

ED42B-04 1425h

Strategies for Expanding the Geosciences Workforce: Recruiting, Mentoring, and Partnering with American Indian Students and Faculty

Ron McNeil (701.854.3861; rsmcneil@aol.com)
Sitting Bull College, 1341 92nd Street, Fort Yates, ND 58538, United States

Tribal Colleges and Universities are a primary resource for reservation-based American Indian communities to create economic development opportunities, build a trained workforce, and promote and preserve traditional culture. They are also the higher education gateway for most American Indian students living on reservations. All Tribal Colleges and Universities offer environmental sciences programs and many provide training in GIS, with environmental science applications. Universities and research centers interested in bringing more diversity into their geosciences programs, and ultimately into the field, should work with Tribal Colleges to expand current environmental science programs and develop a research focus relevant to tribal communities. Partnering faculty and researchers could offer advanced geosciences courses online, support students interested in field research by addressing local water, soil, and climate questions, mentor Tribal College faculty, and collaborate on research projects. During this presentation, we will provide examples of successful and innovative collaborations and discuss strategies for encouraging AGU members to investigate TCU programs and find faculty with whom to collaborate.

URL: <http://www.aihec.org>

ED42B-05 1440h

Oglala Lakota College: A Model Institution for Excellence

Stacy Phelps¹ (6054556001; sphelps@olc.edu)

Michael Fredenberg¹ (6054556003; mfredenberg@olc.edu)

¹Oglala Lakota College, 490 Piya Wiconi Road, Kyle, SD 57752, United States

Oglala Lakota College (OLC) was selected in 1996 by the National Science Foundation as one of six Model Institutions for Excellence (MIE). The MIE Program funded the physical infrastructure, staff, and faculty with the goal of increasing the opportunities for Native Americans to engage in Science, Technology, Engineering, and Math and to develop our capacity to engage in scientific research. As one of the few four-year Tribal Colleges, OLC offers degree programs in Interdisciplinary Environmental Science, pre-engineering, life-science and Information Technology. With the development of the Lakota Center for Science and Technology, which includes a full suite of analytical testing labs and Geographic Information System/Remote Sensing labs, OLC has much to offer the Earth science community. During this session we will discuss our interests and abilities that expand to include students beginning in the eighth grade through the baccalaureate level across South Dakota in Earth Systems Science, Biological Science, Engineering, Information Technology and distance education. We look forward to sharing our capability with this larger community.

ED42B-06 1455h

Partnering for Geospatial Innovations in Indian Country

D. Jhon Goes In Center (605-856-4262; jgic1@earthlink.net)

Sinte Gleska University, 221 East 2nd Street P.O. Box 557, Mission, SD 57555, United States

In the spirit of collaboration and reciprocity, Sinte Gleska University on the Rosebud Reservation of South Dakota will present recent developments, experiences, insights and a vision for education in Native America. As a thirty year young institution, Sinte Gleska University is founded by a strong vision of ancestral leadership and the values of the Lakota Way of Life. A recent relationship building endeavor that utilized a recent Executive Order to empower federal agencies to work hand in hand with tribal colleges has resulted in a formal Memorandum of Understanding with the United States Geologic Survey. This relationship has paved the way toward significant progress that is measured in the enhanced educational services and relevant research for Sinte Gleska University and the Lakota Nation. As an institution of higher learning for the region in the Great Plains, SGU's leadership is unparalleled. Sinte Gleska University proposes to share a vision of collaboration with not only sister institutions but with the greater national and global community. This vision is already in place with SGU's leadership in developing and participating in the World Indigenous Higher Education Consortium. As a recent recipient of the NASA

REASoN CAN award and ongoing projects with the NSF and NOAA, SGU will exemplify the culmination of these endeavors to illustrate and promote innovative partnerships with Federal Agencies, Industry Partners, mainstream academic institutions and other tribal colleges.

URL: <http://www.sinte.edu/nativeview>

ED42B-07 1510h

Encouraging Involvement of Alaska Natives in Geoscience Careers

Catherine L. Hanks¹ (907 474-5562; chanks@gi.alaska.edu)

Sarah J. Fowell² (907 474-7810; ffsjf@uaf.edu)

James Kowalsky³ (fnjek@aurora.uaf.edu)

Daniel Solie⁴ (ffdjs@uaf.edu)

¹Geophysical Institute, University of Alaska, Fairbanks, AK 99775, United States

²Department of Geology and Geophysics, University of Alaska, Fairbanks, AK 99775, United States

³Rural Alaska Honors Institute, University of Alaska, Fairbanks, AK 99775, United States

⁴Alaska Native Science and Engineering Program, University of Alaska, Fairbanks, AK 99775, United States

Geologically, Alaska is a dynamic state, rich in mineral and energy resources. The impact of natural geologic hazards and mineral resource development can be especially critical in rural areas. While Alaska Natives comprise a large percentage of Alaska's rural population, few have the training to be leaders in the decision-making processes regarding natural hazard mitigation or mineral resource evaluation and exploitation. UAF, with funding from the National Science Foundation, has embarked on a three year integrated program aimed at encouraging young Alaska Natives to pursue geosciences as a career. The program combines the geologic expertise at UAF with established Alaska Native educational outreach programs. The Rural Alaska Honors Institute (RAHI) is a bridging program specifically designed to prepare rural high school students for college. To attract college-bound Alaska Native students into the geosciences, geoscience faculty have developed a college-level, field-intensive, introductory RAHI geoscience course that will fulfill geoscience degree requirements at UAF. In years two and three, this class will be supplemented by a one week field course that will focus on geologic issues encountered in most Alaskan rural communities, such as natural hazards, ground water, mineral and energy resources. In order to retain Alaska Native undergraduate students as geoscience majors, the program is providing scholarships and internship opportunities in cooperation with the Alaska Native Science and Engineering Program (ANSEP). Undergraduate geoscience majors participating in ANSEP can intern as teaching assistants for both the classroom and field courses. Besides being mentors for the RAHI students, the Alaska Native undergraduate geoscience majors have the opportunity to interact with faculty on an individual basis, examine the geologic issues facing Alaska Natives, and explore geology as a profession.

ED42B-08 1525h

Successful Tribal College Student Internship

Janie Nall (701-223-4100; phyllis@ndatc.org)

North Dakota Association of Tribal Colleges, 919 S. 7th Street, Bismarck, ND 58504, United States

The North Dakota Association of Tribal Colleges (NDATC) would like to host a student panel for the AGU community in order to convey the ingredients of a successful student internship program from the tribal student view. Tribal college students offer a unique perspective to the study and utilization of Earth systems science, and we would be prepared to help others in the community build successful interactions and recruitment strategies as they build their partnerships into Native America.

ED42C MCC: 3012 Thursday 1600h

Interactions With Native America and Tribal Colleges and Universities II (joint with P, C, PA)

Presiding: J M Nall, NASA Goddard Space Flight Center; W David, NASA Goddard Space Flight Center

ED42C-01 1600h

Native Peoples-Native Homelands Climate Change Workshop: Lessons Learned

Nancy G. Maynard ((301) 614-6572; nancy.g.maynard@nasa.gov)

NASA Goddard Space Flight Center, Mail Code 900, Greenbelt, MD 20771

The Native Peoples-Native Homelands Climate Change Workshop was held on October 28 through November 01, 1998, as part of a series of workshops being held around the U.S. to improve the understanding of the potential consequences of climate variability and change for the Nation. This workshop was specifically designed by Native Peoples to examine the impacts of climate change and extreme weather variability on Native Peoples and Native Homelands from an indigenous cultural and spiritual perspective and to develop recommendations as well as identify potential response actions. The workshop brought together interested Native Peoples, representatives of Tribal governments, traditional elders, Tribal leaders, natural resource managers, Tribal College faculty and students, and climate scientists from government agencies and universities. It is clear that Tribal colleges and universities play a unique and critical role in the success of these emerging partnerships for decision-making in addition to the important education function for both Native and non-Native communities such as serving as a culturally-appropriate vehicle for access, analysis, control, and protection of indigenous cultural and intellectual property. During the discussions between scientists and policymakers from both Native and non-Native communities, a number of important lessons emerged which are key to building more effective partnerships between Native and non-Native communities for collaboration and decision-making for a more sustainable future. This talk summarizes the key issues, recommendations, and lessons learned during this workshop.

URL: <http://www.usgcrp.gov/usgcrp/Library/nationalassessment/native.pdf>

ED42C-02 1615h

A Consortium of Universities Partnering with Tribal Colleges

George A Seielstad¹ (701-777-4755; gseielst@aero.und.edu)

James Rattling Leaf² (605-856-4262; jamesrl@sinte.edu)

¹Northern Great Plains Center for People and the Environment, University of North Dakota Box 9007, Grand Forks, ND 58202, United States

²Sicangu Policy Institute, Sinte Gleska University, Mission, SD 57555-0557, United States

Institutions participating in the Upper Midwest Aerospace Consortium (UMAC) are the Universities of North Dakota, Montana, Idaho, and Wyoming; North Dakota, South Dakota, and Montana State Universities; the South Dakota School of Mines and Technology; and Sinte Gleska University. UMAC's purpose is to build learning communities integrating researchers with stakeholders, with the intent of leading a regional transition toward sustainability. No single culture has a monopoly on ideas for a sustainable future; in fact, the more diverse the input, the better the emergent ideas will be. The region spanned by the Consortium includes 20 Indian reservations and 18 tribal colleges/universities. The input from these institutions is an essential part of any integrated program to change lifestyles for the benefit of present and future generations. Success stories in education and in resource management, including management of cultural and sacred resources by tribal officials and educators, will be described.

URL: <http://www.umac.org>

ED42C-03 1630h

Experiential Learning for Native American Students at Tribal Colleges and Universities

Michelle Lynn Sauve¹ ((202) 895-4879; msauve@american.edu)

Katina Moore¹ ((202) 895-4967; kmoore@american.edu)

¹American University Washington Semester American Indian Program, 4400 Massachusetts Ave NW, Washington, DC 20016-8083, United States

In reaffirming its commitment to Indian tribes and Alaska Native entities, the Federal Government issued Executive Order 13270 of July 3, 2002, stating the policy that "this Nation's commitment to education excellence and opportunity must extend as well to the tribal colleges and universities." Further, the Federal Government has called on the private sector to contribute to these colleges' educational and cultural mission. American University, through its American Indian Internship Program, has responded to this call. American University, a private liberal arts institution of higher education in the Nation's capital, has long ago recognized the importance of experiential learning in undergraduate education. For over 50 years, its Washington Semester Program brings students from other universities around the country and the world to American University's campus and to Washington, D.C. for a unique academic experience. The Washington Semester Program combines academic seminars in various fields of concentration with internship work in government agencies, congressional offices, non-profit organizations, foundations and research institutions in the Nation's capital. Students in this Program get to meet the Nation's leaders, experts in the field, and notable newsmakers while incorporating their academic skills and courses in practice at their internship assignments. The American Indian Internship Program (also known as Washington Internship for Native Students-WINS) is one of the programs in Washington Semester. This program is designed to give American Indian students the chance to study issues of interest to the Native community and to gain valuable work experience through an internship in the Nation's capital. All costs to attend the program are paid by the internship sponsors and American University, including transportation between the students' home and Washington, DC, tuition and program fees for 6 credit hours in the summer and 12 credit hours in fall/spring semester, books for all courses, housing for the duration of the program, travel to/from internship sites, and a weekly stipend to cover meals and personal expenses. As with all the other Washington Semester Programs, the American Indian Internship Program/WINS provides a unique opportunity for the young people of sovereign Native American nations to build leadership skills while living, studying, and interning in Washington, DC., and to bring those skills back to their communities. While this challenging experience is open to all American Indian and Alaskan Native students, it is particularly valuable to students from tribal colleges and universities. The Washington experience serves to expand the tribal college students' understanding of the government's policies towards Indian Nations, the structure of government agencies and their functions, and their impact on tribal communities. Students meet Natives from other tribes and schools from across the country in a very diverse campus community. Our students have a 95 percent completion rate and nearly 10 percent return to do another session. One of the most significant effects of this Program is to reinforce students' commitment to completing their undergraduate education. In addition, once students have been exposed to the professional and academic environment offered at the WINS Program and at internship sites, many students have been inspired to also pursue a graduate or professional degree.

ED42C-04 1645h

American Indian Science & Engineering Society (AISES) Programs: Outreach to Native Americans

Shirley LaCourse ((505) 765-1052 x106; shirley@aises.org)

American Indian Science & Engineering Society (AISES), P.O. Box 9828, Albuquerque, NM 87119-9828, United States

AISES is a national non-profit organization which nurtures building of community by bridging science and technology with traditional Native values. Through its educational programs, AISES provides opportunities for American Indians and Native Alaskans to pursue studies in science, engineering, and technology arenas. The trained professionals then become technologically informed leaders within the Indian community. AISES' ultimate goal is to be a catalyst for the advancement of American Indians and Native Alaskans as they seek to become self-reliant and self-determined members of society. AISES' Higher Education Program consists of scholarships, college relations, leadership development, and internships. This session will focus on the value

and impact of AISES internships for AISES students, including hands-on experience in the student's field of study, co-op opportunities, and entrance into graduate school. AISES currently offers internship placements with NASA-Goddard Space Flight Center, the U.S. State Department, the Departments of Commerce and Veterans Affairs, and the Centers for Disease Control and Prevention. In 2004, AISES will also be offering placements at the Central Intelligence Agency.

URL: <http://www.aises.org/highered/>

ED42C-05 1700h

Building Bridges Between NASA Space Science and Native American Communities

Christy Edwards¹ (720 974 5824; edwardcl@colorado.edu)

Cherilynn A Morrow¹ (720 974 5828; camorrow@colorado.edu)

¹Space Science Institute, 4750 Walnut St, Suite 205, Boulder, CO 80301, United States

This paper will describe the activities of the NASA Office of Space Science Education Broker/Facilitator in building bridges between space science and the educational needs of Native American communities. Our work thus far has been concentrated in South Dakota and Arizona, with educators from Lakota and Navajo communities. We will discuss the important lessons we have learned from our efforts to build trust and fruitful partnerships.

URL: <http://www.space-science.org>

ED42C-06 1715h

Increasing Opportunities and Success in Science, Math, Engineering and Technology Through Partnerships and Resource Convergence

Phillip Huebner (480-727-1036; phillip.huebner@asu.edu)

Arizona State University East, 7001 E. Williamsfield Road, Building 220, Mesa, AZ 85212, United States

Bridging the geographic boundaries and providing educational opportunities is the goal of American Indian Programs at Arizona State University East. Since its inception in 1997, American Indian Programs has established programs and partnerships to provide opportunities and resources to Tribal communities throughout Arizona. From educational programs to enhance student achievement at the K-12 level to recruitment and retention of American Indian students at the post secondary level, American Indian Programs provides the resources to further the success of students in science, math, engineering and technology. Resource convergence is critical in providing opportunities to ensure the success of Indian students in science, math, engineering and technology. American Indian Programs has built successful programs based on partnerships between federal grant programs, corporate, federal and state agencies. Providing professional development for teachers, school assessment, science and math curriculum and data collection are the primary efforts at the K-12 level to increase student achievement. Enrichment programs to enhance K-12 activities include the development of the Arizona American Indian Science and Engineering Fair (the only State fair for American Indians in the country) supported entirely through corporate support, summer residential programs, after school activities and dual enrollment programs for high school students. ASU East's retention rate for first year students is 92 percent and 66 graduating students enter graduate programs. American Indian Programs strives to build student relationships with federal, state and corporate agencies through internships and co-ops. This effort has led to the development of an E-mentoring program that allows students (and K-12 teachers) to work directly with practicing scientists, and engineers in research activities. New programs look to increase technology not only in Tribal schools but increase technology in the homes of students as well.

ED42C-07 1730h

Sun-Earth Day Connects History, Culture and Science

Troy Cline¹ (301-286-6606; cline@mail630.gsfc.nasa.gov)

Jim Thiemann¹ (301-26-9790; James.R.Thiemann@nasa.gov)

¹NASA, Goddard Space Flight Center, Code 630, Greenbelt, MD 20771, United States

The NASA Sun-Earth Connection Education forum annually promotes and event called Sun-Earth Day: a national celebration of the Sun, the space around

the Earth (geospace), and how all of it affects life on our planet. For the past 3 years this event has provided a venue by which classrooms, museums, planetaria, and at NASA centers have had a sensational time sharing stories, images, and activities related to the Sun-Earth connections and the views of the Sun from Earth. Each year we select a different theme by which NASA Space Science can be further related to cross-curricular activities. Sun-Earth Day 2002, "Celebrate the Equinox", drew parallels between Native American Cultures and NASA's Sun-Earth Connection research via cultural stories, interviews, web links, activities and Native American participation. Sun-Earth Day 2003, "Live From the Aurora", shared the beauty of the Aurora through a variety of activities and stories related to perspectives of Northern Peoples. Sun-Earth Day 2004 will share the excitement of the transit of Venus through comparisons of Venus with Earth and Mars, calculations of the distances to nearby stars, and the use of transits to identify extra-solar planets. Finally, Sun-Earth Day 2005 will bring several of these themes together by turning our focus to the history and culture surrounding ancient observatories such as Chaco Canyon, Machu Picchu, and Chichen Itza.

URL: <http://sunearth.gsfc.nasa.gov/sunearthday/2004/>

ED42C-08 1745h

FRIGID: Field Research Investigating Geophysical Interface Dynamics

Mike Comberiate (301-286-9828; Michael.A.Comberiate@nasa.gov)

NASA, Goddard Space Flight Center, Code 420.1, Greenbelt, MD 20771, United States

Imagine this: A Native American Community College and several of the surrounding Native American secondary schools from the Upper Peninsula, Michigan are working with NASA scientists at the North Pole while people worldwide are watching them on the Internet. They are characterizing the arctic sea ice with scientists, who are trying to use satellites to monitor the changes in mass properties that are early indicators of global warming. Their webcasts are using an old NASA satellite that is uniquely able to point a 16-ft dish antenna at them and give them over 1 MBPS connectivity. This is a pioneering NASA program called "You Be The Scientist" and it is engaging Native American students in cutting edge technology. This is an example of the mutually beneficial partnership opportunities available to Native Americans. Come find out about this exciting venture, and develop your pathway to programs and relationships.

ED51A MCC: 3012 Friday 0800h Teaching Petrology in the 21st Century II (joint with V)

Presiding: C A Manduca, Science Education Resource Center, Carleton College; C Davidson, Carleton College; D Mogk, Montana State University

ED51A-01 0800h

Teaching Petrology in the 21st Century: A Workshop Report and Call to Action

David Mogk¹ (406 994-6916; mogk@montana.edu)

Cameron Davidson² (cdavidso@carleton.edu)

Cathryn Manduca³ (cmanduca@carleton.edu)

John Braday⁴ (jbrady@science.smith.edu)

¹Dept. of Earth Sciences, Montana State University, Bozeman, MT 59717, United States

²Dept. of Geology, Carleton College, Northfield, MN 55057, United States

³Science Education Resource Center, Carleton College, Northfield, MN 55057, United States

⁴Dept. of Geology, Smith College, Northampton, MA 01063, United States

Petrology plays an important role in the upper division geology curriculum, introducing students to the skills needed to investigate and interpret igneous and metamorphic rocks that form the bulk of the earth's interior. Central concepts in petrology courses typically include chemical differentiation of Earth, the role of igneous and metamorphic processes in the Earth system, and the occurrences and distribution of rocks and in a variety of tectonic settings. Seventy-nine geoscientists who teach (or plan to teach) petrology in the