



FY 2005 PROGRAM PLAN
January 26, 2005 Update
SOUTH DAKOTA SPACE GRANT CONSORTIUM
<http://www.sdsmt.edu/space>

Introduction

In the FY 2005 probationary year, the South Dakota Space Grant Consortium (SDSGC) will progressively implement the necessary improvements in our educational, research and public service efforts as outlined in our updated final Improvement Plan and draft Strategic Plan, both of which were submitted to NASA HQ on Dec. 20, 2005. The 2005 Program Plan was originally submitted on Dec. 7, 2004, but to correct some inconsistencies in that original document and the Strategic Plan that was submitted several weeks later, this January 26, 2005 updated version of the Program Plan is being submitted per instructions from NASA Headquarters staff. The Consortium's Management Team developed the Strategic Plan over the past few months. The Strategic Plan will be reviewed at Consortium quarterly meetings and updated annually, as necessary.

Our Consortium will continue to engage in those educational and research activities which have previously proven successful, with the understanding that some of these activities must be reduced in scope (and in very few cases, dropped) as a result of the 18.5 percent Space Grant budget cut.

Vision and Mission

The vision of the NASA South Dakota Space Grant Consortium is to expand opportunities for all South Dakotans through education, research, and public service in the fields of aerospace, earth, and space science. By serving as NASA's link to the general public in South Dakota, our mission is to instill the spirit of discovery in South Dakota students and educators, especially in the fields of science, math, engineering and technology (SMET) needed for the development of the Nation's workforce.

We are committed to excellence in student and faculty research and to promoting SMET education and expanding outreach projects across the state of South Dakota. We specifically seek to include women, Native American communities, and other underrepresented groups in all of the programs and activities supported by the South Dakota Space Grant Consortium. One of the strengths of the SDSGC is the partnership with the six Native American colleges and universities in our state, namely: Oglala Lakota College (OLC), Sinte Gleska University, Si Tanka College, Lower Brule Community College, Sisseton Wahpeton Community College, and Sitting Bull College. We will continue to place special emphasis on on-going outreach to Native Americans through our ties with the Tribal Colleges and several of the Native American K-12 schools in South Dakota.

SMART Goals & Objectives

SDSGC's Management Team has developed this FY 2005 Program Plan in alignment with NASA and state priorities focused around SMART (Specific, Measurable, Acceptable, Realistic, Time frame) goals and objectives. Our long-term and short-term goals, objectives, strategies, and outcome indicators for the Consortium's proposed projects are described below in the following six Program Areas: 1) Administration (Management), 2) Fellowships and Scholarships, 3) Research Infrastructure, 4) Higher Education, 5) Precollege (K-12) Outreach, and 6) Other Public Service.

Guiding documents used in the preparation of this Program Plan included: A) NASA's Vision for Space Exploration, B) the President's Commission on Implementation of U.S. Space Exploration Policy, C) NASA's Education Enterprise Strategy, and D) NASA's Human Capital Management Plan. All members of SDSGC's Management Team have been given reference to these four guiding documents.

Time Frame

The specific goals listed under each of the six program areas are long-term and apply to the upcoming five-year Space Grant cycle (2005-2009). The specific activities to achieve those targeted goals are derived from the objectives, strategies and outcome indicators described in the Consortium's current draft Strategic Plan that will be updated and submitted to NASA Headquarters by Dec. 20, 2004. Unless indicated otherwise, the bulleted list of activities that follow the long-term goals apply to 2005 only, with the understanding that they will be evaluated quarterly (and continued or updated as needed for future years) at the Consortium's annual performance audit meeting described under the Management section.

At the end of this Program Plan, a report on the Consortium's 2004 Workforce Development activities (funded under the FY 2003 Workforce Development grant) is included.

Management (Administration)

Management Team Structure

The Consortium's Management Team consists of representatives from the four institutional members of the SDSGC (SD School of Mines & Technology, SD State University, Augustana College, and USGS National Center for Earth Resource Observation and Science "EROS") and, recently implemented, two additional rotating positions filled by affiliate members for a period of two years.

- Dr. Edward Duke, Director
- Mr. Thomas Durkin, Deputy Director and Outreach Coordinator
- Dr. Jacquelyn Bolman, Manager of Special Projects - NASA Workforce Development
- Dr. Daniel Swets, Associate Director at Augustana College
- Mr. Kevin Dalsted, Associate Director at SD State University
- Mr. Gregg Johnson, Science Dept. Manager – EROS
- Mr. James Rattling Leaf, Sinte Gleska University (rotating, 2-year position)
- Ms. Kristie Maher – SD Discover Center & Aquarium (rotating, 2-year position)

Goal for Consortium Management (long term)

The Management Team will be responsive to needs of NASA, the Consortium member and affiliate organizations, and the state of South Dakota, will participate actively in the national Space Grant network, and will seek to increase the resources available to the Consortium.

Key Management Components (objectives, strategies and measurable activities) of 2005 Proposed Plan

- The Management Team will provide timely reporting and responses to NASA Headquarters regarding Consortium operations and finances. All required reports will be submitted on time and in accordance with NASA guidelines.
- The Management Team will work to strengthen relationships with NASA Centers and EROS, the national Space Grant network, and the state's NASA EPSCoR Program. Relationships with NASA Centers and EROS will be maintained and expanded through faculty visits and student

internships. At least 2 faculty will visit NASA Centers or EROS through Space Grant funding in 2005 and at least three student interns will be placed at JPL, KSC, and Goddard. Through assistance from Space Grant, at least 5 student interns will be placed at EROS (SAIC), although the funding for those internships won't necessarily be provided solely through Space Grant.

The Management Team and other representatives of the Consortium will continue to play an active role in the national Space Grant network. Representatives of the Management Team will be present at biannual national meetings and the Western Region Space Grant Meeting.

Effective coordination between the state Space Grant and NASA EPSCoR programs will be provided by having members of the Consortium Management Team also serve on the Technical Advisory Committee of the SD NASA EPSCoR Program.

- The Management Team will be responsive to the diverse interests and resources of the Consortium member institutions and affiliates. Starting in December 2004, two new rotating positions will be established on the Management Team, each for a period of two years, from among the Consortium's affiliate members. These revolving appointments will be available to any affiliate member that indicates an interest in being elevated to the level of Consortium Management for two years. This will provide an opportunity for affiliates to become more actively connected to Consortium planning and activities, as well as provide a more well-rounded Management Team. By March 2005, written guidelines outlining the roles and responsibilities of Consortium management, member institutions, and all categories of affiliate organizations will be drafted. Additionally, a quarterly electronic newsletter will be sent to all members and affiliates to maintain effective communication within the Consortium, to include an invitation to all quarterly meetings and the annual performance audit meeting described in more detail below.
- The Management Team will ensure that Consortium programs are aligned with state "2010 Initiative" priorities in research and education. Members of the Management Team will meet once per year with representatives of state government for this purpose. Beginning in 2006, we will provide an annual briefing to representatives of state executive and legislative branches on Consortium activities.

In addition to the existing SDSGC Management Team which continually assesses program quality, we will consider establishing an independent Advisory Board designed to improve program operations and promote better alignment with NASA and state priorities. If it is decided to create an Advisory Board, at least one representative of state government and one industry representative will be appointed to the Board which would convene for its first annual meeting by February 2006. Management Team personnel will remain intimately involved with the existing SD NASA EPSCoR Program's Steering Committee and Technical Advisory Committee (TAC). For consistency and to build on existing institutional knowledge, the potential new Advisory Board would likely draw heavily from current members of the NASA EPSCoR Steering Committee and TAC.

- SDSGC will obtain the services of an external Program Evaluator to provide assessment of the Consortium's strategic plan, activities, and outcomes. The Program Evaluator will be selected by June 2005 at the latest and will participate in subsequent quarterly meetings of the Consortium.
- Quarterly meetings shall be held and all Consortium members and affiliates are invited. Participation at all quarterly meetings is an expectation of those serving on the Management

Team. Reviews of the Strategic Plan will be conducted at each quarterly meeting to help assure that progress is being made on measurable items.

The Strategic Plan will be updated annually at the Consortium's annual performance audit meeting held during the fourth quarter of the project year. All measurable activities described in the Strategic Plan will be quantified and assessed for completion at the annual performance audit meeting. This procedure will be implemented in 2005 and continued each year as a long-term activity.

- The Management Team will foster interaction between the Consortium and state industries involved in aerospace and related technologies. In the first quarter of 2005, we will conduct a survey of about 95 industries in SD (previously identified by their Standard Industrial Code designations as having some connection to aerospace or other NASA interests) to assess their potential participation in the Consortium. The industry survey will be completed by May 2005.

Likewise, we will endeavor to improve research collaboration with the USGS National Center for Earth Resource Observation and Science "EROS" (operated by SAIC) and other government/industry affiliates. We will also continue efforts to promote effective outreach associated with the proposed Deep Underground Science and Engineering Laboratory (DUSEL) at the now closed Homestake gold mine in the Black Hills of South Dakota.

- The Management Team will seek to maintain and improve the effectiveness of the Consortium as the link between the public and NASA in the state. We will maintain an electronic database and mailing list of contacts in formal and informal education, media, state and local government, non-profit organizations, clubs, and individual citizens. The SDSGC website at www.sdsmt.edu/space shall be maintained as an effective mechanism to disseminate information about NASA, the SDSGC, and research and educational opportunities in SMET-related fields.
- The Management Team will pursue opportunities to increase the resources available to the Consortium, to broaden participation within the state, to collaborate with other state Consortia in areas of mutual interest and capability, and to assure long-term sustainability. We will establish an annual Development Plan that identifies opportunities to increase funding, staffing, and matching funds for the state program and update plan at quarterly meetings. By November 2005, a draft annual Development Plan will be completed for review at the annual performance audit meeting during the fourth quarter. Furthermore, SDSGC shall serve as a clearinghouse for information on funding opportunities from NASA and other agencies that support SMET-related research and education especially in areas of space and earth science. At least 20 targeted announcement of opportunities will be disseminated through the Consortium's electronic newsletter and website each year. The Consortium will coordinate submission of resulting proposals to NASA and other agencies on projects in SMET research and education and will facilitate at least one multi-partner proposal each year to NASA or other agencies.

Fellowship/Scholarship (F/S) Program

Goal for F/S Program (long term)

To deliver a scholarship/fellowship program that offers educational and research opportunities to diverse student and faculty populations pursuing work in fields of science, math, engineering, and technology (SMET) that align with NASA's mission and those of SDSGC members and affiliates.

Key F/S Program Components (objectives, strategies and measurable activities) of 2005 Proposed Plan

- Fair distribution of funds to member universities and educational affiliates will be ensured. Total undergraduate, graduate, and faculty development F/S awards over the FY 2005 project year will be about \$58,885 of NASA Space Grant funds. With \$7,000 in matched undergraduate fellowships from Augustana College, the total for fellowships and scholarships increases to \$65,885 for FY 2005.

A centralized, Consortium-wide annual Call for F/S Proposals (approved by the Consortium Management Team) shall be implemented in February 2005 and made available to all of the Consortium's educational members and affiliates via 1) e-mail to the Space Grant contact at each institution, and 2) availability of the application process on the SDSGC website.

A competitive review of submitted applications shall be conducted by the Consortium Management Team and selections made. Awards will reflect the diversity of the Consortium's membership and statewide balance.

- Fellowship/scholarship targets will account for South Dakota's higher education enrollment percentages of underrepresented minorities and women, as reported by the 2004-2005 Chronicle of Higher Education Almanac. Awards to minorities and women will equal or exceed 10% to minorities and 40% to women.

Our target of awarding at least 10% of our NASA Space Grant fellowship funds to minority students is consistent with minority student enrollment (9.4 %) in South Dakota. Seventy three percent of the minority students enrolled at SD institutes of higher education are Native American students. At least 73% of SDSGC's minority fellowship awards will be made to Native Americans. At least one fellowship will be offered in 2005 to a qualified Native American student at one of the Consortium's Tribal College affiliates.

Our target of at least 40% of SDSGC's NASA Space Grant fellowships to women is based on the 40% national target established during the last 5-year period, as indicated by NASA in a November 2004 notification to Space Grant directors. Marketing techniques such as personal visits, direct faculty contacts, and e-mail will be used to encourage women and minority students to apply for funding.

- Meaningful research placements will be made to student research fellowship awardees by offering internships with NASA Centers, EROS (SAIC), and local industry affiliates. As indicated in the Management Section of this Program Plan, in 2005, at least three interns will be placed at JPL, KSC, and/or Goddard. Through assistance from Space Grant, at least 5 student interns will be placed at EROS (SAIC), although the funding for those internships won't necessarily be provided solely through Space Grant.

Collaborative alignment between Space Grant and research conducted under the SD NASA EPSCoR Program will be augmented by having at least two SD Space Grant Fellows participate in NASA EPSCoR research projects annually.

At least three research fellowships will be offered annually that support SDSGC initiatives such as student robotics activities, Badlands Observatory's astronomical research or "Dark Skies, Bright Minds" Program, NASA's "Microgravity University" reduced gravity student flight opportunity program, etc.

SDSGC's F/S Program will provide educational support/enhancement mechanisms to student researchers, which will help develop skills that contribute to the future workforce. We will facilitate student opportunities to work at NASA Centers through programs such as NASA Academy, USRP, and GSRP by building on SDSGC's continued summer internship experience with JPL, Kennedy, and Goddard. By competitively awarding fellowships to students interested in pursuing NASA-related educational and research projects, we will be doing our part to help the United States protect its technological leadership, economic vitality, and security.

Student researchers will be required to present their projects at the annual SDSGC "Student Summit" (initiated in 2004), as well as other professional, K-12, or civic group outreach experiences to relay their research outcomes, inspire our youth, and raise the level of awareness of NASA in the community. One hundred percent of all student researchers funded through NASA South Dakota Space Grant will present their results each year. Several student Fellows will present their research to State Legislators at the 2005 SD Student Research Poster Session at the State Capitol.

Professional development training will be provided to SDSGC student fellows by faculty specialized in English to better equip the students to present themselves and their work to future employers. Opportunities will be offered to all SDSGC student fellows to take advantage of professional development training on a monthly basis throughout the 2005 academic year. Many of these professional development training opportunities will be offered via distance technology (i.e., the Digital Dakota Network).

- Longitudinal Tracking: South Dakota Space Grant and Workforce Development student Fellows will be longitudinally tracked through their undergraduate and graduate degree programs via student survey forms developed by June 2005. This also applies to student and faculty researchers working on Space Grant-related research projects but funded by other sources such as SD NASA EPSCoR. Additionally, SDSGC staff will work collaboratively with the Admissions and Enrollment Services (AES) Offices of SDSM&T and SDSGC affiliates to collect, evaluate, interpret and track student data. The AES Office utilizes the student information system "Colleague". All six South Dakota Regental Institutions have been integrated into the system as of Fall 2004. We are now able to longitudinally track all Space Grant fellows seeking degrees in the state university system. Student Fellows not enrolled at SD Regental Institutions, such as at Tribal Colleges, will receive the longitudinal tracking survey forms.

Undergraduate and graduate students applying for fellowships are required to provide a transcript with their application packet as well as meet a minimum GPA requirement. Student Fellows will be longitudinally tracked on the following criteria: semester GPA, cumulative GPA, ACT and GRE scores. SDSGC will also track the data for undergraduate Fellows that apply to graduate degree programs, through their degree completion. The SDSGC staff will also work

collaboratively with the pertinent University Systems Career Planning and Placement Offices to track Fellows through career placements.

In the Spring semester 1998, the South Dakota Board of Regents mandated that all incoming students seeking a baccalaureate degree from the South Dakota Unified System of Higher Education meet the minimum performance standards on the approved proficiency exam (CAAP). Baccalaureate seeking students are tested once they successfully complete 48 credit hours in courses at or above the 100 level. In order to be eligible to receive an associate or baccalaureate degree from a Regental university, students must fulfill the proficiency examination requirement as specified within the Board of Regents' policies. Space Grant Fellows will also be tracked on the CAAP exam scores.

Where feasible, SDSGC will work with K-12 schools and space grant related programs to longitudinally track students who participate in outreach programs and projects. This process has been initiated because some school administrators have provided the approval to share student achievement data.

The State of South Dakota is currently in the process of developing a statewide K-12 student tracking system. When this system is in place, SDSGC staff will work to develop data sets for students who have participated in Space Grant programs.

Research Infrastructure

Goal for Research Infrastructure (long term)

Promote the development and improvement of aerospace, earth and space science research capabilities of institutional and affiliate members in South Dakota.

As a "capability enhancement" state, development of research infrastructure within South Dakota continues as one of our main focus areas of Consortium activities. We feel that the environment in South Dakota for further research infrastructure development is favorable. We acknowledge the importance of building and maintaining effective linkages with NASA collaborators to assure the continued development of research infrastructure within SD in areas of strategic importance to NASA's mission. Hence, because of fruitful research collaboration opportunities made available through SD's NASA Program, we will maintain effective communication between our Space Grant and EPSCoR programs.

Key Research Infrastructure Components (objectives, strategies and measurable activities) of 2005 Proposed Plan

- The Consortium will initiate and promote available aerospace and remote sensing research opportunities, especially among faculty. At least three research announcements will be identified and distributed among appropriate SD institutions and affiliates in 2005, resulting in at least one submitted research proposal. The SDSGC Office will be used to launch proposal efforts.
- SDSGC will coordinate with other NASA programs having similar objectives by integrating research management activities with the SD NASA EPSCoR Program. Personnel and office facilities will be shared between Space Grant and EPSCoR Programs to administer research grants.
- SDSGC proposes to establish mechanisms for effective collaboration among faculty from colleges and universities with developing research infrastructures and personnel from research-

intensive institutions. This will be accomplished by promoting web communication of research information and promoting research efforts that link developing faculty members and senior graduate students with established researchers. A physical or electronic document will be prepared and distributed by the fourth quarter of 2005 to appropriate state institutions describing the research related elements of the SDSGC web site. At least three research efforts will be initiated in 2005 that cross institutional boundaries.

- The Consortium will establish cooperative programs linking research activities with academic, government, non-governmental organizations, and industrial affiliates by 1) building, maintaining, and refreshing a network of diverse affiliates in Space Grant, and 2) publishing and distributing material promoting the access of aerospace and remote sensing-related holdings of members' libraries in South Dakota. This will result in the preparation of a description of research capabilities of new and existing Space Grant institutional and affiliate members and the distribution of that document to appropriate parties in the state.

The Consortium plans to continue funding the SDSGC Program Initiation Grant (PIG) program in the 2005-2009 funding cycle. The PIG project(s) function as a mechanism to build additional research collaboration among Consortium affiliates. Future research and technology projects that arise from PIG project seed funding will be used to measure success of the PIG program. In addition to using \$3,500 in Space Grant PIG funds, \$30,000 of SD NASA EPSCoR core grant funds (with an additional \$30,000 in non-federal matching) will be used during the 2005 calendar year to fund meritorious NASA EPSCoR PIG projects. Although NASA EPSCoR PIG projects are clearly not funded through Space Grant, it is worth mentioning both PIG programs since Space Grant and EPSCoR are so intimately connected. Additionally, as mentioned earlier under SDSGC's Fellowship/Scholarship Program, the Consortium intends on having at least two SD Space Grant student Fellows participate in NASA EPSCoR research projects annually.

- SDSGC will continue its successful affiliation with Badlands Observatory, a privately owned facility dedicated to Astronomical Research & Education in Quinn, SD www.sdsmt.edu/space/bo.htm. Badlands Observatory is host to an f/4.8 Newtonian Telescope with a 26" diameter mirror, the largest telescope in the local three-state area. The dark skies in western SD, combined with this extremely sensitive research-grade telescope, place the observatory in the company of some of the world's best astronomical research facilities. Badlands Observatory participates in the international Spaceguard Foundation, in which participating observatories around the world are in the process of cataloguing all of the Near Earth Objects (asteroids) that may represent a global impact hazard to the Earth.
- SDSGC will continue to pursue efforts associated with the proposed Deep Underground Science and Engineering Laboratory (DUSEL) at the now closed Homestake Mine in the Black Hills of South Dakota. In addition to subterranean physics, a whole range of "underground science" has become evident including solar, atmospheric, long-baseline, supernova and high energy astrophysical neutrinos, double beta decay, and dark matter searches; precision and sensitive assay of radionuclides; materials science and engineering; nuclear astrophysics cross-section measurements; hydrology, seismology, rock mechanics and other topics in geoscience; microgravity experiments via long drop tubes; and the study of the evolution and subsistence of biological organisms under extreme environmental conditions (extremophiles).

Higher Education

Goal for Higher Ed. Program (long term)

Involve Higher Education in interdisciplinary programs related to NASA's mission and goals in order to strengthen and promote a strong science, mathematics, engineering, and technology base for South Dakota.

Key Higher Ed. Components (objectives, strategies and measurable activities) of 2005 Proposed Plan

- Faculty and undergraduate/graduate student development will be enhanced through summer and semester fellowships (for faculty and students) at NASA Centers and at EROS. At least 2 consortia faculty will visit NASA Centers or EROS through Space Grant funding in 2005 and at least three student interns will be placed at NASA Centers (JPL, KSC, and/or Goddard). Through assistance from Space Grant, at least 5 student interns will be placed at EROS (SAIC), although the funding for those internships won't necessarily be provided solely through Space Grant. SDSGC university members will continue to promote NASA leadership and educational opportunities made available through NASA Academy, USRP, GSRP, Microgravity University, and other such NASA educational/research programs.
- Linkages between SDSGC and higher education, government and industry in South Dakota will be established and maintained by developing working arrangements with existing higher education geospatial programs such as 1) SDView (part of AmericaView, which is a locally controlled and nationally coordinated program to advance the availability, timely distribution, and widespread use of remote sensing data and technology through education, research, outreach, and sustainable technology transfer to the public and private sectors), 2) NativeView (an innovative approach to technology-transfer and empowerment within Indian Country through access to geospatial/spectral data and existing research), and 3) the GIS Learning Center at SDSM&T and the GIS Center of Excellence at SDSU. By the end of the 2005 program year, we anticipate having signed MOU's with SDView, NativeView, and both the GIS Learning Center and GIS Center of Excellence. SDSGC representatives will participate in the State GIS Conference.
- The Consortium will make earth systems, space, and aerospace science materials available to the higher education community in South Dakota by updating and marketing the SDSGC webpage. The "Educational Opportunities (Higher Ed.);" section of the SDSGC website provides educational materials and links to other educational resources. By the end of 2005, the website will be more user-friendly and equipped with a web counter to monitor access.
- SDSGC will continue to support Native American students at SDSGC member universities and, in 2005, will expand our support to Native American students through fellowships awarded directly to these students at Tribal College affiliates.

It is noteworthy to mention recent efforts at two of the Consortium's institutions of higher education to recruit and graduate Native American students in fields of science and engineering.

- Currently during the Fall 2004 semester, SDSM&T has 10 Native American graduate students and 75 undergraduates enrolled. In the past two years, SDSM&T has set several records. In the fall semester 2003, SDSM&T enrolled 22 first-time American Indian students, the highest number ever in the institution's history. In the same semester, the institution had a total native enrollment of 65, also a record. Even so, that number represented less than 4%

- of the student population, while Native Americans represent 8.3 percent of South Dakota's population. Nationwide, only 315 American Indians graduated with bachelor's degrees in engineering in May 2003, based on the most recent national figures available. Between 2000 and 2004, 17 American Indians graduated from SDSM&T with bachelors, masters, or doctorate degrees. During the 2004 academic year, SDSM&T's Multicultural Committee, co-chaired by the Consortium's Manager of Special Projects for NASA Workforce Development Dr. Jacquelyn Bolman, will review previous diversity strategies, hear relevant testimony, and make strategic recommendations to the university President by May 2005. These strategies are expected to reach out to several target groups including a) the Native American community in Rapid City, b) K-12 students on South Dakota's reservations, and c) the participants and graduates of SDSM&T's currently established American Indian outreach programs (such as the NASA Honors summer program, NSF's Bridges to Success program, NSF's Fire Ecology Summer Camp, and other programs that bring native students to campus to learn math and science skills and to interact with SDSM&T faculty and staff).
- Similarly, SDSU's Flandreau Indian School (FIS) "Success Academy" continues to recruit minorities to various fields of SMET. The Success Academy reaches about 400 Native American FIS freshman, sophomores, juniors, and seniors by enhancing their grasp of NASA career opportunities through a combination of hands-on SDSGC workshops, NASA events, and SD Space Days. In 2004, the program added the senior class at FIS, but only seniors who were interested in attending an institution of higher education were included.
 - SDSGC's Management Team staff at university member institutions will continue to encourage and mentor students in NASA educational endeavors. Specifically, this will include the efforts of the Consortium's Director, Deputy Director and Outreach Coordinator, Manager of Special Projects for WFD, and two Associate Directors. Additionally, SDSU's Outreach and Education Coordinator for SDSGC is a graduate student whose duties include coordination of ACE Camp, assistance for FIRST Robotics (e.g., interaction with Sisseton and Flandreau Indian School, both of which will compete in the 2005 FIRST competition), annual report data collection, and general support for the SDSGC.

Precollege (K-12) Outreach

Goal for Precollege (K-12) Outreach Program (long term)

To increase student interest in and exploration of educational and career opportunities in the fields of SMET, with special emphasis on aerospace, earth and space science.

Key K-12 Program Components (objectives, strategies and measurable activities) of 2005 Proposed Plan

- Due to necessary budget cuts in SDSGC's K-12 outreach program in 2005, to increase the SDSGC's capacity to provide aerospace, earth and space science outreach to K-12 students statewide, SDSGC staff will: 1) share state and national grant and program announcements with Consortium members via e-mail and through postings to the website, and 2) provide linkages among Consortium members to facilitate partnerships for grant applications and program implementation statewide. SDSGC will keep track of the numbers of proposals submitted by Consortium members based upon these notices. SDSGC and/or a group of Consortium members will submit at least one K-12 proposal during the next two years.

- SDSGC will remain committed to increasing teacher capacity to effectively incorporate aerospace, earth and space science technology into the curriculum through the following activities, which in part are already funded under other funding sources.

SD View will conduct a K-12 geospatial education needs assessment survey.

SDSGC will provide professional development workshops for educators on topics related to aerospace, earth/space science and technology. At least 100 teachers will participate in workshops conducted by SDSGC members and NASA personnel. Such workshops include but are not limited to NASA Aerospace Education Services Program (AESP) training, GIS/GPS teacher-training, E-missions, Star Lab Planetarium astronomy training, UMAC's Earth Science Tools for Educators workshop, etc.

SDSGC will maintain its K-12 Educational Opportunities website as a Teacher Resource Directory that directs teachers to such resources as 1) the NASA Educator Resource Centers at the Kirby Science Discovery Center in Sioux Falls and Black Hills State University's Center for the Advancement of Math and Science Education in Spearfish, 2) Badlands Observatory's "Dark Skies, Bright Minds" educational opportunities, 3) various NASA educational/training opportunities, 4) EROS educational opportunities, etc. Existing teacher networks will be used to get the word out on 2005 Space Grant related teacher-training opportunities. Such networks include: 1) the SD science teachers newsletter, 2) SD Discovery Center e-news, and 3) the Black Hills Science Teaching Project (BLAHST), an existing Local Systemic Change initiative designed to improve the teaching of science in grades K-8.

SDSGC will continue to provide financial support for Badlands Observatory's "Dark Skies, Bright Minds" educational program in 2005 <www.sdsmt.edu/space/bo.htm>.

- Although SDSGC staff outreach to students in the classroom will be reduced in 2005, the Consortium will continue to provide support for key K-12 programs that have proven successful in attracting and exposing K-12 students to hands-on educational and career opportunities in the fields of aerospace, earth science and technology. Specific programs include the following.

The annual NASA / South Dakota Space Days event <www.sdsmt.edu/space/SpaceDays.htm> will be continued. The 2005 Space Days event will be open to all students as usual, but there will be an additional special effort to target Native American students. Space Days 2005 will be held on Oct. 7-8, 2005 at the Rushmore Plaza Civic Center in conjunction with the Black Hills Pow Wow (He Sapa Wacipi). This event will attract 3,000 - 4,000 South Dakota students, many of whom are Native American students and their families from rural, reservation communities. The event will bring together Native culture and western science in a manner consistent with Space Grant's goal of recruiting minority students in fields of SMET. Students will be exposed to the excitement and opportunities of various careers in science, math and technology and the impact that NASA has on their lives.

SDSGC will also provide continued financial and staff support to 1) the popular SD Women in Science Conferences that will reach about 500-600 high school girls, their parents and educators in an effort to recruit women for careers in science and technology, and 2) three K-12 science fairs held at Consortium member and affiliate universities, including a) the High Plains Regional Science and Engineering Fair, b) the Eastern South Dakota Science and Engineering Fair which reach a total of about 1,600 to 1,800 middle and high school students, and c) Augustana College's

annual Science Day 2005 which provides about 250 high school juniors and seniors a day filled with hands-on science opportunities and experiences.

- SDSU's ACE Camp will be held in July 2005 with the goal of 24 high school students enrolled in the camp with 50%-50% male-female attendance.
- Dr. MaryJo Lee of SDSU will continue her efforts to recruit Native Americans to fields of SMET via the SDSU/Flandreau Indian School (FIS) Success Academy. This program brings high school freshmen, sophomores, juniors and seniors to SDSU for technical workshops with university professors, a meal, and a fun activity. This year, five FIS graduates have enrolled at SDSU. NASA WFD efforts in 2005 will support an aspect of the Success Academy, in that 10 seniors will complete a 3-credit astronomy course and a 3-credit geography course will be offered in the spring 2005 semester.

Public Service

Goals for Public Service (long term)

- SDSGC will develop and maintain aerospace, earth and space science programs to enhance public scientific literacy and to complement community needs to all citizens in the state.
- SDSGC will engage in multiple facets of the community in the excitement of scientific discovery using science, math, engineering, and technology.

Key Public Service Components (objectives, strategies and measurable activities) of 2005 Proposed Plan

- SDSGC will intentionally work with the Native American population in South Dakota in showcasing NASA activities and scientific study. Specifically, this will be accomplished through the Consortium's Space Days 2005 event at the He Sapa Wacipi Pow Wow in Rapid City where at least 1,000 Native American students and 2,000 non-native students and members of the general public will hear from NASA personnel and learn about NASA opportunities. Likewise, SDSGC will participate in at least 3 local science day activities across the state (in Rapid City, Sioux Falls, and Brookings) by encouraging Native American participation and targeting attendance such that a minimum of 10% of the participants are from Native American high schools.
- The Consortium will inform the public about NASA and Space Grant, and their associated resources and activities. Throughout 2005, SDSGC will continue to sponsor the daily radio broadcast of StarDate on South Dakota Public Radio, where NASA and SDSGC are advertised each day during the work week. At the top of the SDSGC website <www.sdsmt.edu/space/>, a public awareness web portal exists for interesting information about NASA, space, and SDSGC activities. At least one new space/science activity or interesting fact will be posted to this site each month during 2005.
- SDSGC is committed to NASA's policy of renewing a spirit of discovery and will use the excitement of space exploration to promote this policy among the general public. SDSGC staff will produce and give formal and informal presentations to various civic and other public groups, and will generate press releases about Consortium activities. It is anticipated that at least 30 presentations will be presented to the general public by SDSGC personnel.

- SDSGC staff will personally award prizes for student projects associated with the three science fairs discussed under the K-12 Education section of this Program Plan.
- SDSGC will continue to support the Community Education Program in the Black Hills by providing a course titled “Introduction to Astronomy and Current Events in Space” taught by SDSGC Deputy Director & Outreach Coordinator Tom Durkin and other SDSGC affiliate representatives in the Spring of 2005.
- We will maintain Consortium support of the Black Hills Astronomical Society (BHAS) monthly meetings in 2005 and related summer Star Parties that are open to the public at Hidden Valley Observatory during <<http://www.sdsmt.edu/space/BHAS.htm>>.
- Dr. Bob Polcyn of Hot Springs, SD and Fernando Nino of Sioux Falls, SD will continue their appointments as South Dakota’s two Solar System Ambassadors in 2005 by offering numerous presentations to the public and school children on NASA missions and space-related topics. SDSGC will continue to support the Solar System Ambassador Program in SD.

Workforce Development Augmentation Report SD Space Grant Consortium

SDSGC's 2004 Workforce Development (WFD) Program, funded under the FY 2003 Augmentation, was a continuation of a successful 2002/2003 WFD program. This past year focused on continuing to enlarge and enhance the resource pool, or "pipeline" of well-prepared higher education graduates and faculty that stay connected to or become involved with NASA as employees, contractors, or principal investigators. This year's program also placed more emphasis on Native American student recruitment and retention via the pipeline process.

Goal Achieved

The primary goal of the project, to enlarge and enhance the resource pool, or "pipeline" of quality scientists and engineers that become involved with NASA as employees, contractors, or PI's, was achieved. Members of the Consortium utilized their institutions' resources, facilities, and programs to provide students (especially Native American), educators, and faculty members with a 1) SMET education, 2) exposure to NASA relevant projects, and 3) internship experiences at NASA Centers and affiliated centers.

General project activities & objectives directed toward this goal included:

- Improved content knowledge of space science, earth system science, and remote sensing for secondary teachers, Native American and other high school, undergraduate and graduate students, and faculty members.
- Opportunities for hands-on educational and research experiences for program participants.
- Continued use of an expanded SDSGC Program Initiation Grant program to promote the development of NASA-based research opportunities for student and faculty members in South Dakota.
- Additional outreach activities to increase public appreciation for the direct and indirect benefits of NASA-sponsored research and education programs.
- Encouragement for SDSGC University, EROS, and NASA researchers to collaborate more with preservice education faculty to augment their science and technology backgrounds and thereby implement a "multiplier effect" because their interactions with numerous students.

Specific WFD Program Features and Concomitant Metrics

1) NASA WFD Student Internship/Fellowship Program at SDSM&T

NASA Internship/Coop Students - In Summer 2004, SDSGC had two Native American Indian NASA Workforce Development students completing internships at Goddard Space Flight Center. James Sanovia (sophomore in Geological Engineering) worked on "Migrating the Moderate-Resolution Imaging Spectroradiometer Data to GIS Freeware Systems" with Pat Coronado & Kelvin Brentzel in NASA's Code 935 Applied Information Sciences Branch. This was Mr. Sanovia's second internship at GSFC and he continues to pursue NASA opportunities with tenacity. Jenny Stover (sophomore in Environmental Engineering) worked on a remote sensing research project. Ms. Stover is a transfer student from Oglala Lakota College and will become a full time SDSM&T student in Fall 2004. Her goal is to continue to pursue opportunities and employment with NASA.

This past year Jacquelyn Bolman, Manager of Special Projects for NASA Workforce Development, presented the NASA Workforce Development program to all entering SDSM&T freshman and transfer students during the Summer Orientation Program. These presentations highlighted the

following for students and their parents: 1) the opportunities which exist within NASA, 2) programs that are available on campus to support their NASA interests, and 3) the NASA Science and Technology Scholarship Program. The presentations generated a high level of interest in NASA and the programs available to students during their undergraduate and graduate education. There were six summer orientation sessions in the months of June, July and August with approximately 125 students and family members attending each session. Approximately 750 people received the presentation on NASA WFD.

In Fall 2004, the SDSGC staff reformatted the NASA WFD Fellowship Application Process at SDSM&T. All 2,345 SDSM&T undergraduate and graduate students were notified via their personal and university e-mail accounts of the NASA WFD Fellowship Program. SDSM&T Faculty and staff were also notified via e-mail and encouraged to support their students in preparing applications. The e-mails generated discussion about NASA opportunities as well as ways in which to partner NASA-related programs in various academic departments.

Undergraduate and graduate students interested in applying for NASA WFD fellowships were required to submit: 1) a formalized application, 2) a cover letter including a career goal statement and an indication of their interest in NASA and how the program could assist in preparing them for a NASA career, 3) a current resume and transcript, and 4) two letters of recommendation, one from their major academic program advisor.

SDSGC received approximately twenty-six applications for NASA WFD fellowships from SDSM&T students. SDSGC funded approximately sixteen students consisting of:

- Three Native American Undergraduate Students
- One Native American Graduate Student
- One Undergraduate Female Student
- One Graduate Female Student
- Three Graduate Male Students
- Seven Undergraduate Male Students

The Space Grant WFD Fellows were required to develop or continue their research or educational work on NASA-related projects in collaboration with departmental advisors and researchers. Fellows have also been required to attend the Space Grant Professional Development Series. The series is co-hosted by SDSGC staff and a tenured English/Communications Professor from SDSM&T. During the Fall 2004 semester, SDSGC hosted three professional development seminars including topics on communication, leadership, professional writing, and career development. Student fellows have also been required to join a professional association and complete and present a research project.

On November 29-30, 2004, SDSGC hosted the “NASA Student Fellowship Summit” on the campus of SDSM&T, at which the Space Grant student Fellows provided the campus community with 15-minute PowerPoint presentations on their NASA-related research or educational projects. Of the student Fellows specifically receiving WFD funding, presentations at the NASA Student Summit included the following:

- Darren Johnson - “A Look at Astrobiology”
- Louie Arguello - “The Role Resin Plays in Hydrophobic Soil”
- Eric Pollard - “Shape Memory Alloy Deployment of Membrane Mirrors for Spaceborne Telescopes”
- Hazem Shafai - “Shape Memory Polymer and Shape Memory Alloy”

- Erin Landguth - “Embedding Ameriflux Data: Reconstructing the Unobserved Dynamics”
- Jeremy Banik - “Solar Sails”
- Bob Nesheim - “CAMP and Microgravity”
- John McCanna - “NASA’s Stardust Mission”
- Adam Grajkowske - “X-43 Hyper-X Program”
- Brooks Henderson - “Evaluation of Zirconium Tungstate and its Effect on the CTE of Polymers”
- Logan Loeb - “Gravity Probe B”
- Alex Rhodd - “Aquatic NASA”
- *Jason Holdaway - Aero Team (* WFD fellowship funds were awarded to Aero Team account)

2) NASA WFD Student Internship/Fellowship Program at SDSU

South Dakota State University (SDSU) hosted two WFD programs during the past year. The first program allowed ten Native American Indian high school twelfth-grade students, all college-bound, to take a Spring 2004 semester science course at SDSU. The second program involved an undergraduate student who worked cooperatively with an SDSU professor and scientists from NASA’s Kennedy Space Center. Both programs served to enhance the pool of prospective individuals, both native and non-native, that entered SD’s NASA WFD pipeline.

Flandreau Indian School Success Academy Program. “Success Academy” is an early and intensive college preparatory program for Native American students. There are ten FIS students (twelfth-grade) currently taking a 3-credit Introduction to Astronomy course at SDSU, funded by the 2003 WFD grant. Flandreau Indian School (FIS) seniors were offered a 3-credit Introduction to Geography course at SDSU in the Spring 2004 semester. Outcomes and metrics include ten FIS students being enrolled at SDSU and earning six college credits in science prior to high school graduation. Just as important are the positive experiences these students will continue to have next semester taking college-level courses and learning that they can succeed in science-related disciplines.

NASA WFD Summer Fellowships. SDSU offered a student WFD Summer Fellowship in support of a NASA internship. SDSU Professor Dr. Alfred Andrawis developed a partnership with Rebecca Young at Kennedy Space Center (KSC) to study Characterization of Hydrazine/Nitrogen Dioxide Fiber Sensor And Development of OMM-6810B Multimeter Data Logging Apparatus. SDSU student Josephine Santiago partnered with a NASA scientist and worked collaboratively to collect data in the development and testing of sensors. The fiber optic sensors are being evaluated for propellant leak detector among other uses. This activity helped the student see what NASA scientists do in their field. It also helped develop a personal relationship with a NASA Center. A current SDSU student who completed this KSC internship program in 2003 is scheduled to start employment at KSC in the summer of 2005.

3) NASA WFD Student Internship/Fellowship Program at Black Hills State University (BHSU)

Dr. Steven Anderson, BHSU Professor of Geology and Planetary Science, is currently a co-PI for a NASA-funded project titled “the Origin of Transverse Ridges on Large Mass Flows on Mars”. This

project is funded by the NASA Mars Fundamental Research Program (MFR) and involves quantitative modeling and image processing of Mars Observer Camera images of rock surfaces that display regularly spaced surface waves. The PI on the project is Dr. Stephen Baloga, president of Proxemy Research in Bowie, Maryland. Proxemy is a private research firm that conducts research for NASA and Department of Energy, and has close ties to nearby Goddard Space Flight Center. SDSGC's WFD subward to BHSU allowed two undergraduate students to participate in Dr. Anderson's NASA project.

WFD funding has also allowed BHSU students to take the lead role on several successful projects. They have also used the funding to travel and present research at the Lunar and Planetary Science Conference in Houston, TX. Student Richard Hudson has worked on two of these projects. The first focuses on a series of wax experiments used to simulate lava flows under conditions expected on the surfaces of other planets. The following publications have resulted from this work:

Hudson, R.H., Anderson, S.W., *McColley, S., and Fink, J.H., 2004. Fractal variation with changing line length: A potential problem for planetary lava flow identification; Lunar and Planetary Science XXXIV, Abstract #1601, Lunar and Planetary Institute, Houston (CD-ROM).

Hudson, R., and Anderson, S.W., 2003. The fractal dimensions of simulated lava flows; Poster Presentation, Black Hills State University Research Symposium, April, 2003.

Anderson, S.W., *McColley, S., *Hudson, R.K., *Jones, T., and Fink, J.H., 2004. Processes occurring in active lava flow interiors: Insights from analog studies; Abstract submitted to the 2004 IAVCEI Conference, in press.

Anderson, S.W., *McColley, S., Fink, J.H., and *Hudson, R., 2004. Flow processes in lava flow interiors revealed through analog experiments and fractal analysis; GSA Memoir on Lava Flow Dynamics and Kinematics, in review.

The second project conducted by Richard Hudson began this past summer and focused on the use of fractals in planetary lava flow identification. Two additional BHSU students, Tessa Jones and Ashley Marske, assisted in data collection. The team acquired field data in the western United States and presented the initial results of their work at the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) meeting in Chile in November 2004. The titles of these presentations are:

Hudson, R. and Anderson, *Jones, T. and *Marske, A., 2004. Determining the fractal dimensions of evolved lava flows using field and remotely-sensed data; Abstract submitted to the 2004 IAVCEI Conference, in press.

Hudson, R. and Anderson, S.W., 2004. The use of fractals in terrestrial and planetary lava flow identification; State of South Student Research Symposium, #57.

Tessa Jones is a BHSU undergraduate student who is also supported by a NASA WFD Fellowship. Ms. Jones conducted a series of wax experiments at Arizona State University in January 2004, and presented the results of the work at the IAVCEI meeting in Chile in November 2004. The titles of these presentations are:

Jones, T., Anderson, S.W.,*Hudson, R.K., and Fink, J.H., 2004. The influence of cooling and pre-eruption topography on lava flow surface morphology and interior pathway development; Abstract submitted to the 2004 IAVCEI Conference, in press.

Jones, T., *Hudson, R., and Anderson, S.W., 2004. The effect of underlying topography on the development of lava flow interiors: Insights from analog experiments; State of South Student Research Symposium, #63.

Achievements and Outcomes of SDSGC's WFD Program

Recent Trends in Native Student Recruitment and Retention in SDSGC

SDSGC has been critical in the momentum behind a renewed commitment by South Dakota universities to develop partnerships with tribes and tribal communities to initiate and sustain educational, economic and environmental infrastructures. This can be exemplified by the recent Native American Indian accomplishments at SDSM&T. The following accomplishments at SDSM&T are historical for the institution;

- 84 Native American Indians enrolled at SDSM&T;
- 22 Native American Indian first-time freshmen in Fall 2003;
- 10 Native American Indian students pursuing graduate degrees;
- 15 Native American Indian students on Center of Excellence for Advanced Manufacturing and Production (CAMP) Project Teams;
- 7 Native American Indian graduates in May 2003 and 9 in May 2004;
- First Native American Indian, Timothy Bull Bennett, to complete a PhD. degree in Atmospheric, Environmental and Water Resources in May 2004; and
- 19 Native American Indians completed undergraduate and graduate degrees in SMET since 2000.

The above statistics and accomplishments have helped position SDSGC to create and expand programs that will result in a more diversified workforce for NASA and our state. This momentum will be maintained by being cognizant that Native American Indians are the fastest-expanding demographic in the U.S., growing 18.6% between 1990-2001 (Selig Center for Economic Growth, University of Georgia), which is double that of any other ethnic group. Native American Indians currently represent only 0.3% of the nation's engineering labor force and SDSGC is positioned to make a significant difference in increasing this percentage for NASA.

Dr. Jacquelyn Bolman (SDSGC's Manager of Special Projects for NASA WFD), previously SDSM&T's Director of Multicultural Affairs, is currently co-chair of a newly formed SDSM&T Multicultural Affairs Committee. The committee has been established on the request of Dr. Charles Ruch, President of SDSM&T. The mission of the committee is to achieve and maintain national prominence for the recruitment, retention and graduation of Native American Indians seeking science, technology, engineering and mathematics education at the undergraduate and graduate levels while respecting their ethnic heritage. An appreciation of the culture and the contributions of Native American Indians will be promoted wherever possible. The committee is comprised of representatives from the campus community as well as the K-12 schools, tribal colleges, business and industry, alumni, and Native American Indian professionals. In November 2004, a press conference was held to introduce the development and future direction of Native American Indian science and engineering programs. This was a significant step and will result in the creation and implementation of a campus policy to support Native American students and to continue partnerships with Native American communities.

Additional Programs and Activities Supported through NASA Workforce Development

NSF “Bridges to Success Research” Program: SDSGC tribal college affiliate Oglala Lakota College and SDSM&T recently completed the second summer of the NSF “Bridges to Success Research Program”. This is a collaborative partnership where approximately seven undergraduate students from each college participated in a 12-week residential research experience. Students were partnered with faculty researchers and mentors in various research projects. The research projects included:

- Santiago Handboy and Sean Long Fox “Friction Stir Welding of Dissimilar Aluminum Alloys”
- Luke Massingale “Strain Gauges”
- Jon Lu and Austin Richards “Titanium Surface Coatings for Friction Stir Processing”
- Biagio Arobba “Generating Command Files for a Laser Powder Deposition System”
- Brandon One Feather “Laser Powder Software Test”
- Amanda Dowty and Cristy Hawk “Polymer Nanocomposites”
- Natani Gourneau “Basalt FRP: A New FRP Material for Infrastructure Market”
- Bernt Rhodd and Joni Tobacco “Comparing the N/C Present in Plants to Soil and Water Sources in a Selected Ecosystem, and Post Wildfire Hydrology
- Kevin Fast Horse “What is Logic?”
- Conan Lammers and Lyndon Pease “Post Wildfire Hydrology”

Bridges to Success Program students prepared research posters and presented to the SDSM&T campus community in the summer of 2004. The goal of the project was to increase Native American Indian student research achievement and success, as well as to assist in bridging students into the university system. The project was very successful with a 100% retention rate. As of Fall 2004, four of the seven Oglala Lakota College students are attending SDSM&T. Jon Lu and Alex Rhodd are also Space Grant student Fellows this academic year. SDSGC’s WFD Program staff provided co-directorship, mentoring, academic and career advisement, and NASA information to these students.

NSF Fire Ecology Summer Camp was hosted for the second year on the SDSM&T Campus. Drs. Vierling and Bolman partnered with Black Hills State University’s Upward Bound Program in providing 15 Native American High School students with a research experience. Students learned about the ecology of the Black Hills, the role of keystone species in reforestation, fire ecology, GPS, remote sensing, observational research and the indigenous relationship that Lakota Indians have with the Black Hills. The curriculum, which balances indigenous science with contemporary science, encourages students to become “stewards” of the Black Hills and reservation lands and associated resources. Students live on the SDSM&T campus and conduct research in Wind Cave National Park and a local area recovering from forest fire. The project has had tremendous success with 100% of participating students having completed high school and enrolling in college for Fall 2004.

Oglala Lakota College (OLC) Honors Program was co-hosted by OLC and SDSM&T in the summer of 2004 and provided 125 Native American high school students a 6-week summer academic enrichment program. Space Grant staff interacted with the students on a number of SMET academic enrichment programs and provided information and encouragement for their pursuit of NASA opportunities. Jacquelyn Bolman hosted sessions on Native American Indian Indigenous science, historical contributions of Native American Indians in engineering and science, tours of SDSM&T laboratories and research projects, and NASA presentations by SDSGC’s Tom Durkin. Faculty and graduate students

from the SDSM&T geological engineering department, under the direction of Dr. Ed Duke (Director, SDSGC), also team-taught a class on geology and environmental science for the summer program.

“Empowering the School Counselor” Conference was hosted by SDSM&T in August 2003. This was an initiative through the Western Interstate Commission for Higher Education (WICHE). Jacquelyn Bolman developed a community empowerment model for K-12 school districts. The goal of the project was to tether the K-12 community with area businesses, industry, community organizations and foundations to increase the number of Native American Indian, low income, and rural students participating in accelerated learning opportunities. Approximately 25 school counselors from South Dakota attended a 3-day intensive training and were presented with university resources available to the K-12 community. South Dakota Space Grant provided information as well as academic outreach services to a number of Native American and rural schools this past year as a result of the partnerships created during the conference. Those schools include: Little Wound Middle and High School, Loneman School, Pine Ridge Middle and High School, Red Cloud Indian School, White River Middle and High School, Takini School, Lower Brule Middle and High School, Crow Creek High School, Eagle Butte High School, St. Francis School, Todd County Middle and High School, Olerichs High School, Central High School, North Middle School, Jefferson Academy, Corral Drive Elementary, South Middle School, Belle Fourche Middle School, and Dakota Middle School.

SDSGC NASA Workforce Development Program Demographics

Activities	Applicants/ Participants	Number Funded	Metric Outcome	Conference Presentation
SDSM&T				
WFD Fellowships	26	16 2 females 14 males	All WFD Fellows complete Fellowship requirements	
NASA Interns	2	2 1 female 1 male	2 A.I. Students at GSFC	AGU Fall Meeting - Bolman
K-12 & College Pipeline Feeders	480	230 females/ 250 males 65% Non-Indian/35% Indian	K-12 students who participate in outreach programming are tracked for participation in science fair, accelerated learning opportunities and science/math achievement. High school students are tracked for their application to and enrollment in tribal college or the state universities.	
“Bridges to Success” A.I. Summer Res. Program	20	15 3 female 11 male	7 SDSM&T A.I./7 OLC students completed summer SMET research	AGU Fall Meeting, AISES National Con., AIHEC - Bolman
Fire Ecology Res. Summer Program	20	15 11 female 4 male	15 High School Senior A.I. students completed program	AISES National Conference, AIHEC, NIEA - Bolman
SDSM&T/OLC Summer Honors Program	125	125 70 female 55 male	100 9 th -12 th A.I. students 6-week residential camp	
AISES	31	31 7 female 24 male	31 Under/Graduate Students	16 Attended AISES Nat. Conf/8 competed in oral/poster competition. Dr. Bolman presented
Tribal College Dev.	80	80 47 female 33 male	80 A.I. – high school junior level students toured SDSM&T labs and research departments.	AISES Nat. Conf., AIHEC, SACNAS - Bolman
SDSU				
FIS Academy	10	10 7 female 3 male	10 FIS Seniors completed 6 college credits, 10 FIS Students now SDSU freshmen	
WFD Fellowship	1	1 female	UG Student comp. Intern. @ KSC	
BHSU				
WFD Fellowships	2	3 2 females 1 male	UG @ Arizona State University UG @ Proxemy	Presented at Lunar & Planetary Conference, AGU Fall, IAVCEI in Chile 2004.