries, governmental agencies and informal education organizations with interests and capabilities in STEM related fields; (2) build strong partnerships with NASA field centers; (3) encourage cooperative programs among educational institutions, industry, all levels of government and other space grant consortia; (4) encourage interdisciplinary training, research, and public service programs related to the NASA Mission Directorates; (5) develop a strong workforce by recruiting and training professionals, especially underrepresented individuals, for careers in STEM; and (6) promote strong science, technology, engineering, mathematics and

education from kindergarten through university levels, using formal and informal science programs.

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

Outcome #1 (Employ and Educate)

- 44 students were significantly supported from FY10 funds through scholarships and fellowships
- 8 students took next step in FY10 (SG participation supported from FY06-FY09 funds)
    - 4 are pursuing advanced degrees in STEM disciplines
    - 1 accepted a STEM position in K-12 academia
    - 3 accepted STEM positions in industry

The following are quotes from students who are or were previously involved in the ISGC Scholarship, Fellowship, and Internship programs:

- "The Space Grant Program gave me the opportunity to work in an aerospace field with engineers doing real work. This summer internship really helped me determine my education goals, including my major, was an excellent networking opportunity and reaffirmed my interest in an aerospace related field. I now participate in Boise State's Aero Design team and am very interested in pursuing an aerospace career." (Allyssa Bateman, 2010 NASA Center Internships)
- "It has helped further my awareness of what NASA has done and has granted me opportunities on campus. Also, this program has given me the chance to hear from some people that work for NASA. This allows me networking capabilities and a great way to gain new information." (Bridget Wimer, Idaho Space Grant Scholarship Program)
- "It was a phenomenal leadership opportunity. In addition, it gave me a chance to work on a large-scale multi-disciplinary project with a compressed time frame. It is one of three outstanding experiences that gave me the engineering confidence to obtain a position as director of engineering. It was one of the three top experiences I had at school, and helped bridge the gap between theory and practice. I cannot say enough good things about the program. Thank you for the opportunity, I wish every engineering student could do this." (Travis Dean, Microgravity, Coyote Design - Director of Engineering)
- "Participation in the Space Grant program has helped me with communication skills and networking by working with fellow students and engineers in the field. The Space Grant program, including work with the high-altitude balloon project sponsored by the Idaho Space Grant, has exposed me to leadership roles and technical skills that I would have otherwise not acquired." (Christopher Douglas - Boeing Internship/Fellowship, University of Idaho - Research Assistant)

- "I have always been intrigued by NASA and space exploration. During school I participated in as many space related opportunities as I could. The scholarship I received helped me offset the cost of school and lessen the financial burden. I was fortunate to be on the pioneer Boise State Microgravity team for the NASA SEED program. The space grant made significant contributions to our program and its ultimate success. This was and will be the most memorable part of my college career. Participation in the Microgravity program as well as my Space Grant Scholarship helped get me where I am in my career now." (Ryan Bedell - Idaho Space Grant Scholarship Program, Lutron Electronics - Project Electrical Engineer)
- "The Space Grant program got me interested in education. Specifically, I worked with kids and developing curriculum for the 'Mars Rover Challenge'. This led me to a career in teaching." (Elizabeth Cunningham - Idaho Space Grant Scholarship Program, Santa Barbara City College - Mathematics Assistant Professor)
- "The connections that I established as part of my participation in ISGC activities are what ultimately got me my job working at a NASA center." (Austin Howard - Idaho Space Grant Fellowship Program, Neerim Corp. - Aerospace Engineer)
- "The Space Grant Program has had a large impact on my education and life. The program has given me hands on experience, and it has allowed me to develop my leadership skills. I feel that I have a great deal of experience for still being in an undergrad program. This experience will serve me well after I graduate. I have also had the chance to work with engineers that work in NASA facilities, so I have been able to see the industry side as well as the academic side." (Kevin Ramus - University of Idaho - Undergraduate Research Assistant)

Outcome #2 (Educate and Engage)

- Beginning in 2010, the scholarship funding process was altered with the intent to increase the retention of students in the STEM fields. As scholars continue within the STEM field and continue to meet the requirements of the scholarship program, their funding increases each year. The goal is to reward students who continue to remain in the STEM fields and perhaps provide an added incentive for students to remain in STEM.
- A dual enrollment class with Moscow High School has been established to involve high school students and teachers in the University of Idaho Engineering program. This UI Idaho RISE program averaged 27 undergraduate students and 11 high school students for the fall 2010/spring 201 semesters.
- Five seniors in Mechanical Engineering and Electrical Engineering along with 2 graduate students participated in the ISGC's Robotic Lunar Exploration Program (RLEP). This program is a senior design capstone project that is linked to NASA Ames Intelligent Robotics Group.

- Idaho TECH is a program for 4th, 5th and 6th grade students. In 2010, 62 teams participated from around the state. Idaho TECH is part of the Idaho ROKS pipeline program. This program is a collaboration between the University of Idaho's Colleges of Engineering, Agriculture and Life Sciences, 4H – Extension, and the NASA ISGC.
- The NASA ISGC in collaboration with the University of Idaho will host an Idaho Science and Aerospace Scholars capstone event in early June. We anticipate 20 students from northern Idaho to attend this one-day event.

Outcome #3 (Engage and Inspire)

- The NASA ISGC collaborated with the Clearwater Valley Upward Bound program for a week-long engineering workshop. Twenty-five students participated in hands-on robotics activities.
- The ISGC was represented at the Idaho Science Teachers Association annual conference in Lewiston, ID. Information about ISGC programs was provided to attendees.

PROGRAM ACCOMPLISHMENTS

Outcome1: *Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's Strategic goals.*

Scholarship and Fellowship Program

Diversity of Applicants and Participants

- Number and demographics of applicants – 57 total applications; 39% female, 7% underrepresented groups. 21 new awards provided
- Retention rate of scholars compared to non-scholars – in the 2010-2011 program, 96% of our scholars stayed in the same program as the previous year. At the University of Idaho (where 38% of scholars were located in 2010-2011), approximately 59% (freshman to sophomore) of non-scholars remained in an engineering program; numbers are similar across campus and the state. Clearly, the close connection to a scholar's school and program fostered by program requirements serves as a benefit to ISGC scholars for retention purposes.

  All students will continue to be tracked until their first employment through the Space Grant Foundation Longitudinal Tracking System.

Research Component for Scholars/Fellows

- Number of publications, presentations, patent applications and licenses, press releases, or other media efforts related to scholar/fellow activities

- Publications – 11
- Presentations – 58
- Proposals – 13
- Patent – 0
- Press releases – 40 *(includes internships, scholar events, presentations, etc.).*

- Number of scholars involved in research activities – 22 of 34 total scholars (65%) were directly related with ISGC research activities.
- Number of scholars and fellows involved in NASA internships – in 2010, 2 scholars and 4 fellows out of the total number of internships were NASA interns (43% of all interns).

Communication Between Program Participants, NASA, etc.

- **Evaluation of the program by all** participants: Annually, the ISGC hosts two mandatory events for scholars and fellows across the state in order to remain in contact with all scholars/fellows. Scholars and fellows are also required to submit a report each semester commenting on volunteer hour service (scholars) or research progress (fellows). Through both venues, students are asked to comment on the ISGC program, requirements, etc. In 2010, Scholars reported being more informed about many ISGC programs, and as such, were able to become more involved (such as with Idaho RISE, Microgravity University, Idaho Science and Aerospace Scholars, NASA internships, institution specific research, etc.). In 2010, the ISGC has emphasized communications through new venues such as Twitter and Facebook. These venues allow immediate, easy access to information and programs for students, faculty, and the general public. **Number of scholars involved in NASA and/or industry internships and/or the NASA Academy**: In 2010, 2 scholars and 4 fellows served as NASA interns (43% total).
- For all students receiving significant support in the period spanning FY06-FY10, 16 are pursuing advanced degrees in STEM disciplines, 2 accepted STEM positions at NASA contractors, 1 accepted a position at NASA, 12 accepted STEM positions in industry, 1 accepted a STEM position in K-12 academia, and 2 accepted STEM positions in academia. The remaining students have not yet received the degree that they were pursuing while they received their Space Grant award

Research Infrastructure Programs / Higher Education

- **Number of proposals submitted**:13

  Number of proposals funded: 3 proposals have been funded due to research funded by the ISGC were submitted *(one funded – NASA EPSCoR).*

  Number of proposals pending: 8

- **Number of publications/presentations resulting from the ISGC funding**: 21
  - Papers Published – 7 journal and 5 conference papers published; 3 publications involved current undergraduate or graduate students as co-authors
  - Conference Presentations – 6
- **Patents**: 0 filed

- **Number of contacts with NASA researchers by Idaho researchers**: 8 (JPL, Goddard, Ames, Langley, and JSC) visits were made by researchers directly supported by ISGC research grants in 2009. Several other researchers have made contact via e-mail and telephone, and have travel planned for the upcoming summer. Multiple contacts with researchers at JPL and NASA Ames have also been made by the ISGC to encourage more student involvement in programs, as well as to encourage NASA sponsored senior design.

Student Participation (esp. female, underrep.) in NASA research programs

- 99 graduate and undergraduate students participated in NASA-related research supported by the ISGC in 2010. 40 students were involved with ISGC research projects *(25% female, 3% underrepresented, 55% graduate, 45% undergraduate)*. 11 students interned with NASA *(37% female)*, 22 scholars were involved with research programs in their disciplines *(32% female)*, and all 10 fellows were involved in NASA research *(40% female)*. In Idaho RISE, 69 students were involved at ISU, NNU and the UI *(29% female, 4% underrepresented).* Seven students were involved in the Idaho RLEP senior design program at the UI.

Idaho – NASA Collaborations

- **Number of collaborations with industry by Idaho researchers and/or students**: At least nine contacts were made with industry in 2010 by Idaho researchers, including with Micron, Boeing, Positron Systems, the INL, and multiple military industries.
- **Number of contacts with NASA researchers by Idaho researchers and/or students**: Researchers directly supported by ISGC research grants in 2010 visited JPL, Goddard Research Center, Johnson Space Center, and NASA Ames. Several other researchers have made contact via e-mail and telephone, and have travel planned to NASA centers for the upcoming summer. Multiple contacts with researchers at JPL and NASA Ames have also been made by the ISGC to encourage more student involvement in programs, as well as to encourage senior design projects tied directly with NASA. Specific NASA researchers that have been in contact with students include:
- Ames: Susan Lee, Mike Lundy, Marc Murbach, Dr. Terry Fong, Dr. Anthony Colaprete, Dr. David Hash, Johnny Fu, Ed Martinez, Dr. Jim Arnold, Dr. Butler Hine, Josh Benton, Kenny Boronowsky, Ross Beyer, Larry Lemke, Chris

McKay, Janice Bishop, Dr. Michael Bicay, William Borucki, Jack Lissauer, Jason Rowe

- JPL: Dr. Mohammad Mojaradi, Dr. Elizabeth Kolawa, Dr. Tibor Balint, Dr. Tom Spilker, Dr. Linda Spilker, Dr. Kim Reh, James Bernardini, Wayne Schubert, Karen Buxbaum
- Johnson Space Center: Dick Morris, Doug Ming
- Langley Research Center: Dr. David Winker
- Goddard Space Flight Center: Dr. Brent Bos
- NASA Headquarters: T. Balint, Cassie Conley
  Overall, the accomplishments in this program were positive. Improvement will be made in participation of female students and faculty in the following year. Items not reported above that are relevant to the success of this program include:

In 2010, the ISGC supported six research projects that included:

- Small Satellites for Solar System Exploration
- AVIATR: A Titan Airplane Mission to be Proposed to the NASA Discovery Program
- Measurement of Dust Motion under Electrical and Mechanical Perturbation
- Investigations of the potential for microorganisms residing on the Mars Science Laboratory spacecraft to inhabit Mars
- Thermal and Propulsion Subsystems Analysis of the Mars Hopper
- Measurement of physicochemical properties of Fe substituted nanominerals for improved detection on the surface of Mars

These projects directly address priorities in the Exploration Systems, Aeronautics and Science Mission Directorates.

In 2010, the ISGC continued to work with the Idaho NASA EPSCoR program, which currently has five major research projects funded through NASA. Many of these research projects received seed funding from the NASA Idaho Space Grant Consortium that helped them establish their research and prepare to propose for these larger grants.

Student internships with NASA

- **Number of students involved in NASA internships (both new and returning)**: In 2010, 11 students interned with NASA – 3 at JPL, 3 at Ames, 3 at JSC, and 2 at Marshall. One interned with NASA JPL for a second time and one at NASA Ames for a second time. Also, one previously interned at JPL and then interned at JSC in the summer of 2010.

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

Teachers and Students involvement in STEM activities

- **Number of teachers and students involved in ISGC activities**: Teachers: 864 at a minimum *(all levels represented);* students: 8,047 at a minimum *(all levels represented).* Programs range from Idaho TECH, FIRST Robotics, FIRST Lego League, Women in Engineering Day, and E-girls programs to career fairs such as the INL Engineering Expo, to educator science workshops and one-day workshops, etc.
- **Number of requests by teachers or students for information about NASA missions:** In 2010, the ISGC received over 55 requests from teachers for additional information via telephone, e-mail, or through the ERC.
- In the spring and early summer of 2011, the ISGC is supporting Idaho's Summer of Innovation program. Teacher and student workshops will be held in June. Teachers and students will participate in NASA hands-on activities. Teachers will be given the tools to develop curriculum and how to integrate this curriculum into their classroom.
- In 2008, through collaboration with the ISGC, Idaho National Laboratory provided a $50,000 grant to support FIRST robotics teams and for the creation of Idaho ROKS pipeline program. This program begins with FIRST Junior Lego League for grades 1-4, then Idaho TECH for grades 4-6, FIRST Lego League for grades 6-8, FIRST Tech for grades 9-12 and FIRST Robotics for grades 9-12. Informal education programs, such as 4-H after-school robotics, are also included. Ultimately, the participants will attend an Idaho higher education institution and become involved with Idaho RISE and/or Idaho RLEP, thus entering the ISGC's higher education workforce pipeline. A partnership with the ISGC and the State of Idaho 4H program has committed to being the FIRST operational partner for Idaho, and recently held the FIRST Lego League and FIRST Tech Challenge state championship in Idaho. This funding continued to support these efforts in 2010 supplemented by Space Grant funding.
- ISGC continued the Idaho Teaching Engineering to Children (TECH) research and design competition for teachers and 4th, 5th and 6th grade students. This program has been on-going for 20 years, although participation has been declining primarily due to the increase in participation in the FIRST programs in Idaho. . The ISGC is in the process of updating and revising this program to increase interest and participation in the state. We are also looking at ways to make this program available to schools in rural and low-income areas of the state. In 2010-2011, 53 teams are involved (approximately 300 students / 30 teachers). Female students and underrepresented groups such as Native American and Hispanic populations in Idaho are highly encouraged to participate in Idaho TECH.
- The ISGC encouraged underrepresented and female junior and senior high school students to pursue higher education in the science and engineering fields through in-kind support of the University of Idaho (UI) JEMS program, UI Women in Engineering Day, E-girls at Boise State University, Math Counts

at various locations around the state, INL Engineering Expo and UI Clearwater Valley Upward Bound.

- ISGC provided in-kind support to teacher and student STEM workshops at the Museum of Natural History, Warhawk Air Museum, Discovery Center of Idaho, and Palouse Discovery Science Center. All workshops are listed on the online ISGC calendar. Also, the ISGC supported NASA's Summer of Innovation program through the wide network of affiliates and contacts around the state.

Retention Rates in STEM Through Hands-on Programs

- **Number and percentage increase of higher education students and associated affiliate institutions involved in NASA internships or other ISGC research activities**: In 2010, 11 students interned with NASA from the UI, BSU, and College of Idaho. Twenty-two scholars were involved with research programs in their disciplines at the UI, NNU, ISU and BSU. Sixty-nine students were involved with Idaho RISE at ISU, NNU and the UI, and 41 students were involved directly with ISGC Research Initiation Grant programs or supported by a research travel grant at UI, BSU, NNU and ISU.
- **Number of publications authored/co-authored by students involved in NASA activities**: In 2010, 11 publications were completed by students involved as ISGC scholar/fellows, as interns, or as members of a research team.
- **Retention rate of scholars compared to non-scholars**: In 2010-2011, 96% of scholars stayed in the same degree program as the previous year. At the University of Idaho (where 38% of scholars were located in 2010-2011), approximately 57% (freshman to sophomore) of non-scholars remained in an engineering program; numbers are similar across campus and the state. Clearly, the close connection to a scholar's school and program fostered by program requirements serves as a benefit to ISGC scholars for retention purposes.

Student Design and Research Projects:

- In 2010, one Electrical and Mechanical Engineering senior design team was supported by Idaho Space Grant and NASA Ames. A University of Idaho senior design team named TensegriTeam was tasked to develop a tensigrity system. Tensegrity is a unique class of structures composed of axially loaded compression elements encompassed within a network of tensile elements. Researchers at NASA Ames are interested in tensegrity robots because they have similarities to biological systems and have improved compliance over traditional robots. NASA engineers and researchers contributing to the work include Dr. Terry Fong and Vytas SunSpiral in the NASA Ames Intelligent Robotics Group. The goal of the TensegriTeam project is to design and build a tensegrity module capable of controllable shape change as a proof-of-concept for the feasibility of tensegrity robots.

- The Idaho RISE Near Space Engineering team worked with Marc Murbach, a research engineer at NASA Ames Research Center to develop and provide a flight capability to 80,000 feet or higher for testing of Snowflake, an autonomous parafoil system capable of flying to a pre-programmed landing site. Snowflake was developed by the Naval Postgraduate School and NASA Ames Research Center. Research engineers from NASA Ames involved in the project include Marc Murbach, Josh Benton, and Kenny Boronowsky.
- Idaho RISE (near-space scientific balloon program) hosted its 6th symposium on March 25-26,2011. The conference brought together participants from The University of Idaho, Northwest Nazarene, Idaho State University, and Moscow High School. The goals of the RISE Symposium are to raise awareness of RISE activities throughout Idaho, to better understand the available opportunities for high altitude scientific research from balloons, to share ideas and experiences, to encourage interactions and collaborations, and to discuss possible new directions for the Idaho RISE program. This year the symposium was held at one of Idaho's community colleges, North Idaho College (NIC). We invited students and faculty from NIC to attend and are working with the ISGC affiliate representative to start an Idaho RISE program at their institution.
- Two University of Idaho RISE launches occurred in 2010. In April, 2010, the Moscow High School balloon team flew 4 student-designed experiments (solar cells, marshmallow, yeast, protein denaturing) to an altitude of approximately 70,000 feet. The first Snowflake balloon flight took place in October, 2010, reaching an altitude estimated to be 85,000 feet. For the sixth year the University of Idaho offered a two-semester interdisciplinary engineering course, ENGR205/ENGR206. In Fall, 2010, 25 students (4 women) registered for ENGR205, and 29 students registered for ENGR206 in Spring, 2011 (6 women). Two Northwest Nazarene launches occurred and one Idaho State University launch occurred in 2010.
- Working with Moscow High School, Idaho Space Grant continues to offer a dual enrollment "Near Space Engineering" course for the math-based physics class at the high school. Moscow High School students enrolled in the dual enrollment course receive University of Idaho engineering credits for participating in the Near-Space Program. Eleven Moscow High School students enrolled in Fall 2010, and ten students enrolled in Spring 2011.
- In 2006, the ISGC initiated the Idaho Robotic Lunar Exploration Program (RLEP), working with the Intelligent Robotics Group (IRG) at NASA Ames Research Center. The RLEP program is led by two ISGC graduate fellows and involves undergraduate teams working with the fellows and mentored by NASA research engineers to design prototype hardware for future robotic exploration of the moon. As advisors and mentors to the senior design team, the RLEP fellows gain experience in project management and leadership, engineering design, research and development, technical communications, and networking. The hardware developed under the Idaho RLEP program

provides Ames researchers with the opportunity to identify engineering design issues and constraints preliminary to the definition, design, and development of actual hardware.

The 2010 University of Idaho RLEP senior design team is TensegriTeam comprising seven students from computer engineering, mechanical engineering, and Bio/Ag Engineering. Tensegrity is a unique class of structures composed of axially loaded compression elements encompassed within a network of tensile elements. Researchers at NASA Ames are interested in tensegrity robots because they are biologically similar and have improved compliance over traditional robots. The goal of the TensegriTeam senior design team is to design and build a tensegrity module capable of controllable shape change as a proof-of-concept to deomonstrate the feasibility of tensegrity robots. In April, 2011, TensegriTeam members will spend two days at NASA Ames for technical presentations to NASA Engineers and project sponsors.

Overall, the accomplishments in this program were very strong with high participation in programs, internships and research programs, and the majority of metrics met and/or exceeded.

OUTCOME 3*: Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission.*

Informal Education

Stimulating Public Interest and Understanding in STEM

- **Number of media reports about ISGC activities**: In 2010, the ISGC is aware of 68 media reports that were released in newspapers, online, on television, or on the radio about its programs. These reports ranged from coverage on specific programs (such as Idaho RISE, internships, and research symposium, etc.) to general releases about the ISGC. The ISGC continues to receive multiple contacts from the media independent of releases generated by the ISGC. Clearly, a strong relationship with Idaho media venues has been developed through the addition of a communications assistant in the office who is dedicated to media relations.
- **Number of requests by teachers or students for information about NASA missions**: In 2010, the ISGC received over 55 requests from teachers for additional information via telephone, e-mail, or through the ERC. These requests were received from industry, researchers, students, teachers and the general public who were interested in learning more about the ISGC, about NASA, and/or about how to become involved in programs.

Overall, the accomplishments in this program were strong with high participation numbers.

NASA 2010 Education Priorities:

- Authentic, hands-on student experiences in science and engineering disciplines – the incorporation of active participation by students in hands-on learning or practice with experiences rooted in NASA-related, STEM-focused questions and issues; the incorporation of real-life problem-solving and needs as the context for activities.
- Engage middle school teachers in hands-on curriculum enhancement capabilities through exposure to NASA scientific and technical expertise. Capabilities for teachers to provide authentic, hands-on middle school student experiences in science and engineering disciplines (see above).
- Summer opportunities for secondary students on college campuses with the objective of increased enrollment in STEM disciplines or interest in STEM careers.
- Develop new relationships with community colleges as well as sustain and strengthen existing institutional relationships with community colleges.
- Research in traditional aeronautics disciplines; research in areas that are appropriate to NASA's unique capabilities; directly address the fundamental research needs of the Next Generation Air Transportation System (NextGen).
- Research and activities in Environmental Science and Global Climate Change to better understand Earth's environments.
- Diversity of institutions, faculty, and student participants.
- Enhance the capacity of institutions to support innovative research infrastructure activities to enable early career faculty to focus their research toward NASA priorities.

PROGRAM CONTRIBUTIONS TO PART MEASURES

- **Longitudinal Tracking:**

  Total awards = 85; Fellowship/Scholarship = 44, Higher Education/Research Infrastructure = 41; 2 of the total awards represent underrepresented minority Fellowship and Scholarship funding. During the FY10 program year 4 students are pursuing advanced degrees in STEM disciplines, 3 students accepted STEM positions in industry, and 1 student accepted a STEM position in K-12 academia.

  For all students that were significantly supported in the period spanning FY06-FY09, 11 students graduated and are pursuing advanced STEM degrees, 2 students accepted positions at NASA contractors, 1 student accepted a position at NASA, 9 students accepted STEM positions in industry, and 2 students accepted STEM positions in academia. The remaining students have not yet received the degree that they were pursuing while the received their Space Grant award.

- **Course Development:**

The ISGC is working with the College of Engineering at the University of Idaho to explore expanding the Idaho RISE class to a broader audience. At present, most of the students are from the College of Engineering. However, offering an adjacent UI Core course for students in other disciplines, will enhance the awareness of RISE, NASA, and the ISGC. The course would target the general student population and would recruit from disciplines such as education, business, social sciences, and communication, etc. Discussions are at a very early stage.

For the fifth year the University of Idaho offered an interdisciplinary engineering course, ENGR205/ENGR206. The Fall 2010 ENGR204 course registered 25 students, and 29 students registered for ENGR206 in Spring 2011.

Working with Moscow High School, Idaho Space Grant continues to offer a dual enrollment "Near Space Engineering" course for the math-based physics class at the high school. Moscow High School students enrolled in the dual enrollment course receive University of Idaho engineering credits for participating in the near-space program. Eleven high school students enrolled in Fall 2010, and ten students enrolled in Spring 2011.

- **Matching Funds:**

The NASA ISGC is on track to meet its matching requirement for the 2010-2011 grant year. Reported cost share has included salaries, research materials and supplies, and indirect costs. The University of Idaho has agreed to reinvest half of the collected overhead expenses back into the project. These funds will be used as part of our matching requirement; however, they are not disbursed back to the program until the fall of 2011.

- **Minority-Serving Institutions:**

Although there are no minority serving institutions in the state of Idaho, the ISGC has continued to develop its relationship with Salish-Kootenai College in Montana. Through the work of the Director (Navajo) and Associate Director Ed Galindo (Yaqui), connections between this Tribal College and the ISGC have been established. Salish-Kootenai College is also a partner on the ISGC Summer of Innovation grant.

IMPROVEMENTS MADE IN THE PAST YEAR

One of the major milestones of the Idaho Space Grant Consortium in 2010 was the Summer of Innovation. Although this was a separately funded program, the Idaho Space Grant implemented the grant at 12 different sites across three states. Director Thomas and Associate Director Galindo personally taught many of the student and teacher workshops, and the staff of the ISGC coordinated, advertised, organized, budgeted, and generally oversaw all aspects of the Summer of Innovation. It is strongly believed that the contacts that were made in these rural,

underrepresented communities have gained greater exposure of our Consortium and will greatly benefit the ISGC in the future. An immediate result has been the involvement of some of these teachers and students in Idaho TECH. Further, we expect to see some of these same students as ISGC scholars once they reach higher education. It is not expected to see these same students that are in Junior High until at least 4 years from now, and it is understood that much can happen in this amount of time with these students; however, we believe that we have built a good foundation with these students and teachers with NASA STEM programming and developed excellent relationships among these Native American and Hispanic serving communities and the Idaho Space Grant Consortium.

PROGRAM PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

Academic Affiliates

University of Idaho – Lead Institution – Founded in 1889, the University of Idaho is the state's flagship higher-education institution and its principal graduate education and research university, bringing insight and innovation to the state, the nation and the world. University of Idaho researchers attract nearly $100 million in research grants and contracts each year; the University of Idaho is the only institution in the state to earn the prestigious Carnegie Foundation ranking for high research activity. The university's student population includes first-generation college students and ethnically diverse scholars. Offering more than 150 degree options in 10 colleges, the university combines the strengths of a large university with the intimacy of small learning communities.

Boise State University – BSU is an emerging metropolitan research university of distinction achieving its vision through academic excellence, public engagement, a vibrant culture and exceptional research. Reflecting the character of Idaho's capital city – a center of business, government, technology, health care and the arts, BSU is the largest university in Idaho with 19,667 students.

Idaho State University – ISU is a public, higher education institution in Southeast Idaho, with academic programs in business, pharmacy, and the health professions, teach education, engineering, arts and sciences, and applied technology training through the College of Technology. ISU provides undergraduate and graduate educational services to approximately 13,000 students annually.

Lewis-Clark State College – Founded in 1893, LCSC is a public, undergraduate college with a history born of vision and commitment to people. The college serves a highly diverse population, providing educational opportunities to over 3000 students from more than thirty states and twenty countries. LCSC offers instruction in the liberal arts and sciences, professional areas tailored to the

educational needs of Idaho, and applied technical programs that support the state and local economy.

North Idaho College – Founded in 1933, NIC is a comprehensive community college located on the spectacular shores of Lake Coeur d'Alene and the Spokane River. This public, higher education institution provides quality educational opportunities through offering associate degrees in more than 35 transferable academic majors and technical certificates or associate of applied science degrees in 26 professional-technical programs. NIC serves approximately 4,400 students annually.

College of Idaho – Founded in 1891, The College of Idaho provides a curriculum that is grounded in the liberal arts in a challenging, intimate academic setting. C of I is a private, liberal arts institution that provides an undergraduate education for more than 800 students in Caldwell.

College of Southern Idaho – CSI, a public, comprehensive community college, provides educational, social and cultural opportunities for a diverse population of South Central Idaho. In this rapidly changing world, CSI encourages students to lead enriched productive and responsible lives. The College of Southern Idaho is one of the fastest growing institutions of higher education in the state. CSI serves approximately 7,000 students annually.

Northwest Nazarene University – Founded in 1913, NNU is a private, Christian liberal arts university fully committed to an educational process that pursues both intellectual and spiritual development. NNU is committed to providing its students, both undergraduate and graduate, with an acquaintance with the major fields of knowledge through a study in the liberal arts. NNU serves approximately 1,400 students annually.

Brigham Young University – Idaho – BYU-Idaho's mission is to build testimonies of the restored gospel of Jesus Christ, provide a quality education, prepare students for lifelong learning, and maintain a wholesome academic, cultural, social and spiritual environment. This four-year private university, which is affiliated with The Church of Jesus Christ of Latter-day Saints, attracts students from all 50 states and more than 30 foreign countries. It currently serves approximately 11,000 students annually.

Informal Education Affiliates

Discovery Center of Idaho - DCI is an interactive science center providing exhibits and educational programs that offer authentic, sensory experiences making the sciences, math and technology tangible.

Palouse Discovery Science Center - The Palouse Discovery Science Center brings hands-on science and learning experiences to people of all ages. PDSC is a non-

profit organization whose purpose is to further the public's understanding of science and technology through the use of educational programs, exhibits, teaching collections, and activities which emphasize the physical participation of individuals. The Center's offerings support and enhance science in both formal (such as school systems) and informal situations involved with life-long learning.

Warhawk Air Museum & NASA Space Place - The WAM Education Center, including the NASA Space Place Club, is a place where students of all ages can come to learn about World War II History from the warfront to the home-front and how the advancement in technology has had an impact on our society. Students will have an opportunity to learn about the changes that have occurred in America since the advent of man's first flight through the current aerospace developments.

Idaho Mobile Space Station – The IMSS was created in collaboration with the Idaho Dairy Council, ISGC, and former astronaut Tom Jones, among others. A converted semi-truck trailer was used to construct a portable Station that resembles components of the Shuttle, including a robotic arm, exercise bike, and an aviation flight computer program. The Station was designed for grades 5-8, and includes activities both in and out of the Station, such as "Toys in Space," access to astronaut food, etc.

Idaho Science Teachers Association – ISTA serves as the Idaho Chapter of the National Science Teachers Association. ISTA's membership includes science teachers, administrators, and scientists from across the state of Idaho. ISTA focuses on continually enhancing science education in Idaho, awarding outstanding science teachers in the state, and serving as a clearinghouse for resources through use of workshops, conferences, a newsletter, and a website.

Idaho Museum of Natural History - It is the mission of the Idaho Museum of Natural History to actively nurture an understanding of and delight in Idaho's natural and cultural heritage. As the official state museum of natural history, it acquires, preserves, studies, interprets, and displays natural and cultural objects for Idaho residents, visitors, and the world's community of students and scholars. The Museum also supports and encourages Idaho's other natural history museums through mentoring and training in sound museological practices.

Idaho Academy of Science – The IAS was organized in 1958 to further the cause of science and science education in Idaho. The IAS seeks to improve the effectiveness of science education in Idaho, and to promote public understanding and appreciation of the sciences and applied technology in the modern world. It is the only statewide organization in Idaho that embraces all scientific disciplines.

Governmental and Industrial Associates

Bruneau Dunes State Park – The dunes at Bruneau Dunes State Park are unique in the Western Hemisphere. The Park is home to the largest single-structured sand dune in North America, with a peak 470 feet above the lakes. The Park is also home to the Bruneau Dunes Observatory, which houses several telescopes of various sizes that are available for use by the public.

Idaho Division of Aeronautics – The Division of Aeronautics serves to provide the highest quality, effective, efficient, and safe aviation system for all users of services, visiting or residing in Idaho. To this end, the division plans and implements necessary and desired products, programs, and services to develop, encourage and foster an outstanding aviation system that meets the current and future requirements of a growing and diverse Idaho aviation public.

Idaho Department of Education – Idaho's Department of Education was organized in 1891. Today, the Department is organized into an administrative section and six bureaus, and holds responsibility in a variety of areas. The department works in collaboration with the Idaho Board of Education in order to provide general supervision of Idaho's educational institutions and public school system.

Craters of the Moon National Monument & Preserve – Craters of the Moon is one of the best places in the world to see the awesome effects of volcanism. Established by Presidential proclamation in 1924, the Monument and Preserve encompass three major lava fields and 250,000 acres of sagebrush steppe grasslands. The rugged landscape remains remote and undeveloped with only one paved road across the northern end.

Idaho National Laboratory – In operation since 1949, the Idaho National Laboratory is a science-based, applied engineering national laboratory dedicated to supporting the U.S. Department of Energy's missions in environment, energy, science and national defense. Its mission is to deliver science-based; engineered solutions; complete environmental cleanup responsibly and cost effectively; provide leadership and support to optimize the value of EM investments and strategic partnerships; and enhance scientific and technical talent, facilities, and equipment. The INL works with higher education institutions, researchers, industry, and with students of all levels in a variety of capacities.