

# The Affiliate

Spring 2012

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## Dr. Daniel Swets (1964-2011)

This last year the SDSGC team lost a valuable member, Dr. Daniel Swets, Associate Director of the SDSGC at Augustana College. Dr. Swets was a member of the management team of the SDSGC for the past 15 years. He was a highly motivated and accomplished member of team, and he consistently contributed to SDSGC educational and research programs. He helped South Dakota receive the highest number of grants any state received in the past five years. Dan founded the SD Robotics Association and served as its president for the past two years. He co-founded the SD FIRST Lego League.

Dan served as Chairman of the Steering Committee for the NASA South Dakota “Experimental Program to Stimulate Competitive Research” (EPSCoR). The NASA EPSCoR Steering Committee selects the proposals that South Dakota submits to NASA for research funding. His leadership in this area was instrumental in helping South Dakota receive the highest number of funded grants of any EPSCoR state. Dr. Daniel Swets will be missed by all who knew him.

To read more about Dr. Swets, please visit: <http://sdspacegrant.sdsmt.edu/RememberingDan.html>



## Student Fellowships, Scholarships, and Internships

### Diversity in Fellowship/ Scholarship Program

- 33% of funds awarded to women
- 14/86 awards to minority students
- 7/14 minorities were Native American students
- One student at a Tribal College

As the link between NASA and the citizens of South Dakota, the Consortium’s mission is to instill the spirit of exploration and discovery in students and educators and in the general public, with a special focus on the fields of science, technology, engineering, and mathematics (STEM) that are essential for the development of the nation’s workforce. Space Grant also provides fellowship/scholarship funding to students to conduct STEM-related educational and research projects. So far during the current 2011 fiscal year, 54 students from the following six universities in South Dakota have received a total of \$165,000 in NASA funding from the SD Space Grant: South Dakota

School of Mines & Technology, South Dakota State University, University of South Dakota, Black Hills State University, Oglala Lakota College, and Sinte Gleska University. An additional \$46,000 will be provided to fund spring and summer 2012 student internships at NASA Centers and aerospace industries, bringing the FY2011 scholarship total to \$211,000. For example, the following two South Dakota university students received \$10,000 Space Grant stipends to attend 15-week internships at NASA Johnson Space Center (JSC) in Houston, TX, during the spring 2012 semester. South Dakota School of Mines & Technology student Ryan Brown of Rapid City is a junior majoring in Computer Engineering who plans to pursue a Masters degree and then work in the field of space exploration for NASA or the aerospace industry. Ryan’s internship project at JSC is titled “*Autonomous Landing and Hazard Avoidance Technology (ALHAT) and Morpheus user interface development*”. South Dakota State University student Daniel Nehlich of Sioux Falls is a junior majoring in Physics who plans to pursue a Masters in Astronautical Engineering with an emphasis in propulsion in order to contribute to the U.S. space program through the design of new propulsion technologies. Daniel’s internship at JSC will be conducted in NASA’s Advanced Physics Propulsion Lab.

## This Year's NASA Interns



**Ryan Brown, Junior** at SDSM&T majoring in Computer Engineering, was accepted into a 15-week spring 2012 semester internship at NASA Johnson Space Center under a \$10,000 Space Grant stipend. Ryan's internship project is titled "Autonomous Landing and Hazard Avoidance Technology (ALHAT) and Morpheus user interface development". Ryan also conducted a summer 2011 industry internship at Rockwell Collins under a \$7,000 ESMD Space Grant stipend. Ryan plans to pursue a Masters degree and then work in the field of space exploration for NASA or the aerospace industry.

**Daniel Nehlich, Junior** at SD State University majoring in Physics was accepted into a 15-week spring 2012 semester internship at NASA Johnson Space Center (JSC) under a \$10,000 Space Grant stipend. His internship will be with the Advanced Physics Propulsion Lab at JSC. Daniel plans to pursue a Masters in Astronautical Engineering with an emphasis in propulsion in order to contribute to the U.S. space program through the design of new propulsion technologies.



## New ACE Camp Coordinator



Ryan Phillips, the previous coordinator for the last 5 years, took another position out of state and in his absence Cody Christensen was named the new camp coordinator. Cody is a former airline pilot and current assistant professor at SDSU in the aviation program. In addition to working for SDSU, Cody is a multiengine flight instructor and ground instructor as well as a Federal Aviation Administration safety team

member. He has worked with the ACE camp for three years in different capacities and looks forward to bringing ACE camp to the next level. Cody says that "campers should expect the same great experience they have always had with some additional activities to enrich the aeronautical experience with ACE camp 2011!" Welcome aboard Cody!

## SDSGC Staff Changes

Diane Melvin has announced that she is moving and will be stepping down from the Journey Museum, and consequently the SDSGC management team. Over the past several years Diane has provided a vital role and enthusiasm to the team. She will be missed, but we wish her well in her new endeavors.

With Diane's departure brings

Raymond Summers to the Consortium's management team. Ray has been the Executive Director of the Journey Museum in Rapid City, SD since February 2002. The Journey Museum is the natural and cultural history museum of the Black Hills region. The museum is comprised of five independent collections, which are the Museum of Geology at SD School of

Mines and Technology, SD Archeological Research Center, the Dept. of Interior's Indian Arts and Crafts Board and the Minnifusa Historical Society's pioneer collection. Additionally, the Rapid City owned Duhamel Native American collection is also housed in the museum. (Green needs work). Ray grew up in Mitchell, SD, graduated from Mitchell HS and Dakota Wesley-

an University. Ray's first career was as an officer in the USAF as a pilot, staff officer and commander. Ray retired in October 1999 at the rank of Colonel. Ray is married to Colette (Haiar) Summers, also from Mitchell; they have two sons and three grandchildren living in Indiana and Ohio. Ray and Colette live in the Black Hills with views of Mt Rushmore.

# Raven Industries at SDSM&T

In February 2012, SDSGC industry affiliate Raven Industries, Inc. opened a research and development facility in the Black Hills Business Development Center located on the campus of SDSM&T to help support the growth plans of Raven's four divisions and develop a source for recruiting new talent. Initially, Raven assigned their three full-time positions (two Electrical Engineers and one Mechanical Engineer) and six part-time interns to projects involving electronic design and software programming as well, as mechanical projects relating to precision agriculture equipment through their Applied Technology Division. The precision agriculture technology developed at the facility will ultimately help to feed the growing

world by improving efficiencies and accuracy, and minimizing waste, to produce more food on less land. As the facility expands, Raven plans to add development projects for the remaining three divisions: Electronic Systems, Engineered Films, and Aerostar. This partnership directly aligns with SDSGC's workforce development goal of using the Consortium's statewide network of scientists, engineers, and educators to provide talented students with a pathway to careers that will contribute to a highly-trained and diverse workforce for NASA and expand the nation's research and development capacity. Dan Rykhus, President and CEO of Raven Industries said: "The new research and development center aligns with Raven's

interest in supporting South Dakota's higher education and provides rewarding engineering jobs right here in South Dakota. We plan to take advantage of science and engineering students, post-graduate students, and graduates as well as other strong talent in the area." SDSM&T's President Dr. Robert Wharton said: "We are honored to be sought out by Raven Industries for our top-caliber engineering students. Both the company's technology backbone and reputation for its work with NASA and the military make for a natural fit here at the South Dakota School of Mines and Technology. We look forward to Raven offering practical work experiences to help further develop our students." South Da-



kota Governor Dennis Daugaard said: "The State of South Dakota is proud to support the efforts of Raven Industries and their pursuit to support higher education, provide jobs and offer real-world experience for students through their new facility on the South Dakota School of Mines and Technology campus. I'm pleased Raven is expanding into western South Dakota. This kind of creative partnership is just one way private industry and the state are partnering to build out our workforce."

## Summer of Innovations

The SD Discovery Center and its partners the SD Space Grant Consortium, SD 21st Century Community Learning Centers, SDSU College of Engineering, SDSM&T Youth Programs, Augustana Col-

lege/SD Robotics Association and McKinley & Washington Schools of Pierre have been awarded a 4-year, \$750,000 Summers of Innovation award from NASA. The partnership was only one of nine across the nation to be funded.

inspires middle school students and sparks their imaginations by using the excitement of NASA's missions. In partnership with organizations across the country, NASA hopes to test and expand models that are proven to make a difference.

In the South Dakota model, over 30 of the states 21st Century Community Learning Centers have signed on to offer Summer of Innovation programming to their participants. This includes conducting additional STEM programming afterschool and in the summers, helping to enroll their students in STEM summer camps and field trip opportunities and use of STEM teaching kits and outreach programming.

For more information on SD Summers of Innovation contact Coordinator Marie Steckelberg, msteckelberg@dishmail.net.

NASA's Summer of Innovation, or SoI, leverages current NASA research and discovery as a powerful context for student learning. The Summer of Innovation

Through Summer of Innovation, the SD partnership seeks to engage 2500 low-income, female and minority students in 40 hours of STEM activity every summer for four years and provide 40 hours of STEM training related to NASA resources for 150 South Dakota teachers.



NASA Summer of Innovation

# South Dakota Astronaut in Command of the International Space Station

RAPID CITY – A South Dakota astronaut was assigned as commander of the International Space Station (ISS). Sioux Falls-born Astronaut Mike Fossum took command of the multi-billion dollar orbital outpost last September.

The ISS is the most complex scientific and technological endeavor ever undertaken -- a peaceful, cooperative effort involving support from five space agencies representing 15 nations around the world. Construction of the ISS began in 1998 and continued through its completion this past summer. The U.S. segment of the ISS was designated a National Laboratory in 2005 by Congress. Including its large solar arrays, the ISS is larger than a football field, and it has as much pressurized space as a Boeing 747.

Astronaut Fossum has returned to South Dakota several times to speak with students. Prior to his ISS assignment, he twice flew aboard the U.S. Space Shuttle Discovery (STS-121 in 2006 and STS-124 in 2008).

Since permanent human habitation of space began aboard the ISS in November 2000, each of the 202 crew members that have visited the Space Station has been assigned to an "Expedition" number. There have been 29 Expedition crews aboard the ISS over the past 11 years. Mike Fossum was commander of Expedition 29. Fossum arrived at the ISS aboard a Russian Soyuz spacecraft on June 9, 2011 after training in Russia for over two years.

The ISS commander prior to Fossum, Russian Cosmonaut Andrey Borisenko, returned to Earth with two other Expedition 28 crew members including American Astronaut Ron Garan on Sept. 16, 2011, in a Russian Soyuz capsule. The Sept. 14, 2011, exchange of command can be viewed as a 3-minute video online at [http://www.nasa.gov/multimedia/videogallery/index.html?media\\_id=11654211](http://www.nasa.gov/multimedia/videogallery/index.html?media_id=11654211). Viewers will have to scroll through the various video clips to the one titled "Borisenko Hands Over Command to Fossum" posted chronologically on 9/14/11.

Tom Durkin, Deputy Director of the SD Space Grant Consortium at the South Dakota School of Mines and Technology said, "Mike and his Russian counterpart have very nice things to say about each other and the international cooperation of the 15 ISS partner countries. It is also interesting to watch the Sept. 16 landing of the Russian Soyuz capsule that brought back three of the Expedition 28 crew members. The landing of a Soyuz capsule is quite different than the landing of the now-retired U.S. Space Shuttle." A short video clip of the landing is viewable at [http://www.nasa.gov/multimedia/videogallery/index.html?media\\_id=11654211](http://www.nasa.gov/multimedia/videogallery/index.html?media_id=11654211).



Durkin said "When Mike was in command this past fall, the Space Station couldn't have been in better hands." Fossum, who returned to Earth in November after 5 1/2 months in space, wrote a blog called "Living the Dream" about his experiences aboard the ISS. That blog is posted online at [http://blogs.nasa.gov/cm/newui/blog/viewpostlist.jsp?blogname=Living the Dream](http://blogs.nasa.gov/cm/newui/blog/viewpostlist.jsp?blogname=Living+the+Dream).

The U.S. Space Shuttles were retired after the landing of STS-135 Atlantis on July 21, 2011. The 30-year Shuttle legacy (1981 – 2011) is one of astounding success after 135 flights between five orbiters, and two tragic accidents with Shuttles Columbia and Challenger. The

last 12 years of that 30-year Shuttle legacy was devoted to building the ISS in cooperation with the other 14 partner countries.

Durkin pointed out that the only way that we can currently get American astronauts to the ISS is aboard the Russian Soyuz spacecraft. On August 24, 2011 about a month after the last Shuttle flight, a Russian Soyuz rocket serving as an unmanned resupply mission to the ISS failed to reach orbit and crashed in a remote area of Siberia. Since the Soyuz rocket that launched the unmanned resupply cargo was similar to the Soyuz rocket that launches the crewed missions, the Soyuz rocket was grounded by

the Russian Space Agency pending an investigation into the crash, leaving only three Expedition 29 crew members aboard the ISS for a time (Commander Mike Fossum and Flight Engineers Satoshi Furukawa and Sergei Volkov) after the Expedition 28 crew returned to Earth. Fortunately, the investigation was completed and the Soyuz rocket was placed back into flight status before the ISS had to be temporarily abandoned when it came time for the Expedition 29 crew, including Fossum, to return to Earth.

The ISS, an unprecedented, state-of-the-art orbiting laboratory complex, continues to expand the boundaries of space research. Durkin said, "Many discoveries and technologies developed as a result of space exploration and research have application to everyday life on Earth. Many of us use these 'spinoff technologies' every day and don't even realize that they resulted from American investment in space exploration. In addition to satisfying mankind's desire to explore the unknown, just a few examples of everyday benefits of space exploration and research include communications, weather forecasting, medical breakthroughs and imaging technologies, home insulation, laser technologies, GPS, water purification, micro-computing, development of new and stronger materials, propulsion, aeronautics, aviation safety, and robotics."

Picture By: National Aeronautics and Space Administration

**The vision of the South Dakota Space Grant Consortium (SDSGC) is to expand opportunities for all South Dakotans through education, research, and public service in the fields of aerospace, earth, and space science. As the link between NASA and the citizens of South Dakota, SDSGC's mission is to instill the spirit of exploration and discovery in students and educators and in the general public, with a special focus on the fields of science, technology, engineering, and mathematics that are essential for the development of the nation's workforce.**



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