

NASA Idaho Space Grant Consortium

Annual Report

July 2018



Connecting Idaho to NASA for over 25 years



ISGC Vision, Mission and Goals

Vision: For Idahoans to be engaged in NASA's missions of exploration and discovery.

Mission: To support NASA's missions in science, technology, aeronautics, and space exploration through a portfolio of education and research opportunities that benefit both NASA and Idaho.

Goals:

1. To contribute to the development and diversity of NASA's future workforce in disciplines needed to achieve NASA's strategic goals through scholarship, fellowship, and internship opportunities.
2. To attract, educate, and retain students and educators of diverse backgrounds in STEM disciplines through hands-on and other experiential research opportunities.
3. To develop partnerships with NASA, other STEM-related organizations, and companies to provide opportunities for Idaho's researchers to contribute to NASA's missions through innovative research opportunities.
4. To engage K-12 students and the public in the excitement of NASA's missions to encourage the pursuit of higher education in Idaho.

Crosscutting Strategies (Applied across all goals and activities)

- Increase STEM engagement and inclusion: Broaden participation in ISGC programs and projects through a focus on increasing diversity of participants and on STEM disciplines engaged.
- Strengthen evaluation and assessment: Strengthen the ISGC's programs and projects through data-driven evaluation and assessment.
- Expand the ISGC network: Seek out new partnerships with the commercial aerospace industry and other agencies with STEM-focused missions.
- Increase outreach efforts: Integrate more K-12 and public outreach into all ISGC programs and projects to communicate the excitement and value of ISGC's activities.

Message from the Director



It's hard to believe that yet another year has passed! Thanks to all of you who contribute to the continued success of the NASA Idaho Space Grant Consortium (ISGC). The hard work and dedication of the ISGC affiliates throughout the state are essential to the success of ISGC. Thank you for your work and your passion.

It was another busy year for the Consortium. In keeping with our Mission, we supported a wide range of activities aimed at strengthening Idaho's current and future STEM workforce by engaging students and researchers in NASA's missions.

Thank you for your patience and flexibility this year. First, you accommodated our accelerated solicitation schedule, then showed great patience when our funding was delayed. Finally, you showed great flexibility in revising your proposals when we finally received funding. Again, thank you!

The next year will bring many challenges and opportunities. We will work with our affiliates every step of the way as we craft the future of the NASA Idaho Space Grant Consortium—and we look forward to the ride!

All the best,
Joe

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Look for boxes like
this one
throughout the
report
for fun space
trivia!

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Hello, Goodbye

ISGC welcomes two new additions to the staff and bids a fond farewell to another

Meet Kaitlyn Preston, ISGC Program Specialist



I grew up in Fremont, California with about a year spent in Austin, Texas. When I was 16, I moved to Butte, Montana where I graduated from high school and attended college at Montana Tech. I graduated with a B.S. in Mathematical Sciences and a B.S. in Statistics in May 2016. I am currently working on a B.S. in Data Analytics at WSU. I married my husband in December 2017, and we are looking forward to welcoming the newest addition to our family in December 2018.

Fun Facts: My husband and I go bowling often, and love to play cribbage in our free time. We also have an extreme fondness for Disneyland!

Meet Mareyna Karlin, ISGC Office Assistant

I was raised in Coos Bay, Oregon, a small town on the Oregon Coast. In 2013, I moved to Moscow to attend the University of Idaho where I received a full ride academic scholarship. I graduated in May 2017 with a B.S. in Animal and Veterinary Science. For the past two years I've worked as the Microbiological Payload Lead on the TATERTOTS Team, which is part of a NASA Undergraduate Student Instrument Project (USIP) Grant. This fall I'm starting my M.S. degree in Biological Engineering. I have four younger siblings (aged 1-14) whom I adore. I also love animals and have a new-foundland/poodle mix named Baloo.

Fun Facts: I went to the same high school as Steve Prefontaine (an Olympic distance runner) and I pole vaulted for two years in college.



ISGC Bids a Fond Farewell to Allyson Rosemore, ISGC Program Specialist

After two and a half years of dedicated service, Allyson Rosemore left ISGC in May 2018 to pursue a new dream in Illinois with her husband Jack and dog Luke. Moving to Illinois brings them closer to friends and family and will allow Allyson to pursue a new farming venture. We thank her for her service and we wish her the very best of luck!



2015-2018 Snapshot

145
Unique
Scholarship,
Internship, and
Fellowship
Students

82
Grants
Awarded

26
Institutions with Grants

Money and Grants Awarded



10
Colleges and Universities
with Awarded Students

217
Students Participating in
Research Awards

196
Scholarship,
Internship, and
Fellowship Awards

\$792,950
Total Student \$ Awarded

ISGC Planned Solicitation Schedule

| Name | ISGC Award Value | How to apply? | Release Date | Proposals/ Applications Due | Decisions expected |
|---|------------------------------|-----------------------------|---------------|-----------------------------|--------------------|
| Internships – NASA | \$7,300 (UG); \$9,000 (Grad) | Directly with NASA | 10/15/18 | 3/1/19 | April – May 2019 |
| Internships – Industry | TBD | Ad-hoc basis – contact ISGC | TBD | TBD | TBD |
| Fellowships | \$25,000 | Online application | 12/3/18 | 2/20/19 | Late March 2019 |
| Scholarships | Varies | Online application | 12/3/18 | 2/28/19 | Early April 2019 |
| Undergraduate Research and STEM Engagement Grants | \$5,000 to \$25,000 | Proposal | 12/3/18 | 2/8/19 | Mid-March 2019 |
| Research Seed Grants | Up to \$45,000 | Proposal | 12/1/18 | 2/8/19 | Mid-March 2019 |
| Collaboration Grants | Varies | Online application | Rolling Basis | | |
| Pre-College/Informal Education Grants | Varies | Proposal | 10/1/18 | 1/11/19 | Mid-February 2019 |
| K-12 Educator Professional Development Grant | Varies | Online application | Rolling Basis | | |
| K-12 Travel Grants to Science Centers | Up to \$1000 each | Online application | Rolling Basis | | |
| Unsolicited Special Project Grants | Varies | Proposal | Rolling Basis | | |

In 2006, the International Astronomical Union demoted Pluto from a planet to a “dwarf planet.”

We still haven't gotten over it.

National Space Grant Update

The 2019 President's Budget Request from NASA once again proposed eliminating the NASA Office of Education. Both the Space Grant program and the NASA EPSCoR program are part of the NASA Office of Education. The budget request called for an orderly close out of both programs in FY 19. While this was the President's request to Congress, ultimately, Congress makes the decision.

Congressional Update

Fortunately, Space Grant has strong support in both the House and Senate. The current FY 18 funding for Space Grant is \$40 million. Congress also included language stipulating that the Office of Education (OE) limits administrative fees for each program within NASA's OE to no more than 5%. FY 18 ends September 30, 2018. FY 19 starts October 1, 2018.

The House Commerce, Justice, Science (CJS) Appropriations Subcommittee released their FY19 bill in late May. The House CJS bill rejected the President's budget request to eliminate the Office of Education and instead funded OE at \$90 million. Within OE, the House CJS subcommittee funded Space Grant at \$40 million and NASA EPSCoR at \$18 million. There is also language supporting a 5% cap on administrative fees for each program in OE. As of June 14, the CJS bill was out of committee but had not yet been scheduled for the House Floor. Consistent with direction given by the House Leadership, the CJS bill will likely be part of a 3-bill package (aka "minibus") that will likely move forward at the end of June or July.

The Senate Commerce, Justice, Science Appropriations Subcommittee has not yet released the bill and report, but they have released an overview of the bill. From the overview, the Senate also rejected the President's budget request to eliminate the Office of Education and instead funded OE (now labeled Office of STEM Opportunities) at \$110 million. Within OE/STEM Opportunities, the Senate CJS subcommittee funded Space Grant at \$44 million, NASA EPSCoR at \$21 million, MUREP at \$33 million, and STEM Education and Accountability at \$12 million.

NASA Office of Education Update

The last year has seen a lot of leadership changes in the NASA Office of Education. The new Associate Administrator for Education is Mike Kincaid, a 30-year NASA civil servant. Mike is changing up the way the Office of Education operates and we have seen positive changes in the Space Grant Program. The acting Program Manager, JoLetta Patrick, and new Deputy Program Manager, Erica Alston are now holding monthly conference calls to keep the Space Grant community informed about potential opportunities and challenges.

As many of our affiliates are aware, there was a delay with our funding this year. We had anticipated receiving funds for our April 2018 - April 2019 grant year by January 2018. Hence, the reason why we released our calls for proposals in Fall 2017, hoping to make decisions and get awards started in January or February 2018. However, the delays with the Congressional budget—and further delays with spending plans meant that NASA ISGC only received partial funding in April 2018, with two additional installments in early and late June. ISGC has funded projects as funding became available.

With regard to the next Space Grant solicitation, NASA plans to release a multi-year solicitation – sometime in Fall 2018. Given the current restructuring of the NASA Office of Education, it is not yet clear if the solicitation will be similar to past years' solicitations or a great departure from them.

Affiliate Highlights

Boise State University

Boise State Students SOAR with NASA's Student Opportunities in Airborne Research (SOAR) Program



A BSU student team (led by students) designed, built and tested an airborne sensor box to collect temperature, pressure, and vibration during a six-hour, high altitude flight in NASA's WB-57 aircraft. The sensor box needed to interface with the WB-57 to receive power and data from the aircraft. Also, the sensor box needed to store its data for later retrieval.



Ten members of the team flew down to Johnson Space Center to integrate the sensor onto the aircraft, and to meet and interact with NASA engineers. Plus, the students were able to see many of the activities and programs being accomplished at JSC.

(Top left) Boise State University students pose with the WB-57. (Bottom left)-The Boise State students working on their payload.

NASA Spacesuit User Interface Technologies for Students

Nine BSU students designed and created spacesuit informatics using an augmented reality (AR) Microsoft Hololens platform. The concept focused on designing and creating a user interface for a heads-up display which would be used by an astronaut on a spacewalk.

Five members of the team traveled to the Johnson Space Center to test their AR system, and to work with NASA engineers and other teams on this project. The testing went very well and they were able to demonstrate to NASA some of the great possibilities with this system.



(Top and Bottom right) Boise State University SUITS team at NASA Johnson Space Center.

Affiliate Highlights

Boise State University-continued

Micro-g Neutral Buoyancy Experiment Design Teams (Micro-g NExT)



BSU students once again successfully participated in NASA's Micro-g NExT program. This past year, the student team designed, built and tested an ISS module leak repair tool to be used by astronauts during a spacewalk. The tool needed to seal a hole with a range of $\frac{1}{2}$ " to 1" in diameter created by a micrometeoroid/orbital debris (MMOD) with an impact angle from 45 to 90 degrees.

Six (out of 15) members of the team traveled to the Johnson Space Center to test their tool in the Neutral Buoyancy Laboratory (NBL). Before they could test they had to brief the NBL safety team and engineers about their tool to ensure it was safe to use in the NBL. The test was very successful. Plus, the students were able to see many of the activities and programs being accomplished at JSC.



The Micro-g NExT team from Boise State University at Johnson Space Center testing their tool in the Neutral Buoyancy Laboratory

Aerospace Day at BSU

Approximately 400 middle school and high school students participated in Aerospace Day at BSU in February 2018. The event featured many activities including a chemistry demonstration, an aerospace book panel, and hands-on activities light bulb drops, building bridges, and interactive media. The highlight of the event was a phone call from three astronauts aboard the International Space Station.



Sharing the excitement of STEM at BSU Aerospace Day

Affiliate Highlights

Brigham Young University-Idaho

Eclipse 2017:

BYU-Idaho's major space-related thrust revolved around the eclipse. BYU-Idaho's faculty and students were involved in several eclipse-related projects. They include:

- *Citizen CATE*: A student, Zach Brasier, shot many high definition pictures of the Sun's corona through a solar telescope during the eclipse. These will be stitched together to create a 90 minute movie of the solar corona as the eclipse moved across the country. The stitching work is still ongoing.
- *Modern Eddington experiment*: Dr. Stephen McNeil working with several students tried to repeat (as part of a larger national effort) to reproduce the results from the classic Eddington experiment that showed the bending of light by the Sun's gravitational field as Einstein predicted. The results of this effort have not yet been announced.
- *Polarization of Light*: Three of our students worked with Dr. Shaw of Montana State University to measure changes in the polarization of light during the eclipse. Students had worked with him during the summers of 2016 and 2017 in preparation for these measurements. Dr. Shaw and his graduate students meet up with our students at the BYU-Idaho observatory west of Rexburg to make these measurements.



A relatively low resolution eclipse picture taken by Zach Brasier, 21 Aug 2017 in Rexburg ID

Affiliate Highlights

Brigham Young University-Idaho continued

- *High-altitude ballooning:* BYU-Idaho, under the direction of faculty member Ryan Nielson, began a high-altitude balloon group. Coordinating with Dr. Jon Sol of Weber State University, the group has successfully flown several flights, including a flight during the eclipse. Students have designed instruments to fly on the balloon and several good datasets have been produced. The balloon group continued to function although flights during winters do not work (especially if one wants to recover the instruments!). They started flying again in late spring and had a flight the weekend of July 7th.
- *Eclipsefest:* As an outreach effort during the eclipse, BYU-I sponsored “Eclipsefest” on Saturday, 19 August. It included speakers from BYU-Idaho, UCLA, and Fermilab on topics related to the eclipse. In addition, the Eclipsefest features activities for children, solar observing through solar telescopes, teaching about safe eclipse viewing, and planetarium shows. The event was well attended.
- *Hosting eclipse viewers:* BYU-Idaho hosted many groups who came into the region for the eclipse, including alumni groups from MIT and UCLA, and a tour group from the Netherlands. BYU-I estimates that they hosted about 6,000 eclipse views on campus.
- *Eclipse research:* BYU-Idaho students and faculty were heavily involved in following up on the observations made during the eclipse during the 2017-2018 school year, including at least three senior theses stemming from the research they conducted.

Internships

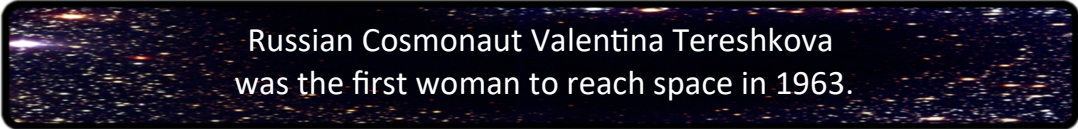
In addition to the eclipse, BYU-Idaho sent interns to NASA Ames Research Center and NASA Marshall Space Flight Center. The ISGC helped additional students secure internships for the summer. Thank you!

BYU-I Planetarium

The BYU-Idaho Planetarium continued to serve an important outreach function. We conduct weekly planetarium shows for the public and a large number of private shows. Public shows were well attended. We schedule one public show each week, but if enough patrons are interested, we will conduct a second show when the first show finishes. In past years, the second show averaged once a month. This year, we conducted a second show about half of the time. In addition, numerous school and other community groups enjoyed private shows. We experienced particularly heavy demand for private shows this spring, more so than past years.

Astrofest

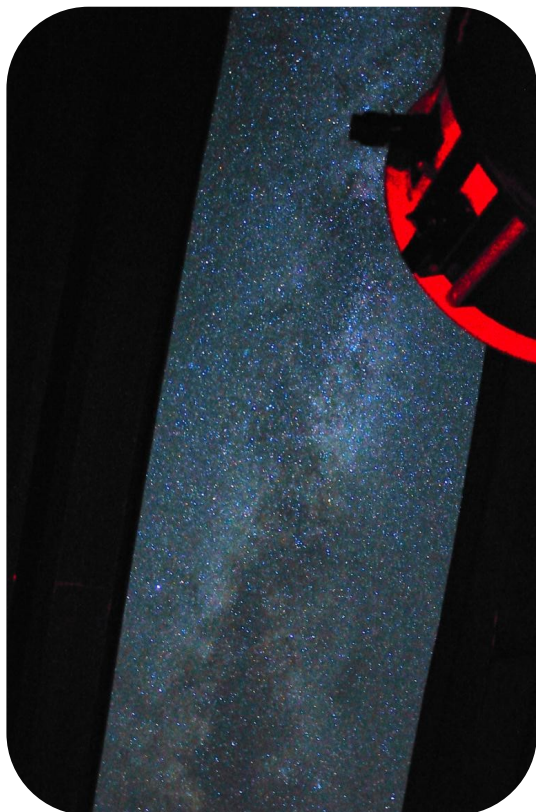
As an outreach effort, we held a public event entitled “Astrofest 2018”. It was modeled somewhat after our “Eclipsefest” event last summer. It featured many of the events of “Eclipsefest”, including lectures, planetarium shows, and games/space related activities for children. It was a great success and had good attendance.



Russian Cosmonaut Valentina Tereshkova
was the first woman to reach space in 1963.

Affiliate Highlights

Bruneau Dunes State Park



Observatory News

Bruneau Dunes' season is going well so far. The Observatory opened in April and will be open until mid-October. The spring was a challenge due to the weather. It was glorious almost every day during the week but inevitably clouded up for the Friday and Saturday viewing programs. Luckily, the weather in the heart of summer is more cooperative!

The biggest news is that Bruneau Dunes received a \$20,000 grant from the Laura Moore Cunningham Foundation to upgrade all park lighting to Dark Sky compliant lights. The Idaho Department of Parks and Recreation also provided funds for this effort and all fixtures have been replaced. These activities are part of Bruneau Dunes' ongoing efforts to become Dark Sky certified and protect and draw attention to the amazing night sky conditions at Bruneau Dunes.

The Milky Way as seen at Bruneau Dunes Observatory

College of Southern Idaho

The CSI Bridge to Success

CSI's Success Structured Scholarships grant awarded 16 one-year \$1,560 scholarships to Bridge to Success students. These success-structured scholarships were disbursed in equal amounts for the fall (\$780) and spring (\$780) academic terms; and were matched with an equal scholarship match from the CSI Foundation.

Overall, the program was a success. Of the 16 recipients, 7 graduated, 2 were accepted in to health care programs, and 7 will graduate in fall 2018 or spring 2019. Overall, when compared to non-bridge students, Bridge scholarship recipients attempted 4 more credits per semester, completed more credits per semester, and earned nearly a full grade higher (3.32/2.5). Bridgers earned an average overall GPA of 3.2.

The Bridge Program also developed "Math Boost" workshops for prospective Bridge students to help them improve their math placement score. These workshops were open to all students, particularly prospective students pursuing STEM degrees.



Affiliate Highlights

College of Western Idaho

Getting Started with ISGC

College of Western Idaho (CWI) reported that they are pleased to be a part of the ISGC now since being welcomed into the Consortium at the end of last year's annual meeting. They spent the year learning more about the programs and how to work within the frameworks required of the Consortium. Willard Pack from CWI reports, "We feel like we're starting to get our feet under us, though it can be a slow process for us."

Another wonderful highlight is that a CWI student was a recipient of a scholarship from the ISGC. Tabitha Hoffman was selected from the group of applicants to join three others in receiving a scholarship to help her future her educational career in the field of engineering. She is interested in Environmental Engineering and has a good mind and an amazing work ethic. Willard Pack expects she will go very far in the field and will be able to make a difference, adding "We're excited to have her studying here at CWI and look forward to learning about her as her career progresses."



Tabitha Hoffman, ISGC Scholarship Recipient from College of Western Idaho

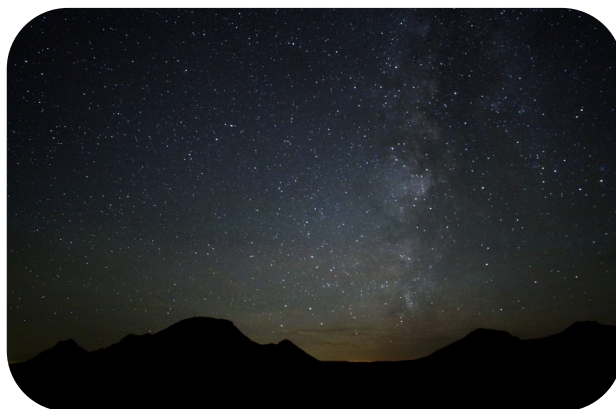
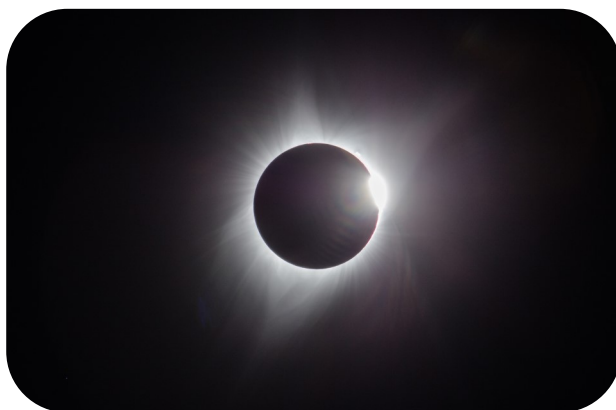
Earth is approximately 93 million miles from the Sun. This distance is also known as an astronomical unit (AU).
On average, Pluto is a distance of 39.5 AU from the sun.

Affiliate Highlights

Craters of the Moon National Monument and Preserve

Craters of the Moon hosted over 800 people at the total solar eclipse event in Arco. The Monument was overwhelmed with record visitation before and after the event including a visit by Neil DeGrasse Tyson! In addition to the main event, the park offered a variety of other space science and astronomy events including the launch of a high altitude eclipse-tracking balloon by a group from USC, solar viewing and Star Parties, talks by NASA scientists, an eclipse focused Junior Ranger booklet, and a special passport stamp with the date/time of the eclipse. There is a terrific short video showing the excitement about the eclipse available at: <https://www.youtube.com/watch?v=9w5NCFg6jZQ&list=PLTRefMcOrQdnnOkNfTFHnMP2xd2MbQ2De>

The team also used the gathering in Arco as an opportunity to publicly announce the Monument's designation as an International Dark Sky Park. Through this designation Craters of the Moon joins more than 60 other public areas world-wide that have been recognized for their quality dark skies and for efforts to preserve and interpret these resources.



(Top left) A group from University of Southern California launches a high-altitude balloon to track the eclipse. (Top right) The eclipse near totality. (Center right) The crowd at Craters of the Moon during the eclipse. (Bottom right) The dark skies at Craters of the Moon.

Affiliate Highlights

Eastern Idaho Engineering Council

This year, the Eastern Idaho Engineering Council (EIEC) sponsored the annual Southeast Idaho Engineers Week Banquet. At that banquet, the first annual STEM Professional of the Year Award was presented to Dr. Steven L. Shropshire. The award was presented on behalf of the Engineering Programs at Idaho State University (ISU) and the Eastern Idaho Engineering Council (EIEC). Dr. Shropshire was recognized for his many contributions to the STEM (Science, Technology, Engineering and Mathematics) fields.



National Engineers Week Banquet



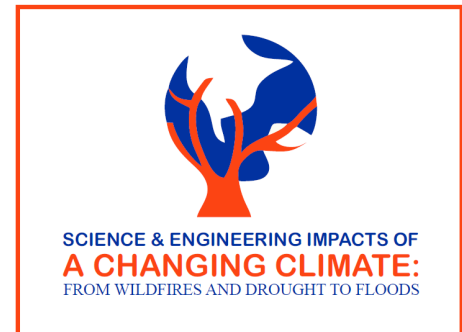
EIEC provided mentors and judges for area STEM-related activities. EIEC also helped sponsor the Southeast Idaho MathCounts competition.

A team of middle school Mathletes from Franklin Middle School won the Southeast Idaho Chapter MATHCOUNTS competition.

Idaho Academy of Science and Engineering

The primary activity for the Idaho Academy of Science and Engineering was the Annual Meeting and Symposium. Local members participated in the March for Science, Science Olympiad, and other area activities. In addition, IASE provided prizes for top participants in statewide science fair competitions.

60TH IDAHO ACADEMY OF SCIENCE AND ENGINEERING SYMPOSIUM AND ANNUAL MEETING



Saturn is not the only planet with rings in our solar system. Jupiter, Uranus, and Neptune also have rings!

Affiliate Highlights

Idaho Out-of-School Network

Zero Robotics

Through a partnership with MIT and NASA, the Idaho Out-of-School Network is honored to again connect Idaho youth with an out-of-this world experience this summer (July 9 - August 10, 2018) - Zero Robotics.

Zero Robotics (ZR) is a computer programming competition for middle school students. Students will learn to control satellites aboard the International Space Station this summer. Zero cost for the curriculum, training or technical support. Zero experience needed for staff or students. Zero gravity - kids will write code that will run in the International Space Station.

ION is pleased to be working with the following sites in Idaho in 2018: Lakeland BASE Program, Spark Afterschool Program, Idaho Museum of Natural History, Sage International School, and Whitney Community Center.

ZERO ROBOTICS



54% of participants said they wanted to study something STEM related in college



86% of participants would recommend Zero Robotics to a friend



80% of participants want to go to college



This year, Idaho won the Western Regional Bracket!

Survey results from students that participated in the 2017 Zero Robotics competition.

The Moon's Sea of Tranquility was the landing spot for the Apollo 11 lunar lander in 1969.

Affiliate Highlights

Idaho State University

DEVELOP

ISU's NASA DEVELOP node is doing very well and is involved in some exciting research, including working with JPL to help validate soil moisture data from the SMAP sensor and its new data fusion product using the EU Sentinel satellite.

RECOVER

The NASA RECOVER project is also doing very well. ISU has developed an automated large fires trigger that helps to create decision support system sites often before they are even requested by agency partners. The large fire trigger tool takes less than two minutes to process followed by another 5-minutes to "generate" fire sites for the agencies. To date, the RECOVER wildfire decision support system developed at ISU's GIS Center in collaboration with NASA Goddard Space Flight Center has been used by agency partners to respond to 83 wildfires across 11 western states.

New Research Data Center

ISU has developed a new research data center (RDC) hosting a substantial array of dedicated research computers, servers, and cluster. The RDC became operational less than a year ago and is becoming a widely used research capability at ISU. All the GIS Center servers have been moved to the RDC which provides improved physical security, backup power, within its Science DMZ design.

New Career Path Internship Program

ISU developed the Career Path Internship program to connect Idaho State University students to professional, paid experiences that will enhance their career opportunities upon graduation. More information is available at: <https://www.isu.edu/career/cpi-program/>



The poster is titled "DEVELOP YOUR CAREER" with the NASA logo and "National Aeronautics and Space Administration" at the top. It features a large satellite image of Earth on the left. The main text reads "with NASA's Applied Sciences' Capacity Building DEVELOP National Program". Below this, there are three circular icons with text: "Enhance technical and professional skills", "Introduction to NASA Earth observation capabilities", and "Gain research and scientific communication experience". A section titled "About Projects" lists application areas: Health & Air Quality, Disasters, Water Resources, Energy, Transportation & Infrastructure, Urban Development, Ecological Forecasting, and Agriculture & Food Security. A "How to Apply" section states that anyone 18 and over is welcome to apply, with a link to <https://develop.larc.nasa.gov/apply.php>. A "Have Questions?" section provides a contact email: NASA-DL-DEVELOP@mail.nasa.gov. The bottom right corner shows a group of people sitting outdoors.

The NASA DEVELOP Program Node at Idaho State University continues to engage students and produce new data products.

Affiliate Highlights

Idaho STEM Action Center

In 2018, the Idaho STEM Action Center (STEM AC) worked collaboratively with various educational and industry groups to pass legislation (House Bill 648, Idaho Code 33-1634) that would require all Idaho high schools to offer at least one computer science course by 2020. By partnering with educational groups and industry, STEM AC will help ensure that Idaho employers will have access to the workforce they need—a workforce that possesses the skills necessary for successful transition from school to employment. In addition, STEM AC serves as a representative on the Workforce Development Council which ensures that there is significant collaboration without duplication.

Because of these coordinated statewide efforts, Idaho will become a STEM business destination. Idaho will have a citizenry that not only recognizes the importance of STEM, but also possesses the necessary STEM skills for the workforce. A highly-skilled STEM workforce will lead to increased investment and business opportunities throughout Idaho. Educators will have the necessary STEM skills and tools to engage students. Students will possess the 21st century skills that employers require: critical thinking, problem-solving, collaboration, and innovation. The result of this multi-tiered approach will be an increase in the number of businesses throughout the state, and the number of STEM jobs available for Idahoans, which will serve to bolster Idaho's economy and lead to long-term economic prosperity for the state and its citizens.

The STEM AC is making an impact throughout Idaho as evidenced by the following metrics from 2018:

- During FY18, over 400,000 student interactions occurred through STEM AC opportunities. .
- In FY18, STEM AC incorporated a new, statewide professional development model and more than tripled its offerings. As a result, STEM AC engaged in 12,633 educator interactions from 78 opportunities.
- In FY18, 35 STEM AC opportunities included grants.
- In FY18, STEM AC also systematically tracked cash equivalent and in-kind donations which totaled \$1,742,217. In total, STEM raised nearly \$2.5M in cash, cash equivalent, and in-kind donations from industry and grants for Idaho STEM education in FY18.
- In FY 18, STEM AC co-sponsored 32 high quality educational opportunities focused on workforce development in high-demand fields.
- In FY18, STEM AC designed and beta tested a mentorship platform with full-scale deployment slated for Fall 2019.
- In FY18, 96 initiatives, programs, events, trainings, and other promotions related to CS were supported throughout the state.
- In FY18, STEM AC supported three computer science competitions and 29 computer science camps.
- In FY18, 143 STEM outreach events were supported.
- In FY18, the STEM AC Team averaged two unique outreach opportunities per week (110 total) related to increasing awareness of STEM/CS, STEM AC, and/or partnership opportunities with STEM AC.

Affiliate Highlights

Idaho STEM Action Center continued



Idaho STEM Action Center engaged students and educators throughout Idaho via a broad portfolio of programs and opportunities.

Affiliate Highlights

Idaho Department of Transportation - Division of Aeronautics



Idaho students participating in Idaho Division of Aeronautics outreach activities.

Representatives from the Idaho Division of Aeronautics have engaged in the following STEM-related outreach so far in 2018:

- Participated in Aerospace Day at Boise State University
- Participated in the Engineering & Science Festival at Boise State University
- Participated in the Aviation STEM Day at Ontario Municipal Airport in Ontario, OR
- Participated in the Girl Scout STEM Exploration Day in Boise
- Conducted a state-wide Aerospace Art Contest
- Delivered a regional Aerospace Career Exploration Academy that attracted more than 65 teenage participants

The Idaho Division of Aeronautics partnered with the following ISGC Affiliates to deliver outreach programs in 2018:

- Boise State University
- Idaho STEM Action Center
- North Idaho College

Halley's comet (last seen in 1986) will be visible from Earth again in 2061.

Affiliate Highlights

Lewis-Clark State College

Excited students

Lewis-Clark State College (LCSC) has been able to fund students who are now graduating and are currently in the pipeline that are excited and motivated to further space research and exploration.

New GIS capabilities

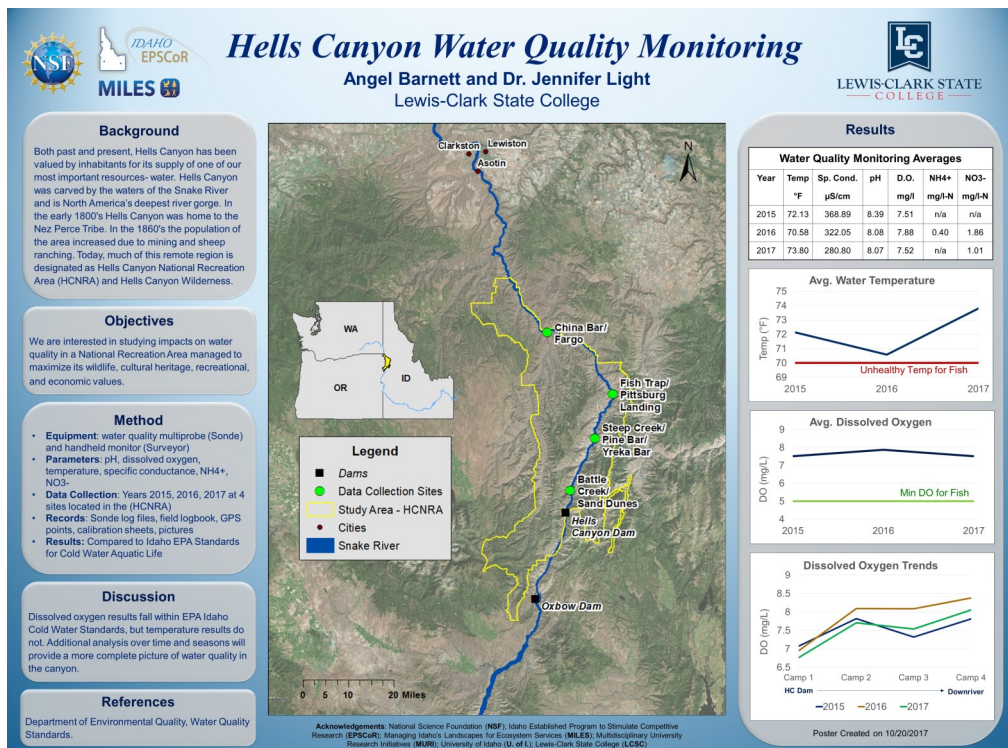
LCSC is developing its GIS capacities through contract and other research opportunities. Currently, they are doing data collection integrated with GIS for transportation-related projects. The LCSC GIS website can be found at lsc.maps.arcgis.com. The website features some of the current and past projects as well as highlighted student projects.

Snake River research

Over the last three summers ISGC affiliate representative, Dr. Jenni Light, has been collecting baseline data on the Snake River through the Snake River Recreation Area reach. Although funding has now dried up, Dr. Light's team is hoping to partner and continue building on the information they currently have. The Hells Canyon dam complex is up for reauthorization and there is considerable debate regarding dams and reservoirs. Her team hopes to add to the body of data on this reach in particular. Dr. Light is always looking for partner projects and hopes to find potential collaborators to continue building water quality data on the Snake River as well as developing new GIS research projects in the region.

Ground penetrating radar

Finally, LCSC has an active history community interested in ground penetrating radar for cemeteries, in particular which may prove beneficial for research and skill development in space exploration and planet information. Dr. Light would love to be able to find partnerships that could benefit both historical data in our area as well as provide a skill set to potential space researchers.



Summary of Dr. Light's research related to Hells Canyon.

Affiliate Highlights

Northwest Nazarene University

MakerSat-0 CubeSat launches!

Northwest Nazarene University's MakerSat team made history with the launch of the MakerSat-0 CubeSat from Vandenberg Air Force Base last November. The CubeSat is in orbit and actively sending back information on the experiments on board. Those experiments are collecting data on the effects of the space environment on 3-D printed polymer materials—specifically, ABS (acrylonitrile butadiene styrene), PLA (Poly Lactic Acid), nylon, and PEI/PC (polyetherimide/polycarbonate) ULTEM. These four materials have the potential to be used in space for 3-D printing structures. The insights from MakerSat-0 data will be used for printing satellites on the International Space Station's 3D printer, which has the potential to revolutionize the CubeSat industry.



*NNU MakerSat Team:
Mitch Kamstra, Aaron
Ewing, Braden Grim,
Connor Nogales, Dr.
Joshua Griffin, and Dr.
Stephen Parke.*

*Keith Moilanen, Robert
Hance and Ben Camp-
bell not pictured.*

MakerSat-0



*The Delta II rocket that
launched MakerSat-0
into orbit.*

Affiliate Highlights

The College of Idaho

NASA internships

The College of Idaho has two students doing internships with NASA. The first is an undergraduate doing a summer internship with the OSSl program. The second is a recent graduate who received a NASA – DEVELOP internship.

New Presidents

C of I recently hired a new president of the college. In fact, they hired two: Jim Everett and Douglas Brigham!

Planetarium setting records

They have a robust planetarium program that is setting records in attendance. Last year over 3000 people attended planetarium shows. Another 750 people (students) visited their portable planetarium at their own schools.

New library

COI has opened their new library: Cruzen-Murray Library. The new facility uses ground water for both heating and cooling.

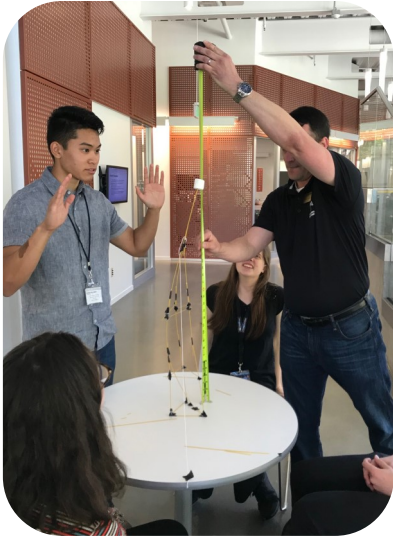


The College of Idaho's new Cruzen-Murray Library

Affiliate Highlights

University of Idaho

Idaho Science and Aerospace Scholars a Success



The University of Idaho (UI) and the ISGC co-hosted the 2018 Northern Idaho Capstone Event for the Idaho Science and Aerospace Scholars (ISAS) program in June. This year's Capstone Event was centered around engineering design for the Mars Curiosity Rover. Eleven rising high school seniors spent the day at UI, competing in three separate engineering tasks. They also gained exposure to the breadth of NASA affiliated research activities across campus including bioremediation, tendon tissue engineering, geographic information system mapping, and organic chemistry. The day culminated in all eleven participants receiving scholarship offers from the UI College of Engineering!

Dr. Bernards assesses the students' attempts to build the tallest tower with limited materials

UAV Project Continues to Fly

Arjan Meddens and his team continued their efforts in the use of unmanned aerial vehicle use. They acquired Unmanned Aerial Vehicle (UAV) lidar data in partnership with the Moscow-based firm Alta Science and Engineering to estimate fuel loads and forest parameters at a unprecedented high spatial resolution. This successful project has led to multiple grant applications, the first ever lidar course given at the University of Idaho (Summer course NRS504/404 Lidar Remote Sensing, 3 credits), and state-of-the-art research on seedling detection using UAV lidar data.



Dr. Meddens and team near Moscow Mountain testing the UAV equipped with lidar

TRIO STEM Summer Camp

The TRIO programs received a \$25,000 grant for hosting a STEM summer camp in July. With this funding the program was able to bring students from three Upward Bound (UB) programs to the UI McCall Outdoor Science School (MOSS) campus to participate in a dual credit course in either Environmental Science or Chemistry. UB students are low-income and/or first-generation in their family to attend college and come from a variety of N. Idaho communities (Wallace, Kellogg, Plummer, Potlatch, Moscow, and Lewiston). Students did volunteer work in their communities to cost-match and greatly enjoyed their week of STEM activities.

Affiliate Highlights

University of Idaho continued

TATERTOTS Take Off



*(Above) The TATERTOTS launching near King's Bowl in August 2017.
(Right) The TATERTOTS team after their successful flights.*

Last August the TATERTOTS Team traveled to Craters of the Moon National Monument for the launch of three payloads: a high altitude balloon imaging payload, a tethered balloon imaging payload, and a high altitude balloon microbiological sampling system. They completed both imaging launches, the first payload imaging over King's Bowl Crater and the second imaging over the park. The microbiological launch was postponed to October 2017 due to last minute software issues. The issues were resolved and the microbiological system was launched at the end of October. Unfortunately tracking was lost, and the team was unable to recover the payload. In March, a kind farmer found the payload in his field and the team leads, Bethany Kersten and Hailey Johnson, retrieved it. The team revived what they could of the payload, and launched again in May 2018. The May launch went better, but again the payload had software issues. The TATERTOTS will be launching the microbiological sampling system again in September, as well as launching their local positioning system in the coming year.



Drug Delivery in Space

Dr. Matthew Bernards was recently awarded an ISGC Research Seed Grant to develop a microdroplet drug delivery vehicle generator. This system is based on the use of a piezoelectric pulse generator to produce polyampholyte polymer droplets. These droplets are polymerized upon ejection, leading to polymer microspheres. The family of polymers being used present the opportunity for extended drug delivery, as they are not readily identified by the body's immune system. The team is currently investigating methods to load these polymer microspheres with Vitamin D, a supplement commonly used by astronauts in space to combat bone degeneration due to microgravity. However, this platform is fully adaptable to support the in-space synthesis of a catalogue of medicines as needed. This is a promising platform for medical needs as we pursue Mars and beyond.

Appendix A: Student awards to date on current 2015 to 2018 Space Grant Award (sorted by award type)

| Student Name | School | Major | Award | Town |
|------------------------|------------------------|--|------------|-----------------|
| Gabriel Garcia | Boise State University | Geology | Fellow | Harlingen, TX |
| Heather Wilber | Boise State University | Mathematics | Fellow | Greenleaf, ID |
| Joel Gongora | Boise State University | Geophysics | Fellow | Boise, ID |
| Kathryn Drake | Boise State University | Mathematics | Fellow | Boise, ID |
| Melissa Roberts | Boise State University | Chemistry | Fellow | Boise, ID |
| Micah Sandusky | Boise State University | Mechanical Engineering | Fellow | Boise, ID |
| Mike Henry | Boise State University | Materials Science and En- gineering | Fellow | Gilbert, AZ |
| Ryan Harper | Boise State University | Electrical Engineering | Fellow | Boise, ID |
| Tate Meehan | Boise State University | Geophysics | Fellow | Cedar Park, TX |
| Meghan Fisher | Idaho State University | Geoscience | Fellow | Chubbuck, ID |
| Ronald Gonzales | Idaho State University | Engineering and Applied Science | Fellow | St. Anthony, ID |
| Theresa Garcia | Idaho State University | Education | Fellow | Chubbuck, ID |
| Aaron Sparks | University of Idaho | Geography | Fellow | Moscow, ID |
| Erik Boren | University of Idaho | Natural Resources | Fellow | Pullman, WA |
| Jesse Rohr | University of Idaho | Biological Engineering | Fellow | Boise, ID |
| Jessica Stitt | University of Idaho | Natural Resources | Fellow | Moscow, ID |
| Jyoti Jennewein | University of Idaho | Environmental Science | Fellow | Moscow, ID |
| Robert Chancia | University of Idaho | Physics | Fellow | Utica, NY |
| Stephen Goodwin | University of Idaho | Mechanical Engineering | Fellow | Moscow, ID |
| Armen Kvryan | Boise State University | Materials Science and En- gineering | Internship | Boise, ID |
| Emily Tanasse | Boise State University | Mechanical Engineering | Internship | Kent, WA |
| Hallie Touchstone | Boise State University | Mechanical Engineering | Internship | Boise, ID |
| Jasmine Cox | Boise State University | Electrical Engineering | Internship | Boise, ID |
| Lawrence Kimsey | Boise State University | Mechanical Engineering | Internship | Caldwell, ID |
| Morgan Hansen | Boise State University | Health Science/Pre-Med | Internship | Boise, ID |

Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Student awards to date on current 2015 to 2018 Space Grant Award—continued

| Student Name | School | Major | Award | Town |
|--------------------------|--------------------------------|-----------------------------------|----------------------|--------------------|
| Nicholas Chapa | Boise State University | Computer Science | Internship | Idaho Falls, ID |
| Samantha D'az | Boise State University | Electrical Engineering | Internship | Boise, ID |
| Shayne Hansen | Boise State University | Mechanical Engineering | Internship | Boise, ID |
| Thomas Van Der Weide | Boise State University | Geophysics | Internship | Boise, ID |
| Joseph Hafen | Brigham Young University-Idaho | Physics | Internship | Idaho Falls, ID |
| Kristen Hawkins | Brigham Young University-Idaho | Physics | Internship | Sanford, CO |
| Makenzie Allen | Brigham Young University-Idaho | Physics | Internship | Ogden, UT |
| Emily Togagae | Brigham Young University-Idaho | Computational Physics | Internship | Rexburg, ID |
| Sarah Schoultz | College of Idaho | Math/Physics | Internship | Columbus, OH |
| Andrew Eskeldson | Idaho State University | Mechanical Engineering | Internship | Kimberly, ID |
| Caleb Renner | Idaho State University | Geology | Internship | Inman, KS |
| Aaron Rogers | Northwest Nazarene University | Engineering | Internship | Port Orchard, WA |
| Stephen Hall | Northwest Nazarene University | Chemistry and Physics | Internship | Windsor, CO |
| Tanner Theel | Northwest Nazarene University | Electrical Engineering | Internship | Redmond, WA |
| Bailey Lind-Trefts | University of Idaho | Mechanical Engineering | Internship | Dalton Gardens, ID |
| Benjamin Plaster | University of Idaho | Chemical Engineering | Internship | Spokane, WA |
| Brandon Hilliard | University of Idaho | Mechanical Engineering | Internship | Boise, ID |
| Hunter Kanniainen | University of Idaho | Mechanical Engineering | Internship | Vancouver, WA |
| Justin Ruehl | University of Idaho | Computer Science | Internship | Caldwell, ID |
| Makynzie Zimmer | University of Idaho | Mechanical Engineering | Internship | Moscow, ID |
| Twinkle Pandhi | Boise State University | Materials Science and Engineering | Internship (2 years) | Round Rock, TX |
| Cody O'Dale | Idaho State University | Geographic Information Systems | Internship (2 years) | Aneth, UT |
| Abigail Cannon | Boise State University | Computer Science | Scholarship | Nampa, ID |
| Andee Morton | Boise State University | Mechanical Engineering | Scholarship | Bozeman, MT |
| Andres Correa | Boise State University | Materials Science and Engineering | Scholarship | Nampa, ID |

Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Student awards to date on current 2015 to 2018 Space Grant Award—continued

| Student Name | School | Major | Award | Town |
|-------------------------|--------------------------------|--------------------------------------|-------------|------------------|
| | | Mechanical Engineering | | |
| Drew Buckmiller | Boise State University | | Scholarship | Sandpoint, ID |
| Forrest Burt | Boise State University | Geosciences (Geology) | Scholarship | Idaho City, ID |
| Jennifer Domanowski | Boise State University | Materials Science and Engineering | Scholarship | Arlington, WA |
| Justina Freilich | Boise State University | Materials Science and Engineering | Scholarship | Nampa, ID |
| Kevin Brown | Boise State University | Electrical Engineering | Scholarship | Eagle, ID |
| Mac Beers | Boise State University | Civil Engineering | Scholarship | Boise, ID |
| Mia Klopfenstein | Boise State University | Materials Science | Scholarship | Meridian, ID |
| Wesley Sandidge | Boise State University | Physics | Scholarship | Boise, ID |
| Brian Bowers | Brigham Young University-Idaho | Physics | Scholarship | Burley, ID |
| Kevin Butler | Brigham Young University-Idaho | Physics | Scholarship | Spanish Fork, UT |
| Shannon Andersen | Brigham Young University-Idaho | Civil Engineering | Scholarship | Rexburg, ID |
| Steven Smith | Brigham Young University-Idaho | Physics | Scholarship | Rexburg, ID |
| Tyler Murdock | Brigham Young University-Idaho | Mechanical Engineering | Scholarship | Idaho Falls, ID |
| McKinley Hammond | Brigham Young University-Idaho | Electrical Engineering | Scholarship | Shelley, ID |
| Devin Krasowski | College of Idaho | Math, Physics, Environmental Studies | Scholarship | Caldwell, ID |
| Natasha Dacic | College of Idaho | Physics, Math | Scholarship | Boise, ID |
| Tyler Truksa | College of Idaho | Math, Physics | Scholarship | Caldwell, ID |
| Adilene Ambriz | College of Southern Idaho | Pre-Pharmacy | Scholarship | Twin Falls, ID |
| Andres Sewell | College of Southern Idaho | Computer Science | Scholarship | Gooding, ID |
| Connor Ridenour | College of Southern Idaho | Physics | Scholarship | Kimberly, ID |
| Cooper Moon | College of Southern Idaho | Engineering | Scholarship | Twin Falls, ID |
| Jade Williams | College of Southern Idaho | Civil Engineering | Scholarship | Richfield, ID |
| Luis Garcia | College of Southern Idaho | Mechanical Engineering | Scholarship | Carey, ID |
| Maria Alvarez | College of Southern Idaho | Chemistry | Scholarship | Oakley, ID |
| Zacarias Pehrson | College of Southern Idaho | Geology | Scholarship | Buhl, ID |

Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Student awards to date on current 2015 to 2018 Space Grant Award—continued

| Student Name | School | Major | Award | Town |
|------------------------|---|---------------------------------------|-------------|-------------------|
| Melissa Marsing | College of Southern Idaho/ University of Idaho | Chemical Engineering | Scholarship | Twin Falls, ID |
| Tabitha Hoffman | College of Western Idaho | Engineering | Scholarship | Boise, ID |
| Cheyret Wood | Idaho State University | Mathematics | Scholarship | Pocatello, ID |
| Jakob Meng | Idaho State University | Mechanical Engineering | Scholarship | Idaho Falls, ID |
| James Wilson | Idaho State University | Microbiology | Scholarship | May, ID |
| Justin Palmer | Idaho State University | Nuclear and Mechanical Engineering | Scholarship | Rexburg, ID |
| Keagan Kingsford | Idaho State University | Energy System Technology | Scholarship | Rexburg, ID |
| Kelsey Hansen | Idaho State University | Biology | Scholarship | Carmen, ID |
| Kristin Clark | Idaho State University | Mechanical Engineering | Scholarship | Spokane, WA |
| Larinda Nichols | Idaho State University | Nuclear Engineering | Scholarship | Blackfoot, ID |
| Mckylie Mitchell | Idaho State University | Nutrition | Scholarship | Buhl, ID |
| Michael Brown | Idaho State University | Physics | Scholarship | Caldwell, ID |
| Sarah Tetzloff | Idaho State University | Geology | Scholarship | Boise, ID |
| Shawna Hennings | Idaho State University | Microbiology | Scholarship | Anaheim, CA |
| Cai Yamamoto | Lewis and Clark State College | Civil Engineering | Scholarship | Quincy, WA |
| Jolee Aeschliman | Lewis and Clark State College | Biology | Scholarship | Colfax, WA |
| Luis Correa | Lewis and Clark State College | Mechanical Engineering | Scholarship | West Wendover, NV |
| Owen Blair | Lewis and Clark State College | Engineering | Scholarship | Asotin, WA |
| Rachel Sila | Lewis and Clark State College | Civil Engineering | Scholarship | Lewiston, ID |
| Amaris Bartle | North Idaho College | Bioengineering | Scholarship | Athol, ID |
| Austin Isakson | North Idaho College | Computer Science | Scholarship | Post Falls, ID |
| Colin Chilgren | North Idaho College | Undecided- Science Interest | Scholarship | Wallace, ID |
| Emmett Schultz | North Idaho College | Mechanical Engineering | Scholarship | Idaho Falls, ID |
| Hannah Johnson | North Idaho College | Chemical Engineering | Scholarship | Coeur D'Alene, ID |
| Jordan Bader | North Idaho College | Mechanical Engineering | Scholarship | Coeur D'Alene, ID |

Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Student awards to date on current 2015 to 2018 Space Grant Award—continued

| Student Name | School | Major | Award | Town |
|--------------------------|---|--|-------------|--------------------|
| Kayla Bayer | North Idaho College | Medical Assisting | Scholarship | Osburn, ID |
| Kayla Turbak | North Idaho College | Biology | Scholarship | Osburn, ID |
| Lucas Andre | North Idaho College | Computer Science | Scholarship | Coeur D'Alene, ID |
| Madelin Elliot | North Idaho College | Chemistry | Scholarship | Coeur D'Alene, ID |
| Paul McLeod | North Idaho College | Engineering | Scholarship | Cocdalla, ID |
| Dustan Paul | North Idaho College/ University of Idaho | Engineering | Scholarship | Rathdrum, ID |
| Anysja Manzer | Northwest Nazarene University | Mechanical Engineering | Scholarship | Melba, ID |
| Ashley Harris | Northwest Nazarene University | Pre-med | Scholarship | Caldwell, ID |
| Benjamin Campbell | Northwest Nazarene University | Engineering | Scholarship | Nampa, ID |
| Blake Johanson | Northwest Nazarene University | Computer Science | Scholarship | Nampa, ID |
| Braden Grim | Northwest Nazarene University | Mechanical Engineering | Scholarship | Melba, ID |
| Erik Anderson | Northwest Nazarene University | Electrical Engineering | Scholarship | Boise, ID |
| Jaime Sandoval Alanis | Northwest Nazarene University | Biology | Scholarship | Nampa, ID |
| Scott Hunter | Northwest Nazarene University | Engineering | Scholarship | Coeur D'Alene, ID |
| Abigail Childress | University of Idaho | Biochemistry, Microbiolo- gy, Spanish | Scholarship | Dalton Gardens, ID |
| Austin Sass | University of Idaho | Computer Science | Scholarship | Moscow, ID |
| Beau Nuxoll | University of Idaho | Mechanical Engineering | Scholarship | Clarkston, WA |
| Ben Bolton | University of Idaho | Computer Engineering | Scholarship | Gooding, ID |
| Chance Messer | University of Idaho | Mechanical Engineering | Scholarship | Marlin, WA |
| Chase Dinning | University of Idaho | Mechanical Engineering | Scholarship | Moscow, ID |
| Cody Barrick | University of Idaho | Civil Engineering | Scholarship | Libby, MT |
| Cory Holt | University of Idaho | Mechanical Engineering | Scholarship | Jerome, ID |
| Geoffrey VonBargen | University of Idaho | Electrical Engineering | Scholarship | Lewiston, ID |
| Hector Magana | University of Idaho | Mechanical Engineering | Scholarship | Burley, ID |
| Jadzia Graves | University of Idaho | Mechanical Engineering, Materials Science | Scholarship | Kuna, ID |

Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Student awards to date on current 2015 to 2018 Space Grant Award—continued

| Student Name | School | Major | Award | Town |
|--------------------------|--------------------------------|-----------------------------------|-------------------------|-------------------|
| Jesse Jutson | University of Idaho | Computer Science | Scholarship | Roseburg, OR |
| Jessica Hunter | University of Idaho | Fire Ecology and Management | Scholarship | Cascade, ID |
| Leanna Dann | University of Idaho | Mathematics | Scholarship | Owyhee, NV |
| Michael Atkinson | University of Idaho | Computer Science | Scholarship | Moscow, ID |
| Mikel Berria | University of Idaho | Medical Sciences | Scholarship | Fruitland, ID |
| Morgan Kerby | University of Idaho | Mechanical Engineering | Scholarship | Moscow, ID |
| Nicholas Anderson | University of Idaho | Applied Physics | Scholarship | Coeur D'Alene, ID |
| Preston Rhodes | University of Idaho | Mechanical Engineering | Scholarship | Athol, ID |
| Richard Baptista | University of Idaho | Mechanical Engineering | Scholarship | Buhl, ID |
| Roslyn McCormack | University of Idaho | Chemical Engineering | Scholarship | Anchorage, AK |
| Selso Gallegos | University of Idaho | Mechanical Engineering | Scholarship | Parma, ID |
| Seth Berryhill | University of Idaho | Mechanical Engineering | Scholarship | Buckley, WA |
| Stephanie Graven | University of Idaho | Physics | Scholarship | Caldwell, ID |
| Tyler Jones | University of Idaho | Mechanical Engineering | Scholarship | Twin Falls, ID |
| Zachary Bjorkland | University of Idaho | Computer Engineering | Scholarship | Lewiston, ID |
| Connor McCoy-Mickelson | Boise State University | Mechanical Engineering | Scholarship, Internship | Boise, ID |
| Kendra Noneman | Boise State University | Materials Science and Engineering | Scholarship, Internship | Eagle, ID |
| Philip Belzeski | Boise State University | Physics | Scholarship, Internship | Boise, ID |
| Logan Carpenter | Brigham Young University-Idaho | Physics | Scholarship, Internship | Rexburg, ID |
| Daniel Furman | University of Idaho | Physics, Math | Scholarship, Internship | Coeur D'Alene, ID |

Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Appendix B: Grants awarded to date on current 2015 to 2018 Space Grant Award (sorted by award type) -

| PI Name | Institution | Title | Award Amount | | Type |
|-----------------------------|-------------------------------|--|--------------|--------|--|
| Mr. Dale Hamilton | Northwest Nazarene University | Refinement of a Fire Monitoring and Assessment Platform (FireMAP) by Undergraduate Researchers | \$ | 25,000 | Undergraduate Research Grant |
| Dr. Stephen Parke | Northwest Nazarene University | MakerSat: Completing Idaho's First CubeSat for a 2017 Launch | \$ | 25,000 | Undergraduate Research Grant |
| Mr. Dale Hamilton | Northwest Nazarene University | Spectral Enhancement of Machine Learning Analytics Using Near-Infrared Remote Sensing for Mapping Wildland Fire Severity | \$ | 25,000 | Undergraduate Research Grant |
| Dr. Grady Wright | Boise State University | Research Experience for Undergraduates in Computational Science: Massively Parallel Iterative Solvers for Computational Fluid Dynamics | \$ | 24,996 | Undergraduate Research Grant |
| Dr. Stephen Parke | Northwest Nazarene University | MakerSat-1: Idaho's ISS-based CubeSat Research Platform | \$ | 24,800 | Undergraduate Research Grant |
| Dr. Ata Zadehghol | University of Idaho | University of Idaho Near Space Engineering Program | \$ | 24,229 | Undergraduate Research Grant |
| Dr. Michael Callahan | Boise State University | Investigating Formamide Chemistry under Plausible Prebiotic Conditions | \$ | 23,912 | Undergraduate Research Grant |
| Dr. Steve Swanson | Boise State University | Boise State University Undergraduate Microgravity Research Team | \$ | 17,928 | Undergraduate Research Grant |
| Dr. Ata Zadehghol | University | Idaho Near Space Engineering Program 2016-2017 | \$ | 16,577 | Undergraduate Research |
| Dr. Gus Engstrom | Boise State University | Zero-G Operable Interplanetary Delivery Based Ergonomics Grabber - Microgravity University at Boise State University | \$ | 10,000 | Undergraduate Research Grant |
| Dr. Gunes Uzer | Boise State University | Role Cellular Connectivity in Maintaining Osteogenesis under Simulated Microgravity in Response to Mechanical Challenges | \$ | 10,000 | Undergraduate Research Grant |
| Dr. Brian Jackson | Boise State University | Dust Devil Survey Using and Instrumented UAV | \$ | 7,000 | Undergraduate Research Grant |
| Dr. Daniel Robertson | University of Idaho | Inspiring Female Students through the Engineering Grand Challenges | \$ | 25,000 | Undergraduate Research Grant |
| Dr. Steve Swanson | Boise State University | Boise State University Undergraduate Microgravity Research Team for NASA SUITS | \$ | 20,961 | Undergraduate Research Grant |
| Dr. Steve Swanson | Boise State University | NASA SOAR at Boise State | \$ | 9,481 | Special Project-- Undergraduate Research |

Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Grants awarded to date on current 2015 to 2018 Space Grant Award—continued

| PI Name | Institution | Title | Award Amount | | Type |
|----------------------------|--|--|--------------|--------|--|
| Dr. Dan Lawrence | Northwest Nazarene University | RockSAT-X 2016 Travel | \$ | 7,500 | Special Project-- Undergraduate Research |
| Ms. Stacy Rauch | University of Idaho | 2017 Engineering Expo | \$ | 7,500 | Special Project-- Undergraduate Research |
| Dr. David Estrada | Boise State University | Enhancing Student Engagement in STEM Through NASA's Wearable Technology Cluster | \$ | 25,000 | Grant to Enhance Undergraduate STEM Engagement |
| Mr. John Hughes | College of Southern Idaho | CSI Bridge to Success: Success Structured Scholarships | \$ | 24,960 | Grant to Enhance Undergraduate STEM Engagement |
| Dr. Lizandra Godwin | Boise State University | Engagement Opportunities for Boise State Students: A Tool for Retention in Engineering | \$ | 24,948 | Grant to Enhance Undergraduate STEM Engagement |
| Dr. Shannon Nawotniak | Idaho State University | It's a Bird; It's a Plane! Unmanned Aerial Systems as Agents of Innovation in Undergraduate Geoscience Education | \$ | 24,494 | Grant to Enhance Undergraduate STEM Engagement |
| Dr. Steve Swanson | Boise State University | Boise State University Undergraduate Microgravity Research Team | \$ | 18,349 | Grant to Enhance Undergraduate STEM Engagement |
| Ms. Christine Chang | Boise State University | ISGC Scholar and Fellow Enhancement Activities | \$ | 2,470 | Grant to Enhance Undergraduate STEM Engagement |
| Dr. Kristopher Waynant | University of Idaho | Metal Organic Framework Core Polymers for Molecular Concentration or Reaction | \$ | 2,001 | Grant to Enhance Undergraduate STEM Engagement |
| Ms. Rosette Alberdi | College of Southern Idaho | CSI Bridge to Success: Success-Structured Scholarships | \$ | 24,960 | Grant to Enhance Undergraduate STEM Engagement |
| Ms. Tavera Freeman | National Society of Black Engineers/ University of Idaho | NSBE Dynamic Engineers Lecture Series | \$ | 700 | Crosscutting Strategy Grant, Undergraduate STEM Engagement |
| Dr. Jerry Harris | Northwest Nazarene University | Nanostructured Polymer Lithography for Photovoltaic Deposition Template | \$ | 10,000 | Crosscutting Strategy Grant, Undergraduate Research |
| Dr. Bryn Martin | University of Idaho | Advanced Ocular and Brain Magnetic Resonance Imaging of Astronauts Following Long Duration Space Flight | \$ | 25,000 | Research Seed Grant |
| Dr. Elton Graugnard | Boise State | Colorimetric Tiling of DNA Origami | \$ | 25,000 | Research Seed Grant |

Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Grants awarded to date on current 2015 to 2018 Space Grant Award—continued

| PI Name | Institution | Title | Award Amount | | Type |
|-----------------------------|-------------------------------------|---|--------------|--------|--|
| Dr. William Knowlton | Boise State University | Excitonic Quantum Coherence Towards Quantum Computing | \$ | 25,000 | Research Seed Grant |
| Dr. Lizandra Godwin | Boise State University | Graphene Foam – Carbon Nanotube Composites for Heavy Metal Sensors | \$ | 25,000 | Research Seed Grant |
| Dr. Arjan Meddens | University of Idaho | Unmanned Aerial Vehicle-based laser altimetry (lidar): new science and data products for 3-D environmental monitoring | \$ | 25,000 | Research Seed Grant |
| Dr. Tara Hudiburg | University of Idaho | Exploratory analysis of drought impacts on forest ecosystem respiration | \$ | 19,779 | Research Seed Grant |
| Dr. Matthew Bernards | University of Idaho | Polymer Microspheres for Drug Delivery in Zero Gravity | \$ | 44,998 | Research Seed Grant |
| Dr. Jim Browning | Boise State University | Plasma Enhanced Printing for In-Space Manufacturing | \$ | 30,208 | Research Seed Grant |
| Dr. Gunes Uzer | Boise State University | Role of YAP-dependent inhibition of radiation-induced cell death under simulated microgravity | \$ | 45,000 | Research Seed Grant |
| Dr. Eric Lindquist | Boise State University | Measuring Socioeconomic Impacts for RECOVER: A Crosscutting Pilot Project for NASA Wildland Fire Research | \$ | 18,265 | Crosscutting Strategy Grant, Research Infrastructure |
| Dr. Kazi Arifuzzaman | Idaho State University/ GIS TReC | Geodesy in Geospatial Analysis | \$ | 2,320 | Special Project--Research Infrastructure |
| Dr. Jerry Harris | Northwest Nazarene University | Travel to NASA Glenn Research Center | \$ | 3,247 | Collaboration Grant |
| Dr. David Estrada | Boise State University | Travel to NASA JSC for CLUSTER Collaboration with D. Litteken | \$ | 2,499 | Collaboration Grant |
| Dr. Matthew Laye | The College of | Collaboration Grant: JSC travel | \$ | 953 | Collaboration Grant |
| Dr. Andy Holland | Idaho State University | ISGC + SEED Enhanced Chemical Research Internship for High School Students in 2017 | \$ | 15,000 | Summer STEM Experiences for High School Students Grant |
| Ms. Becky Hansis-O'Neill | Idaho Museum of Natural History | 3-D Technology Internships for High School Girls | \$ | 14,584 | Summer STEM Experiences for High School Students Grant |

Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Grants awarded to date on current 2015 to 2018 Space Grant Award—continued

| PI Name | Institution | Title | Award Amount | | Type |
|--------------------------|---|--|--------------|--------|--|
| Dr. Jyh-haw Yeh | Boise State University | Summer Research Experience for High School Students in Cybersecurity | \$ | 25,000 | Summer STEM Experiences for High School Students Grant |
| Mr. Pat Blount | Moscow High School | Solar Eclipse 2017 Preparatory Activities - Phase 2 | \$ | 15,472 | Special Project--Solar Eclipse 2017 Grant |
| Ms. Barbara Mueller | Gizmo CDA | GIZMO2Extreme | \$ | 11,000 | Hands-On STEM Engagement Grant |
| Dr. David Coffland | Idaho State University | Idaho TECH | \$ | 10,998 | Hands-On STEM Engagement Grant |
| Ms. Christine Chang | Boise State University | Idaho TECH - Boise | \$ | 5,290 | Hands-On STEM Engagement Grant |
| Dr. Terence Soule | University of Idaho | Middle School Programming Camps | \$ | 970 | Hands-On STEM Engagement Grant |
| Ms. Teresa Cohn | University of Idaho/McCall Outdoor Sci- | 2017 Eclipse Solar Science Program | \$ | 26,454 | K-12 STEM Engagement Grant |
| Dr. RD VanNoy | College of Southern Idaho | CSI – Zero Robotics | \$ | 9,802 | K-12 STEM Engagement Grant |
| Dr. Charles Buck | University of Idaho | DIG’NIT: Digital Innovators Generating New Information Technology | \$ | 24,998 | K-12 STEM Engagement Grant |
| Ms. Anna Almerico | Idaho Out-of-School Network | Zero Robotics Middle School Program (Idaho) | \$ | 17,498 | K-12 STEM Engagement Grant |
| Ms. Elissa Novy | Pocatello-Chubbuck School District | National Science Teacher Association area conference | \$ | 2,587 | K-12 Professional Development Grant |
| Ms. Becky Hansis-O’Neill | Idaho Museum of Natural History | Grant to Attend 2016 Annual Meeting for the Society of Vertebrate Paleontology | \$ | 1,807 | K-12 Professional Development Grant |
| Ms. Angela Heiner | Burley High School | ISU class | \$ | 1,343 | K-12 Professional Development Grant |

Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Grants awarded to date on current 2015 to 2018 Space Grant Award—continued

| PI Name | Institution | Title | Award Amount | | Type |
|--------------------------|--|---|--------------|--------|--|
| Ms. Misty Koeppen | Nampa School District | NASA Endeavor | \$ | 2,500 | K-12 Professional Development Grant |
| Ms. Arielle Horan | University of Idaho | MOSS Experience for Low-Income, First Generation Students | \$ | 24,999 | K-12 Professional Development Grant |
| Ms. Ashelee Rasmussen | Idaho State University/ Idaho Museum of Natural History | iNaturalist Workshop | \$ | 2,500 | Educator Workshop Grant |
| Ms. Marie Hattaway | Idaho After-school Network | Zero Robotics | \$ | 10,861 | Crosscutting Strategy Grant, Pre-college |
| Dr. Joshua Pak | Idaho State University | Summer Science Camp for Underrepresented K-8 Students Designed and Delivered by STEM Undergraduates | \$ | 10,000 | Crosscutting Strategy Grant, Pre-college |
| Dr. David Coffland | Idaho State University | Idaho TECH+ | \$ | 10,000 | Crosscutting Strategy Grant, Pre-college |
| Mr. David Pierce-Garnett | Moscow School District | Space Adventures | \$ | 9,900 | Crosscutting Strategy Grant, Pre-college |
| Ms. Jill Hettinger | North Star Charter School | North Star Charter School's Student Spaceflight Experiment Project: Attending Mission 9 Launch | \$ | 9,040 | Crosscutting Strategy Grant, Pre-college |
| Ms. Angela Heiner | Burley School District | ATK Rockets | \$ | 4,594 | Crosscutting Strategy Grant, Pre-college |
| Mr. Paul Collins | Moscow Charter School | Travel to MOSS | \$ | 500 | K-12 Travel |
| Ms. Lori Lawton | Moscow Middle School | Travel to Future City regional competition | \$ | 432 | K-12 Travel |
| Ms. Amanda DiLenge | Cascade Elementary School | Travel to Idaho TECH competition | \$ | 350 | K-12 Travel |
| Ms. Misty Koeppen | Nampa School District | Travel to Discovery Center of Idaho | \$ | 192 | K-12 Travel |

Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Grants awarded to date on current 2015 to 2018 Space Grant Award—continued

| PI Name | Institution | Title | Award Amount | Type |
|--------------------------|--|---|--------------|---|
| Mr. David Pierce-Garnett | Moscow School District | Bus grant - Moscow | \$ 500 | K-12 Travel |
| Ms. Christine Casselman | Grace Lutheran School | Bus grant - Grace Lutheran | \$ 500 | K-12 Travel |
| Ms. Angela Heiner | Burley High School | Bus grant - Burley | \$ 235 | K-12 Travel |
| Dr. Julianne Wenner | Boise State University | G-Forces: A program to Encourage Family Involvement in STEM Education | \$ 5,000 | Informal Education Grant |
| Mr. Eric Miller | Discovery Center of Idaho | Constellations Collaboration: Stars on Stage | \$ 5,000 | Informal Education Grant |
| Dr. Leandra Aburusa-Lete | Boise State University | ACE Academy Living Lab | \$ 10,000 | Informal Education Grant |
| Ms. Ashelee Rasmussen | Idaho State University/ Idaho Museum of Natural History | Pollinator Conservation Class Series and Native Gardens | \$ 5,000 | Informal Education Grant |
| Ms. Christine Chang | Boise State University | Aerospace Day at Boise State | \$ 10,000 | Crosscutting Strategy Grant, Informal Education |
| Ms. Christine Chang | Boise State University | Aerospace Day 2017 | \$ 10,000 | Crosscutting Strategy Grant, Informal Education |

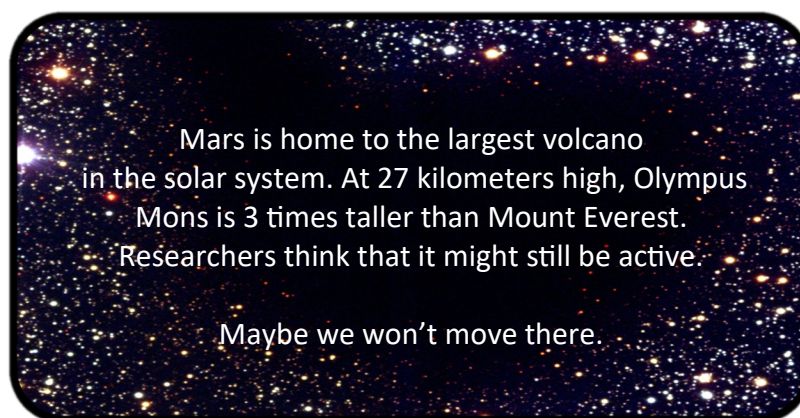
Names in **bold indicate new awards since the 2017 ISGC Annual Report.*

Appendix C: Progress on 3-year Performance Objectives

Green shading indicates achieved or on track to achieve; Yellow indicates that ISGC is close to target, but may not achieve the target.

| Goal 1: To contribute to the development and diversity of NASA’s future workforce in disciplines needed to achieve NASA’s strategic goals | | | |
|---|--|---|--|
| Program Element: NASA Internships, Fellowships, and Scholarships | | | |
| Target (2015-2018): Average of 9 internships awarded per year (NASA and/or STEM industry internships). | Target (2015-2018): Average of 45 NASA OSSI summer internship applicants per year. | Target (2015-2018): Average of 85% of ISGC scholars retained in the STEM pipeline (or transitioning to STEM workforce) at the end of each academic year. | Target (2015-2018): Average of 51% of fellows retained in the STEM pipeline (or transitioning to STEM workforce) at the end of each academic year. |
| Comments: On track; average of 11 internships per year | Comments: On track; average of 56 applicants per year | Comments: On track | Comments: On track |
| Goal 2: To attract, educate, and retain students and educators of diverse backgrounds in STEM disciplines through hands-on and other experi- | | | |
| Program Element: Higher Education | | | |
| Target (2015-2018): Average of 20 students with significant participation in undergraduate research projects at ISGC academic affiliates each year. (Note: This emphasis of this metric has been shifted to focus on significant participation. ISGC will still track general participation in undergraduate research.) | | Target (2015-2018): Average of 5 undergraduate research projects funded at 4 academic affiliates each year. | |
| Comments: 19 significant participants this year . | | Comments: Average of six projects per year at 3.3 affiliates | |
| Goal 3: To develop partnerships with NASA, other STEM-related organizations, and companies to provide opportunities for Idaho's researchers to contribute to NASA's missions through innovative research opportunities. | | | |
| Program Element: Research Infrastructure | | | |
| Target (2015-2018): Average of 8 research seed grant proposals received from 3 or more academic affiliates. | Target (2015-2018): Average of 2 research seed grant proposals with industry collaborators. | Target (2015-2018): Average of 2 students participating on each research seed grant. | |
| Comments: Four proposals in Fall 2015, nine proposals from three affiliates in 2016, six proposals from three in February 2017, 10 proposals from 3 in December 2017 | Comments: On track | Comments: On track | |
| Goal 4: To engage K-12 students and the public in the excitement of NASA's missions to encourage the pursuit of higher education in Idaho. | | | |
| Program Element: Pre-college and Informal Education | | | |
| Target (2015-2018): Average of 300 K-12 students participating in hands-on STEM engagement activities | Target (2015-2018): At least 15 ISGC-supported educators participating in professional development activities over the 3-year grant period | Target (2015-2018): Annual average of 200 K-12 students participating in hands-on activities at STEM-focused museums, science centers, informal education providers, and STEM | Target (2015-2018): Average of 3 ISGC-supported activities per year. |
| Comments: On track | Comments: On track | Comments: On track | Comments: On track |

| Crosscutting Strategies: All ISGC crosscutting strategies are summarized below. | | | | |
|--|--|---|--|---|
| Program Element: Crosscutting Strategies | | | | |
| CS.1: (Participant Diversity) Increase participation of underrepresented groups in all ISGC activities. | CS.2: (Portfolio diversity) Increase diversity of STEM fields and projects supported through student and research awards. | CS.3: (Evaluation and Assessment) Identify key performance metrics for all ISGC activities. Outline and implement processes to collect additional necessary data. | CS.4: (New partnerships) Identify and pursue new partnerships that help the ISGC achieve its strategic goals. | CS.5: (Outreach) Integrate more K-12 and public outreach into all ISGC programs and projects. |
| <i>Target (2015-2018): Average of 10% minority, 35% female participation within each ISGC student program.</i> | <i>Target (2015-2018): 40% of awards go to non-engineering students and/or researchers applying for grants.</i> | <i>Target (2015-2018): Students with significant participation on ISGC research grants will also be longitudinally tracked.</i> | <i>Target (2015-2018): Four community college/ technical school ISGC affiliates</i> | <i>Target (2015-2018): 25% of ISGC research projects include, and report on, K-12 or public outreach.</i> |
| Comments: Within NIFS, we have an average of 37.9% female participation and 14.2% minority participation. ISGC needs help getting more underrepresented students working on research projects. | Comments: On track | Comments: On track | Comments: ISGC welcomed CWI as a new affiliate at the 2017 annual meeting. | Comments: On track |

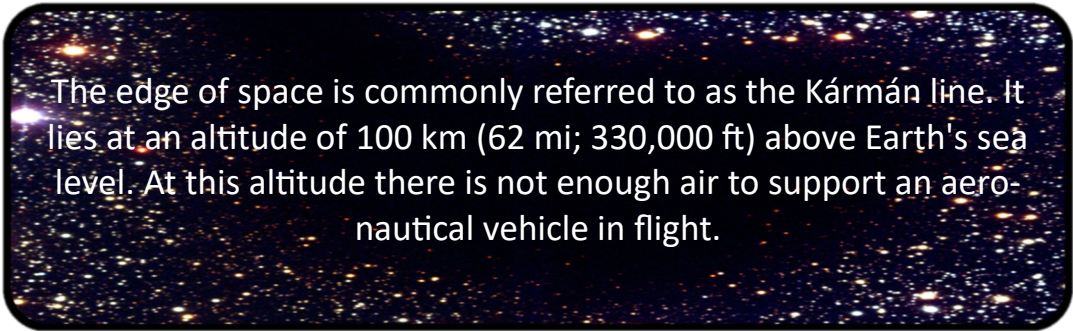


Appendix D: ISGC Affiliate Listing

| Organization | City | Affiliate Representative | Phone Number | Email Address |
|---|---------------|--------------------------|---------------------|---------------------------------|
| Boise State University | Boise | Donna Llewellyn | 208-426-1903 | donnallewellyn@boisestate.edu |
| Brigham Young University - Idaho | Rexburg | Brian Tonks | 208-496-7745 | tonksb@byui.edu |
| Bruneau Dunes State Park | Mountain Home | Bryce Bealba | 208-366-7919 | bryce.bealba@idpr.idaho.gov |
| College of Southern Idaho | Twin Falls | Heidi Adams | 208 -732-6429 | hladams@csi.edu |
| College of Western Idaho | Nampa | Willard Pack | 208-562-3327 | willardpack@cwidaho.cc |
| Craters of the Moon National Monument and Preserve | Arco | Ted Stout | 208-527-1330 | ted_stout@nps.gov |
| Discovery Center of Idaho | Boise | Eric Miller | 208-287-4230 | e.miller@dcidaho.org |
| Eastern Idaho Engineering Council | Pocatello | Eugene Stuffie | 208-317-1477 | gene.stuffie@isu.edu |
| Idaho Academy of Science and Engineering | Pocatello | Eugene Stuffie | 208-317-1477 | gene.stuffie@isu.edu |
| Idaho Department of Education | Boise | Aaron McKinnon | 208-854-6150 | aaron.mckinnon@boiseschools.org |
| Idaho Museum of Natural History | Pocatello | Curt Schmitz | 208-282-2195 | schmcurt@isu.edu |
| Idaho National Laboratory | Idaho Falls | Catherine Riddle | 208-533-7277 | catherine.riddle@inl.gov |
| Idaho Out-of-School Network | Boise | Anna Almerico | 208-947-4270 x 4271 | aalmerico@jannus.org |
| Idaho Science Teachers Association | Boise | Sharon Cates | 208-854-4546 | sharon.cates@boiseschools.org |
| Idaho State University | Pocatello | Keith Weber | 208-282-2757 | webekeit@isu.edu |
| Idaho STEM Action Center | Boise | Angela Hemingway | 208 332-1726 | Angela.Hemingway@stem.idaho.gov |
| Idaho Transportation Department - Division of Aeronautics | Boise | Mike Pape | 208-334-8788 | Mike.Pape@itd.idaho.gov |
| Lewis-Clark State College | Lewiston | Jennifer Light | 208-792-2796 | jlight@lcsc.edu |
| North Idaho College | Coeur d'Alene | Jeremy Kingma | 208-769-3479 | jqkingma@NIC.EDU |
| Northwest Nazarene University | Nampa | Dan Lawrence | 208-467-8662 | mdlawrence@nnu.edu |
| Palouse Discovery Science Center | Pullman, WA | John Cassleman | 509-332-6869 | director@palousescience.org |
| The College of Idaho | Caldwell | Jim Dull | 208-459-5667 | jdull@collegeofidaho.edu |
| University of Idaho | Moscow | Matt Bernards | 208-885-2150 | mbernards@uidaho.edu |

ISGC Staff Contact Information

| ISGC Main Office Staff | Name | Phone | Email |
|------------------------|------------------|--------------|----------------------|
| Director | Joseph D. Law | 208-885-7230 | joel@uidaho.edu |
| Associate Director | Ed Galindo | 208-969-0472 | edg@uidaho.edu |
| Program Manager | Susie Johnson | 208-885-4934 | susiej@uidaho.edu |
| Program Specialist | Kaitlyn Preston | 208-885-0148 | kpreston@uidaho.edu |
| Financial Specialist | Jeffrey Woolpert | 208-885-6030 | jwoolpert@uidaho.edu |
| Office Assistant | Mareyna Karlin | TBD | mkarlin@uidaho.edu |
| Idaho Space Grant | | | isgc@uidaho.edu |
| Idaho NASA EPSCoR | | | ine@uidaho.edu |



The edge of space is commonly referred to as the Kármán line. It lies at an altitude of 100 km (62 mi; 330,000 ft) above Earth's sea level. At this altitude there is not enough air to support an aeronautical vehicle in flight.



Idaho Space Grant Consortium

Affiliate Member Map

Our Vision: For Idahoans to be engaged in NASA's missions of exploration and discovery.



Affiliate Members:

BSU: Boise State University

BYU-I: Brigham Young University-Idaho

BDSP: Bruneau Dunes State Park

CSI: College of Southern Idaho

CWI: College of Western Idaho

CotM: Craters of the Moon National Monument and Preserve

DCI: Discovery Center of Idaho

EIEC: Eastern Idaho Engineering Council

IASE: Idaho Academy of Science and Engineering

IDE: Idaho Department of Education

IMNH: Idaho Museum of Natural History

INL: Idaho National Laboratory

IOSN: Idaho Out-of-School Network

ISTA: Idaho Science Teachers Association

ISU: Idaho State University

STEM: Idaho STEM Action Center

ITD: Idaho Transportation Department-Division of Aeronautics

LCSC: Lewis-Clark State College

NIC: North Idaho College

NNU: Northwest Nazarene University

PDSC: Palouse Discovery Science Center

Col: The College of Idaho

UI: University of Idaho

