

# MAGAZINE

SOUTH DAKOTA TECH

FALL 2003

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A PUBLICATION OF SDSM&T



Dear Friends,

The past five months have been an exciting time for South Dakota Tech. Researchers are engaged in important projects that could unlock nature's secrets, help national defense, and create economic development in South Dakota. Our student vehicle and academic teams had a very successful year, and they all deserve credit for their hard work. You can read about all those things in this issue of South Dakota Tech Magazine.

This has been an exciting time for the Ruchs, as well. Sally and I spent 10 years at Boise State University, where I served as President, before coming to Rapid City this year. I'm excited to work with the campus community to take this wonderful university to a new level of excellence. Sally and I have spent time getting to know Rapid City and the Black Hills, and we've found this to be a friendly, beautiful, and remarkable place.

I've met with many community, business, and political leaders, to determine how South Dakota Tech can be an even more important and relevant part of this community and state. I've always believed that a university must give back, and it is my goal to create a true partnership between the university and the community.

I have also started a biweekly email letter to keep our friends informed of activities on campus. If you would like to receive these letters, please send me your email address.

As always, I welcome your thoughts and comments. I can be reached at [charles.ruch@sdsmt.edu](mailto:charles.ruch@sdsmt.edu).

Very truly yours,

Charles Ruch

# SOUTH DAKOTA TECH MAGAZINE FALL 2003

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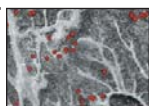
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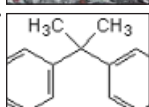
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## CAMPUS

## Profile

South Dakota Tech, 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  
Geology and Geological Engineering  
Industrial Engineering  
Interdisciplinary Science  
Mathematics  
Mechanical Engineering  
Metallurgical Engineering  
Mining Engineering and Management B.S.\*  
Physics

\* New program pending Faculty and Board of Regents approval.

### 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

### DOCTOR 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 \$8,000 per year for South Dakota residents, less than \$8,600 for Minnesota residents, and less than \$9,000 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 the doctorate or other appropriate terminal degree.

## Tech welcomes Dr. Charles Ruch

**D**r. Charles Ruch has been busy since becoming President of South Dakota Tech on July 1.

He has opened lines of communication with the community, created a focus on using research on campus to spur economic development, and begun a strategic planning process, in addition to moving almost 1,000 miles, getting to know a new city, and meeting hundreds of students, faculty, and staff members.

"It's been a hectic few months, but it's been a lot of fun, too," Ruch said. "Sally and I have found Rapid City and the Black Hills to be a great place to live. We thank everyone who has welcomed us with such open arms."

Ruch became Tech's 17th president after spending 10 years as president of Boise State University. Ruch replaces Richard Gowen, who left Tech on June 30 after 16 years as university president.

The South Dakota Board of Regents selected Ruch as Tech president after a national search.

"Dr. Ruch is widely recognized for his collaborative style and his commitment to building an economic development connection between the university and the community," said Regent Pat Lebrun, who chaired the Regents' presidential search. "These are experiences and talents that the Board of Regents looks forward to having him apply here in South Dakota and the Rapid City area."

Under his leadership at Boise State, the university grew to be Idaho's largest, serving 17,000 students in a rapidly growing metropolitan area. The institution's research and development budget grew to \$20 million during Ruch's tenure.

Ruch has master's and doctorate 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 for 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 assignment came at the University of Pittsburgh, where he was a faculty member and department chair.

An active participant in regional and national higher education organizations, Ruch has chaired the Urban and Metropolitan Universities Committee for the American Association of State Colleges and



*Ruch became Tech's 17th president after spending 10 years as president of Boise State University.*

Universities. He has also served on the presidents' councils of the Big Sky, Big West, Western Athletic conferences and as chair of the Western Interstate Commission for Higher Education.

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

"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."

"Since arriving in Rapid City, I have been impressed by the energy and enthusiasm demonstrated for developing a technology based future for our community and region," he said. "I believe that Rapid City is ready for something big. I think this city, and by extension, the entire Black Hills area, has a chance to look at economic development in a new way that would create jobs and economic growth and give our young people another reason to stay in South Dakota."

That already is happening. A group of Rapid City business leaders are working to create a technology incubator that would give fledgling businesses the support they need to flourish.

"I believe that the community is ready to embrace science and technology and the economic opportunities they offer in a big way," he said. "The South Dakota School of Mines and Technology is excited to jump in and be a major player."

On a separate, but related, track, South Dakota Tech continues to look for ways to create economic development opportunities through research. The campus held a workshop October 30 to talk about how the campus can create business spin-offs. The workshop covered topics such as technology transfer, patent processes, available incubator facilities, and other areas critical to creating new businesses. The workshop included presentations from experts recruited from the Black Hills area, and helped faculty and staff better understand the steps required to overcome the challenge of taking a research project and turning it into a business.

"This effort is important," Ruch said. "South Dakota Tech professors

and researchers have several projects that have matured to the point where they are ready to launch new business opportunities, so this workshop is timed perfectly. We look forward to using innovation created on campus to benefit the Rapid City and Black Hills community.”

Ruch also has met with and spoken to community service organizations and continues to make the speaking rounds. During his talks, he discusses campus happenings, his vision for the university, and answers audience questions. Ruch also has started sending a bi-weekly email letter to community members. The letter allows Ruch to communicate directly with the local leaders.

“This is a state university, and taxpayers provide us with a critical source of support,” Ruch said. “They deserve to know what’s happening on campus and have a chance to ask questions.”

Another important effort during Ruch’s first months in office has been beginning a strategic planning process for the campus to guarantee that Tech remains a relevant, important, distinctive, and viable part of our community and of the higher education landscape.

“I truly believe that you always need to look down the road and plan for the twists and turns ahead,” Ruch said. “Strategic planning can help you do that. We have undertaken an effort on campus to create a plan that will shape a vision for this university. The final product we create will set our priorities and our course for the next five to 10 years. I believe this is an important step for any university or business. A strategic plan gives any operation reasons for making decisions. It acts as a beacon you follow to your



*Chuck and Sally Ruch*

goals like a ship at sea follows a line of buoys to port.”

The planning began with a campus-wide, open discussion session held October 29. During the event, the more than 100 faculty, staff, students, alumni, and community members scanned the campus environment by reviewing the university’s mission statement, accreditation requirements, the most recent Academic Advisory Board report, the results of the Marketing and Planning efforts recently compiled, the STUDENT Project, the South Dakota Opportunities report, and the Alumni Association Focus Group Report. Participants then broke into smaller groups to discuss priorities and strategies for addressing those issues.

“It was a long day for those who participated, but it was the best way to get this process started,” Ruch said.

After that event, a smaller group of

faculty and staff read and discussed the comments compiled during the campus-wide event. An even smaller group will then distill the comments into a comprehensive report that will be sent to the entire campus community for additional discussion and comments. That cycle of campus-wide to small-group discussions may happen several times before a final product is written and finalized by the end of the academic year.

“I will be an integral part of the process, and invite the campus community to become engaged in this process to whatever level they are able,” Ruch said. “This important activity will set our course for the future and better prepare us to respond to opportunities that present themselves.”

Ruch is involved in a related planning process with Black Hills State University in Spearfish, another of the six public universities in South Dakota. Ruch and BHSU President Dr. Thomas Flickema and other administrators from both universities have been meeting regularly throughout the fall semester.

“The Board of Regents has asked Dr. Flickema and I to look at ways to improve the services we offer to students in West River,” Ruch said. “We are in the process of examining the ways the two universities can work together to better serve our customers. We don’t yet know what the end result will be, but we do know that, at the end of this project, both universities will be stronger.”

And as Ruch moves forward, he wants to make sure every action the university take is directed toward that goal - making South Dakota Tech the best it can be.





## A legacy of leadership

In 1885, when Gilbert E. Bailey spoke at the dedication of what would become the South Dakota School of Mines and Technology, he called the brand new institution a “child of the territory” that would become a “lusty giant” and enrich the world of science.

More than 100 years later, South



*The first campus building completed in 1886.*



*Class of 1890 - L-R; Benjamin Pozansy, Caroline Feigel, Eva Robinson.*

Dakota Tech continues to reach past the potential Bailey predicted. Throughout its history, the university's leadership guided the progress and created the path Tech follows.

As Tech welcomes Dr. Charles Ruch as the university's 17th president, it's appropriate to look back at the legacy of leadership the university has enjoyed.

### Dr. Franklin R. Carpenter 1886-1889



- Oversaw the opening of the university
- Completed a comprehensive mineral review of the Black Hills with a \$2,000 grant
- Conferred university's first degree to John Hancher

### George F. Duck 1889-1890

(No photo available)

- Held the position for less than a year
- Released from duties along with entire faculty in 1890

### Samuel Cushman 1890-1891



- Left after eight months to return to private sector mining job

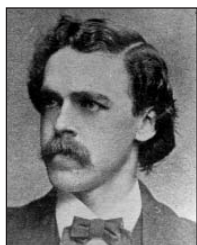
### Dr. William Headden 1891-1893



School

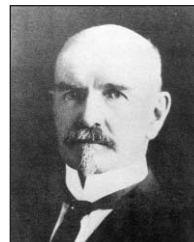
- Struggled to enroll students
- Recommendation to broaden course offerings was denied
- Resigned for post at Colorado Agricultural School

### Dr. Walter Jenney 1893



exonerated of falsifying report.)

- At four months, is the shortest-serving president
- Resigned under controversy about his Black Hills mineral report



### Dr. Valentine T. McGillicuddy 1893-1897

- Enrollment and financial problems continued. The 1895 budget totaled \$6,680.
- Collected substantial resource of tin ore for Museum of Geology
- Improved the campus by planting shade trees

### Dr. Robert L. Slagle 1898-1905



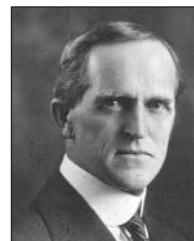
- Published first university catalog, helping to increase enrollment
- Oversaw first organized expedition to the Badlands
- In 1901, conferred first degrees since 1891
- Started several scientific and general interest publications

### Dr. Charles Fulton 1906-1911



- Emphasized engineering and publicizing the university
- In 1910, the university's baseball team won the college championship
- Held the first community open house

### Dr. Cleophas O'Harra 1911-1935



- Moved the university from a struggling mining school to a progressive science and engineering institution
- Oversaw the creation of “M Hill” and the first “M Day”
- First licensed radio station in the state

began on campus

- Offered the campus to help with World War I effort
- Delivered the address at dedication of Mount Rushmore's Washington carving
- Served until his death in 1935
- Called the "father of a thousand boys" at his funeral

#### Dr. Joseph Connolly 1935-1947



- Finished the football stadium and built several buildings, including the O'Harra Building
- Added several new programs
- University name changed to current moniker

- Led university through depths of the Great Depression and World War II
- Used the campus to train soldiers for the Army Specialized Training Program
- Enrollment boomed immediately after World War II
- Continued working on behalf of the university after he left the presidency

#### Earl D. Dake (Acting President) 1947-1948, 1953-1954



- First alum to hold top spot
- Starting salaries for 1948 grads ranged from \$200 to \$300 a month

#### Dr. Warren E. Wilson 1948-1953



- Created 10-year expansion plan, and built the Civil-Mechanical Building
- Placed more emphasis on research, especially in the area of nuclear energy.

- Began Honors Day in 1952
- Hired more faculty to lower the student-teacher ratio to 12:1
- Consolidated graduate programs under one director and created formal rules for graduate programs

#### Fay L. Partlo 1954-1966

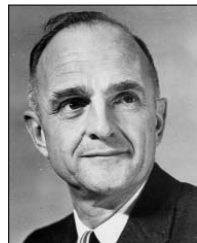


- Saw enrollment double to 940 students between 1953 and 1958
- Approved the creation of a Faculty Lounge
- Created a short-lived graduate program in nuclear engineering

Surbeck Center completed in 1963

- Created the Institute of Atmospheric Sciences in 1959

#### Dr. Harvey Fraser 1966-1975

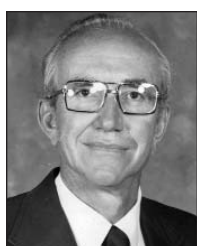


- Added four Ph.D. programs
- Led campus through demonstration-free Vietnam War years
- Conferred honorary doctorate to astronaut

Frank Borman, the first person to orbit the moon

- Started a "Good Teacher Program" for professors
- Saw record-setting enrollments for several years in a row
- Led the campus through the 1972 flood that killed two professors
- Resigned because of Regents' policy that said presidents must retire after 10 years

#### Dr. Richard Schleusener, 1975-1986



- Goodell Gymnasium and physical education complex completed in 1976
- Established new

programs, including computer science and meteorology

- Completed Operation Evergreen, a campus beautification project
- SDSM&T Foundation organized
- University centennial celebrated

#### Dr. Richard Gowen, 1986-2003



- Scientific Knowledge for Indian Learning and Leadership (SKILL) program began
- Masters program added in Technology Management

- Internet arrived on campus in 1992
- Little Miners' Clubhouse child care center established
- SDSM&T reorganizes into colleges in 1994
- Memorial Arch and Plaza constructed in 1996
- Center for Advanced Manufacturing and Production (CAMP) established
- Tech awarded Boeing Educator of the Year Award in 2000
- Advanced Materials Processing (AMP) Center established

#### Dr. Charles Ruch, 2003-present



- Welcome!

Editor's Note: Material from "Centennial: An Illustrated History 1885-1985," published by the South Dakota School of Mines and Technology, is used in this article.





## Deciphering nature's puzzles

How's this for an understatement? Nature is complex.

Scientists studying an emerging area called biocomplexity believe that understanding and sorting through that complexity could lead to a set of laws that govern nature. That set of laws - creating them is a task of Darwinian proportions - could allow humans to better use the natural world for our benefit while sustaining the diversity of life on Earth.

Scientists at the South Dakota Tech are doing their part by studying the ponderosa pine forest in the Black Hills. Researchers hope to figure out why the ponderosa pine tree so completely dominates the landscape. In large parts of the Black Hills National Forest, ponderosa pines account for 99 percent of the tree life. Contrast that with some tropical regions where 200 different species of trees grow per acre, and each species of tree has its own insect-sized predator.

The kind of dominance ponderosa pines enjoy should make the Black Hills highly susceptible to catastrophic attacks by insects. But, while pine bark beetles have eaten holes in the forest, such as in Beaver Park near Sturgis, the Black Hills have not experienced a complete eat-over. Scientists such as South Dakota Tech's Dr. Lee Vierling want to learn what web of mechanisms ponderosa pines use to protect themselves.

"In the southern

Black Hills, we have, basically, one species of tree, and it keeps growing," Vierling said. Vierling is an assistant professor in Tech's Institute of Atmospheric Sciences. "Maybe, the complexity of the system, including the genetics of ponderosa pines, the soil, the climate, and other factors, would explain why they dominate."

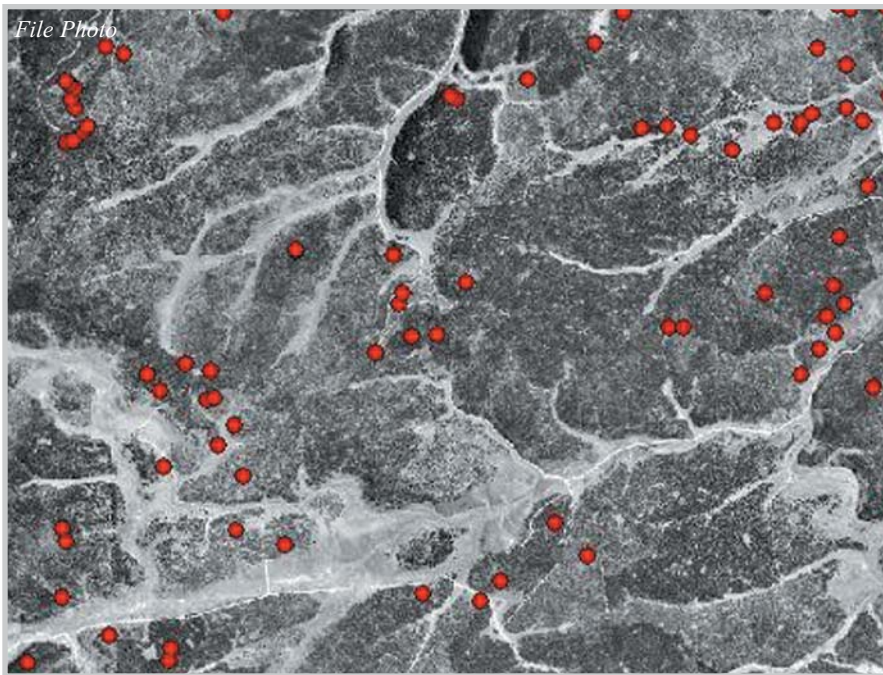
Vierling, assistant professor Dr. Pallaoor V. Sundareshwar, Institute of Atmospheric Sciences, Dr. Pat Zimmerman, director of the Institute, and student Erin Landguth (MS, ATM, Rapid City) are using funding from the National Science Foundation for their research. The NSF grant, awarded three years ago, created the Center for Biocomplexity Studies, a joint venture between South Dakota Tech, the University of South Dakota, and South Dakota State University. The team is in

the conceptual stage of its research.

The funding has been used to purchase equipment, support graduate students, and fund a faculty position at South Dakota Tech. Sundareshwar came to Tech from Duke University earlier this year. The research that Sundareshwar, Vierling, and others have begun could result in a better understanding of how natural systems operate and, in practical terms, better food crops such as corn and others that are easier to grow.

The National Science Foundation has made biocomplexity studies one of its priority areas. NSF created its "Biocomplexity in the Environment" initiative to promote intensive interdisciplinary investigation of complex environmental systems that contain biological and physical components. From individual cells to

whole ecosystems, biocomplexity refers to phenomena that arise from dynamic interactions that take place within biological systems and between these systems and the physical environment. All kinds of organisms, from microbes to human being, fall within the Biocomplexity in the Environment initiative, as do environments that range from frozen polar regions and volcanic vents to temperate forests and agricultural lands as well as the neighborhoods and industries of urban centers.



*This is an 88-square kilometer IKONOS panchromatic image of the west-central Black Hills area. A texture analysis technique was used to attempt to distinguish between field plots (red dots) of areas where ponderosa pines dominate and mixed forest areas. The results help provide a focus for current investigations into spatial complexity and texture analysis methods. Spatial complexity is one area of biocomplexity studies.*



The National Science Foundation predicts biocomplexity research will add to the global knowledge in a variety of fields, from global climate change to the development of new technologies.

Biocomplexity studies have grown out of system theories formulated by scientists in the 1960s. Scientists created those theories to try and make sense of the numerous complex interactions in the world, Vierling said.

"This kind of thinking goes way beyond acknowledging that the world is complex," Vierling said. "We are trying to understand how the complex interactions we see bring about this incredible ordered beauty in the world and the stability it experiences over time. How is it that there is all these complex nonlinear interactions going on, but overall systems remain relatively stable?"

Tech researchers will use the Black Hills as their laboratory to try and decipher that complexity by searching for clues to uncover the reasons ponderosa pine dominates. They will piece together individual factual bricks into a solid wall of evidence. The team will scrutinize the genetic structure of the trees, the soil, the interactions between tree roots and fungus, and

*File Photo*



*Tech professors Dr. Pallaoor Sundareshwar, left, Dr. Lee Vierling, right, and Erin Landguth (MS, ATM, Rapid City), center, examine specimens.*

many other factors that affect the pines.

It is, of course, conceivable that ponderosa pines are dominant as a matter of coincidence, although Vierling doubts that.

"There have been many phenomena throughout history that have been chalked up to chance, but the reality is often that we just never knew the right questions to ask when determining why they happened," he said.

If Tech researchers can untangle the web of factors that create ponderosa pine dominance in the Black Hills, scientists may be able to transfer that knowledge to other systems. For instance, the research could result in an understanding that results in corn crops that produce more corn with less interference from humans. In other words, it's possible that farmers could have a corn crop that is as dominant in the field as the ponderosa pine is in the Black Hills.

"Farmers need a toolbox of weapons" such as pesticides, herbicides,

and other agents and land management practices, to produce top-quality crops and high yields, Vierling said. "This idea of biocomplexity may allow farmers to sustain productivity while reducing how much they have to use from that toolbox."

That won't be easy, but as with all research, you won't know the answer until you ask the questions.

"It's difficult to crack the nut of how living systems work because there are so many things to measure,"

Vierling said. "Discovering a set of laws that govern how nature works is a lofty goal, but hopefully we can contribute one small part to that."



## Molecular level defense

Polycarbonate is versatile. We use it to make compact discs and DVDs, windows for high-performance sports cars, bulletproof windows, jet canopies, even the giant McDonald's "M" that leads the way to fast-food tradition.

It's a great material, but it's still not good enough for future military uses. Dr. David Boyles is working to change that. Boyles, a professor in the Department of Chemistry and Chemical Engineering, is funded by the Army Research Laboratory to create stronger and lighter polymers that will better protect soldiers, pilots, and other military personnel and equipment. Boyles' research attempts to answer the question, "If we change the molecular structure of the polymer, can and how does that impact the properties of the material?"

Boyles has worked on this problem for five years. The National Science Foundation, the Department of Defense, and the Army Research Office have been instrumental in funding his research, culminating in the current contract with the Army Research Laboratory in Maryland.

Polycarbonate is a class of high-performance polymer that fills a unique market niche. General Electric markets the material under the tradename "Lexan," and the German-based company Bayer markets it under the

name "Makrolon." Optically clear and durable, these properties lead to uses that include headlight and eyeglass lenses, medical parts that can be sterilized, drinkware, and unbreakable windows. Scientists create the material by stringing together many simple molecules called monomers. General Electric and Bayer jointly licensed polycarbonate 50 years ago, but scientists still don't know exactly why

made extensive use of polycarbonate during the past 50 years since its independent discovery by GE and Bayer. Its popularity is based on its properties. It is 40 percent lighter and 200 times more shatter proof than glass. Demand continues to exceed supply, and polycarbonate producers make big profits from its sale, a major reason that private industry has not given much attention to improving it.

That opens the door to academic researchers such as Boyles and his collaborators in the United States and Europe.

While polycarbonate meets the current needs of those who use it, a stronger material with better heat resistance that remains clear and ductile would benefit the military. The new material could be used for helmet face shields, goggles, jet canopies, windows for troop transport and other vehicles, and other applications known as "transparent armor."

Boyles also wants a material that can be injected with laser-absorbing dye to protect military personnel from laser-based weapons and tracking systems.

Boyles is working to invent that new material by creating a family of new monomer molecules, the building blocks of all polymers. He, along with Dr. John Bendler, a former South Dakota Tech professor who now is



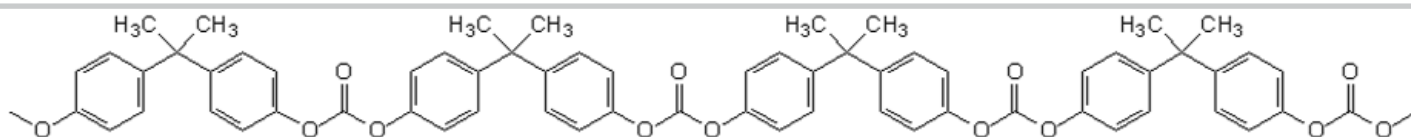
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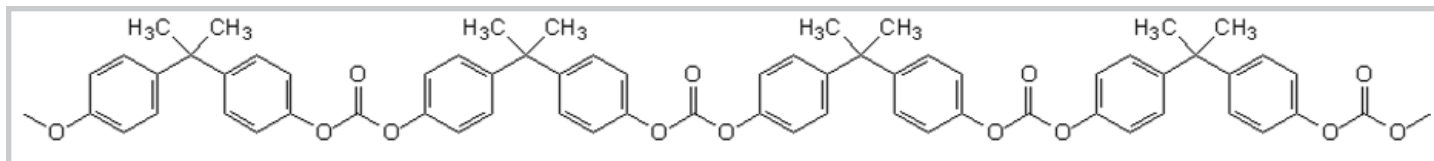
*Rachel Waltner (MS, MES, Creighton) prepares a sample for nuclear magnetic resonance analysis while Dr. Tsvetanka Filipova, a postdoctoral fellow, and Guy Longbrake (MS, MES, Rapid City) ready the required equipment to perform flash chromatography of a new monomer. Organic synthesis requires careful purification and characterization of new materials.*

the material has the remarkable properties it does, although many think that the "flipping" action of the monomer segments contributes to its uniqueness.

Industry and the military have

Polycarbonate molecule





Professor of Physics at the United States Naval Academy in Annapolis, Maryland, are designing molecules that retain the favorable properties of current polycarbonates but also exhibit improved properties. Bendler, a theoretical polymer physicist, uses computer modeling to test molecules from Boyles' imagination to design molecules that may meet the team's needs. Boyles, as a synthetic organic chemist, then synthesizes the molecules in the laboratory to test Bendler's predictions of their properties. The two scientists have invented more than two dozen new monomers so far, and have converted them into several dozen new polymers.

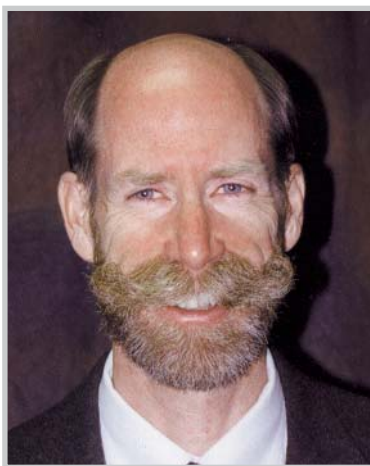
"The molecular features and data obtained thus far convincingly argue that we will have a superior material with superior properties on the bulk scale," Boyles said.

Boyles and his student research group headed by his post-doctoral fellow from Bulgaria, Dr. Tsvetanka Filipova, have created the new polymers in South Dakota Tech's laboratories. The next step will be to use newly purchased equipment that will allow the team to produce finished material for the next level of testing. Producing enough of the new materials so they can be tested in a more complete manner ultimately will require outsourcing the manufacturing, and Boyles is currently in discussion with corporate partners for agreements to do the production.

"Our partners at the Army

Research Laboratory are eager to get their hands on this material and do further work with it," Boyles said.

The commercial polycarbonate material used now is good enough for the roles it fills, but lacks the properties



*Dr. David Boyles.*

required for more extreme conditions. The fundamental problem is that commercial material can be improved only at the expense of introducing major processing problems that would lead to the material's degradation. A polymer with a higher molecular weight would result in a material close to what's desired, but polycarbonate plants could not produce that kind of polymer because it would be too thick and couldn't be molded or otherwise processed into products. Building a plant with that capability is also out of the question, since currently existing

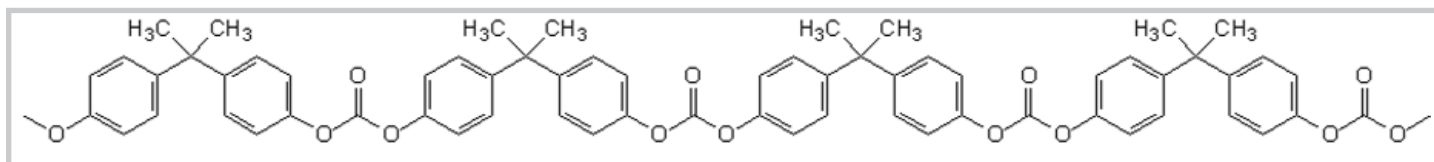
polycarbonate plants cost nearly \$1 billion to build, Boyles said.

"Without new materials, society doesn't go anywhere," Boyles said. "That makes this a science problem, not an engineering problem."

And that's what makes the work so interesting.

"In this kind of research, you think up an idea in your mind based on what already exists," Boyles said. "Then you take that idea from your mind and create it in reality. You make something that didn't exist yesterday. Your idea becomes part of the world, and that's an incredible thing."

It's also an incredible thing that the materials Boyles aims to create will better protect the American soldier in the field.





## Putting knowledge to the test

In quiet computer labs and in not-so-quiet construction areas, South Dakota Tech students spent much of the year designing and building vehicles for competitions against some of the best engineering universities in the world.

The countless hours of work culminate in spring and summer competitions around the country. The projects, all part of Tech's Center for Advanced Manufacturing and Production (CAMP) program, test students' design, construction, presentation, and other skills while teaching them practical and team-building skills necessary for today's world.

Here's how the 2003 vehicle teams fared.

File Photo



### ACM Programming Contest

A team of South Dakota Tech students has been invited to compete in the World Finals of the American Computing Machinery Programming Contest, scheduled for March 2004 in Prague, Czech Republic. The invite came after Pete Gasper (CSc, Sidney, MT.), Jonathan Wolf (CSc, Moorcroft, WY), and Wyatt Zochert (CSc, Webster,) finished fifth in the regional ACM competition in November. Two other Tech teams finished 14th and 26th against the 178 other teams.

In the regional competition, the students answered such problems as "Determine the number of stars that can be inscribed in a circle with a given number of points on the circumference," "Find the minimum

number of steps required to convert a number to a palindrome," and "Determine the frequencies in a signal from a series of observations." The teams had one computer and five hours to solve nine challenging problems. The Tech teams logged countless hours of hard work in the months leading up to the event.

The programming contest requires many skills. All team members must be able to write programs in C++ computer language, and each team needs members with algorithm development skills, strong mathematical ability, and at least one person who is very skilled at debugging the programs the team writes to solve each problem.

The Tech team will compete against 51 other teams in the World Finals. Thousands of teams tried to qualify in regional competitions. At the Finals, Tech will join 21 American universities such as Cornell, MIT, Harvard, and Stanford.

### Aero Design



The Tech Aero Design team's remote-controlled airplane flew to a 15th place finish during a competition in California.

The Aero Design competition challenges engineering students to conceive, design, fabricate, and test a radio-controlled aircraft. The competition is divided into two parts - design and flight. In the design event, the contestants present their design strategy and demonstrate the accuracy of their calculations in predicting the maximum payload the aircraft can lift.

The flight event determines which aircraft can lift the most weight. The competition limits the wingspan of each aircraft, and requires them to take off and land within a limited distance.

### Chemical Car



The South Dakota Tech Chem-E-Car team finished fourth in the nation during the chemical car national championship held November 16 in San Francisco, Calif.

The Tech team won first place in the Chemical Car competition held during the 2003 American Institute of Chemical Engineers Rocky Mountain Regional Student Chapter Conference in Tucson, Ariz. The team won first place in both car performance and in the poster competition.

The team built and operated a chemically powered model car for the competition against six other universities. Tech's car was powered by a hydrogen fuel cell, and its body was fabricated with Tech's rapid-prototyping machine. In the competition, the car had to carry a payload for a certain distance.

### Concrete Canoe



The Tech team showed very well at the 2003 American Society of Civil Engineers Rocky Mountain Regional Conference held in Logan, Utah. The team's concrete canoe was judged on appearance, weight, presentation and sprint and endurance races for men, women and co-ed squads. Besides the canoe competition in Logan, the Tech team competed with design papers, a steel bridge, a pre-design and mystery design.

Here's how the team placed in each portion of the competition: Concrete Canoe, first place; Technical Paper, fifth place; Pre-Design, third place; Mystery Design, 50 participation points; Steel Bridge, sixth place; Non-Technical Paper, fifth place. Tech's student American Society of Civil Engineers chapter has a strong tradition of designing and racing concrete canoes.

### Human-Powered Vehicle



The Tech Human Powered Vehicle team finished in fifth place during the Human Powered Vehicle Challenge held in Reno, Nev.

The vehicles were judged on design and safety, and in sprint and endurance races against 12 teams from across the country. The Tech team, which designed its vehicle so riders sat in a recumbent position, competed in the single rider events.

The team placed first in the competition's design component, 11th in sprint races and sixth in the

endurance races.

### Mini-Baja



Tech sent two teams to the 2003 Society of Automotive Engineers Mini Baja West competition held in Logan, Utah. One of Tech's vehicles, developed using last year's frame with a few modifications, and including underclass students, finished in 83rd place. The second, brand-new vehicle, designed by a group of seniors, finished in 22nd position.

Tech competed against more than 100 engineering design teams. The Baja cars were judged on design, cost, and safety. Teams gave presentations about their cars, and showed off their performance during hill climb, maneuverability and acceleration events. The Baja cars and drivers were also put to the test during the four-hour endurance race over rugged terrain that tested the durability of each vehicle.

### Mini-Indy



Tech's Mini-Indy team finished in 49th place during the annual Mini-Indy competition in Pontiac, Mich.

Students designed, fabricated, and competed with small formula style racecars. The focus of Mini-Indy is not simply on who can build the fastest car, but rather on the use of engineering skills, financial know-how, and creativity. Given certain car frame and engine restrictions, the competition tests students' knowledge, creativity, and imagination.

Vehicles were judged on static inspection, engineering design, solo performance trials, endurance trials, and on other variables. More than 120 teams from around the world traveled to the Pontiac Silverdome (Pontiac, MI) for the event.

### Robotics

Tech won the Institute of Electrical



and Electronics Engineers regional robotics competition held in New Orleans, La.

Thirty-seven teams representing universities in Texas, Colorado, Louisiana, Missouri, Oklahoma, and South Dakota entered robots in the competition. Tech entered three robots, and won first prize with the entry "Hammerhead." Tech graduates Ben McGregor (CEng, '03) and Joe Faddoul (CEng, '03) built Hammerhead. The other Tech robots, Flash and Twitch, suffered last-minute technical problems that prevented them from qualifying for the competition finals.

Teams had to design and build

Student team competitions  
continued on page 33



## Real leadership for the real world

**S**outh Dakota Tech's Center of Excellence for Advanced Manufacturing and Production (CAMP) is growing up.

"We have passed Teaming 101 and are well on our way through Teaming 200," said CAMP co-director Dr. Dan Dolan, a professor in the Department of Mechanical Engineering.

CAMP was started to integrate students, faculty, and industry partners into a center whose purpose is to provide a unique approach to design and manufacturing engineering education. That unique approach is based on the concept of enterprise teams that simultaneously address explicit needs of industry. It provides the major effort in developing the soft skills and hands-on work now demanded by industry and the accreditation agencies. Students work on competition team projects or projects supported by regional industry. Assistive technologies, economic development, and entrepreneurial types of projects are encouraged.

Since it began in 1997, it has grown and changed. It offers nine projects for students, better equipment, better tools, better communication between teams, broader perspective in the leadership of CAMP with the addition of a psychology professor, and a truly student-centered environment, Dolan said.

Any Tech student can participate in any CAMP project, but students also can apply to be official CAMP members. Students apply for those positions much as they would apply for a job. They submit resumes and cover letters to the CAMP directors, and must have a 3.0 or better GPA and an intent to be a leader within the organization. If they meet these two criteria, they are generally selected as CAMP members, Dolan said.

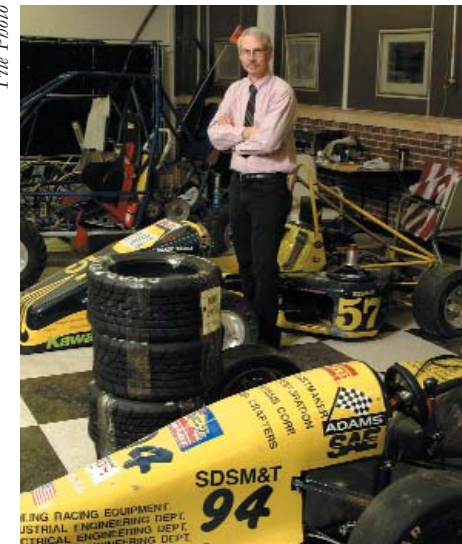
There are many benefits to being involved in CAMP.

"Students get to lead projects or work in the state-of-the-art labs

supported by CAMP," Dolan said. "They get to attend leadership and teaming seminars and retreats. They are able to honestly state on their resumes that they have teaming, leadership and project experience that is a tremendous benefit in the job market, and they get to travel to and take part in regional, national or international student competitions."

Dr. Jim McReynolds, chair and associate professor, Department of Social Sciences, agreed.

"There is a rapid evolution of organizational structures going on now," he said. "This is based on the increasing recognition that the lifespan for many products, particularly technical ones, is increasingly brief, and that the more traditional ways of doing business - that's the way we have always done it - are increasingly maladaptive.



*Professor Dan Dolan in the CAMP lab.*

"Part of this organizational evolution recognizes that employees, all of them, represent untapped potential with their experiences, and, additionally, have vision, imagination and creativity that is also untapped," he said. "To maintain the competitive edge, many, if not most organizations, view the teaming process as a way of

tapping into the full range of potential employee contributions."

CAMP uses that approach with the projects it offers to prepare students for the environment they'll find when they graduate and move into the workforce.

"This is why (the accrediting agency) ABET and our own academic advisory board are actively pushing Tech to bring out more in our students," McReynolds said. "There is the recognition that the process by which goals are achieved influences the rate of progress and the quality of the outcome.

"At this time, the teaming process seems to be the best way to do this, but this process requires the acquisition of skills not usually associated with scientific or engineering education such as cooperation, actively listening, conflict resolution, mutual accountability, trust, and open communication in completing specific projects," he said. "For our students to be more successful in their professional careers, CAMP was developed to provide students with these increasingly important experiences of completing projects accompanied by acquiring the skills which bring out the best individuals."

So far, it's working.

The following students were selected as members of CAMP in the fall 2003 semester.

- **Wayne Baker**, (ME, Sturgis)
- **Bobbie Crater**, (ME, Glasgow, MT)
- **Patrick Dardis**, (IE, West Fargo, ND)
- **Adam Dickinson**, (CSc, Sioux Falls)
- **Jessica Duba**, (EE, Pierre)
- **Jason Howe**, (ME, CEng, Spring, TX)
- **Andy Kannenberg**, (CEng, Sioux Falls)
- **Chad Kirby**, (ME, Sioux Falls)
- **Chris Kroetch**, (ME, Minot, ND)
- **Patricia Krugjohn**, (ME, Sturgis)
- **Matt Reiffenberger**, (ME, Sturgis)
- **Tyler Schiltz**, (ME, Rapid City)





## Spanning cultures, crossing obstacles

A program held at South Dakota Tech this past summer introduced the university to an important group of American Indian students who don't often feel that Tech is a place for them.

The program was part of Oglala Lakota College's "Bridges to Success" initiative. Students in the Oglala Lakota College's Science, Engineering, and Mathematics associate's degree program spend their first two years at Oglala Lakota College (OLC), then transfer to a university engineering program, often at South Dakota Tech.

"Our big goal is to aid students in that transition process," Mike Fredenberg, chair of the Math and Science Department at OLC, said. "When students get to South Dakota Tech, they often run into cultural and social differences, and they don't know anyone. We want to team students up with a mentor and faculty members at Tech as well as with other students already attending to ease this transition process. The other thing we hope for is that students become more interested in science."

During their time on Tech's campus, OLC students worked in the Advanced Materials Processing (AMP) Center, in the Chemistry and Chemical Engineering Department, and in the Civil and Environmental Engineering Department.

Fredenberg has immediately saw changes in the students who went back to OLC for the fall semester. Other students involved are now enrolled at South Dakota Tech. Some of the changes were evident when the OLC students delivered presentations about their research projects.

"Seeing how the students' confidence level grew was very satisfying," he said. "I could just see how much they had grown professionally." That growth is important, Fredenberg said.

"Many students are afraid of big schools and big classes," he said. "They

don't know what they can do yet. They think calculus is unattainable for them. Then they get involved with a program like the one this summer, and they see what they can do. That opens doors for students all over the place."

A \$50,000 National Science Foundation grant funded the program. Besides participating in research projects, the OLC students toured campus to learn about Tech Multicultural Affairs office, counseling services, and others areas on campus that could make the transition to Tech easier. Students also attended a cover letter and resume workshop, a business etiquette lunch, and a PowerPoint workshop.

"Coming off the reservation for

File Photo



*Bridges to Success participants Amanda Dowty (left) and Cristy Hawk (right) take a break from their Chemical Engineering research project they completed with Kelly McCarrie, a participant in the Research Experience for Undergraduates program.*

any new freshman who steps on campus, it can be an intimidating period," Tech's Dr. Carter Kerk said. Kerk, an assistant professor in Tech's Industrial Engineering program, helped coordinate the program. "If you have to cross cultures at the same time, it's even more so.

"Students came into this thing very timid about being on campus and by the end of it, they were very comfortable on campus, they met lots of people, worked on some exciting projects they couldn't have imagined they could have done," Kerk said. "Many of the students left telling us, 'Now I know what I want to do in my career.'"

Two OLC students worked with Dr. Robb Winter, chair and professor, Department of Chemistry and Chemical Engineering. The students, along with a student from San Jose State University who was part of a different program, investigated using nanoparticles as fillers in the thin films used to bond joints found in aerospace applications. The team developed the protocol to create the research specimens and developed the nanofiller material.

"They were doing the real thing, and we actually saw results that were unexpected and reproducible," Winter said. "We are using some of the data to develop proposals to the National Science Foundation."

The experience benefited the students in an obvious way, Winter said.

"I saw a tremendous increase in student confidence," Winter said. "When they first arrived, the OLC students saw this as something totally foreign and they weren't sure they could do it. By the end, they were contributing members of the research team. They moved from having little confidence to having a tremendous amount of confidence and ability."

Bill Arbegast, director of Tech's Advanced Materials Processing Center, noticed a similar change in the students, who worked on four different AMP projects. The AMP projects also were funded, in part, by the Army Research Laboratory.

"The students matured quickly and became increasingly involved in these research programs," Arbegast said. "They developed an intense research mentality and they became more curious about our technologies."

Winter and Arbegast agreed on one other point.

"We should do more programs like this," Winter said. "It's a type of program that is beneficial for any student."



## A small step for Tech, a giant leap for students

In the past two years, three South Dakota Tech students have been selected by the Air Force Research Laboratory as Space Scholars, a prestigious honor for the students and for SD Tech.

In the summer of 2003, Eric Pollard (ME, '03) and Jason Ash (BS, ME, '99; MS, ME, '01) participated in the program. Pollard is now pursuing a master's degree in Mechanical Engineering at Tech. Ash is pursuing a doctorate in Materials Engineering and Science at Tech and is an instructor in the Department of Mechanical Engineering. The two Tech scholars were among 30 people selected from across the country for last summer's program. Every student selected worked in the Air Force Research Laboratory's Space Vehicles Directorate alongside a laboratory researcher.

Pollard worked on a project called "Characterizing the Non-Linear Dynamic Behavior of Membrane Optics," and said the experience taught him important lessons.

"Scholars are incorporated into nearly every current project at the lab and expected to contribute to the effort, culminating in the end result of the summer's work, a conference or journal paper," Pollard said. "Delivering on this expectation is a challenge, but satisfying as everyone is generous with their expertise and enthusiasm for the technologies being developed. The networking connections and the insight I gained has enabled me to be more strategic in my career path."

In the summer of 2002, Jack Massarello (MET, '03) participated in the Space Scholars program. He now is part of the lab's Palace Acquire program, and alternates working at the lab in the area of advanced mirror technology to help develop mirrors for space applications that are more affordable, better, and faster to produce, with pursuing his master's



degree. The Air Force is paying for Massarello's education.

All Space Scholars are competitively selected on the basis of their scholastic achievement and potential contribution to technology areas that are strategically important to the research important to the lab.

"This is a very prestigious program that accepts a small number of the students who apply," South Dakota Tech President Dr. Charles Ruch said.

The Space Scholars Program has been highly successful. Extremely bright and enthusiastic young people have been recruited from some of the most highly regarded universities. They have made significant contributions and with their mentors have published scientific papers in professional journals.

"It's very competitive," Dr. Chris

Jenkins, chair and professor, Department of Mechanical Engineering, said. "When, you look at the list of the students and the schools they come from, it's pretty impressive to see the School of Mine up there with MIT and UC Boulder. It shows that our students compete and perform well with other excellent universities in the nation.

Dr. Jon Kellar, chair and professor, Department of Materials and Metallurgical Engineering, agreed.

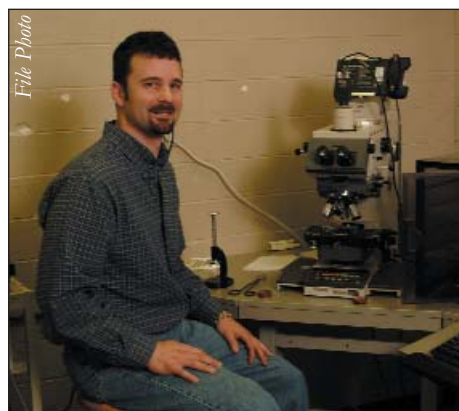
"This is very prestigious," he said. "They compete with students from universities nationwide. We should be very proud of the Tech students who have been selected."

Designed to attract promising science and engineering students for future careers with the Air Force Research Laboratory, the Space Scholars Program is managed at the laboratory's Space Vehicles Directorate. Headquartered at Kirtland Air Force Base, Albuquerque, NM.

The strength of the Space Scholars program lies in its mentors who oversee specific topics based on Directorate technology needs. Mentors then guide the Space Scholars through an appropriate course of research designed to fulfill the laboratory's needs. Topics suggested under this program support all three of the Directorate's World Class Centers - Space Weather, Space Electronics, and Plasma Chemistry, and Physics.

Jeff Welsh, an aerospace engineer at the Air Force Research Laboratory, said the lab is "very pleased" with its relationship with Tech, and hopes more students apply for the Space Scholars program. "The students we've brought down here from Tech have performed exceptionally well," Welsh said. "That speaks to the background and training they receive at the university and the work ethic that Tech students bring."

Jenkins says the selection of Tech



*In the summer of 2002, Jack Massarello (MET, '03) participated in the Space Scholars program. He now works for the Air Force Research Laboratory.*

## Solving problems for engineering and business

Industrial Engineers have a slogan they use at IE dinner parties when they're proudly discussing their chosen careers.

"Engineers make things. Industrial Engineers make things better."

At the South Dakota School of Mines and Technology, the Industrial Engineering program is making good on its promise to South Dakota Tech students. Industrial Engineering has become one of the fastest-growing majors on campus. Enrollment in the program has more than doubled from 48 students in 1998 to 109 during the 2003-2004 academic year.

Dr. Carter Kerk, associate professor in the program, credits the wide appeal to the disciplines Industrial Engineering combines.

"Many of our students admit they were looking to combine business with engineering," Kerk said. "Many were searching for a technical major, but wanted a more people-oriented field. Another reason for our growth has been that our program is relatively small, and we take a personal approach with our students."

That personal approach includes professors taking a genuine interest in the success of their students, and making sure all students have opportunities to succeed.

"The Industrial Engineering major is an interesting and unique choice for a couple good reasons," Dr. Stu Kellogg, professor and program director, said. "Industrial Engineers look at improving systems regardless of what those systems might be. Many IEs go into manufacturing systems, but there are also opportunities in the service industries, retail, health care, logistics, finance, military, and consulting. Industrial Engineering is flexible, versatile, and adaptable. The basic concepts can be applied in various fields and situations. Industrial Engineers like to ask 'Why?'"

Dr. Frank Matejcek, associate



*Dr. Stu Kellogg, Ervin Pietz professor and director of the Industrial Engineering program, has been selected as the 2003 Carnegie Foundation for the Advancement of Teaching South Dakota Professor of the Year for his efforts to teach and support students.*

professor in the program, said prospective students interested in any of the following points likely will find a comfortable fit in the Industrial Engineering program:

- They want to combine business or management with engineering.
- They are interested in being an entrepreneur.
- They enjoy statistics and applying math concepts to problem solving.
- They enjoy communicating and dealing with people.
- They want to design systems that are easier and safer for humans to operate.
- They are always looking for a better way to do things.

As a discipline, Industrial Engineering is concerned with the design, improvement, and installation of integrated systems of people, material, and equipment. It helps bridge the gap between management and operations, and industrial engineers integrate the human resources, raw materials, and equipment components of business and manufacturing. An industrial engineer works with people in addition to solving technical problems, and relates to the total picture of productivity and quality improvement.

Industrial engineers employ a set of skills that includes mathematical

modeling, probability and statistics, computer science, human factors, and interpersonal skills. Many industrial engineers cite that richness as the reason they find the profession so alluring.

The program at Tech is well suited for those students who enjoy applied math and science but do not see themselves sitting at a desk as a design engineer. Typically, these same students have good interpersonal skills and enjoy learning in a broad range of topics.

Students apply the skills they learn at Tech to community projects. Students partner with organizations, evaluate a problem, and design and implement solutions. The program's growth had led to a need for more projects. Any community organization interested should call Kerk at (605) 394-6067.

Industrial engineers apply problem-solving techniques in almost every kind of organization imaginable. Industrial engineers work in banks, hospitals, all levels of government, transportation, construction, processing, social service, electronics, facilities design, service industry, defense, agribusiness, and many other organizations. As organizations and companies recognize the value of industrial engineers, the demand for skilled people in the profession grows.

At Tech, Industrial Engineering students use laboratories for courses in work methods and measurements, and in human factors and ergonomics. To respond to changing industrial requirements, a new, state-of-the-art, computer integrated manufacturing laboratory has been established in the Civil/Mechanical Engineering building, where the other laboratories and program offices also are located. Students spend most of their time in the laboratories while they work on



## Scholarship targets the best and brightest

Higher education embraces a high purpose - preparing students for their roles in the workforce and in society. But like any enterprise, higher education faces competitive challenges. Like every other business, universities must compete for customers and keep those customers once they decide to come through the front door.

Increasing South Dakota Tech's competitive advantage represents the goal of a new scholarship fund drive called the Tech Challenge.

"During the Foundation's Vision 2000 capital campaign, we were

successful in raising more than \$8.5 million in both endowed and non-endowed scholarships," Tech Foundation President Rod Pappel said. "This significantly increased available awards. But to remain competitive in today's university marketplace and ever increasing tuition and fees, SDSM&T must continually increase both the

number of awards available and the size of those awards. Offering renewable scholarships to the very best freshmen is the best place to start."

The Tech Challenge began with a donation from a couple of Tech's great friends. Three years ago, Frank and Marilyn Richardson funded the annual Richardson Outstanding Scholarship Program at Tech. Their latest gift, a

years.

The Tech Challenge is necessary to help Tech recruit and retain the best and brightest students, according to Dr. Howard Peterson (Dean Pete), chair of the SDSM&T Foundation and retired dean of students.

"Scholarship support has always been tight," he said. "In today's market, current year student support is even more needed."

Since the Richardson's kick-off contribution, fundraising has taken many avenues. A phonathon held in April earned pledges of nearly \$27,000 in four nights. The 13 Tech student callers, all

recipients of Tech scholarships, made more than 2,200 calls to Tech alumni to raise awareness of and support for this new fund-raising program.

Other efforts to raise dollars for the Tech Challenge scholarship program to date include mail solicitations to all faculty and staff on campus and a separate mail solicitation to all alumni.



generous \$100,000, is the base for the Tech Challenge. The Richardson's contribution will match dollar-for-dollar other contributions received in support of the Tech Challenge.

"The Richardson's generosity is unending," Pappel said. "This gift will give the Tech Challenge a jumpstart, and more importantly, will be used to challenge others to do the same."

The SDSM&T Foundation initiated the Tech Challenge as a focused effort to significantly increase scholarship dollars available to Tech students. This program is the beginning of a concentrated annual effort to help recruit and retain the very best students at South Dakota Tech by increasing the amount of scholarship support available. The goal of the Tech Challenge is to provide four-year scholarship support to top Tech students. The initial phase will raise money for scholarship support for Tech students' freshman and sophomore

*"...to remain competitive in today's university marketplace and ever increasing tuition and fees, SDSM&T must continually increase both the number of awards available and the size of those awards...."*

**-Rod Pappel  
Tech Foundation President**

*"With the scholarship I have received, I will be able to remain as active as possible in school activities, like men's basketball, and still focus greatly on achieving academic success."*

**-Grant Crawford  
Tech Student**

Foundation staff and campus volunteers have also been actively canvassing local business and community leaders to raise awareness of the importance of supporting scholarships at Tech.

"Being one of Rapid City's largest employers and bringing in 2,400 students per year, Tech has a huge economic impact in Rapid City and on the Black Hills community," Val Olney, senior planned giving coordinator at the SDSM&T Foundation, said. "To maintain this influence, Tech needs to continue to recruit and retain students. This can effectively be done by offering competitive scholarship packages."

Many grateful students who currently receive scholarships at Tech have indicated just how important their scholarship support is to them. For some, scholarship support allows them to focus on their studies and extracurricular activities rather than trying to divide their time between work and school. Other students said that if it were not for the scholarship they receive, they would not be attending Tech at all.

"With the scholarship I have received, I will be able to remain as active as possible in school activities, like men's basketball, and still focus greatly on achieving academic success," Tech student Grant Crawford (ME, Sundance, Wyo.) said.

Student Bobbie Crater (ME, Glasgow, Mont.) agreed.

"The scholarships allow me to focus more on my college education instead of having to worry about how to pay the bills," she said. "They allow

me the opportunity to fully commit my time and energy to what I came here to do, learn."

Frank Richardson (GeolE '55), a Wood native, graduated from Tech in 1955 with a degree in Geological Engineering. He met and married Marilyn, and the couple has two children, Stacey and Scott. Frank Richardson worked for Shell Oil Company for more than 30 years,

Houston, Texas.

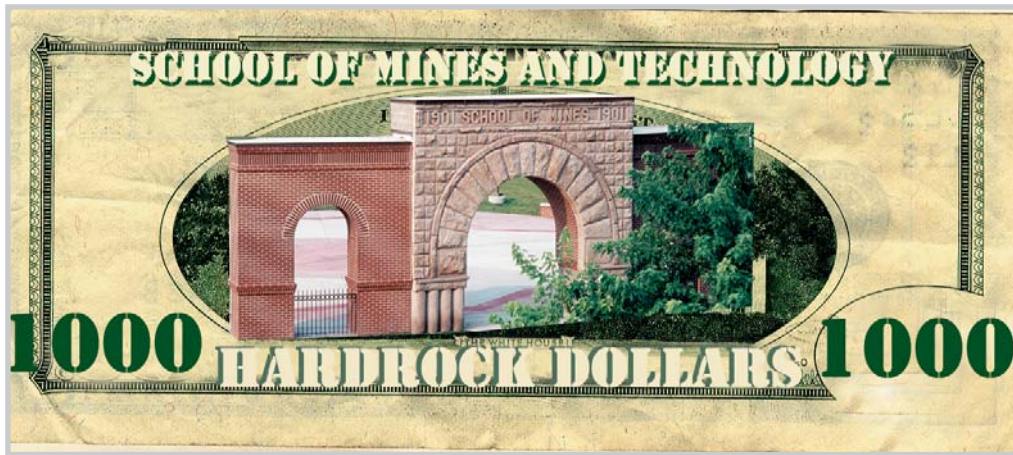
In 1999, the Richardsons funded the annual Richardson Outstanding Scholarship Program. The program awards nine Tech students \$5,000 scholarships every year. The most outstanding sophomore, junior, and senior from Tech's College of Earth Systems, College of Materials Science and Engineering, and College of Systems Engineering are selected. The

Richardson scholars are an elite group on campus, and the Richardson Scholarship is among the most prestigious awards on campus.

"The Mines provided me a fundamentally sound education that served me well throughout

my professional career," Frank said. "Marilyn and I think it only fitting to provide future generations assistance in pursuing their educational goals at Mines."

For information about the Tech Challenge, or to donate to the effort, call the SDSM&T Foundation at (605) 394-2436.



retiring as the company's President and CEO.

Since Richardson's retirement from Shell, he and Marilyn have lived in

*"The Mines provided me a fundamentally sound education that served me well throughout my professional career," Frank said. "Marilyn and I think it only fitting to provide future generations assistance in pursuing their educational goals at Mines."*

**-Frank Richardson  
Richardson Scholarship  
Founder/Donor**





## TARP covers recruitment needs

South Dakota Tech is mining its ranks of alumni to ignite interest in a new generation of students and widen Tech's recruiting reach.

The effort is called TARP -- Tech Alumni Recruiting Program -- and was created from an idea from former Tech admissions director Don Hapward. Joe Mueller, the person now charged with bringing students to Tech, will run, and plans to expand, the program.

"We tell students that our graduates do well and have very little trouble finding jobs," Mueller said. "Now we can prove that by having an alumni tell the students themselves."

The program began several years ago, and more than 20 Tech alumni signed on as volunteers. The volunteers visit high schools and attend college fairs and other events where high school students are gathered. Mueller and Alumni Association director Tim Vottero (BS, Chem, '84) plan to energize the effort and make it better than ever. Tech has added an on-line training feature that will speed the process of drafting and preparing TARP volunteers. Prospective volunteers will find the entire TARP manual at the site, as well as a 20-question test required to become an official TARP volunteer. Find the website at [www.sdsmt.edu/TARP](http://www.sdsmt.edu/TARP).

Tech alum Susan "Booty" Banks (BS, GeolE '75) volunteered for TARP a few years ago after she read that the college fair in her hometown of Pittsburgh, Pa., is one of the largest in the nation. Banks works for the Pennsylvania Department of Environmental Protection as a geologist in the Oil and Gas Management Program. She also serves one of the department's state facilitators and mediators who facilitates meetings between state



personnel and the public.

"With the skyrocketing cost of higher education, especially here in Pennsylvania, I felt it was a good opportunity to see if we could have someone from Tech come here and do some recruiting and promote the School of Mines," she said. She signed up for TARP, and with a revival of the Pittsburgh-area alumni group, attended the annual fair with alums Dennis Poage (BS, EE '67) and Steve Uttecht (BS, EE '92, MS, EE '94). "With budget constraints everywhere, especially in higher education, more responsibility for promoting Tech on a local level must be passed on to the Alumni, and we are very proud to do our part here in Pittsburgh."

This year, the Pittsburgh Three increased their presence at local college fairs held in local high

schools in the fall in addition to attending the big Pittsburgh fair. After their first fair, the trio sent more than 30 reply cards from students who wanted more information about Tech.

"Our chance to participate on a local level will give us more one on one time with students," Banks said. "I would love to know that our recruiting efforts would send two or three local students to Tech in 2004 or 2005. I would also like to get our catalog in the guidance office of every high school in the Pittsburgh area. For those guidance counselors who stopped by our booth at the college fair, we gave them the CD-ROM to share with prospective students. The CD is definitely a great tool and one we are hoping our counselors will utilize with prospective students."

Tech produced a recruitment CD-ROM in 2002. The Admissions Office has distributed more than 15,000 of them so far. The CD-ROM won a Bronze Medal in a national contest sponsored by the Admissions Marketing Report.

The Pittsburgh Three's contribution of time is incredibly valuable, and if they successfully recruit a student, the contribution could turn into four years of tuition and fees.

TARP members can participate in any or all of four different phases of the admissions process. During the academic year, members will participate in the three phases of the admissions process to provide the necessary support for admissions in recruiting students for Tech.

August to December: During the first phase of recruitment, TARP volunteers will assist Tech's Admissions Office generate inquiries by identifying potential Tech students through college fairs, high school visits, and through social contacts. After a potential

*"I would love to know that our recruiting efforts would send two or three local students to Tech in 2004 or 2005."*

**-Susan "Booty" Banks  
Tech alum  
(BS, GeoE '75)**



student has been identified, TARP volunteers submit the student's name and information to the Admissions Office.

**January to April:** The second phase of recruitment involves alumni who will personally encourage students to apply to Tech. Volunteers will contact prospective students by email, telephone, or letter to see if the students have questions and to encourage a campus visit and attendance at a Tech Info Night. This also is a prime time for TARP volunteers to contact the counselors at the high schools in their areas and schedule high school visits. TARP volunteers also can attend Tech Info Night events scheduled during this time.

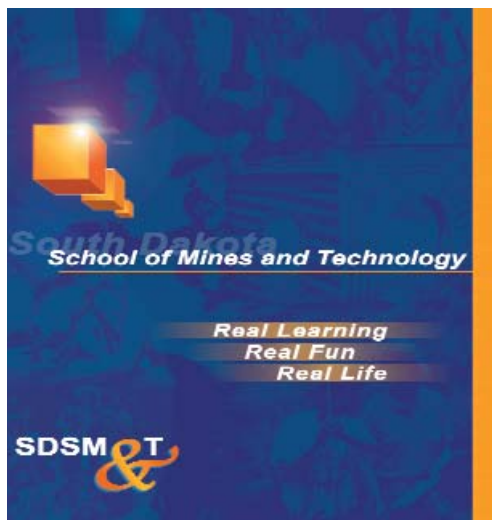
**May to August:** During the third recruitment phase, TARP volunteers will help the Admissions Office sustain the students' enthusiasm so the students carry through with plans to enroll in the fall. Volunteers can do this through send-off parties, picnics, receptions, or informal luncheons.

The biggest benefit of TARP is the reach it gives Tech's Admissions Office. Tech's two full-time admissions counselors can only attend so many college fairs each year. TARP volunteers "get us where we can't be," Mueller said.

"That's the number one benefit," he said.

TARP volunteers go through a short training session when feasible and receive a handbook that outlines the program and each volunteer's responsibilities. TARP volunteers have attended fairs around the country and hopefully, around the world.

TARP volunteers are a well-informed group and can speak about Tech from personal experience. That's a more personal approach to recruiting and helps high school students put a face and



*Tech Alums banded out CD-ROMs to guidance counselors who stopped by the Tech booth at the college fair in Pittsburgh.*

*The CD-ROM won a Bronze Medal in a national contest sponsored by the Admissions Marketing Report.*

a name with their first contact with Tech. Most volunteers give students business cards and invite the high schoolers to call with any questions.

Many other universities use programs similar to TARP. In many cases, the program has helped the universities increase enrollment and transform the schools from regional institutions to school that attracted students from across the country.

Mueller sees that potential at Tech.

"Hopefully, eventually we can recruit all over the United States,"

he said. "We can be a force to be reckoned with."

Tech's Alumni Association helps recruit TARP volunteers.

"TARP complements one of our Alumni Association's fundamental goals to 'encourage the enrollment of qualified students,'" the Alumni Association's Vottero said. "We stress the importance of maintaining continued enrollment of students with the potential, like our alumni before them, for excellence in the fields of science and engineering."

Alumni are usually readily willing to volunteer, Vottero said.

"Tech alumni share a common bond from their time at Tech," Vottero said. "They remember the challenging classes, the fun traditions and remain proud of the school that gave most of us our start in the professional world. As a result, alumni enjoy giving something back to the school that played an important part in their lives, and they are sincere in their wish to see that experience shared with future students."

Alumni who are interested in participating in the TARP program can contact Joe Mueller in the Admissions Office at (605) 394-2414, or toll free at (800) 544-8162 ext. 2414, or by email at [joseph.mueller@sdsmt.edu](mailto:joseph.mueller@sdsmt.edu).

*"Hopefully, eventually we can recruit all over the United States,"... "We can be a force to be reckoned with."*

**-Joe Mueller  
Tech Director of  
Admissions**



# SDSM&T *Reaching* OUT

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



*South Dakota Tech President Dr. Charles Ruch addresses the Black Hills Area Economic Development Partnership group during a tour of Tech's Advanced Materials Processing (AMP) Center. AMP is a unique research laboratory that combines cutting edge equipment and scientific expertise to develop and use 21st Century laser and welding technology to assist the U.S. Army and Department of Defense meet the needs of the military while benefiting the local, regional, and national economy.*



*Photo by Steve Buchholz*

*Nationally recognized experts in the areas of nanotechnology gathered in Rapid City for the first regional conference on Nanoscience and Engineering. Researchers and scientists summarized current nanotechnology research areas in the region, and identified potential for new cooperative research areas and opportunities. Scientists also worked toward the development of large-scale nanoscience and engineering proposals. See related story on page 13.*



*Photo by Steve Buchholz*

*Ten students from around the country who participated in the National Science Foundation supported Research Experience for Undergraduates (REU) program presented their research findings during a public event. The event concluded the sixth year of the Department of Chemistry and Chemical Engineering's participation in the program. An additional component of this year's REU was the inclusion of three middle school and high school teachers through the Research Experience for Teachers program.*



*Photo by Steve Buchholz*

*More than 20 middle- and high-school counselors from the state participated in "Empowering the School Counselor", a summer program at South Dakota Tech designed to promote ways to include more low-income students in accelerated learning programs such as Advanced Placement and International Baccalaureate.*



File Photo



*Youngsters in the Children's Science Center's Newts Nature Camp 2003 listen to a Badlands National Park ranger describe the Big Pig Dig in the Badlands. The two-week Nature Camp allowed children to learn about native plants, trees, mammals, birds, insects, spiders, and much more. The Children's Science Center is an outreach service operated by South Dakota Tech.*



File Photo

*Seven Black Hills area high school teachers completed the Advanced Placement Calculus Institute held at South Dakota Tech. The Institute trained and motivated teachers to prepare students for Advanced Placement classes and college-level work. Teachers received the tools to teach their students to stretch their minds and succeed in challenging courses such as Advanced Placement Calculus. The course was designed to help teachers show their students the wonders of math - not only what it can do, but what students can do when they master math concepts.*

File Photo



*Elementary students from 11 YMCA Kidstop sites will visit the Children's Science Center six times each over the course of the year for after school educational programs.*



File Photo

*A team of South Dakota Tech faculty, staff, and students put together and sent care packages to 17 Tech students who are deployed to combat zones and other places they are serving the country around the world. The care packages included T-shirts, socks, cooling scarves, emails from campus, lip balm, beef jerky, homemade American flag pins, water bottles, licorice, collages of campus photos, letters from Dr. Mahon and Tech President Dr. Charles Ruch, and much more.*



## A duet of music and engineering

Jim Feiszli sat in a music philosophy class in graduate school when the question hit him. There was a bunch of future music educators in the class complaining about a lack of support for music in communities, but they all were training to go to universities and preach to the choir.

were the people who would hold school board and other positions.”

“I also knew that most great engineers and inventors had huge artistic streaks,” he said. “Studies show that if you don’t work both sides of your brain, you don’t develop as you should. Most education that happens in our schools is right brain learning. Music helps you learn holistically.”

Of course, it’s not always easy finding a place for music on a science and engineering campus. While some people may not understand the importance Feiszli sees in his courses, he doesn’t stop trying to convince everyone that music education has a place. It’s a place that Feiszli had to completely build.

“When I came here, there was pretty much nothing,” he said.

The Singing Engineers and a jazz band did exist, but there were no music classes other than Music Appreciation. Feiszli began building a program. He organized choirs, bands, and other singing groups, and started a performance schedule, much of what carries on today. The annual Christmas concert, which continues to draw hundreds of spectators each year, began during Feiszli’s first year.

He also secured equipment, much of it from the state university in Springfield when it closed, space for classes and rehearsals, and a certain amount of respect.

“I was trying to take music from being an activity to being an academic discipline,” he said.

In the early years, he still had to deal with or ignore anti-music sentiment from some fellow professors, and the occasional demand from a physics student to stop teaching drums so the physics class could continue its work. But the work paid off. The bands and choirs grew, and Feiszli heard from

graduates who told him that taking music classes helped prepare them for portions of their careers.

“Solving a calculus problem doesn’t tell you what kind of a person you are,” he said. “Standing with a candle in the cathedral with the next closest singer six feet away, that tells you what kind of person you are. We talk about teaming all the time on campus. That’s exactly what a choir is. You take a group of people and a piece of music and try to figure out a way to make it all work.”

Feiszli doesn’t try to predict the future of music at Tech, he just “tries to do something better today than I did yesterday.” That, and making sure he tells anyone who will listen that music should be a valued part of the campus. And, he’ll use his track record to make the case.

As for the traditional career route, Feiszli doesn’t second-guess his choice to veer away from it.

“I have the unshakeable belief that I’m doing more for my profession here than if I had chosen to follow another route,” he said. “We’re doing some good



1987 Singing Engineers

things here, we’ve got great students, and we’re having fun. That’s pretty cool.”

File Photo



2002 choir

Most of the students in that class - Feiszli included - planned to pursue traditional careers. They would start teaching at small universities and work their way to larger and larger schools. They would always teach classes to students majoring in music.

“Music educators complain all the time that school boards and legislators don’t support music,” Feiszli said. “I asked myself, ‘How many of those board members and legislators themselves ever learned about the importance of music?’”

That question led Feiszli to a job at the South Dakota Tech, not exactly a hotbed of the choral and instrumental arts in 1983. He has spent 21 years teaching that importance and trying to convince future engineers and scientists that learning music will make them better at their chosen careers.

“It intrigued me that here, you had a bunch of people who would graduate and go out into the world and become the powerful people in the communities,” he said. “These

File Photo



## Team strength program builds bodies and minds

When Darren Soucy took control of the South Dakota School of Mines and Technology's football program three years ago, he saw something that needed to be changed immediately.

"There was no off-season strength training program," the head coach said. "It was, 'do something on your own and we'll see you in fall.'"

No more.

"Football at this level, at the college level, goes year-round," Soucy said. "I think that's critical because everybody else is doing it, and if we don't, we're not even giving ourselves a chance to keep up."

Strength and conditioning training also helps prevent injuries, helps players rehab from injuries, and increases their strength, fitness level, and overall athletic abilities.

"It can put an athlete over the top," Soucy said. "We may get a kid who is talented and will do a good job doing the kind of training he already is, but with a strength and conditioning training program like ours, we can help him become the best athlete he can be."

Soucy truly believes that, and he backs it up. Missing a scheduled strength and conditioning training session is no different than missing practice, and could result in not playing the next Saturday. The first time the team's top 85 players arrive in camp in August, Soucy and his coaching staff put each player through a series of weightlifting, running, and other physical tests. If a player doesn't show improvement from the last time the staff saw him, Soucy may send him home. The staff also tests players every month during the academic year to make sure players continue their improvement.

"If he doesn't improve, he hasn't been training," Soucy said. "And we've got 25 other guys who

have been and who want to step into that spot. Our players know from day one that football at South Dakota Tech is a year-round commitment. You can't be 99 percent committed, and we recruit kids who believe in that."



*The Hardrock football team performs strength training routines drills at O'Harra Stadium.*

The team's strength training program consists of two components. Players combine weightlifting with sprints, plyometrics, and other explosive exercises. Following the program gives players the ability to generate short, quick bursts of speed and strength. To do that, players lift heavy weight and do few repetitions, and focus on wind sprints, cone work, and similar workouts.

Players lift weights twice each week during the season and three times in the off-season, focusing on core lifts such as bench press, squat, and power clean. They train auxiliary muscles with other lifts. Players work out in the gymnasium twice a week during the season and in the off-season.

"Everything we do is geared toward football," Derek Gackle, the team's strength and condition coach and offensive line coach, said. "We go all out for 15 seconds and rest for 25, just like a football play."

Soucy and Gackle already can see the results of the team's program.

"One of the biggest things is that we're not waiting for guys to get into shape when camp starts," he said. "They get here in shape and ready to play."

Gackle also has seen a decrease in the number of injuries that keep players out of games and at less than full strength. "We're also competing deeper into games," he said. "We came back and won two games in the fourth quarter last year, and I attribute that directly to our conditioning."

Senior team captain Greg Morehouse credits the strength and conditioning program with making him a better football player, and in part, for helping his growth as a person. Morehouse, an Industrial Engineering major, came to Tech from Parkston High School as a 195-pound halfback. He's put on 60 pounds since, moved to fullback, and is playing the best football of his life.

"That 60 pounds is all good weight," he said. "I'm much stronger now, and when you're strong, you have confidence. You know you put in the time in the weight room and worked harder than everybody else. You know you're bigger than the guy you're going against, and you know he can't take you."

Serious weight and conditioning training is crucial for anyone who wants to be competitive on the field, Morehouse said. It has other benefits as well.

"When you're stronger physically, you're stronger mentally," he said. "There are 84 other guys on this team and I can talk to every one of them. The confidence I have makes me a more open, more outgoing person."

That will benefit Morehouse and every other Hardrock football player for a long time after their playing days are finished.



## Preserving a species one egg at a time

A loggerhead turtle hatchling won't fill the palm of your hand, but the activities of the little critters filled a summer of research and learning at St. Catherines Island, Georgia. South Dakota Tech is a major player in the work to keep the loggerhead from meeting an untimely extinction.

Tech student Michael Knell (MS, PALEO, Council Bluffs, IA) spent the summer studying the nesting and preservation of modern sea turtles on the barrier island off the southern coast of the Peach State. The research is part of Knell's master's degree in Paleontology program. Knell is a research assistant in Tech's Museum of Geology and Paleontology, and will compare his findings to fossil Cretaceous sea turtles from South Dakota.

"Mike has done a remarkable job with the sea turtles in Georgia," Dr. Gale Bishop, museum director and co-director of the St. Catherines Island Sea Turtle Conservation Program, said. "Mike is gaining first-hand experience with living animals and will transfer this knowledge directly back to South Dakota to study fossil sea turtles in South Dakota, while ensuring the continuation of this threatened species in Georgia."

Every morning, Knell combed the beach for the obvious tracks adult female loggerheads leave as they crawl from the ocean. Knell followed the tracks, excavated the nest at the end, scooped up the eggs, and moved them further away from the water. The new nest better protected the eggs because the barrier island is eroding. Knell then placed a screen over the nest to keep

raccoons and other predators away. Sixty days later, Knell returned to the nest to make sure the hatchlings had safe trips back to the ocean.

During the nearly four months Knell spent on the island, turtles created 135 nests. When he left August 23, approximately half of the hatchlings had made their way back to the sea. By the time the hatching completed in October, Knell expected 10,000 baby turtles to hatch. It's likely that only 10 of those will live until adulthood.

Knell counted nests, eggs, and hatchlings, and paid close attention to the behavior of the adult and young turtles. He also observed the decomposition rate of dead turtles that washed onto the beach. The data and notes he collected will help him in his study of Archelon, an extinct, car-sized



*Dr. Gale Bishop, director, Museum of Geology, lectures a class of school teachers and others about the St. Catherines Island Sea Turtle Conservation Program. Fourteen school teachers spent time on the island in July to learn about the conservation of the loggerheads.*



turtle that lived during the Cretaceous Period. South Dakota Tech paleontologists have found Archelon fossils near Pierre, S.D.

"When we find a fossil, we want to know as much as we can about them," Knell said. "It's great to have modern examples that we can study."

Loggerhead sea turtles live their entire lives in the ocean as marine swimmers, except for periodically nesting on sandy beaches of the temperate regions of the world, according to the St. Catherines Island Sea Turtle Conservation Program's website, <http://www2.gasou.edu/cturtle/001welcome.html>. Female sea turtles mature between 20 and 30 years of age, mate with males in the ocean, and crawl onto sandy beaches to deposit their eggs. Each female deposits multiple clutches, but they don't nest every summer. On the Georgia coast, loggerheads nest from mid-May through August. Each clutch consists of approximately 114 eggs the size, shape, and color of ping pong balls.

South Dakota Tech's Museum of Geology and Paleontology helps operate the Conservation Program, along with Georgia Southern University, the Georgia Department of Natural Resources, and the St. Catherines Island Foundation. Bishop designed and operated the program for 10 years while a professor at Georgia Southern, ran the program for a year during his brief retirement, and brought the program to Tech.

The St. Catherines work is important because the number of sea turtles in all the world's oceans is declining.

Film evidence from the major nesting beach of Kemp's Ridleys at Rancho Nuevo, Mexico, indicates that 40,000 females nested there in a single day in 1947. Monitoring of this beach showed about 1,300 females nesting in 1966. Since 1978, all nests have been counted and numbers have declined



*A recently hatched sea turtle paddles its way back to the surf on St. Catherines Island, Georgia. Of the approximately 10,000 loggerheads hatched on the island last summer, only 10 will likely live to adulthood.*

steadily by about 14 nests per year, with the current level of nesting less than one percent of the estimated nests deposited in 1947.

Data gathered on Little Cumberland Island, Georgia, during a 30-year period indicates a clear decline in turtle numbers of three percent per year. Parallel data from Cape Island, South Carolina, shows a similar decline over a 17-year period. Both populations experienced a sharp decline in the middle 1970s for unknown reasons.

The rapid decline of the population of Kemp's Ridley sea turtles, the slow, but steady decline of the loggerhead sea turtles in Georgia and South Carolina, and observational data of the decline of other sea turtles around the world has led conservationists and scientists to the conclusion that sea turtles are in danger of becoming extinct. As a result, all sea turtles are now listed as endangered or threatened species.

Bishop designed the Conservation Program to prevent turtle populations from dropping further. But there's more to it.

Bishop and Knell hosted 14 school teachers on the island in July so the teachers could learn about the conservation of the loggerheads. Many of the teachers came from the Georgia

area, but Kelsa Christopher, a science teacher at Dakota Middle School in Rapid City, also made the trip.

"Each teacher is expected to develop a sea turtle or endangered species teaching unit based upon their hands-on field experience," Bishop said. He estimates that 120,000 schoolchildren have experienced one of the teaching units created by any of the 132 teachers who have attended the program.

The Museum of Geology and Paleontology also is developing web sites to record and disseminate daily data from the St. Catherines project, educational activities for K-12 educators, and an electronic curriculum vitae and portfolio assessment tool.

In addition to the schoolteacher education program, Bishop and the Tech graduate student working on the island also teach an annual group of 20 to 30 veterinarians about sea turtle conservation in a program called "EnviroVets."

Participants "come from all over the world to study the best practices of North American non-game wildlife conservation," Bishop said.

The Sea Turtle Rapid Habitat Assessment procedure created based on the St. Catherines work, is now used on all Georgia barrier islands by the Georgia Department of Natural Resources to assess sea turtle habitat annually.

"It's an important project," Bishop said. "And it's people like Mike Knell and Kelsa Christopher who are helping save a species from extinction."



**Lisa Schlink** (MET, Rapid City) was awarded a \$1,000 MPD scholarship by the Society of Mining Engineers. "The competition for these scholarships is keen. The committee review highly qualified candidates. Lisa is to be congratulated on your selection," Schlink's notification letter said.

**Anne Michelle Larson** (ChemE, Albert Lea, MN) was awarded the Marlin R. Scarborough Scholarship by the South Dakota Board of Regents. The \$1,500 scholarship honors the late Marlin R. Scarborough, who was president of the Board of Regents at the time of his death. The Scarborough Endowment Fund annually provides a scholarship to a student at a South Dakota public university. Applicants must have a 3.5 grade point average, demonstrate leadership potential, and be nominated by their university.

**Peter Nam Soo Kim** (MES, Korea) won the \$3,000 International Precious Metals Institute Student Award for Precious Metal Research. The award and certificate citing his work will be presented at the Institute's annual conference, scheduled for June in Puerto Rico. The prize recognizes and encourages outstanding work by a graduate or undergraduate student in precious metals research.



*Tech Homecoming royalty 2003 (from left): Stephanie Beck (IEng, Rapid City), Nick Newell (CEng, Havre, MT), and Naomi Fossen (CEE, Pierre).*

South Dakota Tech made the usual Homecoming royalty pair a set of three by crowning two Queens and a King during an M-Week ceremony. **Nick Newell** (CEng, Havre, MT) was elected Homecoming King. **Stephanie Beck** (IE, Rapid City) and **Naomi Fossen** (CEE, Pierre) were elected

Homecoming Queens. Tech crowned two Queens because Beck and Fossen tied in voting by students. The royalty presided over the M-Week parade and the Homecoming football game. The other Homecoming King candidates were **Nick Bottolfsen** (ME, Yankton); **Matt Kafka** (IE, Yankton); **Kevin McGinnis** (ME, Yankton); **Chuck Murray** (IE, Sioux Falls). The other Homecoming Queen candidates were **Jessica Christensen** (IS, Rapid City); **Lisa Gunderson** (IS, Piedmont); **Lindsay Lipps** (IE, Hay Springs, NE).

**Curtis Smith** (ME '03) and **Aaron Carlson** (GeolE '03) were commissioned as U.S. Army second lieutenants following the spring 2003 commencement. The newly commissioned officers also took part in the tradition of the silver dollar salute. The salute dates to the earliest days of the U.S. Army. This honored tradition calls for newly commissioned second lieutenants to give a silver dollar to the first enlisted soldier who salutes them. The coin represents the symbolic receipt of respect due the newly earned rank. It signifies the deep sense of gratitude of the new officer for the knowledge that enlisted soldiers, especially Non Commissioned Officers, have passed on to them during training. It is an expression of respect to duty and to each other that is shared by commissioned officers and enlisted soldiers. It is acknowledgment from one professional soldier to another that welcomes the new officer into the service.

Two students from Sturgis received the Sky-Vue Scholarships offered at South Dakota Tech. **Ross Bestgen** (ME) and **James Knutson** (ME) received the scholarships. Sky-Vue MotelCorp Inc. of Rapid City created the scholarships for Mechanical Engineering students attending South Dakota Tech. Recipients must be full-time students with grade-point averages of 3.0 or higher who are active in campus activities and are recommended by the Chair of the Mechanical Engineering Department. Sky-Vue MotelCorp Inc. created the scholarship to assist students in the successful completion of their education at South Dakota Tech.

In a slight variation on the "Trick or Treat"

theme, teams of South Dakota Tech students spread out across Rapid City on Halloween night to collect items for a food drive. The students went door-to-door beginning after 5 p.m. to ask for donations of canned goods and non-perishable food items. Everything collected was given to the Rapid City Regional Food Bank. **Theta Tau Omega** fraternity sponsored the event.

*File Photo*



*Members of South Dakota Tech's chapter of the American Chemical Society present an \$825 check to the Cornerstone Rescue Mission in Rapid City to help the mission fulfill its goal of building a women's shelter. The ACS chapter held a raffle and bake sale to raise the money.*

**The American Chemical Society** student chapter at South Dakota Tech received an Honorable Mention award for its activities during the 2002-2003 academic year. The chapter, advised by **Dr. Dan Heglund**, associate professor of Chemistry, took part in many public service and professional activities during the 2002-2003 school year. Among other activities, the chapter:

- Conducted a hygiene drive and collected 417½ pounds of soap, deodorant, shampoo, and other items for the Cornerstone Rescue Mission, Wellspring Family Based Services and Working Against Violence, Inc.
- Performed Chemistry Outreach shows for students at area schools and organizations.
- Presented "Cool Chemistry, Hot Show" for school students visiting Tech during National Engineers Week.
- Collected Teddy bears from campus for hospital and ambulance services to comfort children in times of need.
- Attended regional and national chemistry seminars and meetings.
- Won the 2002 "best overall" prize for homecoming parade floats.

"The American Chemical Society is delighted to have a Student Affiliates chapter

at the South Dakota School of Mines and Technology," American Chemical Society President Elect **Elsa Reichmanis** wrote in a letter, "and would like to thank you for fostering an environment in which such an important extracurricular educational activity can flourish. We extend our warmest congratulations to the students and to Professor Heglund for setting such a fine example for other chapters." The chapter will be honored during the 227th Annual American Chemical Society National Meeting in Anaheim, Calif., in March 2004.

The American Chemical Society celebrates **National Chemistry Week** by hosted a fund-raiser for the proposed women's center at the Cornerstone Rescue Mission in Rapid City. To match the theme of the week, "Earth's Atmosphere and Beyond," the club set up a scale-size model of the solar system, informative posters about the planets, demonstrations based in atmospheric chemistry, and held a raffle and a bake sale. The students have invited local elementary and middle school students to participate in a field trip to the solar system.

The **Alpha Delta Pi** sorority at South Dakota Tech washed cars for charity during an event in September. The sorority donated all money raised to the Ronald McDonald House, a service that provides housing to families of seriously ill children who are receiving treatment at nearby hospitals.



## Campus Briefings

The South Dakota School of Mines and Technology held its **147th Commencement** on Saturday, May 10, 2003, in the Rushmore Plaza Civic Center arena.

Nearly 250 undergraduate and graduate students were candidates for degrees. Nineteen alumni who graduated 50 years ago also attended the ceremony and received certificates commemorating their graduation.

**Matt Goeden** (CEng, Yankton) and **Abe Kean** (CEng, Pierre) were the student speakers.



During his time at Tech, **Goeden** worked as a student researcher for the South Dakota Board of Regents, a software developer with Innovative Systems in Mitchell and an Information Technology Specialist for Mount Marty College. He was very involved in a variety of campus organizations. He was a member of Triangle fraternity, where he served as vice president. He also served as an Orientation Leader, and was a member of TONITE, the student programming board, where he served as chair of the Special Events Committee. He served as Freshman Class President, Sophomore Class President, Finance Committee Chair and Student Association Vice President, and recently completed his tenure as the Student Association President. For the past two years, Matt was a member of the statewide Student Federation.

**Kean** was very involved with campus organizations. He served in many positions with Student Association, including a term as President. He served as an Orientation Leader, and on many panels, including the Parking Committee, Commencement Committee, and the Surbeck and King Center Renovation Committee. He was a member of Triangle Fraternity, Computer Engineering Honor Society, Order of Omega Greek Honor Society, and other organizations and clubs. He completed internships with Motorola, South Dakota Department of Transportation, and South Dakota Department of Environment and Natural Resources.



**Dr. Larry Simonson**, a professor in Tech's Department of Electrical and Computer Engineering, received the **Guy E. March Medal**. Simonson has been very active in his association with Tech for the past 38 years, beginning in 1965 when he was a freshman. After completing his

undergraduate and graduate studies at Tech, he worked for Texas Instruments in Dallas, Texas, for 2½ years before joining the Electrical Engineering faculty at Tech in 1976. He currently is the Hoffert Professor of Electrical and Computer Engineering, and served as chair of the department for 4½ years. During his tenure on the faculty, he has been influential in maintaining positive interactions with the students, the department, the institution, the community, and the alumni association. Simonson has been very active in the Electrical and Computer Engineering Department's efforts to recruit students. He has participated in College Career Day activities for many years and has given many department tours to prospective students. He has served as advisor to many campus organizations. Simonson has been very active in his work with campus committees. He has served on the Faculty Advisory Council and as Chair of the Faculty. His recent efforts have been associated with the University Scholarship Committee and the Engineering Assessment Committee. He has also assisted the Athletic Department as scorebook keeper for basketball games, scoreboard operator for football, and announcer for football, basketball, and track for many of the past 27 years.

**U.S. Navy Commander John Herrington**,



a NASA astronaut, was the commencement speaker. Commander Herrington was born in Wetumka, Oklahoma, but grew up in a long list of places. After high school in Plano, Texas, he received a bachelor's of science degree in applied mathematics from the University of Colorado at Colorado Springs in 1983. He joined the U.S. Navy, and began a career that would make any servicemember proud. Commander Herrington received his commission from Aviation Officer Candidate School in 1984 and was designated a Naval Aviator in 1985. While assigned to Patrol Squadron 48, Herrington was designated a Patrol Plane Commander, Mission Commander, and Patrol Plane Instructor Pilot. He was selected to attend the U.S. Naval Test Pilot School in 1990. After graduation, he reported to the Force



Warfare Aircraft Test Directorate as a project test pilot for the Joint Primary Aircraft Training System. He conducted additional flight test assignments flying numerous variations of the P-3 Orion as well as the T-34C and the DeHavilland Dash 7. Following his selection as an Aeronautical Engineering Duty Officer, Commander Herrington reported to the U.S. Naval Postgraduate School where he completed a master's of science degree in aeronautical engineering in June 1995. He was then assigned as a special projects officer to the Bureau of Naval Personnel Sea Duty Component when he was selected for the astronaut program. During his Naval career, Commander Herrington was a Distinguished Naval Graduate from Aviation Officer Candidate School. He was awarded the Navy Commendation Medal, Navy Meritorious Unit Commendation, Coast Guard Meritorious Unit Commendation, Coast Guard Special Operations Service Ribbon, National Defense Medal, three Sea Service Deployment Ribbons, and various other service awards. In 1996, Commander Herrington reported to NASA's Johnson Space Center to complete two years of training and evaluation, and to become qualified for flight assignment as a mission specialist. Commander Herrington was assigned to the Flight Support Branch of the Astronaut Office where he served as a member of the Astronaut Support Personnel team that was responsible for Shuttle launch preparations and post-landing operations. In November 2002, Commander Herrington became the first Native American to fly into space. During the mission, the space shuttle Endeavour became the sixteenth Shuttle mission to visit the International Space Station. Mission accomplishments included the delivery of the Expedition-Six crew, the delivery, installation and activation of the P1 Truss, and the transfer of cargo from Shuttle to the Station. During the mission, Commander Herrington performed space walks totaling 19 hours and 55 minutes.



Tech also awarded an honorary doctorate to **Keith Zell** (ME, '65). A native of South Dakota, Zell's professional career

included two years at Control Data Corporation and 34 years at MTS Systems Corporation. Both companies are located in Minnesota. Zell recently retired as Executive Vice President of MTS Systems Corporation. With the company, he held positions of increasing responsibility across the business, including marketing, product development, sales, design engineering, international management, manufacturing, field service and finally executive responsibility for more than 70 percent of the company's \$390 million business. Zell and MTS Systems Corporation have been great friends of South Dakota Tech. During the past few years, the company and university worked together to create the Advanced Materials Processing Center on campus. The center, which will conduct research on the cutting-edge of materials technology, is outfitted with the only Friction Stir Processor of its kind in the world. MTS built that piece of equipment, and the Laser Powder Deposition technology in the center. The center allows Tech to investigate how industry, the military, and government agencies can use the technology produce stronger, longer-lasting, and less expensive products. Zell currently serves as co-chairman of the Academic Advisory Board to Tech. He currently serves as President of the university's International Alumni Association. He has held academic advisory positions for engineering departments at Tech, the University of Wisconsin, and the University of Saint Thomas in Saint Paul, Minnesota. In these positions, Zell has directly influenced corporate contributions and government contracts leading to major engineering laboratory expansions. For the past year, Zell has held the position of 3M Fellow and Distinguished Visiting Lecturer in the University of Saint Thomas Engineering and Technology Management Program. He also serves as a board member and consultant to a number of small high-technology companies and is a part-time cattle rancher in eastern South Dakota.



**Alum Donates \$550,000 To Tech**

**Tommy Ingvalson** (ME, '66) credited the training and education

he received at the South Dakota School of Mines and Technology for allowing him to advance through the corporate ranks of Shell Oil Corporation in his 30 years of service to the company. Because Ingvalson thought it was important to give to the people attending the university the same opportunities he had, his estate donated one-third of the Thomas Ingvalson Revocable Trust to the SDSM&T Foundation. The amount of the donation is approximately \$550,000.

Ingvalson grew up in Rapid City. He graduated from Rapid City High School in 1957, and attended the South Dakota School of Mines and Technology for one year. After taking approximately six months off, he enlisted in the U.S. Navy in January 1959. After serving a three-year tour of duty, he came back to South Dakota Tech. He received a bachelor's of science degree in Mechanical Engineering in 1966. Ingvalson immediately went to work for Shell Oil Corporation. He worked for Shell in California until the mid 1970s, when he was transferred to Wood River, IL.

Ingvalson's hard work and perseverance paid off. He moved up through the corporate chain of command, with a particular focus on refinery work, both offshore and onshore. He transferred from Illinois to Houston, Texas, and worked for the Shell office there and in La Place, LA. He shuttled between the two cities until settling in La Place, where he worked until his retirement in 1994. After retiring, he moved back to the Black Hills, where he lived until his death in 2001.

**Dr. Stuart Kellogg**, South Dakota Tech's



Ervin Pietz Professor and director of the Industrial Engineering program, has been selected as the 2003 Carnegie Foundation for the Advancement of Teaching South Dakota

Professor of the Year.

"Dr. Kellogg is an outstanding professor," Tech President Dr. Charles Ruch said. "His students praise him, he dedicates himself to becoming a better teacher, and makes sure

his students leave Tech with the technical and other skills they need to succeed.”

Kellogg has taught at South Dakota Tech since 1990. He holds a bachelor's degree from South Dakota State University, an M.B.A. from the University of South Dakota, a master's degree from South Dakota Tech, and a doctorate from the University of Texas, Austin.

Kellogg is a recognized leader in curriculum assessment and improvement. He has worked on campus and in the professional community to improve learning experiences for students. He has demonstrated a special commitment to incoming students, with the development of the Professionalism in Engineering and Science, a course that is now a requirement for our entering students. Kellogg is well published and shares with the engineering education community the results of the successful efforts on Tech's campus so faculty and students at other institutions can also benefit.

Kellogg's support of his students extends beyond the classroom. He attends the sporting events and other extra-curricular activities. He encourages his students to seek out opportunities that allow them to use their expertise to help community organizations. One beneficiary of those efforts is the Black Hills Workshop, an organization that assists the developmentally disabled live and work as independently as possible. That relationship has led to annual student projects that help the Black Hills Workshop better serve its clients.

Kellogg also is engaged within the Rapid City community as a leader in the Boy Scouts, the Rapid City Symphony, and as a strong advocate for the sustained high quality in our elementary and secondary schools. He has received national recognition for his service to the engineering programs.

Dr. Karen Whitehead, Tech's vice president for Academic Affairs, nominated Kellogg for the award.

#### Career Service Association Gives TEA Awards

The Career Service Council at the South

Dakota School of Mines and Technology has given recent Traditions of Excellence Awards to the following Tech employees. 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 concept of successful job completion and has promoted a positive working relationship with students, faculty, and staff.

• June 2003: **Cindy Hise**, secretary in the



Department of Materials and Metallurgical Engineering and in the Mining Engineering program. Hise started working at Tech in August 1995. Her nominator said, “Cindy is an incredible secretary. She goes above and beyond the call of duty to help serve the department and SDSM&T.”

• July 2003: **Pat Kung**, a programmer



analyst in Information Technology Services. Kung started working at Tech in May 1991. Pat's nominator said, “Her persistent attention to detail, dedication to a job well done, and an untold number of hours devoted to the project has given us a valuable and easy-to-use management tool while giving students a speedy process. We appreciated her efforts more than we can say!”

• August 2003: **Leslie Kelley**, the senior



secretary in University and Public Relations. Kelley started working at Tech in February 2003. Her nominator said, “Leslie has performed her assigned duties at a high level, or above and beyond expectations on a daily basis since her first day. In a short amount of time, she has developed an outstanding working relationship with students, faculty, administration and staff. Her positive, upbeat attitude is contagious.”



• September 2003: **Peggy Fleck**, a secretary in the Student Activities and Leadership Center. Her nominator said, “Peggy defines the word excellence. She has

quickly learned how to navigate the procedures on campus, and is persistent in following a task through to completion. She does this with the best attitude and a friendly smile. She is always willing to go out of her way to help, and often goes above and beyond the call of duty.”

#### McCarville Attends Summer Institute

**Kata McCarville**, associate director of the Institute of Atmospheric Sciences at the



South Dakota School of Mines and Technology, attended the Summer Institute for Women in Higher Education Administration. Bryn Mawr College and Higher Education Resource Services Mid-America sponsored the Summer Institute, held at Bryn Mawr College in Pennsylvania.

**The Summer Institute** was established 28 years ago to improve the status of women who traditionally have been underrepresented in higher education administration. Participants in the program are provided with the skills and information pertinent to the management and governance of colleges and universities and with the timely information and perspectives on teaching, research, and service.

The Summer Institute seeks to build a network of women administrators who are committed to working together and supporting each other to expand opportunities for women in higher education. This network is enhanced by interaction with the Summer Institute faculty that includes women and men from government, foundations, professional associations, and colleges and universities throughout the United States.

The Rapid City Area Chamber of

Commerce recently recognized **Dr. James D. Feiszli**, Tech's director of Music Activities, for his service to the Rapid City community by awarding him the Rushmore Honors Award for the performing arts. In addition to his university activities, Feiszli founded the community choral ensembles Dakota Choral Union and Kantorei, and is actively performing with his six-voice professional ensemble Dakota Voices. He has collaborated with nearly every Black Hills area arts entity, including Black Hills Symphony Orchestra, Black Hills Community Theater, Black Hills Chamber Music Society, Rapid City Children's Chorus, and the Rapid City Municipal Band. Feiszli also is the founder, past president, and former executive director of ChoralNet, Inc. - the Internet Center for Choral Music. He currently serves on the ChoralNet board of directors.

**William Arbegast**, director, Advanced Materials Processing Center, received \$600,000 from the Edison Welding Institute (Prime: United States Department of Defense-Army Research Lab) for the project, "Materials Joining for Army Weapons Systems."



**Dr. Sookie Bang**, professor, Department of Chemistry and Chemical Engineering, and **Dr. Venkataswamy Ramakrishnan**, distinguished professor emeritus, Department of Civil and Environmental Engineering, received \$51,620 from the National Science Foundation for the project, "Performance of Microbiologically Enhanced Concrete Structural Elements."

**Dr. Jacquelyn Bolman**, director, Office of Multicultural Affairs, received \$36,139 from the South Dakota Board of Regents (Prime: United States Department of Education) for the project, "No Child Left Behind Improving Teacher Quality Program."



**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. Arden Davis**, chair and professor, Department of Geology and Geological Engineering, received \$5,000 in additional funds from the United States Department of

Interior for the project, "Conduct Studies of the Belle Eldridge Abandoned Mine Site - Additional Funds."

**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."



**Dr. Sherry Farwell**, dean, Graduate Education and Sponsored Programs and senior advisor to the president for research and development, 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."

**Dr. John Helsdon**, professor, Institute of Atmospheric Sciences, received \$375,920 from the National Science Foundation for the project, "Three Dimensional (3D) Modeling and Observational Studies of Lightning-Produced Nitric Oxides." Helsdon also received \$157,800 from the National Science Foundation for the project, "Numerical Studies of Thunderstorm Electrification, Maxwell Currents, and Lightning."

**Dr. Brian Hemmelman**, assistant

professor, and **Dr. Keith Whites**, Steven P. Miller endowed chair and professor, Department of Electrical and Computer Engineering, received \$10,000 from Imation, Inc., for the project, "LTO Data Cartridge FR Tags - Background Investigative Research."



**Carrie Herbel**, instructor, Department of Geology and Geological Engineering, and collections manager and preparatory, Museum of Geology, received \$50,991 from

the United States Department of Interior-National Park Service for the project, "Support field work, lab preparation and curation of paleontological material collected from the Conata Basin Excavation Site (Big Pig Dig)." Herbel also received \$23,993 from the United States Department of Interior-National Park Service for the project, "Documentation of Significant Paleontological Localities within the Poleslide Member, Brule Formation, Badlands National Park."

**Dr. Chris Jenkins**, chair and professor, Department of Mechanical Engineering, received \$55,820 from Triton Systems, Inc. (Prime Air Force Research Laboratory-Department of Defense) for the project, "Innovative Coating Design to Shape Compliant Optics Into a Parabolic Net Shape." Jenkins, and **Dr. Jon Kellar**, chair and professor, Department of Materials and Metallurgical Engineering, received \$802,108 from the Air Force Research Laboratory for the project, "Lightweight and Novel Structures for Space."

**Dr. Scott Kenner**, chair and associate professor, Department of Civil and Environmental Engineering, received \$31,500 in additional funds from the Belle Fourche River Watershed Project (Prime: South Dakota Department of Energy and Natural Resources - Environmental Protection Agency) for the project, "Belle Fourche River Watershed Assessment and TMDL - Supplemental Biological Sampling on Whitewood Creek."

Kenner and **Dr. Thomas Fontaine**, associate professor, Department of Civil



and Environmental Engineering, received \$15,000 in additional funds from the South Dakota Department of Energy and Natural Resources (Prime: Environmental Protection Agency) for the project, "Spring Creek/Sheridan Lake Watershed Assessment Project - Supplemental Monitoring."

**Dr. Charles Kliche**, program director and professor, Mining Engineering Program, received \$36,125 in additional funds 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, and **Dr. Larry Stetler**, associate professor, Department of Geology and Geological Engineering, received \$10,600 from the United States

Geological Survey for the project, "Black Hawk Quadrangle, SD: North 'one-half' Hermosa Quadrangle, SD." Lisenbee also received \$16,000 from the West Dakota Water Development District for the project, "Aquifer Vulnerability Map (1:24,000) of the Northern Half of the Rockerville and Southern Half of the Rapid City West Quadrangles, South Dakota."



**Dr. Antonette Logar**, chair and professor, **John Lofberg**, instructor, and Roger Schrader, instructor, Department of Mathematics and Computer Science,

received \$5,000 from Mitchell Technical Institute (Prime: South Dakota Department of Education) for the project, "Technology for Teaching and Learning 2003."

**Dr. James Martin**, curator of vertebrate paleontology and professor, Museum of Geology, received \$70,614 in additional funds from the National Science Foundation for the project, "Collaborative Research: Evolution and Biogeography of Late Cretaceous Vertebrates from the James Ross Basin, Antarctic Peninsula." Martin also

received \$2,500 from the Bureau of Land Management-Lakeview District Office (Prime: United States Department of Interior) for the project, "Fossil Lake Field School."



**Dr. Jan Puszynski**, professor, Department of Chemistry and Chemical Engineering, and dean, College of Materials Science and Engineering, along with **William Arbogast**,

director, Advanced Materials Processing Center, **Dr. David Boyles**, professor, Department of Chemistry and Chemical Engineering, **Dr. Fernand Marquis**, professor, Department of Materials and Metallurgical Engineering, **Dr. Sherry Farwell**, dean, Graduate Education and Sponsored Programs, **Dr. Robb Winter**, chair and professor, Department of Chemistry and Chemical Engineering, **Dr. Dan Dolan**, professor, Department of Mechanical Engineering, **Dr. Brad Baker**, assistant professor, Institute of Atmospheric Sciences, **Dr. David Dixon**, associate professor, Department of Chemistry and Chemical Engineering, **Casey Allen**, research scientist II, Advanced Materials Processing Center, and **Dr. James Sears**, research scientist IV, Advanced Materials Processing Center, received \$2,625,000 in additional funds from the Army Research Laboratory (Prime: United States Department of Defense) for the project, "Advanced Materials and Processes for Future Combat Systems." Puszynski also received \$6,000 from the U.S. Civilian Research and Development Foundation (CRDF) (Prime: Department of State) for the project, "Chemically-Activated Combustion Synthesis and Densification of Boron Nitride-Based Composite Materials."

**Dr. Paul Smith**, professor emeritus, 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. Glen Stone**, professor, Department of Materials and Metallurgical Engineering, and Casey Allen, research scientist II, Advanced Materials Processing Center, received \$25,000 from the Pacific Northwest National Laboratory (Prime: U.S. Department of Energy) for the project, "Friction Stir Processing of Ceramic Reinforced Materials."

**Dr. Kerri Vierling**, assistant professor, Department of Chemistry and Chemical Engineering, received \$30,000 from South Dakota Game Fish and Parks (Prime: United States Department of Interior) for the project, "Black-backed and Lewis's woodpecker's reproduction following fire and salvage logging activities."



**Dr. Lee Vierling**, assistant professor, Institute of Atmospheric Sciences, received \$211,988 in additional funds from the National Science Foundation for the project, "Career: An Integrated Research/Educational Plan to Develop and Deploy a Pointable, Hyperspectral Remote Sensing Instrument on a Tethered Balloon."



**Dr. Keith Whites**, Steven P. Miller endowed chair and professor, Dr. Neil Chamberlain, professor, and Dr. Thomas Montoya, assistant professor, Department of Electrical and Computer Engineering, received \$10,260 in additional funds from the National Science Foundation for the project, "Equipment Acquisition to Establish an Applied Electromagnetics and Communications Laboratory-Research Experience for Undergraduates (REU)." Whites also received \$30,000 from RealTronics, Inc. for the project, "Multi-Resonant Antenna Simulation and Test: Supporting an NSF Phase 1 SBIR."



## Research Notes

**Dr. Robb Winter**, chair and professor, Department of Chemistry and Chemical Engineering, received \$7,145 in additional funds from the National Science Foundation for the project, "Nanomechanics and Interphase Chemistry of Interfacial Fracture." Winter also received \$108,537 from the National Science Foundation for the project, "SDSM&T-MUS&T REU Site Collaboration."



### Space Scholars continued from page 14

students for the Space Scholars program in another step in the Tech's relationship with the Air Force Research Laboratory. Jenkins spent two summers with the lab as a Summer Faculty Fellow and he spent a sabbatical working with the lab. Jenkins and Dr. Jon Kellar, chair and professor, Department of Materials and Metallurgical Engineering, are now working on \$1 million research project for the laboratory.

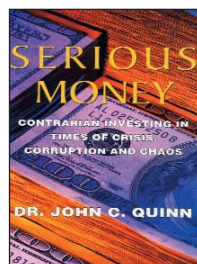
Jenkins is investigating the development of advanced mirror technologies while Kellar is researching the use of composite materials for fuel tanks and other applications. The research is important research project for the space program.

"Every pound you take into orbit costs from \$2,000 \$10,000," he said. "Saving pounds is a critical driver for spacecraft because every pound you save means more payload you can carry or more functionality you can provide."

It's the kind of research future Space Scholars could participate in. Motivated undergraduate juniors and seniors, and graduate students with top academic credentials in scientific and engineering fields are invited to apply. Only U.S. citizens are eligible. Any South Dakota Tech students interested in applying for the 2004 program should contact Dr. Chris Jenkins or Dr. Jon Kellar. Details are available at <http://spacescholars.plk.af.mil/>. Applications are accepted between 12-Jan 03 and 27-Feb 04.



## Campus Publications



**John Quinn**, Associate Professor, Department of Social Science, wrote the book, "Serious Money: Contrarian Investing in Times of Crisis, Corruption and Chaos." The book is a how-to lesson on market timing, but Quinn also writes about a wide range of investment strategies, diversification, Wall Street scandals, and common-sense investing. He also writes a first-hand account of the bulls and bears he has seen in his three-decade career. He talks about his own successes as a portfolio manager, and he confesses his own market missteps. He earned a bachelor's degree in political science from Yale and a law degree from the University of Pennsylvania. He also earned a doctorate degree in juridical science from New York University. For the next 28 years, Quinn worked for some of the world's biggest names in finance, including Merrill Lynch, Nomura Securities, Irving Trust, Chase Manhattan, the Hong Kong and Shanghai Baking Corp., and National Westminster Bank, heading units in New York, Tokyo, Hong Kong, and Singapore. He returned to Rapid City in 1996.

**Dr. Maribeth Price**, associate professor, Department of Geology and Geological Engineering, write the book, "Mastering ArcGIS." This book serves as an introduction to GIS and is your partner in developing the skills needed to succeed in this exciting and rapidly developing field. Based on the widely-used ArcGIS software developed by ESRI, Inc., the book provides extensive training in GIS concepts and skills for either a student in a classroom setting or



a professional working alone. People everywhere are increasingly turning to geographic information systems (GIS) to assemble and analyze information about features on our planet, both natural and man-made. The sophisticated capabilities of GIS support enhanced decision-making across a broad spectrum of fields, including natural resources, land use planning, business applications, education, and more. Many people are finding GIS skills a valuable asset to their chosen professions, and the need for well-trained analysts is growing. Price earned a bachelor's degree from Dartmouth College, and a master's and doctorate from Princeton University. She has taught at Tech since 1995.



### Industrial Engineering continued from page 15

their senior design projects, capstone experiences that combine the classroom and practical components of each student's education at Tech. As often as possible, senior design projects use the facilities of local industries, service organizations, governmental agencies, and other types of business.

Dr. Jennifer Karlin, assistant professor in the program, offers the following advice for high school students considering Industrial Engineering.

"While you are still in high school, continue to register for progressive math and science courses that are available, making sure to get an excellent grounding in algebra and trigonometry," she said. "Once you start college, make sure you develop good study habits and learn about problem solving skills and teaming skills such as those taught in Tech's GE 115 class. Join our professional society, the Institute of Industrial Engineers, and attend the functions, meet frequently with the IE Faculty, and start planning to find progressive summer work opportunities to help build some experience."

And the reward for students who do all that?

"They'll have an exciting career in an interesting field," Karlin said.





**Welcome:**

**Jason R. Ward**, Exempt, Electronics Specialist, Electrical and Computer Engineering/CAMP (5/12/03)

**Dr. Pallaoor V. Sundarshwar**, Faculty, Assistant Professor, Institute of Atmospheric Sciences (5/12/03)

**Dr. Hao Fong**, Faculty, Assistant Professor, Chemistry and Chemical Engineering (6/2/03)

**Linn A. Miller**, Exempt, Assistant Coordinator of Academic Support Development, Academic and Enrollment Services (6/2/03)

**Heidi R. Peterson**, CSA, Laboratory Storekeeper, Chemistry and Chemical Engineering (6/2/03)

**Nancy J. Kuster**, CSA, Secretary, Institute of Atmospheric Sciences (7/14/03)

**Travis L. Sieber**, Exempt, Director, Student Activities and Leadership Center (7/9/03)

**Dr. Charles P. Ruch**, Exempt, President, President's Office (7/1/03)

**Dennis R. Greer**, Exempt, Equipment Manager/Certified Athletic Trainer, Intercollegiate Athletics (8/1/03)

**Matthew C. Stevens**, CSA, Programmer/Analyst, Title III (8/14/03)

**Cabot-Ann Christofferson**, Instructor, Chemistry and Chemical Engineering (8/15/03)

**Dr. Kyle W. Felling**, Faculty, Assistant Professor, Chemistry and Chemical Engineering (8/15/03)

**Dr. Dan Hoyer**, Assistant Professor, Civil and Environmental Engineering (8/15/03)

**Dr. Jennifer N. Karlin**, Faculty, Assistant Professor, Industrial Engineering Program/Mechanical Engineering (8/15/03)

**Dr. Umesh A. Korde**, Faculty, Associate Professor, Mechanical Engineering (8/15/03)

**Dr. Andrea E. Maleck**, Faculty, Assistant Professor, Civil and Environmental Engineering (8/15/03)

**Swamy Dhoss Ponpandi**, Faculty, Instructor, Electrical and Computer Engineering (8/15/03)

**Dr. James J. Stone**, Faculty, Assistant Professor, Civil and Environmental Engineering (8/15/03)

**Farewell:**

**Shawn Mechling**, Exempt, Athletics, (5/15/03)

**Barbara McCormack-Dunfee**, CSA, Devereaux Library, (5/16/03)

**Michelle C. Howell**, Exempt, Student Activities and Leadership Center (6/6/03)

**Chelsea R. Lien**, CSA, Title III (7/18/03)

**Dr. Richard J. Gowen**, Exempt, President's Office (6/30/03)

**Brett L. Schriock**, Faculty, Information Technology Services (6/30/03)

**Dr. Scott A. Williams**, Faculty, Chemistry and Chemical Engineering (5/19/03)

**Jill M. Heckert**, Exempt, Academic and Enrollment Services (8/14/03)

**Change:**

**Bryan J. Schumacher**, Exempt, from Assistant Director of Information Technology Services to Director of Information Technology Services (7/1/03)

**Dr. Katherine (Kata) A. McCarville**, Exempt, from Director of Information Technology Services to Research Scientist I/Associate Director position in the Institute of Atmospheric Sciences (7/1/03)

**Elaine Baker**, from Assistant Director of the Institute of Atmospheric Sciences to

Instructor, Chemistry and Chemical Engineering (8/15/03)

**Name change:**

**Ruth M. Fontenot-Prince**, (Museum of Geology) is now Ruth M. Hynes

### Student team competitions continued from page 11

autonomous robots that could follow a black line track in the fastest time possible. The track contained various intersections, line disappearances, ramps and turns. Each of these situations was preceded by a symbol on the track that the robots could detect. The robots needed to interpret and act on the symbols correctly to achieve the most efficient path to the finish line.

**Solar Car**

After a promising start, the Tech Solar Motion team hit a speed bump on its way to a national competition with an unfortunate test drive accident several weeks before the race. The team worked around the clock to fix the car and ready it for the race. The mechanical systems were almost repaired and things looked brighter, until the team found problems with the solar array. The polymer tape used to insulate the cells from the substrate developed shorts when the team tested the array under a full load in full sun. Unfortunately, the team did not have enough spare solar cells or enough time before the competition to fix these problems.

The team is working on improving the car for the 2004 Formula Sun competition next summer.



## Memorials



**Dr. John J. Dunn  
(1931-2003)**

Dr. John J. Dunn, professor emeritus of English at the South Dakota School of Mines and Technology, passed away on June 23, 2003, in Rochester, MN.

John Dunn was born on April 16, 1931, in Milwaukee, Wisconsin. He considered himself a third generation South Dakotan, and grew up on his grandparents' farm north of Dupree, South Dakota. His grandparents were homesteaders who were married on the day South Dakota became a state. Dunn attended school in Dupree, Mobridge, Sioux Falls, Watertown, and Mitchell. He graduated from Notre Dame High School in 1949 and from St. John's University in Collegeville, Minnesota, in 1953.

After two years in the Army, he attended graduate school at the University of Minnesota, from which he received a master's and later a doctoral degree in English. He also completed research at the University of Nottingham in England and studied for a year at the University of Southern California in Los Angeles. He taught for several years at St. Vincent College in Latrobe, PA. He joined the faculty of South Dakota Tech in 1961, and served Tech for the remainder of his teaching career except for one year at Gustavus Adolphus College in Minnesota. He received many awards for his teaching and service to students during his long tenure at Tech.

Throughout his years at Tech, Dunn established the Delta Sigma Phi Fraternity Memorial Scholarship, the Frances M. Dunn Memorial Scholarship, and the John Dunn Endowment with the Tech Foundation. Upon establishing these funds, Dunn stated, "Teaching has been the very essence of my life, and - other than immediate family and a few close friends - my students have been the most important people in my life. What I give now is only a small token of my affection for them and my appreciation of what they have given me over the past years."



**L.F. "Bus" Ivanhoe  
(1920-2003)**

"Bus" Ivanhoe (MinE 42) passed away at his home in Ojai, California, on September 29, 2003.

Bus Ivanhoe was born in Klameth Falls, OR, on December 18, 1920, and later attended Brazilian and German schools in Rio de Janeiro from 1933-1938. He learned Portuguese, German, and Spanish in South America. In 1938, Ivanhoe returned to the United States from Brazil and came to South Dakota Tech. At Tech, he was given the opportunity to work his way through college.

Bus was a practical oilman with more than 50 years of worldwide oil-finding experience in all sizes of companies. His education included a B.S. in Mining Engineering 1942, South Dakota Tech; M. S. Geology 1950, Stanford University; and Oceanography, UCSD-Scripps Institute of Oceanography. He was a Certified Petroleum Geologist and state-registered geologist, geophysicist, and engineer.

Ivanhoe authored more than 100 technical papers on an unusually wide variety of subjects including 50 on the evaluation of foreign prospective petroleum basins and projections of future oil discoveries around the world. In 1984, the BBC of London selected him to be an anchorman with the renowned Dr. M. King Hubbert for an Open

University science film on the earth's future oil supply. Bus was also well known as a popular and effective public speaker. In 1986, he addressed various European petroleum societies on the topic "The Third Oil Shock" predicted for the late 1990s.

Ivanhoe was an avid reader, was curious, observant, an original thinker, and an idea man - a true example of the inquisitive layman. As a long-term avocation from 1965-1976, he researched and synthesized, and in 1982 published the "World Prehistory Culture Correlation Chart" that summarized technical, economic, and cultural developments of the entire world since 8500 B.C.

In May 1995, South Dakota Tech named Ivanhoe the Guy E. March Medal recipient for outstanding achievement in his field. Ivanhoe was also a tremendous supporter of South Dakota Tech. He donated funds to create the Ivanhoe International Center on campus in addition to a fellowship and excellence award endowment.



**I-90 & Haines Ave. Exit # 58**

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**Rapid City, SD 57709-1451**



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**Fax: 605-343-7085**



## Children's Science Center

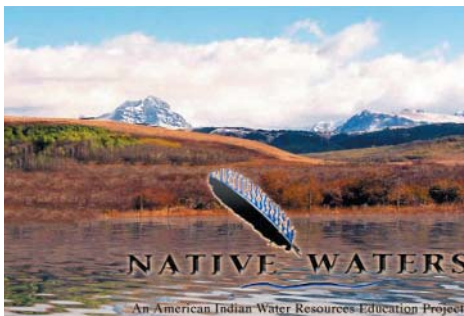


The Children's Science Center, a university outreach service, will host two traveling exhibits during the next few months.


**Dinostories** will run from January 5, 2004, through February 21, 2004. This colorful, hands-on traveling exhibit gives visitors a chance to explore the lives and habitats of dinosaurs. Visitors can crawl into a life-sized dinosaur nest, compare samples of dinosaur teeth, unearth a fossil cast, and use other hands-on components to explore the lives of dinosaurs.



**Native Waters**, an American Indian water resources education project, will run from March 1, 2004, through April 23, 2004. It combines art, hands-on activities, and film to share scientific and cultural ways of learning about and understanding water. A tipi provides a space to learn through storytelling, audio and video areas introduce different aspects of a watershed, while hands-on interactives introduce basic water science principles.



For information about the exhibits or the Children's Science Center, call (605) 394-6996, or visit [www.hpcnet.org/sdsmt/csc](http://www.hpcnet.org/sdsmt/csc)





# Electric Universe

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# CALENDAR

## *of Events*

### December 15-19

Final Exams

### December 19

President's Graduation Reception - Surbeck Center - 3:00-4:30 PM

SDSM&T Winter Band Concert/Symphonic Band and Jazz Band/Rushmore Plaza Civic Center, Rapid City - 7:30 PM

### December 19

Graduation - Rushmore Plaza Civic Center Theatre - 10:00 AM

Women's Basketball @ Honolulu HI Classic Residence Halls close

Winter Break Begins

Hanukkah Begins

### December 25

Christmas Day

### December 29-30

Men's Basketball Perkins Classic

### January 1

New Year's Day

### January 3

Men's /Women's Basketball vs. Black Hills State - 6:00 PM and 8:00 PM

### January 7

Registration

Spring Orientation

### January 8

Classes Begin

### January 9

Men's/Women's Basketball @ Huron University - 6:00 PM and 8:00 PM

### January 10

Men's /Women's Basketball @ Dakota State - 6:00 PM and 8:00 PM

### January 16

Men's/Women's Basketball vs. Jamestown University - 6:00 PM and 8:00 PM

### January 17

Men's/Women's Basketball vs. University of Mary - 6:00 PM and 8:00 PM

Cracker Barrel session - CB 204 - 9:00 - 11:00 am

### January 19

Martin Luther King Birthday - No Classes

### January 23

Men's/Women's Basketball @ Valley City State - 6:00 PM and 8:00 PM

### January 24

Men's/Women's Basketball @ Mayville State - 6:00 PM and 8:00 PM

Cracker Barrel session - CB 204 - 9:00 - 11:00 am

### January 29

Men's/Women's Basketball Black Hills State - 6:00 PM and 8:00 PM

### January 31

Cracker Barrel session- CB 204 - 9:00 - 11:00 am

### February 3

Spring Career Fair - 9:00 AM to 12:00 PM and 1:00 PM to 4:00 PM

### February 6

Men's/Women's Basketball vs. Dakota State - 6:00 PM and 8:00 PM

### February 6-7

Mathematic contest in modeling

### February 7

Men's/Women's Basketball vs. Huron University - 6:00 and 8:00 PM

### February 10

Career Planning Workshop: Business Networking Reception/Etiquette Dinner - 4:00 PM

### February 13

Men's/Women's Basketball @ University of Mary - 6:00 PM and 8:00 PM

### February 14

Valentine's Day

Men's/Women's Basketball @ Jamestown University - 6:00 PM and 8:00 PM

### February 20

Men's/Women's Basketball vs. Minot State - 6:00 PM and 8:00 PM

### February 21

Men's/Women's Basketball vs. Dickinson State - 6:00 PM and 8:00 PM

### February 22-28

National Engineers Week

### February 25

Men's/Women's Basketball Playoffs

### February 28

Men's/Women's Basketball Playoffs Mathcounts contest

### March 2

Men's/Women's Basketball Playoffs

### March 5

40th Annual Concrete Conference - EP252 - 8:00 AM

### March 6-14

Spring Break

### March 11

Black Hills Regional Job Fair - Rushmore Plaza Civic Center - 12:00 PM to 6:00 PM

### March 11-13

AIChE Rocky Mountain Regional Student Chapter Conference - BYU, Provo, UT

### March 16-17

CAAP/Information Technology Exam - 8:00 AM to 12:15 PM

### March 17

St. Patrick's Day

### March 18

CAAP/Information Technology Exam - 12:30 PM to 4:45 PM

### March 21-27

Greek Week

### March 23

Honor's Day Convocation

### March 25

Women's History Month Luncheon - Bump Lounge - 11:30 AM

### March 26-27

Cultural Expo

### March 29-April 2

Spring Fling

### March 31

ACM programming competition World Finals - Prague

### April 2

49th Regional High Plains Science and Engineering Fair

ASCE Rocky Mountain Regional Conference - Colorado State University

### April 2-4

IEEE Robotics Competition - Oklahoma City

### April 6-8

3rd Annual Easter Egg Hunt - Tech Bookstore

### April 11

Easter

### April 12

Easter Monday - No Classes

### April 15

2004 Science Contest

### April 16-17

Rocky Mountain Section Meeting of the Mathematical Association of America

### April 16-18

TONITE: NACA Regional Conference

### April 17

Alpha Omega Epsilon Formal Passover Begins

### April 22

Tech Environmental Club's Earth Day Event - 9:00 AM to 3:00 PM

Student Rummage Sale - Ballroom

### April 24

SDSM&T Spring Concert/Choir, Symphonic Band, Master Chorale and Jazz Band/Rushmore Plaza Civic Center, Rapid City - 7:30 PM

### April 30-May 1

Space Days 2004

### May 2

IIE Spring Picnic

### May 3-7

Final Exams

### May 7

President's Graduation Reception - Surbeck Center - 3:00 PM

### May 8

Graduation - Rushmore Plaza Civic Center Arena - 10:00 AM

Residence Halls Close for summer - 12:00 PM

### May 9

Mother's Day

### May 10

West River Math Contest

### May 31

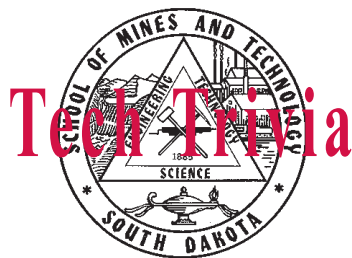
No Classes - Memorial Day

Visit the on line calendar for details  
[www.hpcnet.org/sdsmtcalendar](http://www.hpcnet.org/sdsmtcalendar)

For details about K-12 and Children's Science Center events, visit the K-12 calendar:

[www.hpcnet.org/SDTechK-12](http://www.hpcnet.org/SDTechK-12)

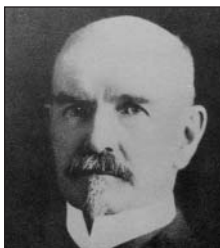




# Tech Trivia

## Did you know that...

- Valentine T. McGillicuddy wasn't just president of South Dakota Tech? He was a doctor, helped establish the boundary between the United States and Canada, worked as a topographer in



the Black Hills, served as Indian Agent on the Pine Ridge Indian Reservation, served as mayor of Rapid City, and went to Alaska to help fight the 1918 flu. He knew the colorful characters of the Black Hills - Calamity Jane, Custer, Sitting Bull, Red Cloud, and others. He also administered medical care to a dying Chief Crazy Horse.

- Faye L. Parlo, Tech president from 1954 to 1966, purchased the first computer on campus? It was an IBM 1620, and arrived on campus in 1961. The "completely transistorized digital computer"



found a home in the McLauri Building. By 1965, a special short course was offered to instruct faculty and staff in the fundamentals of computer programming and the operation and capabilities of the IBM 1620 Data Processing System.

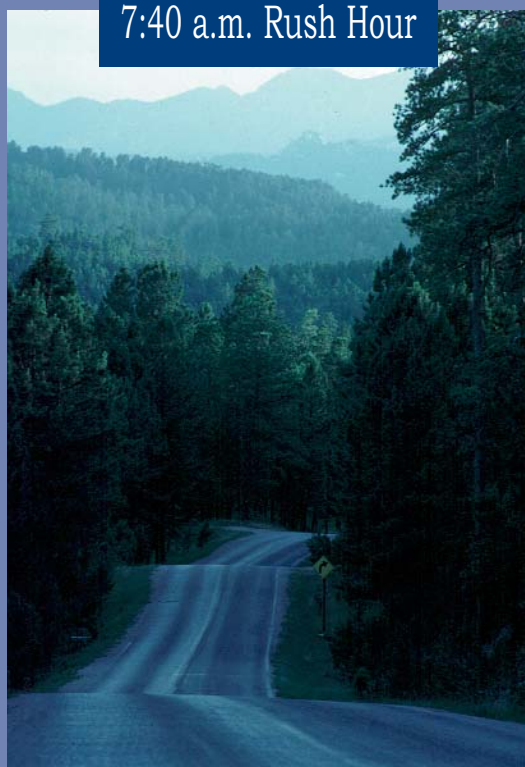
- Dr. Cleophas O'Harra, Tech president from 1911 to 1935, moved the university from a struggling mining school to a progressive science and engineering institution? He



also oversaw the creation of "M Hill" and the first "M Day," offered the campus' help with the World War I effort, delivered the address at dedication of Mount Rushmore's Washington carving, and was called the "father of a thousand boys" at his funeral.

4,500 copies of this publication were printed by SDSM&T at a cost of \$1.10 each.

7:40 a.m. Rush Hour



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The photo of the snowboarder on the postcard is courtesy of SD Tourism.



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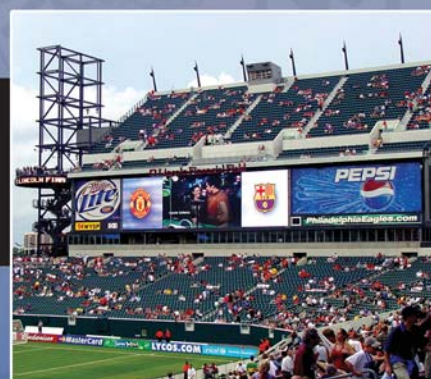


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