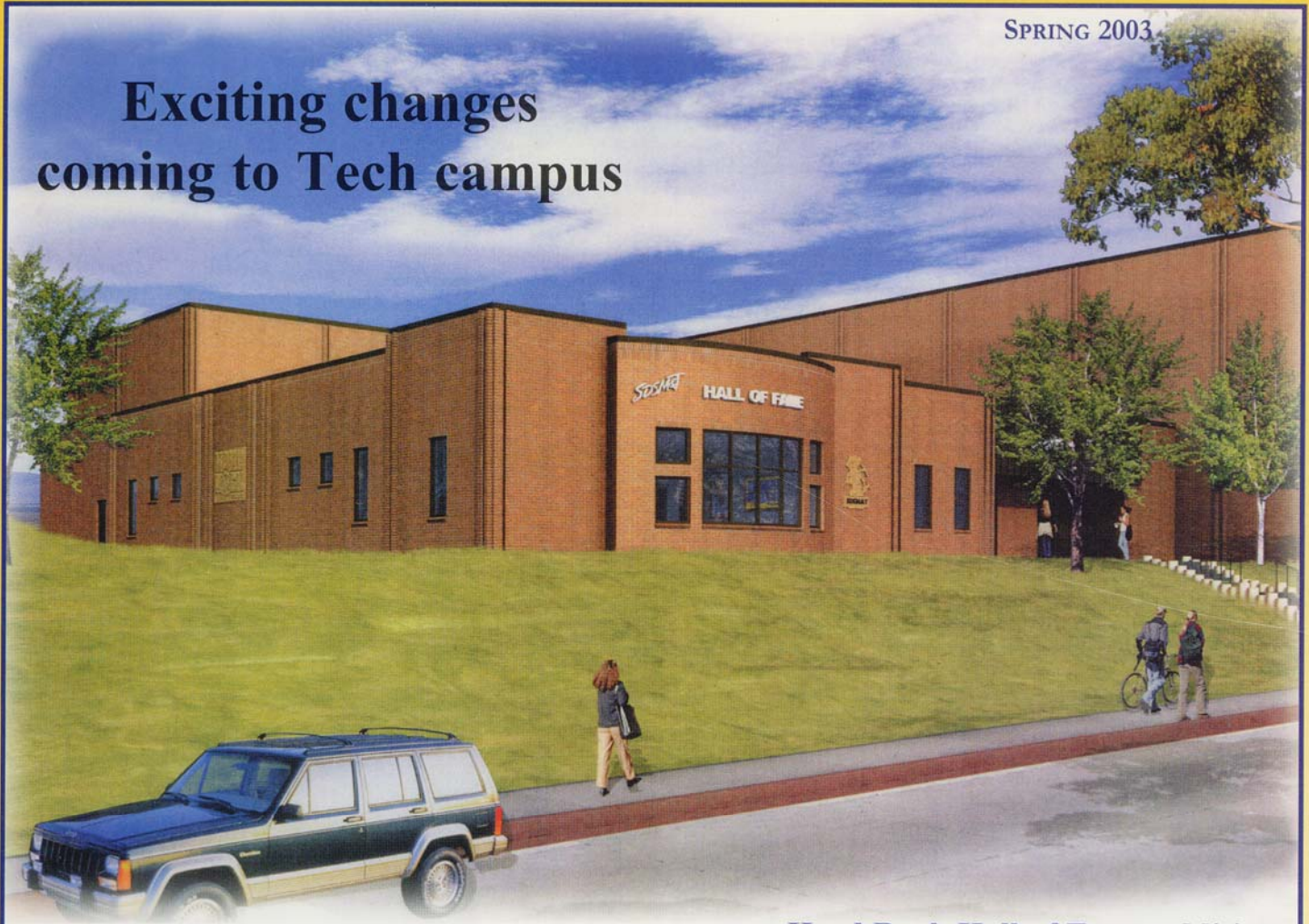


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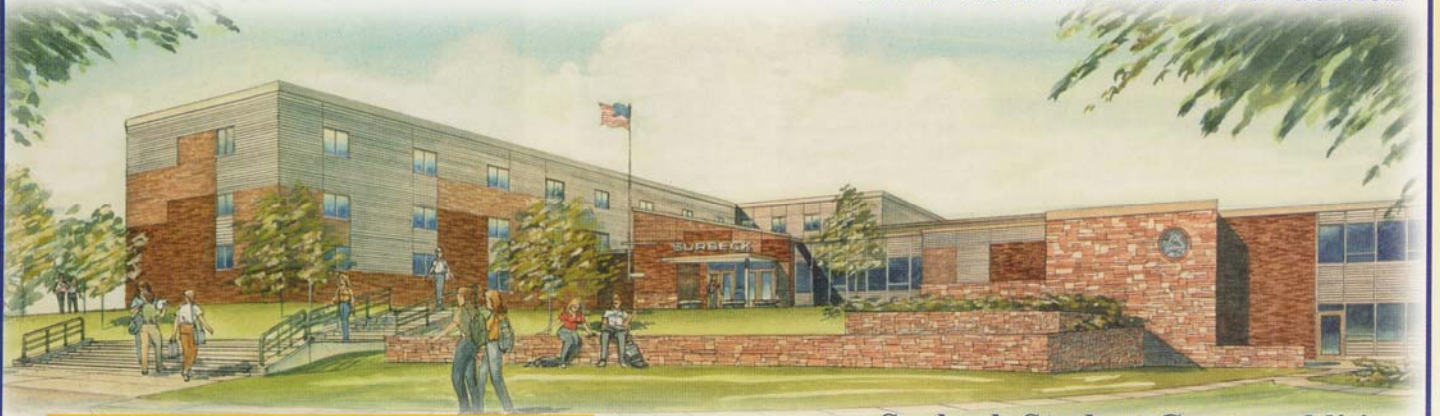
SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY

SPRING 2003

**Exciting changes
coming to Tech campus**



Hard Rock Hall of Fame addition



Surbeck Student Center addition

A PUBLICATION OF SDSM&T

Perspectives



Dear Friends,

As we prepare to conclude twenty-six years with the South Dakota higher education community on June 30, 2003, Nancy and I thank the thousands of students and colleagues with whom we have had the privilege of sharing the dream of building a better future for South Dakota.

In 1977, I was invited to serve as Tech's Vice President for Academic Affairs to help guide the development of new programs in computer science and materials engineering. In 1984, I was appointed president of Dakota State University with the charge to change the mission of the first teachers college of the Dakota Territory to the first university with information technology fully integrated throughout all programs. In 1984 I also had the privilege of serving as the Centennial President of the Institute of Electrical and Electronics.

In 1987, I began what has become the second longest tenure for a president of "The Mines." The university community has worked together to build new programs in industrial engineering, interdisciplinary sciences, computer engineering, and technology management. We added the doctoral program in atmospheric, environmental, and water resources along with the masters and doctoral programs in materials engineering and science. The old Liberal Arts building was taken down and replaced by the central Classroom Building. In the past five years enrollment has increased by 9% and SDSM&T will receive the highest percentage budget increase of the system with the readjustment of funding in July 2003.

The award-winning Center for Excellence in Advanced Manufacturing and Production has developed exciting new approaches to prepare graduates as team leaders to produce products on time and in budget. In 2000, this center received the prestigious Boeing recognition as the most innovative achievement in engineering education in the nation.

There have been highly successful collaborate efforts to increase support for scholarships through the first capital campaign of the university, a campaign that achieved twenty five percent more than its goal. Our alumni and friends in industry have generously supported the enhancement of our laboratories and academic facilities to ensure that our graduates are well prepared for a lifetime of success in their chosen professions.

Perhaps the most important responsibility of a president is to help develop a faculty dedicated to enhancing the learning of each student. Educational excellence is achieved when excellent students study in the classrooms of excellent faculty. It has been my commitment to build an excellent faculty by meeting with each candidate for a faculty or administrative position. I believe we have been able to hire the most outstanding faculty and staff of any institution of our size in the nation. We hold the top position among South Dakota institutions for the percentage of doctoral faculty. Appropriately, our faculty is both the most tenured and the highest paid in South Dakota. These faculty and students are ready to continue the traditions of educational excellence that are the hallmark of this university.

We are pleased to have had strong support from leaders across the state - governors, legislators, members of congress, and people throughout our cities and towns, to enhance the future of South Dakota. These efforts have ranged from K-12 classroom and web delivered education, to nearly a hundred economic development projects, to advocating the conversion of the Homestake Mine into a national laboratory. Thanks to continuing support from our congressional delegation for programs to develop new material processing capabilities for the Army. There are now significantly increased research opportunities for faculty and graduate students. The addition of researchers and unique equipment for advancing the processing of materials using friction joining, laser additive manufacturing, and composites, gives Tech the potential to become a special center for the development of the new lightweight vehicles and equipment for defense applications of the future.

Thanks to the cooperative efforts of many individuals the university is well prepared for continued growth. I am pleased that we have been able to move forward with construction projects this summer for a new residence hall and renovations in the Surbeck Center, additions and renovations in the King Center, the conversion of the Forestry Building into a Composites Research Laboratory, and development of a centralized campus air conditioning system. These projects continue the improvements in classrooms, laboratories, and student service areas began with the recent renovations of the Civil-Mechanical Engineering building.

Nancy and I have particularly enjoyed the opportunity to work with the exceptional students who attend Tech. Nancy will continue as an advisor to the Alpha Delta Phi Sorority and a member of Friends of the Devereaux Library. We plan to continue to participate and support Tech activities. We will remain in Rapid City and look forward to spending more time with family and friends.

Thank you for the opportunity to be a part of the Tech family.

Richard J. Gowen

SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY MAGAZINE SPRING 2003

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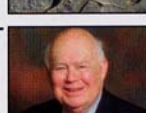
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CAMPUS

Profile

The South Dakota School of Mines and Technology, founded in 1885, has been a national leader in preparing world-class engineers and scientists. Our graduates design, construct, and operate modern technology to meet complex challenges such as global warming, health care delivery, energy resource development, mineral extraction and processing, environment quality, futuristic transportation, and national defense. Our alumni are held in the highest regard by their fellow leaders in industry, consulting, government, health, and education.

Tech has diversified to meet the needs of engineering and science throughout the world. South Dakota Tech's intellectual environment was shaped a century ago by the ingenuity and rugged individualism of pioneers in science and technology. Tech's present day pioneers provide inspiration and remain on the cutting edge in the fields of engineering and the sciences.

ACADEMIC PROGRAM: SDSM&T is a state-assisted university providing graduate and undergraduate degrees in science, engineering, and interdisciplinary studies, as well as an associate of arts degree in general studies.

BACHELOR OF SCIENCE DEGREES

Chemical Engineering

Chemistry

Civil Engineering

Computer Engineering

Computer Science

Electrical Engineering

Environmental Engineering

Geological Engineering

Geology

Industrial Engineering

Interdisciplinary Science

Mathematics

Mechanical Engineering

Metallurgical Engineering

Physics

MASTER OF SCIENCE DEGREES

Atmospheric Sciences

Chemical Engineering

Civil Engineering

Computer Science

Electrical Engineering

Geology and

Geological Engineering

Materials Engineering and Science

Mechanical Engineering

Paleontology

Technology Management

DOCTORATE OF PHILOSOPHY DEGREES

Atmospheric, Environmental, and Water Resources

Geology and Geological Engineering

Materials Engineering and Science

ENROLLMENT: The University has a diverse enrollment of approximately 2,447 students from 39 states and 27 countries. Our 13 departments offer degree programs in engineering and science disciplines at the baccalaureate, masters, and doctoral levels. Students enter the university with the highest ACT composite in the state and more than half graduating within the top 25% of their high school.

COSTS AND FEES: Annual undergraduate costs for tuition, fees, room, and board total less than \$8,300 per year for South Dakota residents, less than \$8,700 for Minnesota residents, and less than \$9,300 for residents of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Iowa, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, Utah, Washington, and Wyoming. Annual total costs for all other undergraduates is less than \$12,600 per year.

RESEARCH: High quality research is conducted in departments and in our research institutes.

FACULTY: The School of Mines and Technology employs 112 faculty members. Nearly 85 percent hold a doctorate or other appropriate terminal degree.

Gowen recalls history of change at Tech

Dr. Richard J. Gowen's life and career have been dedicated to advancing scientific knowledge and discoveries, educating university students to prepare them for the challenges of the engineering, scientific, and technological workforce, helping children embrace the wonders of math and science, and using the capabilities of the university to improve its community.

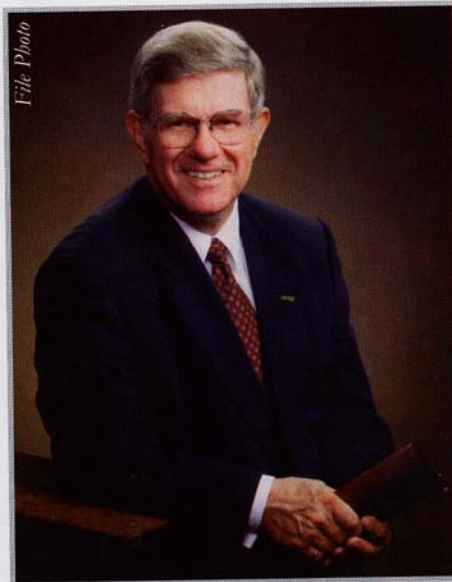
Dr. Gowen rose from humble beginnings in New Jersey to become President of the South Dakota School of Mines and Technology, a highly regarded engineering and science university that sends its graduates around the world. Those graduates and the companies that employ them owe Dr. Gowen a debt of gratitude because he created a system and environment that prepares students as well as any engineering and science university in the United States.

"The most critical thing in my mind to a university is the educational environment," Dr. Gowen said. "You want an environment that brings faculty and students together in a classroom setting where the dialogue of learning takes place. When I came to Tech, we began to look ahead at some very important changes that would allow us to make a commitment to the quality of both faculty and students. We've been very successful in bringing quality students and faculty to campus."

Dr. Gowen became the 16th president of the South Dakota School of Mines and Technology in 1987. During his tenure at SDSM&T, he has been instrumental in the development and implementation of Internet technologies designed to provide opportunities for individualized learning. These technologies also have proven effective in the business world. His vision and technical expertise have been valued assets to other leaders in the state as South Dakota has led the challenge of providing Internet

linkages and access to computer technologies to every K-12 school through the state's "Wiring the Schools" program.

"We have tremendous people here, and we have the ability and responsibility to lend the expertise of our faculty and staff to efforts to improve the opportunities in South Dakota," Dr. Gowen said. "Because of those efforts, SDSM&T is recognized as a real leader in the state. That's a position we can all be proud of."



Tech's leadership role in the effort to show that the Homestake Gold Mine could become a National Science Foundation underground laboratory is an example of the university using its expertise for the good of the community.

"When Homestake announced it was going to close, I felt very bad about it," Dr. Gowen said. "But, instead of just letting the mine close, we looked at it as an opportunity. After discussions with Dr. Sherry Farwell (Dean, Graduate Education and Sponsored Programs), Dr. Ken Lande (University of Pennsylvania), the governor, and others, we worked to see if it would be possible to turn the mine into a laboratory for underground science.

SDSM&T worked on the engineering side and showed that you could safely prepare that mine for a laboratory. I have every reason to believe that it can be well constructed in a safe manner for 100 years of use.

"We also began working with our Congressional delegation to make sure Homestake, and then Barrick, was comfortable with the process," Dr. Gowen said. "That work is continuing. The economic advantages of bringing such great science and wonderful opportunities to the state are just mind-boggling. We continue to work to try and make that happen."

Dr. Gowen has provided tremendous leadership to the university in many arenas. He led SDSM&T through its first-ever capital campaign, major building and renovation efforts, and the implementation of computer technologies. Those efforts positioned SDSM&T as a technology leader in the state and region. Under his leadership, SDSM&T has received numerous national academic recognitions, including the 2000 Boeing Educator of the Year Award. Dr. Gowen's work also earned personal awards, including several from the Rapid City Chamber of Commerce. In 2003, he was named the Engineer of the Year by the South Dakota Engineering Society.

Tech has always held and protected an excellent reputation in the regional community, but during Dr. Gowen's tenure as President, that reputation grew even stronger. Business owners come to Tech's researchers for help with difficult engineering and technology challenges. Entrepreneurs seek campus expertise to make their dreams come true. Elementary, middle, and high school teachers come to campus to expose their students to the exciting worlds of math, science, and technology. Community groups constantly look to Tech faculty and staff for assistance with boards of directors and other volunteer tasks. Dr.

Gowen has created an environment that encourages faculty and staff members to use their expertise and energy to volunteer and assist community groups.

Dr. Gowen's encouragement doesn't end there. He wants Tech's professors and researchers to aggressively pursue research funding that will not only allow the campus to advance knowledge and make discoveries, but will assist industry, the nation, and the world. That's one example of how Tech has changed during Dr. Gowen's tenure.

"We are constantly looking for ways to change to meet the needs of students and industry, but one innovation comes to mind immediately," he said. "When higher education took a 10 percent budget cut a few years back, we were told that we could keep that money, but we had to use it to improve education. That led us to ask ourselves what could we do to better prepare our students for industry. As we asked those questions, we heard the message that industry today is team-oriented.

"In the engineering world in the past, we prepared engineers to be self-contained," he said. "In effect, industry hired you because you were an electrical or a mechanical, and they needed someone to do those things. Now, there is a major emphasis on the use of interdisciplinary teams. You no longer solve the problem as a specialist. You solve the problem as a team. We recognized that shift, and took action to meet the new expectations. Several people came together on campus and we came up with the CAMP (Center of Excellence for Advanced Manufacturing and Production) program. That program has been incredibly successful."

Under Dr. Gowen's leadership, the South Dakota School of Mines and Technology Foundation tackled a momentous effort for any institution - its first-ever capital campaign. The campaign, "VISION 2000: Leadership for the Next Century" began in 1995 with a goal of raising \$16 million by



Dr. Gowen with wife Nancy, daughters Cindy and Kerry, son Jeff, daughters Betsy and Susan.

Tech's Reunion 2000. Tech announced during the reunion that the campaign surpassed its original \$16 million goal by raising more than \$20.3 million.

Alumni, friends, and corporations played key roles in helping Tech reach its goal. More than 870 individuals and 241 corporations participated as national campaign leaders. These leaders include alumni and friends from coast to coast in all decades and disciplines.

Highlights of the campaign included:

- a 74 percent growth in scholarships available to students at Tech. Tech announced that it had raised almost \$8.5 million - 150 percent of the original goal. Included in this amount are numerous individual scholarships that are \$5,000 or more each.
- four new professorships were established for an 84 percent increase in annual faculty support. Tech also established its first-ever endowed chair, the Steven P. Miller Endowed Chair, with a gift of nearly \$1.4 million dollars.
- more than \$10 million raised for programs and laboratories, including gifts from Caterpillar, Cargill, Dow Chemical, and the Dow Corning Foundation. Tech also received a \$500,000 grant from the Kresge Foundation, used to help fund the complete renovation of the Civil/Mechanical Engineering Building.

Dr. Gowen also demonstrated his commitment to future generations of

science and technology leaders through the establishment of a number of outreach programs. These programs include the annual Engineers Week celebration, which began in the Spring of 1978 with a simple Grubby Contest, and has grown to the weeklong series of events it is today. Engineers Week brings hundreds of elementary, middle, and high school students to campus. While on campus, students learn about the importance of engineering in world, and how they can join this exciting career. Dr. Gowen also was instrumental in starting the Scientific Knowledge for Indian Learning and Leadership (SKILL) Program, designed to enhance the college preparedness of under-served populations, principally American Indian students in grades 4-12; the Children's Science Center, a hands-on museum in downtown Rapid City that introduces children of all ages to science, math, and technology in a fun, interactive, and non-threatening way; and math and science based on-campus child care.

"We took the position previously that we didn't worry about where you came from," Dr. Gowen said. "Now, we worry about who are you when you arrive, what you've done, and what you know. So, math and science education has become a major concern for us. We help children and young people embrace science and math learning, and we help them evolve in that type of education. It's a day-by-day process that doesn't happen over night, but it's an important part of the job of the university. As we've continued this role shift, we're beginning to see students coming to us who have received the kind of preparation they need so they can succeed very well here."

Dr. Gowen also served as Vice President for SDSM&T from 1977 to 1984, and as President of Dakota State University, Madison, S.D., from 1984 to 1987. There, he led a mission to integrate computers and information systems throughout the curriculum.

Prior to joining the higher

Scholarship makes dreams come true

While Santiago Handboy's career plans may be a little unclear and in flux, he knows one thing.

"I want to make a difference in people's lives," he said. "There aren't enough people around for kids to talk to when they need advice or need help getting into college or need help making a decision. I needed that, and there were people around to help me. I'd like to make sure other kids have that same thing."

The \$20,000, two-year scholarship Handboy, who goes by the name Tito, received this year will help him achieve that goal. Handboy, a graduate of Rapid City Central High School, is a junior Industrial Engineering major at Tech. The scholarship, which covers tuition, books, and other expenses, is from the David and Lucile Packard Foundation Tribal Scholars Program.

The Tribal Scholars Program supports graduates of tribal colleges who are admitted to four-year colleges and universities for study in science, engineering, computer science, or mathematics. Handboy, an enrolled member of the Cheyenne River Sioux Tribe, earned an associate's degree at Oglala Lakota College.

The David and Lucile Packard Foundation was created in 1964 by David Packard (1912-1996), co-founder of the Hewlett-Packard Company, and Lucile Salter Packard (1914-1987). They shared a deep and abiding interest in philanthropy. The Foundation awarded approximately \$454 million in grants in 2001.

The scholarship eliminates the need for Handboy to work outside of school. "I would have had to work otherwise, but now I can really concentrate on school," he said.

Handboy's interest in Tech and in Industrial Engineering began in sixth grade, when he attended the Scientific Knowledge for Indian Learning and Leadership (SKILL) summer program at Tech. He participated every summer in either the SKILL or NASA Honors

Program at Tech until he graduated from high school. It was during one of those programs that he heard a presentation by Dr. Carter Kerk, associate professor, Industrial Engineering program.

"It was just a natural transition to come to Tech, and Industrial Engineering sounded really interesting," Handboy said.

But studying engineering, and the associated math and science, serves another purpose.

"My two little brothers look up to me, and they see me learning math and science," he said. "They're important skills to have no matter what you go into. On the reservation, kids don't have these skills, so maybe if they see me doing it, they'll do it, too."

File Photo



Santiago Handboy received a \$20,000 scholarship from the David and Lucile Packard Foundation Tribal Scholars Program. The scholarship covers tuition, books, and other expenses.

Handboy calls Kerk an important reason why he chose, and has stayed, at Tech. Since they first met in 1998, the two stayed in touch. Kerk served as a reference on Handboy's scholarship application.

"Tito is an exceptional student and an exceptional young man," Kerk said. "I first met Tito in the summer of 1998, when I was serving as the interim director of the SKILL Program and Tito was a student in the associated NASA Honors Program. We very quickly became acquainted and I

became aware of his exceptional academic abilities and his charming personality."

"I followed his progress through the school systems," Kerk said. "We maintained contact through the SKILL/NASA summer program again in 1999. During this time, we have also played basketball together, competing on the same team through the YMCA. I also served as his unofficial academic advisor while he was still in high school and now have the honor of serving as his official academic advisor for the courses he is taking at South Dakota School of Mines and Technology. He is making excellent progress toward a BS in Industrial Engineering."

The typical incoming engineering Tech freshman is hopefully ready to take calculus I, college chemistry, and college physics, but some are not ready for those courses and must take remedial courses to prepare. When Handboy graduated from high school, he already had completed 46 college credits, including Calculus I, Calculus II, Differential Equations, College Chemistry I, College Physics I, and College Physics II.

Handboy also excels outside his studies, Kerk said.

"Tito is a leader among his peers," Kerk said. "They look to him for leadership. He is levelheaded. I have seen him in potentially volatile situations on the basketball court and he maintains himself as a gentleman when others around him are losing composure. I see him serve as a positive role model for his younger siblings and also for my young children."

"He is truly a pleasure to be associated with. Everyone that meets Tito appreciates his enthusiasm and smile. Tito is one of those people who will succeed at whatever he sets his mind to," Kerk said. This scholarship will greatly enhance his dreams."



New telecommunications research facility

A new laboratory at South Dakota Tech will help professors and students conduct research that could influence the next waves of the telecommunications revolution.

A donation of more than \$1.2 million from Tech alum Steven P. Miller made the lab possible. Miller returned to campus Friday, Nov. 22, to help dedicate the lab named in his honor. The Miller Lab, located in Tech's Electrical and Computer Engineering Department, will be used for teaching and research related to applied electromagnetics.

The same donation created the faculty position occupied by Dr. Keith W. Whites. Whites, the Steven P. Miller Chair, has worked since Aug. 2001 to establish a telecommunications focus in the Electrical and Computer Engineering Department. Whites has secured more than \$600,000 in outside funding to make that happen.

"The Miller Lab will allow Dr. Whites to conduct fundamental and applied research with a special emphasis in telecommunications," Dr. Larry Simonson, professor of Electrical Engineering and former chair of the Electrical and Computer Engineering Department, said. "The combination of the state-of-the-art laboratory equipment and Keith's expertise has already greatly expanded our teaching and research capabilities."

Miller and Tech officials dedicated the lab in the Electrical Engineering and Physics Building Room 230. Tech invited economic development officials, friends, students, and others to help celebrate the lab's opening.

"The effort has enhanced our university's ability to attract outstanding undergraduate students, graduate students, and faculty," Simonson said. "It will



Dr. Keith Whites (EE, '86), Steven P. Miller Chair, left, and Steven Miller (EE, '69) hold the plaque that commemorates the laboratory.

also allow South Dakota Tech form partnerships with economic development efforts in the creation of entrepreneurship and employment opportunities for engineering and science graduates."

Whites is a South Dakota native. He graduated from Madison High School in Madison, received his bachelor's degree in electrical engineering from Tech in 1986, and his master's and doctoral degrees in electrical engineering at the University of Illinois-Urbana-Champaign. Before coming to Tech, he taught and conducted research for 10 years at the University of Kentucky.

Whites specializes in applied electromagnetics and wireless communications, and has received a number of governmental and industrial research grants and awards. In addition to research, Whites has developed two new courses in computational electromagnetics, as well as the new course,

"Wireless Communications." That class gives students the chance to learn the theoretical and practical intricacies of analog communication electronics. Whites has written and co-written two textbooks, "Introduction to Electromagnetic Fields" and "Visual

Electromagnetics for Mathcad."

"It is an honor to hold the Miller Chair," Whites said. "Funding from the endowment has provided me the opportunity to focus efforts on cutting-edge research with current equipment technologies. Applying this knowledge in the classroom enhances our students' academic growth and competitiveness in the job market."

Miller graduated from Tech in 1969 with an electrical engineering degree. Miller grew up in Beresford and graduated from high school in 1965. After graduation, Miller married Kathleen L. Casey of Madison and went to work for Texas Instruments. During his nine-year tenure there, he held various engineering positions. In 1973, he became the manager of the Surface Acoustic Wave Device Engineering and Development Laboratory.

In the mid-1970s, Miller and three of his co-workers wrote a business plan to raise venture capital financing for a new company. Miller helped form a management team that succeeded in raising capital and formed Sawtek in 1978. Sawtek began producing SAW filters, devices that reduce noise and interference in wireless communications such as cell phones, cable television, wireless Internet, satellite communications, and others.

Miller served as president of Sawtek from its formation in 1978, chief executive officer from 1986, and chairman of the board from 1996. In September 1999, Miller retired but remained chairman. In 2001, Sawtek merged with TriQuint Semiconductor, Inc. Miller has assumed a position on TriQuint's nine-member board of directors.



The sweet smell of success

Whenever word spreads in a community that a neighbor wants to create a hog farm, the NIMBY virus breaks out. Hog farms are fine, neighbors say, but Not In My Back Yard. Complaints about hog farm projects in South Dakota during the past few years have ranged from potential environmental problems to foul air created by hundreds or thousands of hogs.

Research completed by two South Dakota Tech professors could help remove some of the stink from the debate.

Dr. Dave Dixon, associate professor, Department of Chemistry and Chemical Engineering, and Dr. Jan Puszyński, dean, College of Materials Science and Engineering, and professor of Chemical Engineering, recently completed a study of ways to reduce the intensity of the odor emanating from a hog farm. Dixon and Puszyński teamed with Dr. Mylo Hellickson, a professor in South Dakota State University's Department of Agriculture and Biosystems Engineering. The National Pork Producers Council funded the research.

The researchers set out to design a system that combines mechanical, biological, and chemical systems to make hog barn air less unpleasant.

"This has been a most successful project," Hellickson wrote in the team's report. "The results indicate that the systems being considered have outstanding potential for significantly reducing odor and dust in air exhausting from swine buildings."

The research is important because the intensification of livestock production, driven in part by economic necessity, has concentrated large number of swine into larger production facilities. Associated concerns include odor,

human and animal health, and environmental degradation. The researchers believe that continued and enhanced vitality in the industry will be closely related with technological and management developments that address those concerns.

Hellickson designed a mechanical-biological system that uses a wet plastic mesh that creates environmental conditions that degrade odor and dust. Hellickson tested the system in an operating hog barn, and found that it removed up to 100 percent of the dust from the air.

Dixon and Puszyński designed a chemical absorption system that uses a weakly acidic solution to remove from the barn air dust and ammonia, significant contributors in creating foul smells. The system, tested in Tech's Chemical



Engineering laboratory, removed 97.7 percent of ammonia from an air stream that mimicked hog barn exhaust air. Two

Tech students, Molly Mackey (MS.ChE, Belle Fourche) and Breanne Vottero (ChE, Rapid City) built the system this past summer.

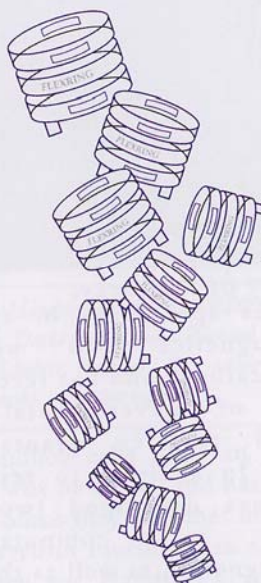
Here's how the Tech system works. An air stream with same amount of ammonia as would be created by several hogs enters a PVC pipe and mixes with a solution of water and sulfuric acid. The cleaner air leaves the top of the system, while most of the solution is recycled. The portion of the used solution that drains from the system is ammonium sulfate, a fertilizer than can be disposed of relatively easily.

"We tried to design a system that could be used with minimal effort," Dixon said. The only control on the system is one that monitors the acidity of the cleansing solution and prompts a pump to add more acid when needed.

The Tech and SDSU researchers built the systems so they could be combined to increase their total effectiveness.

This project is just one example of the potential that research at the state's universities holds for the state and its people.

"This research is important because it takes what we do in fundamental research and translates that into things that can impact economic development and quality of life in the state," Dixon said. "And, it shows people a tangible benefit to research. There are lots of opportunities for the university to work with the state's industries in collaborating on research that could lead to real products."



Dixon and Puszyński designed a chemical absorption system that uses a weakly acidic solution to remove from the barn air dust and ammonia.

Dr. Mylo Hellickson designed a mechanical-biological system that uses a wet plastic mesh that creates environmental conditions that degrade odor and dust.

Bio-technology research proving profitable

Corn is the little grain that can.

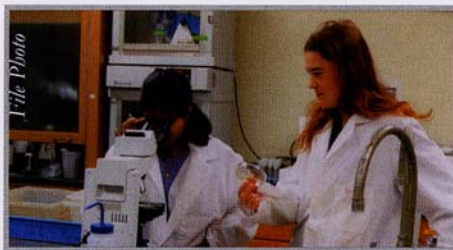
Put corn on the cob in the correct hands, and you can end up with ethanol, soda pop sweetener, low-cost polymers for industry, cattle feed, plastic forks and plates, clothing, and a slew of other products.

Biochemical engineers take the science that makes those advances possible and figure out ways to make the technology profitable on a large scale. The South Dakota School of Mines and Technology has been building a way for Chemical Engineering students to focus on this growing area.

"We're trying to tailor what we do to the needs of the bioprocess industry by giving students a depth of coverage in the classroom combined with a significant hands-on experience," assistant professor Dr. Patrick Gilcrease said. "Many students don't get this kind of experience unless they go on to the graduate level. We want to give our undergraduate students that experience now so they can work in this industry right away."

According to the American Institute of Chemical Engineers "Journal," modern biochemical engineering can probably trace its origins to the early days of the Golden Era of Antibiotics, when the dialog between biochemists, microbiologists, and chemical engineers began. In the early 1980s, Dr. Jay Bailey, the esteemed chemical engineer who foresaw a new horizon between the two disciplines of biochemistry and chemical engineering, published a series of papers.

Bailey believed that the unique combination of molecular insight, quantitative logic, and problem-solving skills could be equally applicable to the analysis and engineering of a living cell. At the



Tech students Sowmya Talari (ChemE, India), left, and Cassady Marshall (ChemE, Laramie, Wyo.) examine specimens in Tech's Biochemical Engineering laboratory.

same time, he recognized that chemical engineers would have to embrace molecular biology, the emerging branch of biochemistry that sought to explain the complexities of life in molecular terms.

Some two decades later, biochemical engineering science is reaching maturity.

The most basic definition of biochemical engineering is the application of chemical engineering to biological systems. Biochemical engineers do a lot more than figure out innovative ways to use corn. They design biological systems for environmental remediation, they engineer improvements to pharmaceuticals, and they work in other areas that combine biochemistry, microbiology, and chemical engineering.

Chemical Engineering students at Tech interested in biochemical engineering take a series of courses that cover all those areas. They augment that with experience in Tech's biochemical engineering laboratory. Students such as Cassady Marshall (ChemE, Laramie, Wyo.) use their knowledge in the laboratory to research problems presented by industry. Marshall is working on a project to determine what sulfate-reducing bacteria will best clean the wastewater at a Wyoming company so the business can recover valuable soda ash at the

bottom of its waste ponds.

"It's interesting because you're doing something that actually has an impact," Marshall said.

The success and growth of Tech's biochemical engineering focus is due in large part to support from Cargill, Inc. The Minneapolis, Minn.-based company gave Tech \$225,000 during the past three years. Tech has used the money to develop faculty expertise, modify the biochemical engineering curriculum, and improve the laboratory facilities. Cargill will provide \$50,000 a year for the next three years so Tech can continue developing the biochemical engineering initiative.

"We really appreciate Cargill's support," Gilcrease said. "They've helped us advance this focus area and made possible what we have today."

Biochemical engineering holds excellent promise to generate and sustain economic development in South Dakota. In fact, it already has. Ethanol plants has popped up in eastern South Dakota, and plans are in the works to build a plant that would break down the structure of timber and turn it into useful products. Several chemical engineering graduates from Tech work in these plants, bringing valued added benefits to the farmers of South Dakota.

"South Dakota is an agricultural state," Gilcrease said. "Biochemical engineering takes what farmers produce and turns it into other useful products that have more value than the crops themselves. It gives farmers one more way to market what they grow."

Industries would be needed to process those agricultural products, industries that could be built in South Dakota. That benefits everyone.



Creating a future of assessment

If you don't have a ready answer to the question "What, exactly is assessment," you aren't alone. But don't conclude that you would find assessment boring. If the learning process interests you, if defining the skills, knowledge, and attitudes that a university should instill in its students challenges you, and if designing class plans or imagining how you might phrase a question to find out if someone understands another culture energizes you, then assessment is your kind of topic.

Assessment is far more than testing. It is an ongoing process aimed at understanding and improving learning. If you were a teacher, here is what the assessment process would mean to you and a class you might teach:

- First, you decide, clearly and specifically, what a student should learn as a result of taking your course.
- Next, you set performance expectations by describing the knowledge, skills, and attitudes a student should acquire. (This step answers the question, "how will you know successful learning when you see it?")
- Then, you figure out how to measure or detect the learning your course should instill in the student.
- The logical next step is measuring the learning, so you do that.
- Once you compile the results of your measurements, you figure out what they mean and identify any strengths and weaknesses they may reveal in your course.
- One of the last - and often the hardest - steps in the process is translating what the results told you into actions to take to improve your class.

So, assessment is measuring learning in order to improve teaching. The process described above is carried out in individual courses, in academic programs,

and in the university as a whole. Faculty members are responsible for assessing the courses they teach and the programs for which they serve as faculty members. And, to be truthful, they have a very tough job.

The simple illustration above hides the many challenges and difficulties of "doing assessment." Our understanding of how and why the brain learns is still imperfect, and there are many types of learning that may be impossible to measure precisely. For instance, the goals the South Dakota Board of Regents sets for the learning we want to achieve for each student who completes our General Education Program (roughly the first two years of college) includes the following:

"Students will understand and be sensitive to cultural diversity so that they are prepared to live and work in an international and multicultural environment."

Now, imagine that the course for

which you must achieve the assessment process is Cultural Anthropology. Where do you begin? What aspects of learning about cultures will best equip your students to live and work in a multicultural world? And, how do you measure such learning? Faculty members in the College of Interdisciplinary Studies are currently struggling with these and other similar questions.

Fortunately, the benefits of doing assessment well are significant enough to motivate faculty members to persevere despite the challenges. The prospect of understanding how learning happens and how a curriculum can be finely tuned to achieve the best possible level of learning is irresistible to anyone committed to teaching.

The benefits most people would list of having effective assessment processes would include maintaining institutional accreditation, and demonstrating to stakeholders, such as parents, students, and taxpayers, that the money they invest through taxes and tuition is well spent. Accrediting agencies and legislators demand increasingly sophisticated and effective assessment programs. And, often, it is easy for busy faculty members and administrators to become focused on the need to respond to these external mandates.

The next three years, for instance, will require us to respond successfully to the Accreditation Board for Engineering and Technology (ABET), which will evaluate nine programs in 2004. And, in 2006, the entire institution will be evaluated and visited by the agency that grants our institutional accreditation, The Higher Learning Commission.

The really interesting and important work of assessment, however, continues to be the



In January 2003, a task force led by Dr. Al Boysen, professor, Department of Humanities, met to put the final touches on the Tech Oral Presentation Rubric, an important portion of the assessment initiative. Pictured, from left to right: Dr. Jo Lee, associate professor; Dr. Kathy Antonen, chair and professor; Dr. Rod Rice, associate professor; Boysen, all of the Department of Humanities; Dr. Jackie Adamson, assistant professor, Department of Social Sciences; Jim Hartman, systems programmer, Information Technology Services; Dr. Scott Williams, assistant professor, Department of Chemistry and Chemical Engineering; Dr. Judy Sneller, associate professor, Department of Humanities; Dr. Larry Simonson, professor, Department of Electrical and Computer Engineering; and Dr. Bob Corey, chair and associate professor, Department of Physics.

Assessment continued on page 30

Dow Corning experimental laboratory

The chemical engineering laboratory will soon be a complete educational package. In it, students design, build, and test solutions to the same engineering problems professionals in the workplace tackle every day.

Much of the recent work completed in the laboratory was done with a \$200,000 grant from the Dow Corning Foundation. Chemical Engineering professors are using the money to create the Dow Corning Foundation Enhanced M.A.P.S. (Materials, Automation, Processing, and Simulation) Laboratory.

"We think we really have a unique laboratory with this open-ended simulation combined with experiments and laboratory experiences that the M.A.P.S. laboratory has provided us," Dr. Robb Winter, chair and professor, Department of Chemistry and Chemical Engineering, said. "We know that students not only have the theory they get out of our courses, but that this laboratory experience gives them the hands-on experience that they're going to need to be able to be contributors from day one when they begin their careers."



The M.A.P.S. Laboratory gives students hands-on experience in construction and operation of Chemical Engineering equipment.

Work is ongoing to create the three experiments that will be the cornerstones of the M.A.P.S. laboratory. When complete, students will, and to some extent, already can, perform real experiments in the areas of fluid transfer, absorption, and heat transfer. They use the equipment to verify and fine-tune mathematical and computer-based solutions to problems, and to understand the nuts and bolts of how these kinds of experiments work.

Students spent the summer of 2002 constructing portions of the experiments, and work continues to create a remote control room from where all the experiments can be directed. All the work is aided by a \$100,000 National Science Foundation grant the Chemical Engineering program received, in part because of the Dow Corning contribution.

The lab represents an innovative and practical approach to Chemical Engineering experiences at focused on design, processing, and testing of materials. Through laboratory experiences that build in complexity, students will integrate proficiencies in Materials handling, pilot plant Automation, Process control, and Simulation software, mapping a course in experiences and knowledge that can be readily applied as future industrial employees.

Steered by a partnership that spans 45 years, SD Tech and the Dow Corning Foundation are enabling students with the skills, knowledge, and

hands-on experience to prepare them to hit the ground running in industries across the country. The M.A.P.S. lab gives students hands-on, open-ended laboratory experiences that are integrated into the chemical engineering curriculum and parallel work being done in industry. Those experiences extend beyond the laboratory.

"It is not just the lab that is going to be beneficial," said Doug Aldrich (BS ChemE '62, MS ChemE '68), Dow Corning Global Manager of Laboratory Facilities, Science and Technology. "It is really tying together all the course work, labs, and independent research. Getting the professors and students



Tech student Kyle Wermers (ChemE, Mitchell) constructs one of the M.A.P.S. Laboratory components.

really collaborating on this is what is going to make this M.A.P.S. lab an absolute step change in how schools prepare their engineers for the future. I am just glad that SD Tech is one of these making step changes. This is looking forward to a very bright future for both the School of Mines and Dow Corning."

Graduates of SDSM&T have been recruited by Dow Corning for more than four decades, and Dow Corning has been a top employer of Tech's Chemical Engineering graduates for the past 10 years. This longstanding partnership benefits both through active co-op participation and recruiting, previous projects with a materials focus, and strong employee retention and performance.



Reducing carbon dioxide's effect on global warming while putting \$ in the pockets of farmers and ranchers

Call it Air Farming, or better yet, How to Help the Environment and Make Money, Too.

Its actual name is carbon sequestration, and promises a novel approach to land use that could earn money for farmers who are proactive in helping solve the world's environmental problems. In short, farmers and ranchers would be paid for using land management practices that keep carbon in the ground rather than releasing it into the air as, the main atmospheric culprit in global warming.

Scientists at the South Dakota School of Mines and Technology are leading an effort to create a carbon sequestration program in South Dakota. Tech's Institute of Atmospheric Sciences administers the program, funded by a grant from the office of former South Dakota Gov. Bill Janklow. The program, called C-Lock, includes collaboration with agencies and scientists throughout the state.

The C-Lock program is centered around two main goals.

- First, C-Lock scientists are working to identify and assess Carbon Emission Reduction Credits (CERCs) for agricultural lands in South Dakota. That means the scientists are creating a system to equate the amount of carbon stored in soil as a result of land management and soil conservation programs into certificates that verify that carbon storage.
- Second, C-Lock aims to maximize the value of CERCs for individual farmers in South Dakota through a system of continual validation and marketing.

"We have estimated that carbon stored in South Dakota as a result of the conversion of farmland into natural grasslands through the Federal Conservation Reserve Program - a farm program that provides financial incentives to retire especially sensitive, highly erodible cropland - has produced carbon credits worth between

\$100 million and \$500 million," Dr. Patrick Zimmerman, director of the Institute of Atmospheric Sciences and the initiator of the C-Lock project, said.

The idea of carbon sequestration bloomed from the debate over global warming. There is evidence that global warming exists and is tied to carbon dioxide. Ancient air bubbles trapped deep within the ice of Greenland and Antarctica indicate that global temperatures have closely mirrored the atmospheric concentration of carbon dioxide during the past 160,000 years. Concentrations of carbon dioxide in the atmosphere have risen by 30 percent during the past 200 years due to a combination of fossil fuel burning, deforestation, and agricultural practices around the world. Whether global temperatures are increasing as a result of the increasing concentrations of greenhouse gases remains to be conclusively established, but the majority of scientific evidence indicates that significant climatic shifts are occurring now and are likely to continue through our lifetime as a result of rising concentrations of carbon dioxide and other trace gases in the Earth's lower atmosphere.

Ancient air bubbles trapped deep within the ice of Greenland and Antarctica indicate that global temperatures have closely mirrored the atmospheric concentration of carbon dioxide during the past 160,000 years. Concentrations of carbon dioxide in the atmosphere have risen by 30 percent during the past 200 years...

According to the Environmental Protection Agency, rising global



temperatures are expected to raise sea levels and change precipitation and other local climate conditions. Changing regional climate could alter forests, crop yields, and water supplies. It could also affect human health, animals, and many types of ecosystems. Deserts may expand into existing rangelands, and features of some of our National Parks may be permanently altered.

Most of the United States is expected to warm. Scientists currently are unable to determine which parts of the United States will become wetter or drier, but there is likely to be an overall trend toward increased precipitation and evaporation, more intense rainstorms, and drier soils. Many of the potentially most important impacts depend on whether rainfall increases or decreases, which can not be reliably projected for specific areas.

The link between atmospheric carbon dioxide concentrations and impending climate change has spurred much recent activity among governments around the world to decrease the future risks associated with rapid climate change. One priority is to slow the rate of increase of carbon dioxide concentrations in the atmosphere by changing current industrial and agricultural practices. The process of removing carbon dioxide from the atmosphere and locking it away in the ground or in the oceans is carbon sequestration.

Before arable soils of the United States were first plowed, a large amount of carbon existed in these rich soils in

the form of dead organic matter. Since the onset of agricultural activity, repeated turning and aeration of the soil has broken up the thick layer of organic matter. That resulted in the loss of carbon because the organic matter converted to carbon dioxide.

However, changing agricultural management practices, such as switching from conventional tillage to no-till, can result in an increase in the accumulation of organic matter in the soil. This accumulation - or sequestration - results in a decrease in the atmospheric burden of carbon dioxide. Furthermore, if it can be documented to exist and be measured, it has value in the global marketplace. As an additional benefit, these practices also can be shown to reduce the amount of local sediment that makes it into rivers and streams.

That's where farmers and ranchers can take advantage of their land and expertise in managing it.

If industries that are required to reduce carbon dioxide emissions can be certain that carbon is being stored somewhere in South Dakota, they can pay a fee to the farmer or rancher to ensure that carbon-storing management practices will continue. That means, in effect, that a company doesn't need to change its practices because the farmer has. This process results in the production of CERCs, or Carbon Emission Reduction Credits. The credits can be bought, sold, and traded in the same way as other commodities.

"We have developed C-Lock to provide an effective interface among farmers and ranchers who manage lands

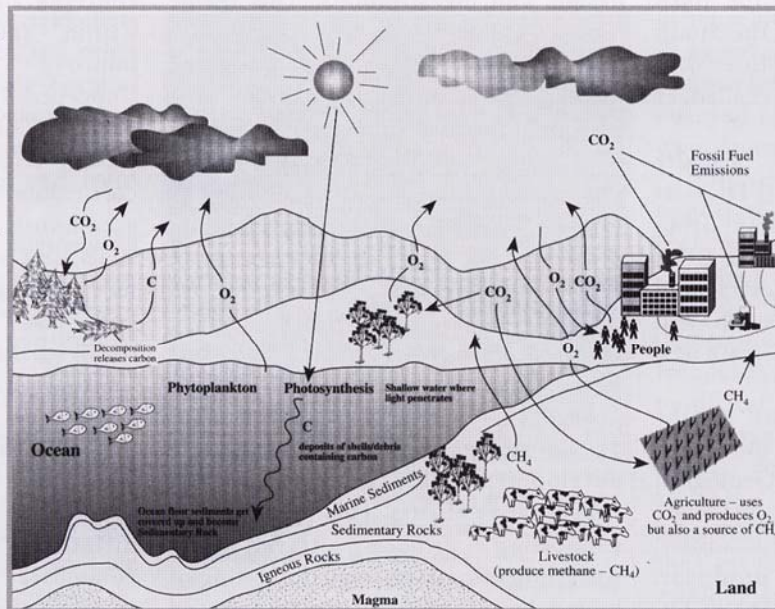


Diagram of the Carbon Cycle.

to sequester carbon, those in the private sector with the need to offset future emissions, and with regulatory agencies charged with ensuring compliance with national and international regulations." Zimmerman said.

A second process that can generate CERCs is through carbon substitution

"We have developed C-Lock to provide an effective interface among farmers and ranchers who manage lands to sequester carbon, those in the private sector with the need to offset future emissions, and with regulatory agencies charged with ensuring compliance with national and international regulations."

-Dr. Patrick Zimmerman

in fuels. That is, if renewable fuels such as ethanol and other biomass fuels are burned instead of fossil fuels, the amount of fossil fuel carbon burning that has been averted also will likely qualify as a carbon credit. Therefore, production of biomass fuels will serve to create additional CERCs that may be bought, sold, and traded on the open market.

A third process is the capture of greenhouse gases other than carbon dioxide. For example, on a weight basis, methane is about 20 times more effective in terms of its global warming potential

than carbon dioxide. That means that trapping methane emissions from landfills for use in generating heat or electricity can quickly create valuable, easily verifiable carbon emission reduction credits. This and similar potential greenhouse gas emission offsets are proposed for future investigation by the C-Lock team.

At this time, the basic framework for C-Lock has been created and tested by selected farmers.

"The C-Lock team believes that the program is but one example of a process needed in order to stimulate a free-market approach to pay for commodities like clean air and clean water," Zimmerman said. "Those things are vitally important and often taken for granted, but they are increasingly recognized as critical to the prosperity and survival of the rapidly industrializing world. C-Lock provides an ecologically sound way to buy time to allow technology to catch up to global environmental issues related to increasing emissions of carbon dioxide."



Faculty development grant

A \$300,000 grant from the Bush Foundation will help the South Dakota School of Mines and Technology faculty face the challenges of education.

In Nov. 2002, the Faculty Development Committee (FDC) at Tech received a three-year grant from the Bush Foundation in response to its funding proposal, "Complexity and Coherence: Integrating Research and Curriculum Development to Create new Learning Environments."

Each year, the members of the FDC - Dr. Alvis Lisenbee, professor, Department of Geology and Geological Engineering; Dr. Rod Rice, associate professor, Department of Humanities; Dr. Lee Vierling, assistant professor, Institute of Atmospheric Sciences; Dr. Stan Howard, professor, Department of Materials and Metallurgical Engineering; Dr. Michael Hudgens, assistant professor, Department of Humanities; Dr. Frank Matejick, associate professor, Industrial Engineering program; Dr. Mike Batchelder, professor, Department of Electrical and Computer Engineering; and Dr. Kerri Vierling, assistant professor, Department of Chemistry and Chemical Engineering - are responsible for awarding \$67,870 in Bush funds and \$10,000 in institutional funds for workshops, travel, and teaching enhancement projects.

Since this Bush grant is new for the 2002-2003 academic year, the committee members find themselves doing outreach and explaining how, precisely, the "themes" of the Bush grant translate into projects and plans that can be funded. There are three themes of the grant:

• Theme #1:

Collaborating through research and design

Promoting lifelong learning and improving the classroom experience through faculty and undergraduate collaborative projects such as research,

design, and investigations. This theme means supporting student and faculty projects that foster and reinforce student commitment to learning as a lifelong, repetitive process. The Faculty Development Committee hopes to see requests for projects and travel that link in-class learning and learning beyond the classroom.

• Theme #2:

Improving pedagogy and the curriculum

Expanding scholarly activity in pedagogy, defined as the art and science of teaching, and curriculum development with an emphasis on collaborative efforts. This theme means supporting projects, travel, and workshops that encourage the testing of innovative instructional practices and increasing understanding of the learning process. Through this theme, the FDC hopes have a strong positive impact on the curriculum at many levels.

• Theme #3:

Integrating and linking curricular concepts

Integrating and linking curricular

concepts and instructional approaches within and across disciplines to improve curricular continuity. Conceptually, this theme may be the newest. The FDC is seeking to support faculty efforts to link aspects of the curriculum. The committee's idea is to accomplish this by focusing on key skills or concepts and to use them to link courses, programs, and even co-curricular activities, such as involvement in student government or international student groups. The committee is now considering a proposal, for instance, to use a teaching unit on ethical thinking in an engineering context in courses in three different programs. And, the committee hopes to fund development work on the "ethical dilemma" lessons already used in the freshman-engineering course, GE115. The committee expects the impact in this example will be that engineering students will be given multiple opportunities to exercise their abilities to reason ethically as engineers before they face real-world choices. The members of the FDC believe this approach to learning is worth funding.

So, as you can see, "developing" faculty does not mean that faculty members need remediation. Rather, they need to be supported in their ongoing efforts to expand their horizons of knowledge and teaching practices. Engineering education is subject to many new demands. New engineers, for example, must graduate with experience working on project teams. They must have an understanding of how their engineering decisions will impact society. They need a grasp of contemporary issues, and, as suggested above, the ability to think ethically as engineers. Teaching such skills and attitudes is challenging to professors who have devoted their lives to studying chemical engineering



File Photo

The Faculty Development Committee, left to right: Dr. Michael Hudgens, assistant professor, Department of Humanities; Connie Vanbockern, secretary, Department of Chemistry and Chemical Engineering; Dr. Kerri Vierling, assistant professor, Department of Chemistry and Chemical Engineering; Dr. Lee Vierling, assistant professor, Institute of Atmospheric Sciences; Dr. Kate Alley, director of Academic Initiatives; Dr. Rod Rice, associate professor, Department of Humanities; Dr. Frank Matejick, associate professor, Industrial Engineering Program; Dr. Mike Batchelder, professor, Department of Electrical and Computer Engineering; and Dr. Stan Howard, professor, Department of Materials and Metallurgical Engineering.

Faculty development
continued on page 30

Engineering meets history

Medieval armies used trebuchets to hurl giant stones and other missiles to kill their enemies and win battles. South Dakota Tech students use the contraptions to fling tennis balls to earn grades and learn about engineering.

Students in freshman engineering classes had a little more than three weeks during the fall 2002 to design their trebuchets within the confines of a kit handed out in classes. Students could alter design factors of the kits in hopes of increasing the distance their trebuchets tossed a tennis ball. The project gave students the opportunity to apply engineering skills to a real project that allows them to see immediate results of their decisions.

"We wanted to reinforce principles discussed and demonstrated during the semester using a real hands-on project," Dr. Larry Stetler, associate professor, Department of Geology and Geological Engineering, said. "Hopefully, they learned that working with others can be a challenge, but rewarding as well. Also, we wanted to foster the idea of critical thinking and analysis in terms of design modification."

The trebuchet project had at least three main objectives:

Students would be able to work effectively on a team to solve a simple design problem utilizing the fundamental principles of engineering design, experimentation, and data analysis.

Students would be able to write a satisfactory technical report detailing the problem, experimentation, and overall design process.

Students would be able to satisfactorily give a technical presentation detailing the problem, solution, and results of a simple design problem.

The trebuchet project was the culmination of the GE 115 course and included all aspects of the course curriculum. This included working on



Engineering student teams compete in the trebuchet contest designed to teach all aspects of design, experimentation, and data analysis.

teams, posting materials to student web pages, collecting, analyzing and modeling data using Microsoft Excel, using engineering design methodology to solve simple problems, technical writing, and presentation.

"Our indications are that most teams were able to overcome any real or perceived team difficulties and that they also were able to understand the design enough to alter or modify portions of it to achieve maximum performance," Stetler said.

As an introductory engineering course, GE 115 does not focus on any one engineering discipline. Rather, it teaches fundamental engineering principles applicable to all disciplines.

Most of the true engineering challenges for trebuchet construction were removed from the project. During the summer of 2002, Dr. Stuart Kellogg, professor and director, Industrial Engineering program, designed and built a model trebuchet. Kellogg and Stetler fine-tuned the machine in terms of performance and had local firms bid on mass-producing kits that could be simply assembled using interchangeable parts. Riss and Associates, a local cabinet-making company, won the bid and made 70 kits

using white oak. Kellogg and Stetler designed into the kits at least 10 basic design elements that could be altered or changed by the students based on their own data analysis.

"In the end, they had plenty of opportunity to incorporate design into their project," Stetler said.

Once each team received its kit, it was up to the team members to determine how to maximize the trebuchet performance. Design modifications that affected performance were related to the design of a counter-weight system and attaching it to the frame, designing and constructing a sling to hold and throw the projectile (a tennis ball), and maximizing performance by adjusting the length of the throwing arm and the distance the counter-weights were from the pivot point on the throwing arm. However, the primary principles involved with the trebuchet performance were all based on fundamental physics.

"We intended for the students to be able to assess the trebuchet in terms of the physics involved, and then modify the basic design to maximize performance," Stetler said. "Hopefully, this enforced to the students that physical principles need to be understood before an engineering design can become an effective design."

There were 13 GE 115 sections. Every section participated in the project, which culminated with a competition in the King Center Gymnasium. The winning team's trebuchet threw a tennis ball more than 100 feet.

The trebuchet project also harkened back to the very creation of the word, engineer. In its early days, the trebuchet was called an Ingenium, and the technicians that maintained and operated the machines were called Ingeniators, from which we get the word "engineer."



Campus facelift promises exciting times ahead

A trio of projects will make Tech a more student-centered campus that better meets the needs and wants of current and future students.

The projects include the construction of a new, 300-bed residence hall that will connect to a renovated Surbeck Center, and extensive renovations to the King Center.

"These are exciting times at SDSM&T," Tech President Dr. Richard Gowen said. "These are important and needed projects that will keep SDSM&T attractive to prospective students while enhancing the opportunities available for current students."

The Tech Student Association assumed the leadership role for this initiative. Student leaders began communicating to the student body the idea of a general activity fee increase to pay for the Surbeck and wellness center portions of the projects in the fall of 2001. Numerous student forums, hearings, and campus newspaper articles all helped shape the proposals.

"A lot of times, students complain about not being able to see where their student fees are being used," Student Association President Matt Goeden (CEng, Yankton) said. Goeden served on the committee that devised the projects. "This is a chance for students to directly see their student fees in action."

Surbeck Center

The Surbeck Center, built in 1961,

serves as the focal point for student activities on campus.

On the main floor, the project includes reconfiguring the front entrance, building a spacious student computer lab, significantly upgrading the South Lounge area, and reconfiguring conference rooms.

On the ground floor, the 2,000-square-foot space that now includes the bowling alley will be rejuvenated to create better space for student organizations, and the Student Activities and Leadership, Multicultural Affairs, and Ivanhoe International Center offices. The project also will upgrade the fire alarm and electrical systems.

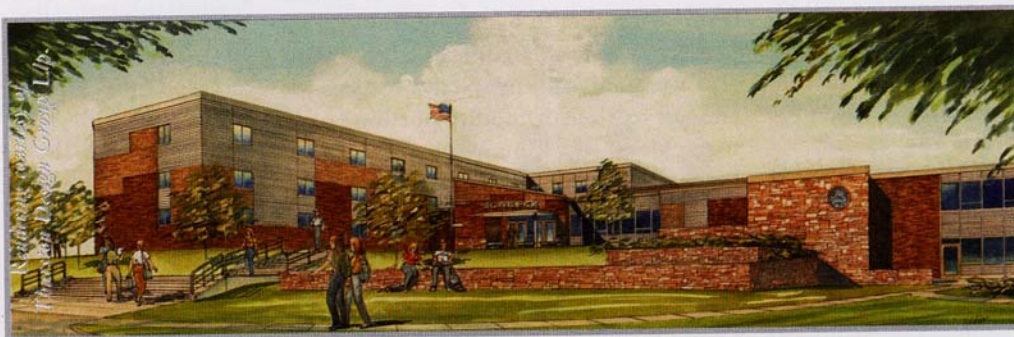
"The projected view of the Surbeck Center is student-focused," Tech student Kristen Heck (GeoE, Sioux Falls) said. Heck served on the committee that devised the Surbeck/Residence Hall project. "All the student organizations are planned

students, Dr. Pat Mahon, Tech's Vice President for Student Affairs and Dean of Students, said. The lounge areas and student organization space also are designed to promote mingling and mixing of students.

"There's a value to students learning about cultural differences and learning about Kwanzaa and Cinco de Mayo in a non-intrusive way," Mahon said. "An engineering student from South Dakota may have limited exposure to different cultures. If they have that exposure here, then when they go to work in Atlanta, Georgia, or someplace in Michigan, they will already be comfortable with people of different nationalities."

Residence Hall

A new 300-bed residence hall will be constructed adjacent to the north end of the Surbeck Center. Room configurations will include suites and standard double rooms. Study lounges, a kitchen, and an exercise room also will be included. Since the residence hall will connect to the Surbeck Center's main floor, a coffee and smoothie shop, the cashier's office, the campus safety office, and a common



The Surbeck Student Center, built in 1961, serves as the focal point for student activities on campus. The new addition is designed to enhance the campus experience for students.

together in a visible zone to get more involvement. There will be areas to relax and have a comfortable atmosphere as well as areas for study groups. Our view was to turn the Surbeck Center from administrative to student friendly and usable."

The committee worked hard to make sure the Surbeck Center will continue to be attractive to students who live on campus and to commuter

front desk operation will serve both.

"Providing students with more of what they want is the best part of this building project," Residence Life Director Reeny Wilson said. "We've talked with many students, held focus groups, gathered survey information, and more. Through a new residence hall, we will offer students more on-campus housing options, better meet their needs, and hopefully attract more

students to the Tech campus."

Heck, the student on the project committee, said the new hall will accomplish those goals.

"We've needed a new dormitory for several years now," she said. "The new dorm will accommodate current students' needs with more conveniences. The way I think of the new dorm is a cheap apartment on campus. It will provide the basic necessities with a little bit of luxury, and it will be very convenient to students who are involved on campus."

King Center

The students' primary desire for the King Center was the reconstruction of existing weight and exercise rooms into an up-to-date wellness center.

To create the wellness center, several walls will be moved or removed to create much more space for the wellness center than is available now. Modern exercise equipment, television sets, and sound capabilities also will be added.

The existing locker room on the west end of the second floor will be converted to two locker rooms that enter into the new wellness center. The new locker rooms will be approximately 57 percent larger than existing locker room space. The new locker rooms not only will provide convenient service to the remodeled wellness center, but will

provide an extra locker room and improved accommodations for visiting athletic teams.

"Students will benefit by the project for the fact that they will have an inexpensive way to keep in shape that has the convenience of being on campus," Heck said. "Right now, the King Center offers that same thing, but more students will be attracted to it because of the extended facility."

Goeden agreed. "The renovations to the King Center are going to give the students a first-class wellness center which will allow students to work out and stay healthy without having to leave campus and buy a membership to an off-campus wellness center," he said.

An important part of the King Center Renovation is the creation of the Hardrock Room and Hardrock Hall of Fame. That part of the project will be funded entirely by private donations. The Hall of Fame addition also will feature classroom and office space.

The history of Tech athletics dates back to 1895 and professes more than 100 years of wins, losses, championships, and great individual achievements. As the Hardrock Club celebrates 50 years of service to Tech and Tech athletics, the hope is to permanently dedicate a place to not only remember the past, but to look to the future with pride for what Tech stands for on the playing field and in the classroom.

To this end, the planning for the Hardrock Room is nearly complete. This exciting project is an important part of the Hardrock Club's Golden Anniversary Campaign, a three-year campaign with a \$1 million goal. The 3,995 square-foot



Interior of the Hard Rock Club and Hall of Fame addition.

addition will feature the new Hardrock Hall of Fame.

The Hall of Fame will honor past athletes, coaches, teams, and contributors, as well as display athletic memorabilia from the university. A Hall of Fame committee has been established to set the criteria for induction and to begin reviewing candidates. Committee members include Harold Fritzsche (ME '51), retired Tech coach Bob Hunt, Tech athletic director Hugh Welsh, retired Rapid City Journal sports editor Don Lindner, former Tech sports information director Jim Morrison, and current sports information director Tom Rudebusch.

As a part of the Golden Anniversary Campaign, any person, company, or group pledging at least \$1,500 over three years will receive a brick inscribed with their name or a name they choose to honor. The bricks will be placed in the Hardrock Hall of Fame.

If you are interested in having your name on a brick or otherwise assisting the Hardrock Club and its Golden Anniversary Campaign reach its goal, contact Tom Rudebusch at (605) 394-2601 or Brad Johnson at the Foundation at (800) 211-7591.



Rendering courtesy of TSP Architects.



The Hard Rock Club & Hall of Fame addition.

The South Dakota School of Mines and Technology has a firm belief in partnering its, staff, and students with communities, businesses, and K-12 educational organizations throughout the region.

Photo by Steve Buchholz



Midnight Breakfast: Connie Vanbockern, secretary, Department of Chemistry and Chemical Engineering, serves a plate of midnight breakfast to a student on the night before Fall finals began. Tech staff and faculty cooked and served the late-night meal to give students a reason to take a study break.

Photo by Steve Buchholz



Leslie Kelley, senior secretary in the Office of University and Public Relations, creates a tornado in a bottle for school children during the Kids Fair, an event sponsored by Youth and Family Services. Hundreds of students visited the Science Center booth during the event to see science experiments at work and to try some of their own.

Photo by Steve Buchholz



Holiday Concert: Tech President Dr. Richard Gowen and Nancy Gowen greet visitors to the free annual Christmas Concert at Our Lady of Perpetual Help Cathedral in Rapid City. The concert celebrated its 20th year in 2002.

Photo by Steve Buchholz



Food Baskets: Pastor Joann Conroy of Lutheran Campus Ministry prepares to deliver a food basket to a member of the Tech community. Staff, faculty, and students donated food and money to make sure no one went without during the holidays.

Photo by Steve Buchholz



Battle Reenactment: Two members of the Society of Creative Anachronism reenact a Medieval battle for a Humanities class. The reenactors discussed weapons, armor, and fighting methods before putting all they knew to use.

File Photo



Shark Class: Students explore the anatomy of spiny dogfish sharks at the Children's Science Center during an enrichment class. Center Education Coordinator Liliane Wood guided the students through the exercise.

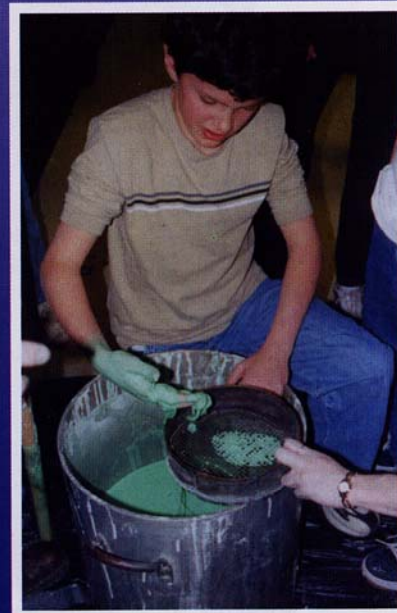
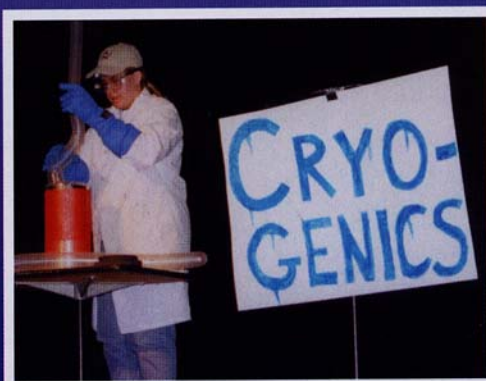
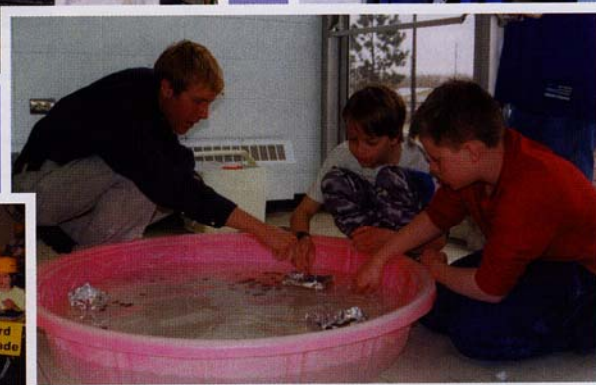
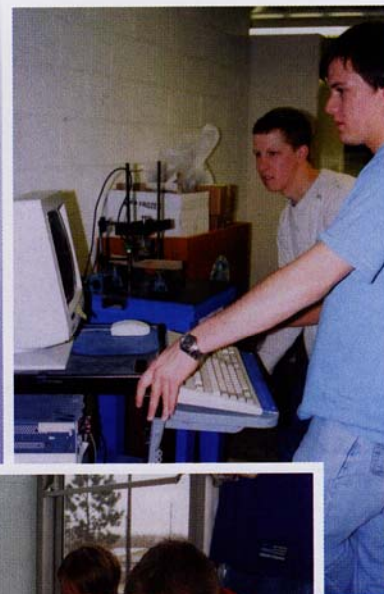
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Storybook Island: Members of the Tech chapter of Circle K take a break from decorating at Storybook Island in Rapid City.

Engineers Week

Photos by Steve Buchholz



Engineers Week



Janet Carter (BS. GeolE, '92. MS. GeolE, '94), standing, addressed a lunchtime crowd about the recently completed Black Hills Hydrology Study. Carter managed the project for the U.S. Geological Survey.



Tech honored six Outstanding Recent Graduates during Engineers Week. Five recipients were able to attend (from left): Gail Schmidt (BS. CSc, '92, MS. CSc, '94), Stacy Phelps (ME, '96), Matthew Bunkers (BS. IS, '92, MS. Mtro, '93), James Daley (Mine, '94), and Janet Carter (BS. GeolE, '92. MS. GeolE, '94). T.J. Safranski (EE, '92) was unable to attend.

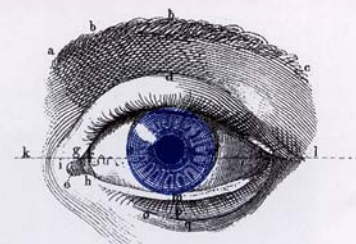


Engineer Celeste Baine was the featured speaker during Engineers Week. She talked to middle school, high school, and college students about the exciting careers that exist in engineering.



More than 125 graduating seniors joined the Order of the Engineer during an Engineers Week ceremony. Inductees recite a pledge to uphold the values of the Order.

VISION - a traveling exhibit at the Children's Science Center



Come See Why You See What You See

Focus on these eye facts:

Because most people blink every five seconds, our eyes are actually closed for nearly 30 minutes of our waking hours.

If cataracts could be delayed by just 10 years, the need for cataract surgery in the United States would decrease by almost half.

These interesting eye tidbits are part of a fascinating science exhibit called VISION that celebrates the wonderful world of sight. The Children's Science Center in Rapid City, an outreach service of South Dakota Tech, hosts the exhibit from March 20 through July 19, 2003. The Discovery Center and Aquarium in Pierre hosts the exhibit from July 25 through Jan. 4.

"This is a great exhibit," Julie Smoragiewicz, Tech's vice president for University Relations, said. "It's designed to teach everyone, no matter their age, about eye health and research, things important to all of us."

The Rapid City community had the chance to see eye education in double during March and April because Tech and the Science Center used The Nature of Things page in the *Rapid City Journal* to focus on the theme, "The Eyes Have It." The Nature of Things runs every Monday in the Journal's Local section.

Bringing the exhibit to Rapid City and Pierre was made possible through a



NORTHERN PLAINS EYE
FOUNDATION

generous gift from the Rapid City-based Northern Plains Eye Foundation. Their mission is to promote and support research, education, and service for eye care in this region.

"We really appreciate the Northern Plains Eye Foundation's support," Discovery Center executive director Kristie Maher said. "Without their generosity, it

would have been very unlikely that we could bring this important and educational exhibit to South Dakota."

The 2,000-square-foot exhibit highlights two themes - how the eye and brain work together to create vision, and how researchers are developing novel strategies to protect our eyesight from disease and developmental problems.

This exhibit is designed for anyone from age 2 to 92. It presents complex ideas in very simple terms. VISION also offers a remarkable display of artifacts, including antique eyeglasses, eye charts, and Army Signal Corps binoculars.

The exhibit highlights the past, present, and future of publicly funded vision research, by the use of text, photographs, artifacts, and 10 interactive stations.

The National Eye Institute created the VISION exhibit to celebrate the Institute's 25th anniversary. Congress created the NEI to improve the diagnosis, treatment, and prevention of eye disease. Today, the NEI sponsors more than 75 percent of the eye research conducted in the United States. Since its creation, research supported by taxpayers through the NEI has led to discoveries that have saved hundreds of thousands of people worldwide from vision loss and blindness. These accomplishments include laser surgery for eye diseases; treatment for eye diseases such as diabetic retinopathy, glaucoma, uveitis, retinopathy of prematurity, ocular herpes, and cytomegalovirus retinitis; and advanced knowledge of how the eye functions in both health and



Illustration:

A computer generated model of aldose reductase, an enzyme associated with complications of diabetes. National Eye Institute scientists are studying this enzyme to find better ways to protect people from complications of diabetes, especially loss of vision.

Courtesy of Peter F. Kador, Ph.D., National Eye Institute



disease that will lead to future sight-saving treatments.

Museums and universities across the country have hosted the exhibit.

The education portion of the exhibit is split into four areas:

How We See - Photos, graphics, and interactive stations explain the anatomy and physiology of the eye and the visual system.

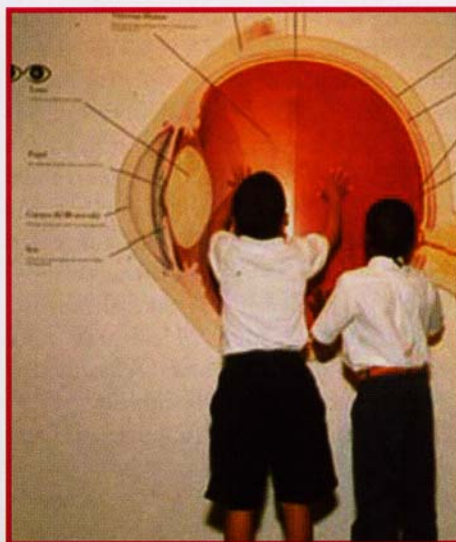
Eyeing the Past - Artifacts from The National Museum of Health and Medicine are displayed, including a collection of hand-blown glass eyes from the Casey Eye Institute at the Oregon Health Services University in Portland, Ore.

Eye Care Today - Common eye diseases and disorders are highlighted, outlining the groups at risk, incidence, symptoms, diagnosis, treatment, research results, and ongoing research. Diseases explained include myopia, hyperopia, astigmatism, presbyopia, strabismus, amblyopia, retinopathy of prematurity, diabetic retinopathy, age-related macular degeneration, glaucoma, and cataract. This section also addresses the importance of clinical and basic research. Low vision also is discussed and illustrated in this section.

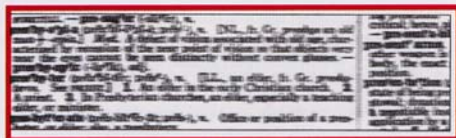
The Future - Panels predict the future of vision research.

"We're excited about hosting the exhibit and giving visitors a chance to learn how they can help their eyes stay healthy," Smoragiewicz. "We invite everyone to join us for this eye-opening experience."

The Children's Science Center is open Tuesdays through Saturdays from 9 am to 4 pm. Admission is only \$3. Members and children ages 2 and younger are admitted free of charge.



The VISION exhibit highlights a larger than life hands-on learning experience for all ages.



Simulation of presbyopia.



Simulation of cataracts.

The Children's Science Center offers educational programs associated with this exhibit and a variety of summer enrichment classes. For more information about the Children's Science Center, log on to www.hpcnet.org/sdsmt/csc/handsonscience

CSC Exhibit Schedule

VISION: March 20 - July 19, 2003

Bugs Eye View: July 22 - November

Summer Enrichment Classes 9 a.m. to Noon

Skate Dissection
June 17 - 18

Digging in the Dirt
June 24

Polyhedra
June 25

The Eyes Have IT!
July 1 - 2

What's Bugging You?
July 8, 9 and 10

From Sea to Shining Sea
July 29, 30 and 31

Let's Go Fishing!
August 5 - 6

Crazy Constellations
August 12 - 13

Kitchen Chemistry
August 20 - 21

Science Olympiad
August 26 & 27

Newton's Nature Camp
July 14 - 18 and July 21 - 25
9 a.m. to 5 p.m.



Research examines dino elimination

Dinosaurs left behind countless signs of their time on Earth. One of those signs are lumps of solid waste called coprolites. That knowledge has always left an intriguing and important scientific question - did dinosaurs pee? And, if so, where's the evidence?

A husband-wife team from South Dakota Tech thinks it may have found the answer. Dr. Gale Bishop, director, Museum of Geology, and Kata McCarville, on leave from her position of director of Instructional Technology Services to pursue a doctorate in Geology, have been working on this research. And they've created quite a buzz. Their research into what may be evidence of dinosaur urination has been featured in several magazines and at least two languages.

File Photo



A cross sectional view of one of the trace fossil scours discovered and documented by McCarville and Bishop.

"The nature of the subject matter, of course, attracts attention," McCarville said. "Some people discount the work as trivial or unimportant. Some people just have a negative reaction, perhaps partly sourced in embarrassment regarding the subject matter. Negative reactions from some scientists reflect a tendency to devalue trace fossils, although in recent years we have seen that trace fossils provide important information about extinct organisms."

"Trace fossils in general, as well as this one in particular, give us the opportunity to glean information about

animal physiology and behaviors -- information that is not accessible if we limit ourselves to studying only skeletal remains," McCarville said.

McCarville and Bishop found the evidence in question in southern Colorado along a dinosaur trackway near the Purgatoire River. The researchers theorize that giant, 16-ton sauropod dinosaurs urinated while walking through the area. The evidence is a bathtub-shaped depression 10 feet long, three feet wide, and 10 inches deep. The origin of the depression has never been known, although it has been guessed at and ignored by researchers for years. The basin is located at the same ground level as 40 sauropod trackways and 43 theropod trackways.

"On the nearly flat lake shore, the only source of such an elevated fluid stream would be animals crossing the area," Bishop and McCarville wrote. "The volume of liquid required to form a scour structure as large as the one in question suggests it may represent the expulsion of liquid wastes from one of the sauropod dinosaurs crossing the tracksite. There is no known source for an elevated stream of fluid except the large (16-ton) dinosaurs crossing the site."

They based that finding on the examination of a cross-sectional view of the structure walls and fill, and by comparing the basin to similar experimental scours formed in laminated sand at St. Catherine's Island, Ga., where Bishop has studied turtles for years.

The question is important in the context of current theories regarding the origin of birds as descendants of dinosaurs. Some paleontologists insist that because birds don't, dinosaurs could not have eliminated wastes in liquid. McCarville and Bishop are challenging that belief based on their observations of living birds. Their research reveals that hummingbirds eliminate about 80 percent of their body weight per day in the form of



File Photo

Dr. Gale Bishop gathering research data.

liquid, mostly water. The team's observations of captive ostriches and brown pelicans in the wild show that they also eliminate significant streams of liquid waste.

The controversy over dinosaur elimination really erupted several years ago, spurred by the scene in the documentary, "Walking with Dinosaurs," where the *Postosuchus* (a crocodile-like animal) urinates to mark its territory. That scene also was what gave McCarville the first notion that liquid dinosaur waste created the basin, which interested McCarville previously.

McCarville and Bishop were funded by the U.S. Forest Service to study the depression in detail. They presented their findings at the annual meeting of the Western Association of Vertebrate Paleontologists last February in Pasadena, Calif., then in the form of a poster at the Oct. 2002 meeting of the Society of Vertebrate Paleontology in Norman, Okla. Since then, the topic has been covered in an on-line French-Canadian magazine, "Cybersciences," which is affiliated with the publication "Quebec Science," and in the United States in "Science News." Articles also have appeared in the French science magazine, "Science et Vie," and in "Geotimes."



The South Dakota Board of Regents recognized several Tech student organizations.

The Award for Academic Excellence

The award for academic excellence was given to Tech's **American Indian Science and Technology Engineering Society (AISES)** in December 2002. The club sponsors many activities throughout the academic year, including an American Indian Forum series, a campus wide blood drive, and participation in an after-school program for youngsters in the Rapid City Area School District.

File Photo



AISES Award: Dr. Pat Mabon, Vice President for Student Affairs and Dean of Students, AISES Advisor Jacquelyn Bolman, AISES Region 5 Representative Misty Mousseaux (IS, Porcupine), and Regent Harvey C. Jewett.

Organizational Leadership

The award for organizational leadership was presented to **The Raver** in December 2002. The Raver, a student-written campus-wide publication, focuses on issues and events that concern students. The Raver serves as both the traditional newspaper information source and an entertainment venue on campus.

The Award for Academic Excellence was given to members of **Tau Beta Pi** in May 2003. Members of the engineering honor society, are in the top one-eighth of the junior engineering class or the top one-fifth of the senior engineering class. At the society's national convention, the Tech chapter received awards for outstanding projects and the Secretary's Commendation Award. Tau Beta Pi sponsors an annual spring career fair and an Order of the Engineer luncheon on campus. Three Tech students have received national Tau Beta Pi scholarships, and one graduate student received a national fellowship.

Community Service

The Community Service Award was given to the **Circle K Club** in May 2003. The club has performed more than 500 hours of community service during the past year. For one project, members stayed up for 24 continuous hours to conduct a community service marathon project in Rapid City. Tech Circle K members have served as governor and lieutenant governor for the Minnesota-Dakotas District of Circle K.

The Award for Organizational Leadership was given to members of **Triangle Fraternity** in May 2003. Members volunteer their services for many projects, including highway cleanup, blood donor drives, a community haunted house during Halloween, the Hospice Christmas party, and as servers at a local arts festival. Fraternity members also serve as leaders in other campus-based organizations, including Student Association, the school entertainment club, Students Against Drunk Driving, the homecoming committee, Student Ambassadors, Tech Geological Association, and the orientation committee.



Community Service Award: Richard MacDonald, Dan Wolf (EE, Canton), Regent Harvey C. Jewett, and Dr. Pat Mabon, Vice President for Student Affairs and Dean of Students.

Leadership Development

South Dakota Tech named seven students to its Leadership Development Team. The Leadership Development Team is comprised of students whose mission it is to provide Tech students with opportunities to become confident and qualified leaders. The students: **Chris Bartelt**, chair (IE, Watertown); **Jenni Christensen** (EE, Bloomington, Minn.); **Anita Hansen** (IE, Hermosa); **Chad Nienhueser** (CE, Sidney, Neb.); **Justin Reisenauer**, (ChemE, Hettinger, N.D.); **Dan Wolf** (EE, Canton); **Miaken Zeigler** (EnvE, Sturgis).

Computer Programming Contest

The following Tech students competed in the Association for Computing Machinery International Collegiate Programming Contest. The four Tech teams competed against 155 other teams from universities in the Midwest and Canada. The contest pitted teams of three university students against eight or more complex, real-world problems, with a grueling five-hour deadline.

16th Place Team: **Matt Colvin** (ChemE, Math, Hutchinson, Minn.); **Chad Hartsel** (CSc, Gillette, Wyo.); **Jonathan Wolf** (CSc, Moorcroft, Wyo.)

17th Place Team: **Pete Gasper** (CSc, Sidney, Mont.); **Nathan Sachs** (CSc, Rapid City); **Wyatt Zochert** (CSc, Webster)

55th Place Team: **Ben Cutler** (MATH, CSc, Hot Springs); **Mike Henrickson** (CSc, Pierre); **Tim Jacobson** (CSc, Rapid City)

69th Place Team: **Caleb Herbst** (CSc, Keystone); **Chris Rickett** (CSc, Highmore); **Warren Rose** (CSc, Bismarck, N.D.)

File Photo



Computer Programming teams.

American Institute of Chemical Engineers

A group of Tech Chemical Engineering students attended the 2002 American Institute of Chemical Engineers (AIChE) Annual meeting in Indianapolis, Ind., during the fall 2002 semester. In addition to networking with the other 1,000 chemical engineering students from across the country and Puerto Rico, the Tech AIChE student chapter competed in the Chem-E-Car poster competition, coming home with the Golden Tire Award for Best Looking Design. Tech car competition team members include Chemical Engineering students **Justin Vreugdenhil** (Parkston), **Zac Doorenbos** (Owatonna, Minn.), **Craig**

File Photo

Bossert (Aberdeen), **Sean Coleman** (Wagner), **Gena Engel** (Colome), **Anne Larson** (Albert Lea, Minn.), **Terry Klein** (Rapid City), **Tara Boehmer** (Mitchell), and Mechanical Engineering student **Bobbie Crater** (Glasgow, Mont.). The student activities concluded with **Sarah Farber** (ChemE, Glendive, Mont.) presenting a poster on her summer research experience in biochemical engineering (REU at Colorado State University). Students, other than those on the competition team, attending the conference this year included Chemical Engineering students **Anne Larson** (Albert Lea, Minn.), **Mitchell Wendt** (Sioux Falls), **Benjamin Mauch** (Mooreton, N.D.), **Pearl Barnhart** (Rapid City), and **Sara Farber** (Glendive, Mont.). Chapter advisor **Dr. David Dixon**, associate professor, Department of Chemistry and Chemical Engineering, accompanied the students.

File Photo



Chemical Engineering Student award recipients.

Leadership Hall of Fame

Four students were inducted into the South Dakota School of Mines and Technology's Leadership Hall of Fame during a ceremony in March. Tech's Leadership Development Team created the Hall of Fame to raise awareness about the importance of student leadership and to recognize the valuable contributions student leaders make. The inductees for the 2003 Leadership Hall of Fame are **Geoff Fecske** (EE, Queens, N.Y.), **Matt Goeden** (CEng '03, Yankton), **Nick Newell** (CEng, Havre, Mont.), and **Josh Sting** (CEng '03, North Mankato, Minn.).

Leadership Recognition

The following students were recognized for leadership skills during the Fifth Annual Leadership Recognition Reception hosted by Dr. Richard Gowen and his wife Nancy.

Student leaders from all facets of campus life were invited to the reception including athletic team captains, peer advisors, resident assistants and more. Tech's Leadership Development Team organized the reception.

The Order of Omega

The following students have been inducted into the Order of Omega at the South Dakota School of Mines and Technology. The Order of Omega is a national Greek honorary society. **Stephanie Beck** (IE, Rapid City); **Martha Billingsley** (Chem, Rapid City); **Rebecca Burrows** (GeolE, Dyer, Ind.); **Derek Colling** (IS, Laramie, Wyo.); **Elizabeth Cornelison** (Chem, Hill City); **Michael Dorman** (ME, Kennebec); **Kris Grinnell** (Chem, Rapid City); **Nicole Grove** (IS and Chem, Rapid City); **Mychal Hoffman** (CEng, Highmore); **Jason Howe** (ME and CEng, Woodland, Texas); **Jennifer Korn** (ChemE, Meridian, Idaho); **Jesse Suck** (CEng, Havre, Mont.); **Gavin Woltjer** (AA.GS, Sioux Falls).

Orientation Leaders

The following students have been selected as Orientation Leaders at the South Dakota School of Mines and Technology. The group of 22 students met regularly throughout the spring semester to prepare for the arrival of new students. **Jenny Baker** (ChemE, Broomfield, Colo.); **Katie Begeman** (ChemE, Rapid City); **Rod Carroll** (CEng, Sioux Falls); **Jenni Christensen** (EE, Bloomington, Minn.); **Lee Corley** (CSc, Rapid City); **Megan Dangel** (CE, Viborg); **Martin Digler** (IS, Liberia); **Jessica Elsen** (IS, Hecla); **Kevin Erdmann** (ME, Rapid City); **Scott Fritz** (IE, Sioux Falls); **Bob Hodgson** (IE, Lemmon); **Tyson Kubas** (CEng, Dickinson, N.D.); **Cori Leis** (IE, Rapid City); **Lindsay Lipps** (IE, Hay Springs, Neb.); **Mike Malone** (ME, Rapid City); **Jennifer Moege** (Chem and IS, Parkston); **Chad Nienhueser** (CE, Sidney, Neb.); **Brandy Pelton** (CE, Killdeer, N.D.); **Justin Reisenauer** (Chem, Richardton, N.D.); **Jesse Robbennolt** (ME, Agar); **Breanne Vottero** (ChemE, Rapid City); **Miaken Zeigler** (EnvE, Sturgis).

Phi Eta Sigma

The following students from have been inducted into the Phi Eta Sigma National Honors Society chapter at the South Dakota

School of Mines and Technology. The Phi Eta Sigma Honor Society is a national organization that recognizes freshmen students with high grade-point averages. **Aaron Mulock** (ME, Rapid City); **Alicia Burtzlaff** (IS, Buffalo Gap); **Andrew Downs** (EE and PHYS, Sioux Falls); **Anthony Johnson** (ME, Pierre); **Ashley Potter** (CE, Casper, Wyo.); **Ashley Wilsey** (ChemE, Tea); **Benjamin Salverson** (ChemE, Glenham); **Bernard Frankl** (CE, Philipsburg, Mont.); **Betsy Deis** (ME, Hudson, Wis.); **Brandon Skari** (CSc, Wheatland, Wyo.); **Brandy Pelton** (CE, Killdeer, N.D.); **Briana Bichler** (Chem, Tomball, Texas); **Bridget Fiegen** (ChemE, La Crescent, Minn.); **Chelsea Melcher** (IS, Whitewood); **Christian Calvert** (ME, Fargo, N.D.); **Daniel Keller** (ME, Wallace); **David Higaki** (CSc, Box Elder); **David Rickenbach** (EE, Oelrichs); **David Smith** (CE, Owanka); **Erica Hinker** (IS, Sturgis); **Erin Becker** (IS, Black Hawk); **Erin Muhmel** (IS, Crofton, Neb.); **James Free** (CEng and CSc, Rapid City); **Jennifer Pazour** (IE, Pukwana); **Jeremiah LaBrake** (CE, Rapid City); **Jessica Hicks** (IS, Rapid City); **Jill Anderson** (CSc, Pierre); **John Brosnahan** (EE, Lead); **Jonathan Hurd** (ME, Rockham); **Joseph Steinbronn** (ChemE, Dimock); **Josh Koehnen** (IE, West Fargo, N.D.); **Joshua Williams** (ME, Pierre); **Justin Kasemodel** (EE, Sioux Falls); **Justin Wenner** (ME, Lemmon); **Justin Williamson** (ME, Yankton); **Larissa Johnson** (CEng, Mobridge); **Laura Hanson** (IS, Rapid City); **Leo Buzalsky** (CEng, Amidon, N.D.); **Matthew Hainy** (ME, Wessington Springs); **Meagen Legg** (IS, Ellsworth AFB); **Melody Clark** (IS, Gillette, Wyo.); **Michael Iversen** (CSc, Sturgis); **Nicole Carr** (CE, Rapid City); **Robert Hoard** (CSc, Casper, Wyo.); **Ross Bestgen** (ME, Whitewood); **Sean Stenson** (CEng, Hill City); **Seth Holloway** (CE, Rapid City); **Shauna Olson** (IS, Hill City); **Shawn Wock** (ME, Dickinson, N.D.); **Stephanie Nielson** (GeolE, Grand Forks, N.D.); **Thad Bauer** (ME, Pierre); **Zacary Tellinghuisen** (ME, Spearfish).

Resident Assistants

The following students have been selected to serve as a Resident Assistant at the South Dakota School of Mines and Technology for the 2003-2004 school year. **Chris Bartelt** (IE, Watertown); **James Beat** (ME,

Bryan, Texas); **Jon Bogott** (CEng, Bloomington, Minn.); **David Burnett** (IE, Philip); **Chris Calvert** (ME, Fargo, N.D.); **Jenni Christensen** (EE, Bloomington, Minn.); **Chris Deaver** (EE, Winner); **Sarah Farber** (ChemE, Glendive, Mont.); **Ben Good** (ME, Parker); **Dan Hammarsten** (ChemE, Ashley, N.D.); **Sarwat Hassan** (ChemE, India); **Justin Kasemodel** (EE, Sioux Falls); **Cory Lillesve** (EE, Kasson, Minn.); **Tim Lystad** (IE, Stanley, N.D.); **Pat McGreer** (ME, Grant, Neb.); **Jennifer Moege** (Chem and IS, Parkston); **Shawn Moulton** (IE, Encampment, Wyo.); **Wes Mulder** (ME, Corsica); **Tim Parrie** (ME, Saratoga, Wyo.); **Jen Pazour** (IE, Pukwana); **Micah Peters** (CSc, Spearfish); **Justin Reisenauer** (Chem, Richardton, N.D.); **Clint Richards** (Phys and IS, Spearfish); **Nick Rogakis** (CE, Fort Collins, Colo.); **Pat Schwickerath** (CE, Newton, Iowa); **Breanne Vottero** (ChemE, Rapid City); **Dan Wolf** (EE, Canton); **Miaken Zeigler** (EnvE, Sturgis).

Student Association

The following students were elected to serve one-year terms in the South Dakota School of Mines and Technology Student Association. SA President, **Wes Roth** (CSc, Laramie, Wyo.);



SA Vice President, **Chris Bartelt** (IE, Watertown); Senior Class President, **Micah Peters** (CSc, Spearfish); Senior Class Senator, **Peter Gasper** (CSc, Sidney, Mont.); Senior Class Senator, **Jason Leander** (IE, Rapid City); Junior Class President, **Clark Wismer** (EE, Britton); Junior Class Senator, **Shelly Erickson** (IE, Sioux Falls); Junior Class Senator, **Nathan Odenbach** (IE, Britton); Sophomore Class President, **Dustin Schley** (CE, Stratford); Sophomore Class Senator, **Briana Bichler** (Chem, Tomball, Texas); Sophomore Class Senator, **Jonathan Hurd** (ME, Rockham); Sophomore Class Senator, **Jennifer Pohl** (CE, Wheaton, Minn.); Sophomore Class Senator, **Justin Wenner** (ME, Lemmon); Freshman Class Senator, **Chris Nordquist** (EE, Morris, Minn.); Freshman Class Senator, **Brad Derby** (IE, Sturgis); Freshman Class Senator, **Michael Bunkers** (ME, Chester); Grad Student Representative, **Jed Padilla** (MS.CSc,

Cheyenne, Wyo.); International Representative, **Martin Digler** (IS, Liberia).

Gowen continued from page 3

education system in South Dakota, Dr. Gowen served as an officer in the United States Air Force from 1957 to 1977. His service to the Air Force included 15 years as a member of the permanent faculty of the U.S. Air Force Academy. He also served as the Director of the joint NASA-Air Force Space Medical Instrumentation Project and as a member of the NASA Astronaut Medical Research launch and Recovery Team.

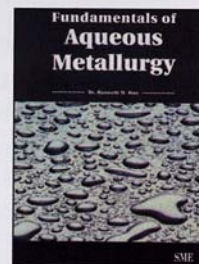
Dr. Gowen earned a B.S. in Electrical Engineering from Rutgers University in 1957. He earned a M.S. in 1960 and a Ph.D. in 1962, both in Electrical Engineering from Iowa State University.

Dr. Gowen's professional service has been extensive. He served as a board member for ETA (a supercomputer company); Institute of Electrical and Electronics Engineers (and served as their centennial president in 1984); American Association of Engineering Societies; Co-President for the National Science Foundation All Nations Alliance for Minority Programs; Team Chair, Consultant Evaluator Corps, North Central Association of Colleges and Universities; Eta Kappa Nu, (electrical engineering national honorary); Triangle Coalition; Recyclights; the Rapid City Area Chamber of Commerce; and the Web-based Education Commission.

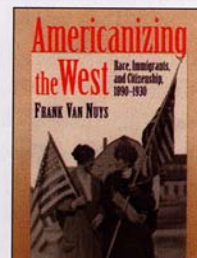
In all those activities, Dr. Gowen worked hard to succeed, a characteristic he has always held.

"It goes back, I think, to when I developed my personal philosophies," he said.

"When a door opens, you just better rush in," he said. "You may find that there's a big hole on the other side, and I've had a few of those, but that doesn't mean you don't go through the door. I see retirement as another door, and it's open."



Dr. Ken Han, distinguished professor, Department of Materials and Metallurgical Engineering, authored a textbook entitled, "Fundamentals of Aqueous Metallurgy," published by the Society for Mining, Metallurgy, and Exploration, Inc. This textbook is an introduction to interfacial phenomena, hydrometallurgy, and metallurgical kinetics. It is designed for college juniors and seniors and freshmen graduate students who would like to learn the fundamental principles of water-based metallurgy.



The arrival of immigrants on America's shores has always posed a problem: once they are here, how are these diverse people transformed into Americans? The Americanization movement of the 1910s and 1920s addressed this challenge by seeking to train immigrants for citizenship.

In the new book, "Americanizing the West," Tech's **Dr. Frank Van Nuys**, assistant professor, Department of Social Sciences, examines this issue. For the first time, a book looks at how the Americanization movement, in an effort to help integrate an unruly West into the emerging national system, was forced to reconcile the myth of rugged individualism with the demands of a planned society.

The book was one of three finalists in the Non-Fiction: Contemporary category for the Spur Award from the Western Writers of America.



Tech prepares for Presidential Transition



Dr. Charles Ruch will become the 17th president of South Dakota School of Mines and Technology on July 1.

Ruch served as president of Boise State University for 10 years. Under his leadership, the school grew into Idaho's largest university, serving 17,000 students in a rapidly growing metropolitan area. The institution's research and development budget also grew to \$20 million during Ruch's tenure.

"I was very interested in the work under way here in South Dakota to link higher education and economic development," Ruch said. "Public higher education has much to offer by way of its research capacity and faculty expertise to South Dakota's economic development resources."

Ruch has Ph.D. and M.A. degrees in education from Northwestern University and a bachelor's degree in chemistry from The College of Wooster (Ohio). Prior to his time at Boise State, Ruch served 11 years at Virginia Commonwealth University - first as an associate dean and dean, and for the remaining six years as provost and vice president for academic affairs. His first university assignments came at the University of Pittsburgh, where he was a faculty member and department chair.

He is actively involved in the Boise community, where he has chaired the United Way board and the Future Foundation of Boise and has served on the chamber of commerce board. He and his wife, Sally, have four grown children.

Distinguished Alumni

The South Dakota School of Mines and Technology honored five alumni during Tech's 146th Commencement held Saturday, Dec. 21, 2002, in the Rushmore Plaza Civic Center Theatre. Tech bestows the Distinguished Alumni awards on graduates who have made outstanding contributions in their professions and to Tech.



Bruce Bad Moccasin (CE '72, MS CE '86)

A native of Pierre, Bad Moccasin received his bachelor's of science and master's of science degrees in Civil Engineering from Tech in 1972 and 1986, respectively. While at Tech, he competed in basketball, track, and cross-country and earned nine varsity letters. After graduating from Tech in 1972, he spent several years with the Bureau of Indian Affairs in Aberdeen, and in Winnebago, Neb., where he held positions as Highway Engineer, Facilities Manager, and Area Safety Officer. Bad Moccasin is a registered Professional Engineer in the state of South Dakota.

In 1977, Bad Moccasin joined the Indian Health Service (IHS) as an Environmental Engineer. During his distinguished 25-year career with IHS, Bad Moccasin rose through the ranks to become the Director of the Aberdeen Area Indian Health.

At his retirement in Dec. 2001, he received the U.S. Public Health Service Distinguished Service Medal for directing a major health program in the Department of Health and Human Services.

Dr. Douglas W. Fuerstenau (Met '49)

After graduating from high school in Rapid City, Fuerstenau received his bachelor's degree in Metallurgical Engineering from Tech, his master's degree from the Montana School of Mines and ScD from MIT. Fuerstenau has held many responsible positions in industry and academia throughout his career. Since 1959, Fuerstenau has been a professor with the Department of Materials Science and Engineering at the University of California Berkeley. Fuerstenau's career has been recognized with numerous awards and honors.

Fuerstenau has been very active in professional organizations and conferences around the world, and has been a member, officer, and mentor to many organizations, both domestic and international. He was elected to the National Academy of Engineering in 1976. He is the founding

editor of the International Journal of Mineral Processing, one of the most prestigious journals in the field. As a loyal supporter of Tech, Fuerstenau has served as a member of the Tech Advisory Board since 1994, as a Tech Foundation Trustee since 1997, and as National Co-Chair of Tech's Vision 2000 capital campaign.



George F. Garlick (EE '58)

After graduating from high school in Curtis, Neb., Garlick received his bachelor's degree at Tech, master's degree from the University of Southern California in 1960, and doctorate from Iowa State University in 1962.

Garlick is the founder, CEO, and Chairman of the Board of Holosonic, Inc., founded in 1969. He is also the President and Founder/Partner of Garlick Enterprises, Inc., Holographic Engineering LLC, Stevens Center Business Park and Advanced Imaging Technology, which was selected as the best new radiology company by the 80,000 member Radiological Society of North America (RSNA) in 2002.

Garlick was instrumental as a founder in the formation of the Tri City Science and Technology Park Association.

Garlick holds two patents in the field of Nuclear Instrumentation, a patent in the instrumentation for Geological Testing, and 12 patents or patents pending in the field of holography. He is also a Lifetime Contributor of Tech's Alumni Association.



Steven P. Miller (EE '69)

Steven P. Miller grew up in Beresford and graduated from high school in 1965. In 1969 he earned his bachelor's degree in Electrical Engineering, graduating with honors from Tech.

Miller then went to work for Texas Instruments and held various positions during his nine-year tenure.

In 1991, he successfully formed what would become one of the nation's largest Employee Stock Ownership Plans with assets of more than \$600 million in Sawtek stock and a portfolio of 10 mutual funds. Sawtek merged with TriQuint Semiconductor in 2001, and as a result, Miller was elected to the Board of Directors for TriQuint in Hillsboro, Ore. He also serves as Chairman of the Board of Xytrans, MetaTech, and of the Central Florida Innovation Corporation (CFIC).

He established the first endowed chair at Tech, the Steven P. Miller Endowed Chair in Electrical Engineering, with a gift of more than \$1.2 million in 2001.



Marlene D. Nelson
(ME '74)

Born and raised in Martin, Nelson received her bachelor's degree in Mechanical Engineering in 1974, becoming the first woman to graduate

with a Mechanical Engineering degree from Tech. She obtained a master's degree in Business Administration from Seattle University in 1989, and later an executive MBA from MIT. Nelson's 28-year career at Boeing has spanned nearly every phase of the commercial airplane business. She currently has Chief Project Engineer and Engineering Platform team leader responsibilities for the legendary Boeing 747 where she leads a \$200 million business and the efforts of nearly 1,000 engineers.

Nelson is a recent past member of the Tech ME/IE Industrial Advisory Board, and current Boeing Executive Focal for Tech, announcing in 2000 that Tech's Center of Excellence for Advanced Manufacturing and Production had received the Boeing Outstanding Educator Award. She is Executive Champion for the Boeing Women in Leadership Affinity Group and recent past Board Member of Washington Manufacturing Services. Nelson was a National Leader in Tech's Vision 2000 capital campaign.

Tradition of Excellence Award

The Career Service Council at the South Dakota School of Mines and Technology

gives its Tradition of Excellence Award to a Career Service Council employee each month. The Career Service Council gives the award to someone who has performed their assigned duties at a high level or above and beyond expectations, who has taken the initiative to promote the concept of successful job completion and has promoted a positive working relationship with students, faculty, and staff.

Recent winners include:

December 2002: **Ruth Golabiewski**, former senior secretary in University and Public Relations.

January 2003: **Marie Romano**, senior secretary in Student Affairs and Dean of Students.

March 2003: **Christal Krein**, secretary in the Physics Department.

April 2003: **Linda Carlson**, secretary in Graduate Education and Sponsored Programs.

May 2003: **Laurie Pope**, secretary in the Mathematics and Computer Science Department

America's 100 Best College Buys

The South Dakota School of Mines and Technology was the only university in South Dakota named to the list of America's 100 Best College Buys for the 2002-2003 academic year. This is the fifth consecutive year Tech has made the list.



"When you add this distinction to the excellent record of Tech students finding jobs and earning high starting salaries, it shows that students are getting their money's worth and more when they choose the South Dakota School of Mines and Technology," Director of Admissions Joe Mueller said.

Tech's 2001-2002 graduates averaged starting salaries of more than \$46,000. The long-term average of Tech graduates finding

work in their career fields or in gaining admission to graduate school exceeds 95 percent.

This year's America's 100 Best College Buys is the seventh list published by Institutional Research & Evaluation, Inc., a research and consulting organization that specializes in the recruiting and retention of students for universities. Each year, the organization identifies the 100 colleges and universities in the United States that provide students the highest quality education at the lowest cost. The organization sends surveys to each institution that meets its criteria and makes selections for the list. This year, 1,026 universities responded to the survey.

A university or college must meet the following criteria to be eligible: be an accredited, four-year institution offering bachelor's degrees; offer full residential facilities including residence halls and dining services; have had an entering freshman class in the fall of 2001 with a high school grade point average and/or SAT/ACT score equal to or above the national average for entering college freshmen; have an out-of-state cost of attendance in 2002-2003 for three-quarters or two semesters below the national average cost of attendance or not exceeding the national average cost by more than 10 percent.

The survey also reported average costs of attendance, which were based on the costs at a private institution and the out-of-state costs at a public institution. The average costs for 2000-2001 were \$19,430. Tech costs are \$7,219 for South Dakota residents and \$11,574 for out-of-state residents.

Recognition was also given for the academic records of incoming students. Entering freshman at Tech earned an average ACT average score of 24, SAT average of 1171 and a GPA average of 3.37.



Dr. Carter Kerk, associate professor of Industrial Engineering, has been selected to the newly formed U.S. Occupational Safety and Health Administration's (OSHA) National

Advisory Committee on Ergonomics (NACE). The American Society of Safety Engineers (ASSE) nominated Kerk for the committee.

According to OSHA, the new committee will advise Assistant Secretary of Labor of Occupational Safety and Health John Henshaw on a number of issues related to OSHA's four-pronged approach to reducing ergonomic-related injuries in the workplace - guidelines, research, outreach and assistance, and enforcement.

Kerk serves as vice chair and trustee for the ASSE Foundation and is also the chair of its scholarship awards committee. Additionally, Kerk serves as a director on the Board of Certified Safety Professionals (BCSP) and as liaison to BCSP's Education Standards Committee for ASSE. His teaching experience includes courses in Human Factors Engineering/Ergonomics, Work Methods and Measurements, Safety Engineering, Safety Management, System Safety Engineering, Occupational Biomechanics, Work Physiology and Anatomy, Information Systems, Engineering Economy, and Accounting for Engineers. His previous industry engineering experience includes Central Nebraska Tubing, Brownie Manufacturing Co. Inc., Dorsey Laboratories, and the Nebraska Energy Office. Kerk has been awarded more than \$1.5 million in sponsored research and support from various organizations and companies including NASA, the National Institute for Occupational Safety and Health (NIOSH), and the National Science Foundation (NSF).

Kerk specializes in education, research, and consulting in ergonomics, human factors, biomechanics, and safety engineering. "As an academician and teacher, Dr. Kerk is on the cutting edge of the issues that will be the focus of this advisory committee's work," ASSE President Mark Hansen said. "His education, experience, research, academic endeavor, as well as his ongoing commitment to ASSE, its members, and the Society's mission of protecting people, property, and the environment all show that he will be an excellent asset to this committee. Dr. Kerk is another of those unsung heroes who work tirelessly behind

the scenes at making workplaces safer for all."

Since OSHA's announcement last spring of its strategy to reduce ergonomic injuries, three industries - nursing homes, retail grocery stores, and poultry processing - have begun working with OSHA to create the first sets of ergonomic guidelines.



Dr. Gale A. Bishop, professor, Department of Geology and Geological Engineering, and director, Museum of Geology, has been appointed as associate editor for Invertebrate Paleontology for the Proceedings of the Biological Society of Washington.

The Proceedings of the Biological Society of Washington is a quarterly journal published by Allen Press in Lawrence, Kan., for the Biological Society of Washington. The Journal publishes "papers bearing on systematics in the biological sciences (botany, zoology, and paleontology)."

"Systematics," Bishop said, "includes the description and naming of new species of plants and animals which inhabit the Earth today, or inhabited it in the past." Systematics is essential to our understanding of biodiversity and evolution. It is becoming even more important as global warming continues and humans continue to negatively interact with the environment, Bishop said.

In order to measure these effects on the extinction of plants and animals, it is necessary to have a baseline against which to measure changes in the diversity of ecosystems. Journals such as the Proceedings of the Biological Society of Washington allow scientists to publish their findings about modern and ancient diversity of planet Earth, Bishop said.

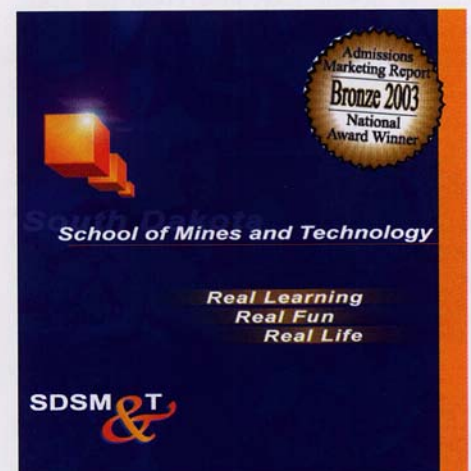
Tech's **V.J. Hedrick**, an associate programmer/analyst in Information Technology Services, appears as one of the regular experts on South Dakota Public Radio's "The Computer Guys." This program is one of the rotating topics

covered in the South Dakota Forum schedule of "ask the experts" shows that are featured each Friday. During the show, hosted by Kent Osborne, the experts answer all kinds of questions about computers and technology, taken from live callers and by e-mail. You can hear "The Computer Guys" on South Dakota Public Radio stations statewide, usually on the first and third Fridays of the month at 11 a.m. Mountain Time. The web site for the show is www.techradio.us.

V DAY
UNTIL THE VIOLENCE STOPS

South Dakota Tech was selected to host the V-Day College Campaign of the Vagina Monologues. Tech was given the rights to a special version of the script for the Vagina Monologues to produce on campus. The event was predominantly student run, directed, and acted. Tech must sold tickets, with the proceeds benefiting a community organization that works to prevent violence against women and girls. The performances were held Jan. 31 and Feb. 1 in the Surbeck Student Center Ballroom. "This was a very cool opportunity to bring together people on our campus and make an impact in the community as well," Student Activities and Leadership Center Director Michelle Howell said.

Real Learning. Real Fun. Real Life. The South Dakota School of Mines and Technology's interactive recruitment CD-



ROM, "Real Learning. Real Fun. Real Life.," claimed a Bronze Medal from the Admissions Marketing Report in a nationwide contest.

"Prospective students and high school counselors have received the CD very well," Tech Admissions Director Joe Mueller said. "We started with 15,000 copies, and already know we'll need more soon."

Tech partnered with James Tower, a Minnesota-based multimedia company, to produce the CD this past summer. Tech's Admissions Office used most of the 15,000 copies at college fairs, in direct mail efforts, and to respond to requests for information about the university. Admissions will use a second run in similar efforts.

The CD includes information about academics, student life, tuition, career opportunities, and just about everything else a prospective student needs to know. Upbeat music, two clever narrators, and an interface that gives viewers complete control over what they see and hear hold the presentation together. Viewers can download an admissions application from the CD or link directly to Tech's website to learn more or to apply online.

"We're proud of the CD," Mueller said. "It gives students an exciting and interactive way to learn about Tech and how the university can help them reach their goals."

Joe Mueller served on the Tech team that assisted James Tower in creating the concept, script and feel of the presentation. **Dr. Karen Whitehead**, vice president for Academic Affairs, **Julie Smoragiewicz**, vice president for University Relations, **Bill Jones**, director of Academic and Enrollment Services, **Steve Buchholz**, public information manager, and **Tiffany Smith**, former publications manager, also served on the team.

Admissions Marketing Report is a monthly magazine that covers the rapidly changing and competitive admissions marketing field. A panel of marketing, advertising and academic professionals evaluated each entry submitted in the 18th Annual Admissions Advertising Awards Competition against

other entries in the same group and category. Judges based their decisions on overall creativity of the piece, marketing execution and impact of message.



The South Dakota Humanities Council honored **Dr. Sid Goss**, professor, Department of Social Sciences, with its 2003 Distinguished Service in the Humanities award.

Goss has been involved with humanities in South Dakota since the 1970s and has been on the SDHC Board of Directors since 1993, serving as Chair from 1999-2001. He also serves on the Federation of State Humanities Councils, a national Board with representatives from all around the country, as Chair of the Legislative Committee. Goss recently retired from the South Dakota Board, however, he still remains active in the humanities at the national level.

"Sid has been tireless in promoting the humanities for many years both on and off the Council," Jack Lyons, SDHC Chair, said. "He has been an integral part of the team effort which has made the humanities a vital part of people's lives in the state and beyond."

Honors Convocation

At the 52nd Annual Honors Convocation, the South Dakota School of Mines and Technology presented awards to students, faculty, staff, and friends of the university in recognition of their outstanding service and academic achievements. The faculty and community award winners:

The Mines Award for Outstanding Public Service was given to **Carol Hillard**, former South Dakota Lt. Governor. Hillard learned early in life that we have an obligation to give back to society part of what we have been given. Hillard served on several boards and commissions and later taught in the public school system. She entered the business community as a co-owner of an automobile agency, and later became President of the Rapid City Chamber of Commerce. She later became involved in public service, serving for seven years on the Rapid City Common Council and four years

in the South Dakota Legislature. In 1994, she was elected as South Dakota's first woman Lieutenant Governor. She served in that position for eight years. Hillard has left the political arena and has entered yet another area of public service. As a foreign consultant, she contracts with the United State Department of State and other non-government organizations.

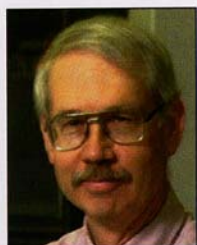
The Mines Award for Outstanding Teaching was given to **Christine Owen**, a science teacher at Hamlin High School in Hayti. Owen exemplifies excellence in teaching. She expects and gains quality work from her students and does an outstanding job of connecting the knowledge of today with the research for tomorrow. Owen is the Science Fair Program coordinator, Middle School Science Fair judging coordinator, and Assistant Varsity Girls Basketball coach. She is involved with curriculum development, and the adaptation of course content and complexity to accommodate special needs, as well as the ages and interests of students. She serves on the District Faculty Technology Committee and developed a network of resources available through corporate, professional, and institutional contacts in order to enhance classroom curriculums and enriched student learning.



The Benard A. Ennenga Faculty Award was given to **Dr. Don Teets**, professor, Department of Mathematics and Computer Science. He was honored because Dr. Teets consistently has among the best student opinion survey results in a department that prides itself on excellence in teaching. Typically, 95 percent of his students rate his overall instructional quality as good or excellent. One of the ways Teets has significantly contributed to the university is by offering innovative courses in new areas of mathematics. Teets is active in research, and uses his research in the classroom to connect what students learn to the real world. He constantly infuses his courses with new and exciting material and to look for the best way to help students grasp concepts. He is truly an exceptional teacher whose interactive

teaching style is highly regarded by students.

The L. Richard Kitchen Memorial Award was given to **Suzi Aadland**, director, Ivanhoe International Center. She was recognized because she has distinguished herself as an exceptional advisor to international students. She constantly rises to the occasion for students facing difficult situations and has been a positive influence in the lives of many international students. She learns from listening to students, reading, and taking graduate level courses in cultural diversity. She also is well respected in the region as the international student advisor who knows how to balance INS laws, university requirements, and student needs.



The Virginia Simpson Award was given to **Dr. Dan Dolan**, co-director, Center for Advanced Manufacturing and Production, and professor, Department of Mechanical Engineering.

As a professor, Dolan has made sure that Mechanical Engineering students leave Tech with the skills they need to be successful. Through his active involvement in the community, he benefits the university and the place we call home by linking the two in many ways. In addition to reflecting a strong belief in volunteerism, Dr. Dolan shares his professional expertise on engineering and technology issues.



The Presidential Award for Outstanding Professor was given to **Dr. Stuart Kellogg**, director and professor, Industrial Engineering Program. Dr. Kellogg was honored for putting

a higher priority on the interests of the program and the success of students than on his own recognition and self-interests. His nominators expressed their strong beliefs that there is no one who can possibly be more dedicated to the success of students than Kellogg.



Assessment continued from page 8

learning. So, when someone mentions "assessment," don't think simply of multiple-choice tests. Think instead of faculty grappling with how to define and articulate their teaching goals, faculty conversing with one another about what occurs in the classroom, and everyone on campus learning new ways of approaching and improving teaching.

Currently, there are two main committees on Tech's campus that are working on developing and improving assessment - the Engineering Assessment Committee (EAC), and the General Education Program Assessment Committee (GEAC). The EAC consists of faculty members who play leadership roles in assessment in each of the engineering programs. The EAC's big task this year is helping the engineering programs prepare for their 2004 re-accreditation visit by ABET.

The GEAC is designing and implementing an assessment program for the core set of "general education" courses that all students must take. Their task is challenging because no single academic major houses all the courses. Instead, the courses - in math, English, and chemistry - for instance, are taught all over campus. So this committee must unite the entire campus in assessing and improving a particular program.

Aside from the EAC and the GEAC, there are multiple groups that have formed to accomplish specific assessment projects. For instance, faculty members who teach writing have just developed a "rubric" for assessing written communication, and another group of faculty members from across campus have developed a companion rubric to assess oral presentations. A "rubric" is a kind of grid containing multiple performance indicators that enable many people to quantify or agree upon a skill (such as writing well) that can't be objectively defined with absolute precision.

Another big assessment undertaking this past year has been the

development of the "Digital Archival Tool." Students upload work samples into a database via a web interface, and faculty upload matching assessments of student work. Everything in the database can be searched, filtered, and retrieved, and this is all done with mouse clicks via a website.

There are many additional smaller projects underway that have been funded with "assessment mini-grants" awarded by the EAC and GEAC. By Jan. 15 of this year, the two committees had awarded \$24,500 total to 25 faculty members working on 15 separate assessment projects. When you add it all up, Tech faculty members are doing a phenomenal amount of work on developing and improving assessment at all levels on campus. For more information, visit the Virtual Assessment Office at www.hpcnet.org/assessmenthomepage.



Faculty development continued from page 12

or computer science, or another specialty area. Our social sciences, humanities, and science faculty members are feeling similar pressures to remain current with new instructional practices and the very large amount of new research being done on how the brain learns.

As in the area of assessment (See story, page 8), Tech faculty are moving into the future together in an active, exploratory way. This is no time to be adverse to change in American higher education. Thanks to the work of the assessment committees and the Faculty Development Committee, Tech is definitely finding its way.





Dr. Kate Alley, director, Academic Initiatives, received \$300,000 from the Bush Foundation for the project, "Complexity and Coherence: Integrating Research and Curriculum

Development to Create New Learning Environments."

Dr. Sangchul Bang, professor, Department of Civil and Environmental Engineering, received \$6,250 in additional funds from the National Science Foundation for the project, "Collaborative Research: Effect of Point of Loading on Lateral Resistance of Rigid Piles."

Dr. Gale Bishop, professor, Department of Geology and Geological Engineering, and director, Museum of Geology, received \$4,200 from the United States Department of the Interior-Bureau of Land Management for his project, "Dry Creek Petrified Tree Stabilization Plan." Bishop also received \$9,006 from Georgia Southern University (Prime: Department of Education-Eisenhower Higher Education Act) for the project, "2002 Eisenhower Sea Turtle Assistantship."

Dr. Jacquelyn Bolman, director of Multicultural Affairs, **Dr. Pat Mahon**, Vice President for Student Affairs and Dean of Students, and **Chuck Colombe**, coordinator of Educational Services, received \$10,000 from the Western Interstate Commission for Higher Education (Prime: Department of Education) for the project, "Empower the Counselor."

Dr. David Boyles, professor, Department of Chemistry and Chemical Engineering, **Dr. Jon Kellar**, chair and professor, Department of Materials and Metallurgical Engineering, and **Dr. William Cross**, research scientist II, Department of Materials and Metallurgical Engineering, received \$203,707 from the United States Department of Agriculture (EPSCOR) for the project, "NanoBio-Plastics and Composites from Linseed Oil and Saccharidic Source Materials."

Dr. William Capehart, assistant professor, Institute of Atmospheric Sciences, received \$2,190 from the University Corporation for Atmospheric Research (Prime: National Oceanic and Atmospheric Administration) for the project, "The 7th Annual Northern Plains Convective Workshop on Analysis, Interpretation and Forecast Application."



Dr. Andrew Detwiler, chair and professor, and **Dr. John Helsdon**, professor, Institute of Atmospheric Sciences, received \$123,988 from the National Science Foundation for the

project, "Further Analysis and Modeling Studies of Severe Thunderstorm Electrification and Precipitation Study (STEPS) Cases."



Helsdon also received \$157,800 from the National Science Foundation for the project, "Numerical Studies of Thunderstorm Electrification, Maxwell

Currents, and Lightning."

Barb Dolan, director, Student Information Systems, received \$325,350 in additional funds from the U.S. Department of Education for her project, "Strengthening Student Success Through Student Data System Enhancement and Equipment Upgrades."



Dr. Ed Duke, professor, Department of Geology and Geological Engineering, and manager, analytical services, Engineering and Mining Experiment Station, received \$15,533

from Oglala Lakota College (Prime: National Science Foundation) for his project, "Technical Support for OLC's Environmental and Remote Sensing Lab."

Dr. Richard Farley, research scientist IV, Institute of Atmospheric Sciences, received \$9,900 from the North Dakota Atmospheric

Resource Board (Prime: State of North Dakota) for the project, "Severe Thunderstorm Numerical Simulations Manuscript Rework."



Dr. Sherry Farwell, director, Graduate Education and Sponsored Programs, received \$108,500 in additional fund from South Dakota State University (prime-NSF)

for his project, "Rushmore Initiative for Excellence in Research." He also received \$23,784 from the Governor's Office of Economic Development for his project, "Internet Telescope Proposal: 'Dark Skies, Bright Minds.'" Farwell also received \$91,882 in additional funds from NASA for his project, "South Dakota's NASA Workforce Development Program." He also received \$100,000 in additional funds from NASA for the project, "South Dakota Space Grant College and Fellowship Program - 2003 First Robotics Program." Farwell also received \$10,502 in additional funds from the University of North Dakota (Prime: NASA) for the project, "A Public Access Resource Center (PARC) Empowering the General Public to Use EOSDIS - Implementation Phase." In addition, he received \$744,209 in additional funds from South Dakota State University (Prime: National Science Foundation) for the project, "South Dakota Rushmore Initiative for Excellence in Research." Farwell also received \$218,250 from NASA for the project, "South Dakota Space Grant Consortium."

Farwell also was invited by the National Science Foundation to participate in two proposal review panels. The first was the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Phase II Panel on Nanomaterials.

Farwell and **Dr. Karl Lalonde**, research scientist II, were invited to attend the NSF EPSCoR Cyber Infrastructure Workshop. This workshop was by invitation only, and the participants discussed "enabling technology tools" such as the Access Grid and Internet-2, and their relation to future large-scale science and engineering projects.



Farwell, **Dr. Lee Vierling**, assistant professor, Institute of Atmospheric Sciences, **Dr. William Capehart**, assistant professor, Institute of Atmospheric Sciences, and **Dr. Pat**

Zimmerman, director, Institute of Atmospheric Sciences, received \$512,100 in additional funds from NASA for the project, "The Use of Remote Sensing for Monitoring, Prediction, and Management of Hydrologic, Agricultural, and Ecological Processes in the Northern Great Plains."

Dr. Thomas Fontaine, associate professor, Department of Civil and Environmental Engineering, received \$18,496 from the United States Department of Agriculture-Forest Service for the project, "Impact of Forest Fires on Floods."



Dr. Patrick Gilcrease, assistant professor, Department of Chemistry and Chemical Engineering, received \$85,601 from University of Wyoming (Prime-AFOSR) for his project, "Biocatalysis for the Synthesis of Polymer Precursors."

The following Department of Atmospheric Sciences members attended the American Geophysical Union Fall 2002 meeting: **Dr. John Helsdon**, professor, presented his paper entitled, "Three-Dimensional Modeling of Maxwell Currents and Lightning in Electrified Storms." **Tom Warner**, T-28 pilot and MS student, presented a poster entitled, "Aircraft Observations of a Lightning Channel in STEPS." Poster co-authors were IAS members **Dr. Andrew Detwiler**, professor, Qixu Mo (now at SPEC, Inc.), and **Donna Kliche**, research scientist II. **Dr. Changhui Peng**, associate professor, presented his poster entitled, "The Carbon Cycles of Chinese Terrestrial Ecosystems." (co-authors: J. Fang, Z. Guo, H. Wu).

Carrie Herbel, collections manager, preparator, and instructor, Museum of Geology, Museum of Geology, received

\$8,000 United States Department of the Interior-Badlands National Park for the project, "Preparation and Curation of Fossils collected from the Bombing Range Survey, Badlands National Park." She also received \$2,400 from United States Department of the Interior-Badlands National Park for the project, "Curatorial Backlog of Museum Specimens, Badlands National Park."



Dr. Mark Hjelmfelt, professor, Institute of Atmospheric Sciences, received \$168,627 from the National Science Foundation for the project, "Collaborative Research: Investigations of Non-Classic Lake-Effect Boundary Layer Process Supplement."

Dr. Chris Jenkins, professor, Department of Mechanical Engineering, received \$10,000 from Triton Systems, Inc. (Prime: Air Force Research Laboratory) for his project, "Innovative Coating Design to Shape Compliant Optics into a Parabolic Net Shape."

Jenkins, and **Dr. Stuart Kellogg**, Pietz professor and director, Industrial Engineering Program, received \$44,237 from the University of South Dakota (Prime: National Science Foundation) for the project, "Development of a Method to Utilize Laser Processing Techniques to Improve the Bonding Characteristics of Spray Coatings."



An article by **Dr. Roger Johnson**, associate professor, Department of Mathematics and Computer Science, has been accepted for publication in the British Journal

"Teaching Statistics." The article, "Record Values and Surviving Glacial Moraines," describes a way of estimating the number of ice ages based upon the surviving geological record and does so in a way that is instructive for beginning students of statistics. Johnson also was an invited speaker at the fourth annual high school

statistics teacher's workshop of the Colorado-Wyoming Section of the American Statistical Association. He gave two presentations. The first was "Some classroom activities in probability and statistics" and the second, based upon an article that will appear in the British journal "Teaching Statistics," was "Record values and surviving glacial moraines."



Dr. Jon Kellar, chair and professor, Department of Materials and Metallurgical Engineering, and **Dr. William Cross**, research scientist II, Department of Materials and Metallurgical Engineering, received \$42,000 from Advintec (Prime-Department of Defense) for the project, "Improved Performance of Composite Tanks in Cryogenic Storage Applications."

Dr. Melvin Klasi, associate professor, Department of Civil and Environmental Engineering, received \$43,997 from the South Dakota State University (Prime-Federal Highway Administration (US DOT) for the project, "South Dakota Transportation Technology Services (16)."

Dr. Charles Kliche, professor and director, Mining Engineering Program, received \$54,487 from the United States Department of Labor-Mine Safety and Health Administration for the project, "Mine Health and Safety Training for Miners and Contractors."



Dr. Alvis Lisenbee, professor, Department of Geology & Geological Engineering, received \$3,385.90 from the West Dakota Water Development District for his project, "Revision

of the 1:24,000 Scale Geologic Map of the Rockerville 7.5 Minute Quadrangle, South Dakota."

Lisenbee, **Dr. Larry Stetler**, associate professor, and **Dr. Arden Davis**, chair and professor, Department of Geology and Geological Engineering, received \$8,000



from the West Dakota Water Development District for the project, "Aquifer Vulnerability Map (1:24,000 Scale) of the Southern Half of the Rapid City West Quadrangle, South Dakota."

Lisenbee, and **Dr. Nuri Uzunlar**, research scientist IV, Department of Geology and Geological Engineering, received \$8,000 from the West Dakota Water Development District for the project, "Geologic Map Preparation of the Southern Half of the Hill City (1:24,000 Scale) 7.5-Minute Quadrangle, South Dakota."



Dr. Antonette Logar, professor and chair, Department of Math and Computer Science, received \$8,453 from Raytheon (Prime: United States Geological Survey) for her project, "Assistance with Development of the MODIS Direct Broadcast System." Logar also received \$5,828 from Raytheon (Prime: United States Geological Survey) for her project, "Development of a Web Site for the LDOPE Tools."

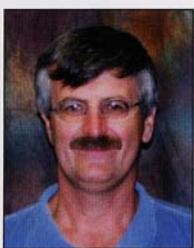
Dr. James Martin, professor, Department of Geology and Geological Engineering, and Curator of Vertebrate Paleontology, Museum of Geology, received \$141,228 from the National Science Foundation for the project, "Collaborative Research: Evolution and Biogeography of Late Cretaceous Vertebrates from the James Ross Basin, Antarctic Peninsula."



Dr. Jan Puszynski, dean, College of Materials Science and Engineering, and professor, Department of Chemistry and Chemical Engineering received \$44,161 from the United States Army Research Office (Prime-United States Department of Defense) for his project, "Investigation of Ultrafast Condensed-Phase Reactions

Between Nanopowders." Puszynski, also received \$90,000 in additional funds from the University of Minnesota (Prime: US Department of Defense) for the project, "Processing Behavior of Nanoenergetic Materials."

Puszynski, **William Arbogast**, director, Advanced Materials Processing, **Dr. David Boyles**, professor, Department of Chemistry and Chemical Engineering, **Dr. Fernand Marquis**, professor, Department of Materials and Metallurgical Engineering, **Dr. Mikhail Foygel**, professor, Department of Physics, **Dr. Andrey Petukhov**, professor, Department of Physics, **Dr. Vladimir Sobolev**, associate professor, Department of Physics, **Dr. Sherry Farwell**, dean, Graduate Education and Research, **Dr. Brad Baker**, assistant professor, Department of Atmospheric Sciences, and **Dr. David Dixon**, associate professor, Department of Chemistry and Chemical Engineering, received \$2,145,000 from the Army Research Laboratory (prime-USDOD) for the project, "Advanced Materials and Processes for Future Combat Systems."



Dr. James Sears, research scientist IV, Advanced Materials Processing Center, received \$100,000 from AeroMet Corporation (Prime: Army Research Lab) for the project, "Laser Additive Manufacturing (LAM) Proposal (02)."

Dr. Paul Smith, professor emeritus, Institute of Atmospheric Sciences, received \$250,000 in additional funds from the National Science Foundation for the project, "Armored T-28 Aircraft Facility for Research Requiring Storm Penetrations." Smith also receives \$36,000 from Aeromet, Inc. (Prime-United States Army) for the project, "Further Calibration Work on the KPol Radar."

Smith, and **Dr. Andrew Detwiler**, chair and professor, Institute of Atmospheric Sciences, received \$92,612 from the North Dakota Atmospheric Resource Board (Prime-United States Department of

Interior) for the project, "Contributions to the Weather Damage Modification Program of the North Dakota Atmospheric Resource Board."



Dr. Judy Sneller, associate professor, Department of Humanities, presented a paper entitled "WebCT & The Seven Principles: Creating a More Student-Centered Technical Communications Classroom" at the Rocky Mountain Modern Language Association Conference in Scottsdale, Ariz., on Oct. 12, 2002.

Dr. Larry Stetler, associate professor in the Department of Geology and Geological Engineering, received \$10,000 from South Dakota Game Fish and Parks (Prime: United States Department of Interior) for his project, "Water Resource Development of Ephemeral Supply." Stetler, and **Dr. Scott Kenner**, chair and associate professor, Department of Civil and Environmental Engineering, received \$47,705 from the Bureau of Indian Affairs (Prime: United States Department of the Interior) for their project, "Regional Curve Relationships in South Dakota."



Dr. Robb Winter, chair and professor, Department of Chemistry and Chemical Engineering, received \$108,537 from the National Science Foundation for the project, "SDSM&T-MUS&T REU Site Collaboration."

Dr. Pat Zimmerman, director, Institute of Atmospheric Sciences, and professor, Department of Atmospheric Sciences, participated in the U.S. Climate Change workshop held Dec. 2 to Dec. 5, 2002, in Washington, D.C. Zimmerman also received \$250,000 in additional funds from the Governor's Office-State of South Dakota for the project, "South Dakota Carbon Sequestration Project (C-Lock)."



PERSONNEL

Changes

Welcome:

Colleen M. Gustafson, CSA, Secretary, Advanced Materials Processing (AMP) Center/College of Materials Science Engineering, (12/2/02)

Dr. Jonathan I. Bloch, Faculty, Haslem Postdoctoral Paleontology Fellow/Assistant Professor, Geology and Geological Engineering/Museum of Geology, (1/1/03)

Ryan H. Koontz, Exempt, Integrated Manufacturing Specialist, Center for Advanced Manufacturing and Production (CAMP), (1/1/03)

Pamela J. Hegre, Faculty, Instructor, Chemistry and Chemical Engineering, (1/1/03)

Rebecca Lust, Faculty, Instructor, Social Sciences, (1/1/03)

David W. Gutierrez, Instructor, Chemistry and Chemical Engineering, (1/1/03)

Richard L. Wold, Instructor, Chemistry and Chemical Engineering, (1/1/03)
Dr. Stanley S. Smith, Faculty, Instructor, Chemistry and Chemical Engineering, (1/1/03)

Swamy Dhoss Ponpandi, Faculty, Instructor, Electrical and Computer Engineering, (1/6/03)

Tamara L. Gregoire, CSA, Senior Secretary, President's Office, (1/13/03)

Peggy D. Fleck, CSA, Secretary, Student Activities and Leadership Center (1/21/03)

Leslie T. Kelley, CSA, Senior Secretary, University and Public Relations, (2/13/03)

Dr. Karen L. Updegraff, Exempt, Research Scientist I (Postdoctoral Associate), Institute of Atmospheric Sciences, (2/18/03)

Richard D. Sweeney, Exempt, Assistant Football Coach/Assistant Intramural Director/Wellness Center Supervisor, Intercollegiate Athletics, (4/1/03)

Debra J. Renken, CSA, Programmer/Analyst, Title III, (4/1/03)

Farewell:

Christopher Salazar, CSA, Lab Storekeeper, Chemistry and Chemical Engineering, (12/12/02)

Brandy Strom Dugger, CSA, Secretary, Student Activities and Leadership Center, (12/13/02)

Rune Torgersen, Faculty, Electrical and Computer Engineering, (12/31/02)

William H. Martin, CSA, Title III, (1/17/03)

Michele L. Azar, Faculty, Devereaux Library, (2/6/03)

Daniel S. Moore, CSA, Devereaux Library, (2/6/03)

Ruth Golabiewski, CSA, University and Public Relations, (2/28/03)

Brenda K. Hemmelman, Exempt, Academic and Enrollment Services, (3/14/03)

Paulette Palladino, Exempt, ITS, transferred to the Board of Regents Office of the Chief Information Officer (1/10/03)

Shawnna J. Willcox, CSA, Business and Administration, (3/28/03)

Kristy Allgier, Exempt, Athletics, (4/30/03)

Dr. Vasudevan Devanath, Faculty, Chemistry and Chemical Engineering, (5/8/03)

Change:

Alicia L. Allen, Exempt, accepted the Assistant to the President position in the President's Office, (10/23/02)

Dennis M. Rush, CSA, Electrical and Computer Engineering, has been reclassified to a Computer Support Specialist, (1/1/03)

Jon T. Day, CSA, ITS, reclassified to a Systems Software Specialist (3/1/03)

Memorials



Dr. J. Paul Gries (1911-2003)

This year Tech reluctantly saw the closing of a long and fruitful chapter in South Dakota geology and departmental history with the passing of Dr. J.

Paul Gries.

Dr. Gries joined the faculty of South Dakota School of Mines in 1936. During his long and distinguished career, he also served as Graduate Dean. He retired from active teaching in 1976 but continued to serve as Professor Emeritus until moving to Michigan.

Dr. Gries authored his book, "Roadside Geology of South Dakota." It is printed by Mountain Press Publishing Company as part of their series that includes most of the Rocky Mountain region. The book is available through the Department of Geology and Geological Engineering.

Dr. Steven McDowell (1956-2003)

Steven McDowell attended Miami University, Oxford, Ohio, and received a B.S. in Chemistry in 1978. In 1983, he received a Ph.D. in Inorganic Chemistry from Iowa State University. He was a Postdoctoral Associate from October 1983 until



August 1985 at the University of California, Riverside. He was a member of the staff of the Departments of Chemistry at California State University, Long Beach, and Santa Monica College, before moving to Rapid City in 1990.

He began at the South Dakota School of Mines and Technology in 1990 as an Assistant Professor of Chemistry, later becoming an Associate Professor of Chemistry and acting as Chair of the Department of Chemistry and Chemical Engineering from 1998 to 2002.

He was a member of Alpha Chi Sigma; American Chemical Society; Inorganic Division of the American Chemical Society, and the South Dakota Academy of Sciences, of which he was President in 2002-2003. He received the Ronald T. Pflaum Award (Outstanding Alpha Chi Sigma Chapter Advisor) in 1996. He had numerous publications in the Chemistry field.

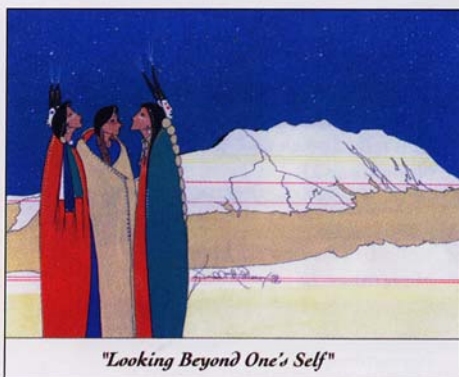
Visit the on line memorial discussion at: interact.hpcnet.org/discussion/mcdowell/Default.htm

"Looking Beyond One's Self"

SDSM&T is working to address the educational obstacles faced by American Indian students. For the past twelve years SDSM&T has offered innovative science, technology, engineering and mathematics programming for pre-college students providing students with opportunities to reside on campus and work with premier faculty on research projects. Students, through scholarships, are empowered to pursue science and engineering degrees. We are proud of their dreams and accomplishments.

Mr. Don Montileaux was commissioned by SDSM&T in 1994 to create a work of art that depicted three American Indians looking beyond the immediate horizon and toward a vision of the future symbolizing our desire for young American Indians to reach beyond themselves...toward the stars and their visions. Proceeds from the sale of the "Looking Beyond One's Self" prints will be used to support educational programming. The prints are available for purchase for \$150.00.

The original painting flew aboard the March 1995 STS-67 NASA mission of the space shuttle Endeavor. The Endeavor was also the shuttle, which took the first American Indian Astronaut Commander John Herrington, "to the stars" on November 22, 2002.




"Looking Beyond One's Self"

Please contact Dr. Jacquelyn Bolman, Director of Multicultural Affairs, at (605) 394-1828 to jacquelyn.bolman@sdsmt.edu.

Pilamiye' (Thank you)

You can order a print on line at
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CALENDAR *of Events*

June 30

Richard J. Gowen retires as the 16th president of SDSM&T

July 1

Charles P. Ruch assumes leadership as the 17th President of SDSM&T

July 3

Summer Session Two Ends

July 4

Independence Day ~ No Classes

July 7

Summer Session Three Begins

July 13-23

Solar Team (Chicago to Los Angeles)

August 14-15

Summer Orientation

August 18-19

Summer Orientation

August 21-22

Summer Orientation

August 22-23

Volleyball Travelodge Classic @ Dickinson State

August 28 - 30

ROTC Zero Week

August 29-30

Volleyball Red Raider Classic @ Northwestern

IA Golf @ Bismarck - 1:00 pm

September 1

Labor Day ~ No Classes

Orientation Entertainer - Travelin' Max

September 1-6

Welcome Week

September 2

Registration Day

President's Picnic 5:00 pm - 6:30 pm

Student Life Skits 6:30 pm - 7:30 pm

September 3

First Day of Classes

Federal Work Study (FWS) Meeting,

All FWS students must attend one meeting

CB 204E - 10 am or 2 pm

Volleyball @ National American Univ - 7:00 pm

September 4

InterFraternity Council Picnic 6:00 pm

Canyon Lake Park

September 5

Welcome Back Dance 9:00 pm

Volleyball Rocky Mt. Tournament

Golf @ Dickinson - 1:00 pm

September 6

Football vs. Colorado School of Mines - 1:00 pm

Golf @ Dickinson - 1:00 pm

Volleyball Rocky Mt. Tournament

September 10

Volleyball vs. Minot State - 7:00 pm

September 11

YMCA Corporate Cup

September 12

Golf @ Minot - 1:00 pm

September 13

Football vs. Jamestown College - 1:00 pm

Golf @ Minot - 1:00 pm

Volleyball vs. Univ. of MN Morris - 11:00 am

September 16

Career Fair

September 17

Volleyball vs. Dickinson State - 7:00 pm

September 18

Women's Networking Lunch

Bump Lounge - 11:30 am to 1:00 pm

September 19

Golf @ Jamestown - 1:00 pm

September 20

Football @ Huron University - 1:30 pm

Golf @ Jamestown - 1:00 pm

Soccer @ Univ of Minnesota-Morris - 5:00 pm

September 21

M Week: Senior Frosh Picnic

Soccer @ South Dakota State Univ - 10:00 am

September 22

M Week: Intro of the Candidates 7:00 pm

September 23

M Week: Quad Games

September 24

M Week: Quad Games

Volleyball @ University of Mary - 7:00 pm

September 25

M Week: Coronation 7:00 pm

September 26

M Week: M Day Picnic and Hill Climb 12:00 p.m.

September 27

M Day: Parade 11:00 am

M Day: Dance 9:00 pm - 12:00 midnight

Football vs. Mayville State University - 1:00 pm

Soccer vs. University of North Dakota - 1:00 pm

September 28

Golf @ Rapid City - 1:00 pm

Soccer vs. University of Mary - 1:00 pm

September 29

Golf @ Rapid City - 1:00 pm

September 30

Career Planning Workshop - 3:30 pm

October 1

Volleyball vs. Black Hills State - 7:00 pm

October 3

Golf - Region III/DAC-10 @ Minot - 1:00 pm

October 4

Football @ University of Mary - 1:30 pm

Golf - Region III/DAC-10 @ Minot - 1:00 pm

Soccer @ North Dakota State Univ - 7:00 pm

October 5

Soccer @ Minnesota State Univ-Moorhead -

10:00 am

October 8

Volleyball vs. National American Univ - 7:00 pm

October 11

Football vs. Dakota State University - 1:00 pm

Soccer vs. Northern State University - 2:00 pm

October 13

Native American Day - No Classes

October 15

Volleyball @ Minot State - 7:00 pm

October 17

Volleyball vs. Mayville State - 7:00 pm

October 18

Football @ Black Hills State University - 1:30 pm

Soccer @ Northern State University - 2:00 pm

Volleyball vs. Valley City State - 7:00 pm

October 22

Volleyball @ Dickinson State - 7:00 pm

October 24

All Campus Leadership Retreat

Volleyball vs. Jamestown College - 7:00 pm

October 19-24

National Chemistry Week

October 25

All Campus Leadership Retreat

Football @ Valley City State University - 1:30 pm

October 26

Soccer vs. South Dakota State University - 10:00 am

October 28

Career Planning Workshop - 11:00 am

October 29

Volleyball vs. University of Mary - 7:00 pm

October 31

Tech Family Weekend

Men's Basketball vs. Rocky Mountain - 7:00 pm

Volleyball @ Huron University - 7:00 pm

Halloween

November 1

Tech Family Weekend

Football vs. Minot State University - 1:00 pm

Volleyball @ Dakota State - 7:00 pm

November 4

CAAP/Information Technology Exam

8:00 am to 12:15 pm

November 5

CAAP/Information Technology Exam

8:00 am to 12:15 pm

Volleyball @ Black Hills State - 7:00 pm

November 6

CAAP/Information Technology Exam

12:30 pm to 4:45 pm

November 7

Men's/Women's Basketball vs. Dakota Wesleyan

University - 6:00 pm and 8:00 pm

November 8

Football @ Dickinson State University - 1:30 pm

Men's/Women's Basketball vs. Mount Marty

6:00 pm and 8:00 pm

Volleyball DAC-10 Playoffs

November 10

Men's Basketball @ Rocky Mountain - 7:00 pm

November 11

No Classes - Veterans' Day

November 12

Volleyball DAC-10 Playoffs

November 14-15

Women's Basketball Tech Classic

November 19

Volleyball Region III Playoffs

November 20

Men's Basketball @ Univ of Sioux Falls - 7:00 pm

November 21

Men's Basketball @ Univ of S. Dakota - 3:00 pm

Women's Basketball @ Butte MT Classic

Volleyball Region III Playoffs

November 22

Women's Basketball @ Butte MT

Classic Volleyball Region III Playoffs

November 27

Thanksgiving Break - No Classes

November 28

Thanksgiving Holiday - No Classes

Men's Basketball Thanksgiving Classic

Women's Basketball @ Black Hills State Classic

November 29

Men's Basketball Thanksgiving Classic

Women's Basketball @ Black Hills State Classic

Visit the on line calendar for details
www.hpcnet.org/sdsmtcalendar



Tech Trivia

Did you know that...

- Tech's Museum of Geology opened for summer visitors in 1923? It's now open year-round and has thousands of fossils and minerals on display in its collection. This photo shows an early view of the museum, located in the O'Harra Building on campus.



- Ten years after the Rapid City 1972 flood, a memorial fountain was built south of the Rushmore Plaza Civic Center by the American Society of Civil Engineers student chapter at Tech? The fountain includes plaques that list all the victims of the flood.



- This box was found in 1973 in the Prep Building cornerstone? Contents included an invitation to the laying of the cornerstone, copies of local newspapers, and tin from the Etta Mine in Keystone.



4,100 copies of this publication were printed by SDSM&T at a cost of \$2.16 each.

7:40 a.m. Rush Hour



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Daktronics EIT and 2000 SDSM&T graduate

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