



Impulse

College of Engineering
South Dakota State University

Winter 2001

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Dear *alumni and friends*

The students at South Dakota State University have always inspired my thinking. The Senior Design Conference, which is an annual event held in October, publicly demonstrates the energy, ingenuity and most importantly the theoretical and practical development of the students. The projects they present are not just an exercise to demonstrate some classroom theory or concept, but they are seeking the solution for a “real” problem.

Provost and Vice President for Academic Affairs Dr. Carol J. Peterson honored the College of Engineering by asking me, the dean, to address the December graduation. My first thought was to ask, “Why me?” and then refuse. However, after thirty seconds of consideration I realized that this was not only a personal honor for me but recognition for the faculty, students and alumni of the College of Engineering. It did not take me very long to develop the theme, **WHAT DO I DO NOW?**

What I related to the students is that they are excellent students and they will build on that throughout their lives. Their learning will continue. Our great nation demands that people contribute with their ability so we can move forward as a people.

Many of our students are involved in extracurricular activities and their future professional life will continue to make that demand and offer that opportunity. I am sure that many of you probably have clear memories of the out-of-classroom experiences whereas the classroom activities have dimmed.

Contributions to the community through volunteering of time and expertise are something that the students do while attending SDSU. I told them that I expect them to continue with that concept of sharing as they move into the professional and business world.

I urged them to continue the connection to family, friends and colleagues, because that is their base for building relationships. Their personal growth **will** depend on the connection to people from the past.

I only hope that the students remember a point or two from my talk and again I appreciate the recognition for the College of Engineering.

Thanks to all for your continuing support of the College of Engineering and its programs.

Virgil G. Ellerbruch, Ph.D., P.E.
Dean of Engineering

Impulse

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South Dakota State University

■ Features

New MTS machine takes university researchers to another level 2

With a push, pull, or a twist, the new MTS machine allows faculty and students to conduct research at another level.

Stat students profit from Big Blue 4

SDSU alums at IBM spearhead fund-raising for a new computerized statistics lab.

Too much fun to quit . . . almost 6

Dean Virgil Ellerbruch is stepping down after thirty-four years.

Rebuilding a life 8

In a wheelchair 12,000 miles from home, a Bangladesh student still plans to earn his master's, and "do something for me and this world."

NASA turns to SDSU researchers 9

Schiller, Helder lead a project to verify satellite information for the space agency.

Entrepreneur Center becomes reality 11

Effort will support entrepreneurial ventures at SDSU, in the region.

■ Students

Baumberger receives \$2,000 scholarship from ASCE 12

Department organizations honor top students 13

■ Faculty

Discovering Dakota hospitality 14

College welcomes eight new faculty members 16

Familiar faces tabbed as department heads 18

Summer job sparks Robert Finch's second career 19

■ Alumni

EerNisse among SDSU's finest 20

Making a lasting impact 21

From tinkering tot to mechanical engineer 22

New electrical engineering scholarship established 23

■ Contributors

Dean's Club 24



New MTS machine takes research to another level.
Page 2

Ellerbruch stepping down after 34 years of service.
Page 6



Finch starts his second career at IBM.
Page 19

■ About the Cover

Doug Peters places a metal rod in the Material Testing System for strength testing in the heat power laboratory. See story on page 2.

Cover photo by Eric Landwehr.

■ Impulse

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Crothers Engineering Hall

May 18, 2001 at 3:30 p.m.

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Twisted Research

About the only thing it can't do is talk. That's how advanced a new machine called the 810 Material Testing System, or MTS, is. Located in the heat power laboratory northeast of the administration building, the MTS tests the mechanical properties of various materials to determine their strength.

The results can be quite useful, especially for manufacturers wanting to know if the parts they produce have the endurance and quality necessary to stand up to varying degrees of stress.

The 2,000-pound MTS does its talking by exerting as much as 55,000 pounds per square inch or as little as five pounds on an object by pushing, pulling or twisting with its two jaws powered by a high-pressure hydraulic fluid system.

Replaces outdated machinery

For Arden Sigl, professor of civil and environmental engineering, seeing the MTS become reality was especially gratifying. He was a leading proponent among his colleagues in obtaining such a machine, especially after it was becoming increasingly clear that the current machines lacked the necessary technology to meet the research demands of today.

"I've worked on getting this system for quite a few years," says Sigl, in his thirty-second year with the College. "What we have now is a state-of-the-art machine that increases the capability we had in our older machines, which may be as old as I am. It's an upgrade by allowing us to do things in research areas that we weren't able to do before. It's a significant improvement over what we had."

The MTS is a totally computerized system that replaces a pair of manually-controlled machines that date back to the 1940s in Crothers Engineering Hall.

"Even though the older machines still work, they have to be replaced," Sigl says. "We not only test as part of our teaching function, but we also, for example, get requests from industry to do certain types of tests. The new machine allows us to do things in the lab with students that we couldn't do



Doug Peters, fabrication technician, and program engineer Derek Hengeveld test the strength of a piece of metal in the MTS machine. After data is fed into the personal computer, testing is conducted by the machine on the left.

before with the presentation of data because it's computer driven. It's highly sophisticated and you have a lot of power at your command."

Funding came from South Dakota EPSCOR (Experimental Program to Stimulate Competitive Research) which awarded \$57,150 in state and local funds toward the purchase of the MTS in February 2000. The College then provided \$69,820 in matching funds.

The MTS allows an operator to easily obtain information about the fracture mechanics properties of advanced materials, compression properties of composites, or perform other, more traditional materials testing.

Suzette Burckhard, assistant professor in civil and environmental engineering, likes the versatility of the MTS system.

"We have one machine now that does compression testing and one that does tension testing," she says. "This machine does both by increasing our ability to test materials, and to show students how materials perform under different types of loading."

Programming improves testing

Loading refers to the amount of pressure the MTS applies to a piece of

material, and the amount of pressure is gauged by the type of load cell that's installed in the system.

"It's an interesting machine," Sigl says. "Unlike the old machines where you start the motor and open valves, the MTS can be programmed to test the behavior of materials under different stress conditions."

The MTS is composed of the load unit assembly, a hydraulic power unit, and the TestStar IIs control system.

The TestStar IIs control system is the brain of the MTS and it has three major hardware components: the TestStar system software that runs on a personal computer, a digital controller, and a remote station control panel. The components work in harmony as an integrated system—each with its own distributed intelligence—to make it more user-friendly to allow for more testing and less time learning the system.

Can test cyclic strength

When a specimen is loaded into the jaws of the MTS, the system can test at least three different mechanical strength properties: elastic, plastic, or cyclic. An elastic property, much like a rubber-band, will go back to its original size

when it's pulled and let go. A plastic property resembles a piece of cellophane when it's pulled and becomes deformed. A cyclic property refers to how many times an object can be pulled and let go before the motion begins to affect its original shape.

"A cyclic property is like a vibration because you are continually loading and unloading it," says Carrie Mattson, instructor and coordinator in engineering technology and management. "A good practical example is when you have a machine running and you have bolts that hold it together. The bolts are constantly being vibrated. They will fail faster because they are being loaded that way. So, we test material to see how it reacts to that type of motion."

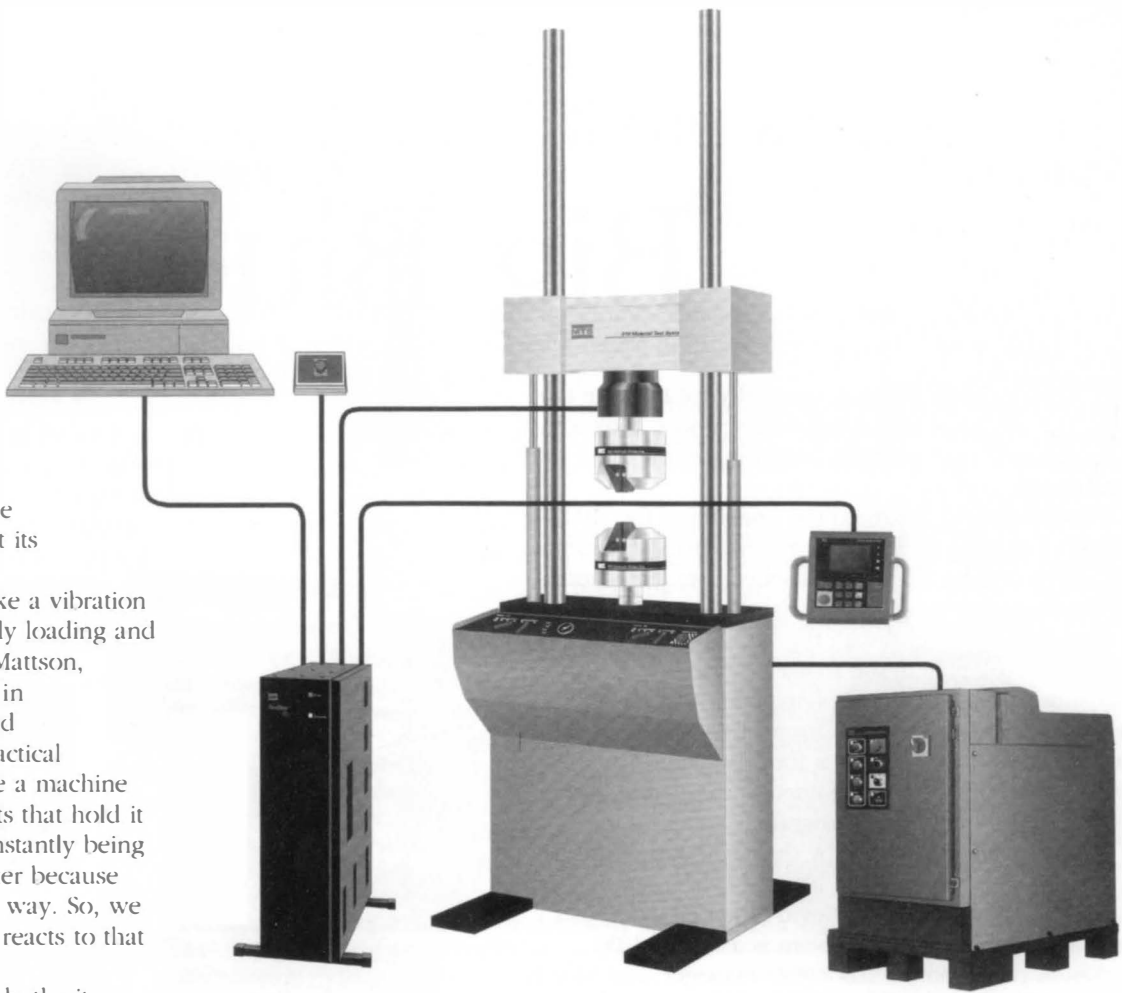
Mattson and Burckhard both cite fatigue and failure analysis among the many functions performed by the MTS.

According to Burckhard, overweight trucks and road damage is an area that can be explored since it's not known for sure how many times trucks have to pass over before damage occurs.

"We can take a piece of road bed and test it as if trucks were driving over it by continually compressing and releasing it," says Burckhard. "We can go through a series of, say 1,000 cycles, or like 1,000 truck wheels running over it. What happens to the strength? Does it drop off significantly or slowly drop off? These are the questions this machine helps us to answer."

Burckhard also points to the thousands of metal rivets used in airplane construction and how they hold up under constant cabin pressurization.

"It's the little rivets, not the skin, that gets so much of the stress," she says. "Every time they are pulled and released they develop little micro cracks. So, what the MTS does is it allows us to better understand how that happens. It helps to set guidelines on regular maintenance checks to see if any cracks have developed."



ABOVE: The five primary pieces of the MTS 810 system. Clockwise, from upper left, a personal computer, a load unit assembly, a remote station control panel, a hydraulic power unit, and a digital controller. **BELOW:** With a vice grip hold, the hydraulic wedge secures a steel rod for strength testing. The machine allows fatigue studies on nearly every type of material. From titanium to advanced ceramics and plastics.

Explains why materials break

Why an object suddenly fails or doesn't perform as expected is the bottom line for the existence of the MTS.

"If something breaks we want to know why," Mattson says. "Did it have the strength it was supposed to? If it didn't, then it's a materials problem. If it did have the strength, then it's something else. So, this is a problem-solving machine, too."

Mattson adds that a new window has opened up for students and faculty with the addition of the MTS.

"We haven't had this type of capability until now," she says. "This is quite significant because a whole new range of research has been created for us now that we have this system."



Stat students profit from

Big Blue

The education process, especially for those in the mathematical and computing sciences, took a turn for the better with the beginning of the 2000-2001 school year.

The fall semester marked the opening of the IBM statistics computerized laboratory and smart classroom. The computerized lab includes sixteen student stations, one teacher station, and smart classroom equipment.

The story didn't end with the statistics lab. In a separate development, the IBM Partnership in Education Program with SDSU was implemented. As a result, SDSU has been approved as a site for an IBM AS/400 server, training, and on-going classes for faculty and students. SolCom, Inc. of Sioux Falls joined SDSU as one of the corporate sponsors of the program.

It was all made possible by the dedicated efforts of SDSU's alums, including the likes of Lyle Solem ('59, electrical engineering) and Kevin Moe ('88, computer science and mathematics). Solem is a former IBM Rochester development laboratory manager, and Moe is the current manager of the IBM San Francisco Test Center in Rochester.

Solem and Moe spearheaded the campaign that contacted every SDSU graduate who either works at or has retired from IBM Rochester. Nineteen individuals contributed more than \$75,000 in outright gifts, pledges and matching gifts. IBM's equipment matching program provided a matching equipment option for gifts from current and retired employees.

The bottom line means new learning opportunities for SDSU students and faculty are now available.

The statistics lab means SDSU students are better able to get a state-of-the-art education, according to Kenneth Yocom, head of the mathematics and statistics department.

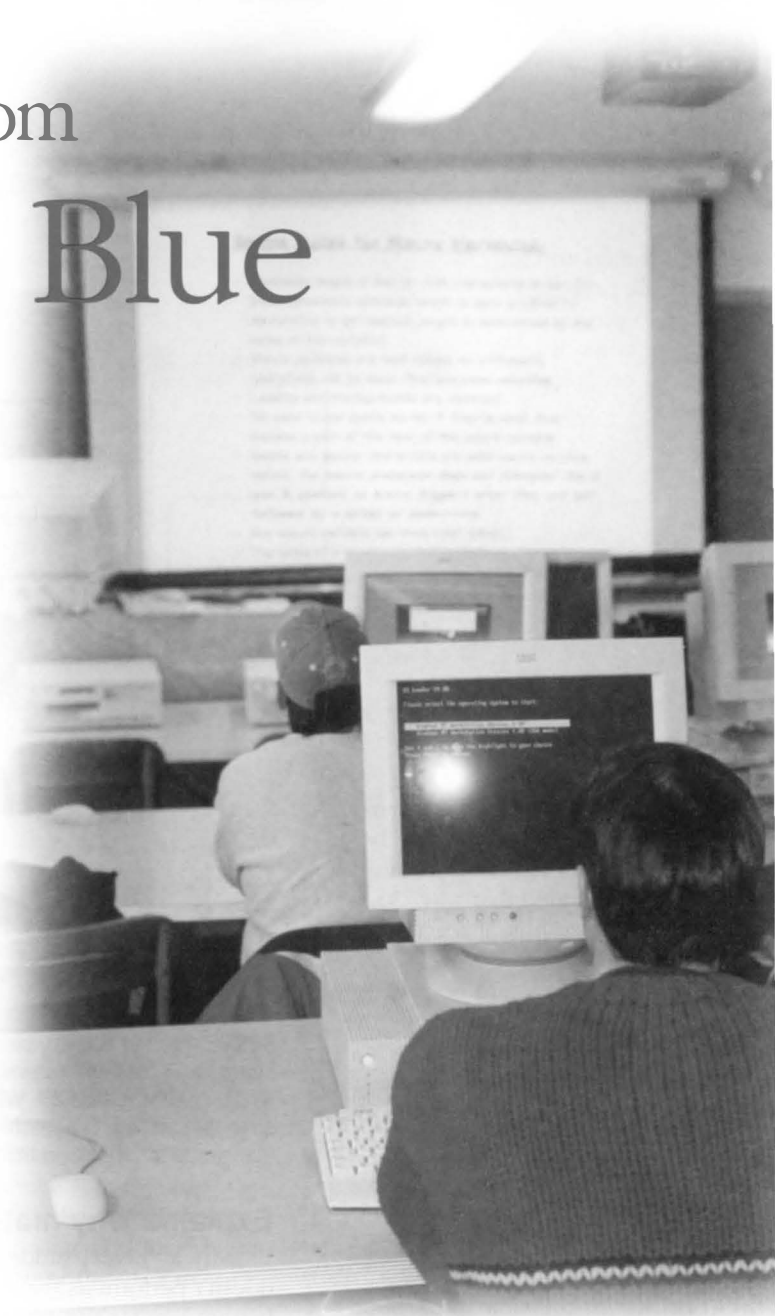
"This will give students a real world experience," he says. "People doing statistics in the real world aren't using a calculator. They're doing it on a computer."

The lab, which houses computers paid for by a matching grant from IBM through its SDSU graduates, makes life easier for students and faculty by making available a central location that is dedicated to the mathematical sciences, particularly in the field of statistics.

Furthermore, the computers in the lab are equipped with the premier statistical package in the world today, SAS (Statistical Analysis System).

Previously, students had to use computer labs spread around campus and many of the labs lacked the necessary statistical software. In addition, since they were university computer labs, they were extremely busy and consequently the scheduling of courses in the labs became nearly impossible.

Since space was a premium in the math department in Harding Hall, the IBM computerized statistics lab found a



The IBM statistics computerized laboratory and smart classroom, located in Ag Hall, contains sixteen student stations, one teacher station, and smart classroom equipment.

home on the first floor in Agricultural Hall. "It allows our students to use the statistical software package that's really required in all the upper-level statistical courses," says Yocom, in his thirty-eighth year at SDSU. "Almost every graduate student has to take a statistics course. Before, there were only certain computers on campus that had access to SAS."

"We really appreciate all the help from our alums that allowed us to equip the lab," adds Yocom. "For us, it means equipment that we probably wouldn't have gotten otherwise."

Dr. Tim Wittig, associate professor and statistics coordinator, says having a potent software system like SAS allows for the opportunity to train and teach students about statistics with the best method possible.

"Students now have a place where they can go and know that the statistical software package SAS is always available,"

says Wittig, who points out that one of the down sides of the availability of smaller and less reliable statistical software is that many people use them without knowing what they are doing.

"Unfortunately, like running a bad experiment in a lab, the results can range from silly to fraudulent. But, with a computer lab like this one, we, who are professional statisticians, can teach people how to use the software tools available, how to interpret the results of computer output, and how to present the results to others in an understandable fashion."

According to Wittig, the new statistics lab also falls in line with SDSU's education philosophy.

"One of the missions of any land-grant university is to disseminate knowledge," he says. "The computer lab, the statistical software, and the opportunities to train others in statistics, helps to fulfill this mission of SDSU."

"Our alumni who made this possible are to be congratulated on helping statistics fulfill its role in science and research at SDSU," Wittig adds. "The computer lab is still relatively small. But, I hope when other alumni see what a difference their contribution makes, the lab will grow and grow." As part of the IBM AS/400 program, faculty can travel to the IBM plant in Rochester and be exposed to the latest in curriculum and

software development related to the IBM AS/400 system. Faculty then return to campus and share the knowledge with their students.

"The IBM corporation is interested in this program because the customers they have today have trouble finding people who are trained on the IBM AS/400," Solem says. "The program is a win for all involved. SDSU gets in excess of \$1 million in hardware and software for participating in the program, and the students and faculty will be trained to meet the greatest needs by companies today."

Students will find themselves extremely employable because of the number of IBM/AS 400s being used by industry and the shortage of people qualified to work on the system. Through the program, the technology will be periodically upgraded at SDSU as industry advancements occur.

Taking advantage of a company's matching gift program can help alums do much more with their contributions, according to Moe.

"It's an incredible way to leverage what alumni are able to do and a powerful way to help out a state-assisted school," he says. "It definitely showed me a way to maximize my gift back to the college."

Record Phonathon

goal in sight

Students within the College of Engineering were busily preparing for a record effort in the annual Phonathon as this edition of *Impulse* went to press.

Last year the College hit a record total of \$141,442, which was \$5,000 more than the old mark of \$136,532 set in 1998. Teresa Kub and others with the Phonathon Committee planned to blow past the current mark like a finely tuned Baja vehicle. This year's goal was \$165,000, and the students planned to meet that goal by February 9.

This year's phonathon ran Saturday afternoon, February 3, through Friday night, February 9. While the phonathon's purpose remains unchanged, the setting moved across the campus. Previous efforts have been staged from the basement of Pierson Hall, where a bank of sixty-four phones was set up in the dormitory. This year's calling was done from the SDSU Foundation's Call Center.

The computerized calling center eliminated the need to dial the eleven numbers needed to make a long-distance call. So, even though there were only sixteen phones at the Call Center, the work was expected to go faster, hence the higher

goal, according to Barb Dyer, who helps coordinate the event from the dean's office. Two students were assigned to each phone during a shift and there were two shifts per night, she says. Students continue to send out thank-you letters to donors.

Students from departments with the most alumni had the most phones. The Civil, Electrical, and Mechanical Engineering Departments each had three phones from which to call. Ag and Biosystems Engineering students had two phones to use in their efforts. Other departments had one phone, Dyer says.

When a department completed its calling, another department used its phones. "The phones were always operating for someone," she notes. Phonathon dollars keep the College operating at a peak level.

Teresa Kub, student chairperson for the Phonathon, says, "This year we were focusing our Phonathon efforts on student scholarships, equipment upgrades, and special projects which are only possible with private support. These projects include the Engineering Expo, publication of the *Impulse*, and student chapter activities." Kub directed the Phonathon with Chuck Tiltrum, who again served as faculty adviser.

Too much fun to quit

Virgil Ellerbruch loves his work almost too much to retire, but he is anyway. The dean will step down June 30 after being honored at a May 3 farewell reception.

Ellerbruch, who turned 65 this past November, will have given thirty-four years of service to SDSU when he completes this semester. He could have left SDSU several years earlier and still received full retirement pay, but he didn't take that route.

"I enjoy my work. I enjoy the interaction with the students and the faculty, the staff, and the administration. I didn't really think about retirement until this past summer. That's when I decided to make it one more year," says Ellerbruch, whose silver hair is the only clue that the Lander, Wyoming, native carries a 1935 birth date.

Although it could be a headache to serve as dean in a college with 1,260 students and construction plans in the works, Ellerbruch says he has no complaints. "There is nothing I can really say 'I hate doing that.' The addition to Crothers, the Solberg renovation—I never looked at those as anything other than an opportunity to help South Dakota students.

"Certainly there have been challenges with the budget, and those will continue, but those challenges have always been there," says the soft-spoken Ellerbruch, who became dean in fall 1999 after being named as acting dean at midyear.

Foundation helps the College

He adds that budget challenges have been less formidable than those faced by his predecessor and long-time colleague Duane Sander.

In recent years, support from the SDSU Foundation "has made it possible for us to grow and support programs and students and their education," Ellerbruch shares.

Sander, who has taken a position with the Foundation since retiring as dean on June 30, 1999, cited 1998 as an example of the Foundation's more active



Although Dean Virgil Ellerbruch will put Crothers Hall behind him when he retires June 30, he and his wife Georgann plan to remain in Brookings.

role in the supporting the University. That year \$150,000 to \$175,000 was raised from the Phonathon for ongoing expenses at the College. Another \$140,000 was provided for scholarships through endowments and annual gifts. Special purpose donations, including money for Crothers Hall Addition and renovation of Solberg Hall, totaled \$982,000.

The total contributions for the Crothers Hall addition was \$3.75 million, which was matched by the state with \$3.75 million for renovation of the existing structure. "In many cases our alumni and friends just need to be asked

and brought up to date with the University. Our engineering alumni have been very willing to provide help within their means," Sander notes.

Although Ellerbruch finished his career at the administrative end of the College, his perspective was not inverted, Sander says.

"He has always been very student-oriented, and has been excellent at really looking ahead to the things we need to change and do to make our College of Engineering one of the top colleges in the nation," the former dean says. "In general, I think he has an attitude of

... almost

support, and mentoring, and encouragement to the faculty, students and department heads in each of the majors,” Sander summarizes.

Related topics to real world

Jay Grabow can testify to the support Ellerbruch had for electrical engineering students. Ellerbruch served as his master's degree advisor. “Whenever you went to his office for help, he would show you and then ask you questions, making sure you understood it. He would take you to the next level. He was thoroughly concerned that you were learning.”

That concern also was reflected in his classroom style, says Grabow, who earned EE degrees in 1989 and '91. “He was extremely hands-on. When he taught he always related it to real-world applications. It wasn't out of the textbook or theoretical. It was hands-on application. Dr. Ellerbruch has a certain energy about him. He would say this is why that works.”

For example, one day he took a computer disk apart and applied a spray to show the magnetic field. “He took a step beyond what he had to teach,” says Grabow, a business unit manager at Midcom in Watertown who keeps in touch with Ellerbruch and occasionally speaks to Intro classes on careers in engineering.

Students found success

Other students showed an appreciation for his openness. In his evaluations, students complimented

Ellerbruch for his “honesty in talking with them in discussing their future and where they might be in five to ten years,” Ellerbruch says. His popularity was reflected in a 1989 vote that named him teacher of the year for the College.

But leveling with a student isn't always a time of celebration. “Sometimes that includes saying ‘you didn't pass that course. You're not going to stay in the College of Engineering,’” Ellerbruch says. “That usually turns out positive too.”

“They know they need to go to another area, but nobody's ever told them. When they do, they go on to another challenge and become successful.” And some students who went through the College later found success in other areas. Successful students who participated in a lot of activities top Ellerbruch's list of favorite SDSU memories.

“They haven't necessarily gone down the narrow path of technology. Some have broadened out and gone into law and medicine. That makes me feel good about the education they received at SDSU. The education they got here exposed them to other areas that interested them.”

He knew he'd found his love

For Ellerbruch, his interest has always been teaching. After graduating from Lander (Wyoming) High School and moving halfway across the state to pursue a degree in electrical engineering, Ellerbruch received his bachelor's from the University of Wyoming in 1960. “I really enjoyed

working with students. My first experience teaching was when I taught a lab for the physics department while I was working on my master's at the University of Wyoming.” Ellerbruch got that master's in 1961 in electrical engineering and headed into the work world—employed as an engineer with Sperry Utah Company in Bountiful, Utah.

That lasted a year. Then he responded to a call to return to his alma mater to teach. While there he began work on his doctorate, a degree he did not complete until 1969, two years after Ellerbruch had begun work at SDSU. “I didn't work on it (the doctorate) very strongly at first. I put my efforts on the classroom.”

Another show of commitment

That's just one example of his commitment to education. Another is his resolution not to be influenced by prejudices. “As a professor I trained myself not to look at people's hair or how they dressed to make a decision. I always made my decision on how they could perform in the classroom.”

Although Ellerbruch will remain in Brookings after his retirement, he says he will miss his co-workers. “In my present job, I have more interaction with the staff than with students or faculty, and I will miss working with them. The Career Service employees have been a pleasure to work with and make an excellent team for the College.” A new “captain” for the team is to be selected this spring. Four finalists have been on campus for interviews.

Adieu to the dean

The College of Engineering will hold a farewell reception for Dean Virgil Ellerbruch from 2:30 to 4:30 p.m. Thursday, May 3, in the Walder Room at the Student Union.

The College encourages people to send letters, cards, and photos in advance so they can be compiled into a scrapbook. Items may be sent to the College of Engineering, Box 2219, SDSU, Brookings, SD 57007-0096.

Ellerbruch at SDSU

Fall	2000-present	Dean of Engineering
June	1999-Fall 2000	Acting Dean
	1995-1999	Assistant Dean of Engineering
	1994-1995	Acting Assistant Dean
	1974-1995	Professor, Head of Electrical Engineering Department
	1982-1985	Acting Head, Computer Science Department
	1972-1974	Acting Head, Electrical Engineering Department
	1967-1972	Assistant/Associate Professor, Electrical Engineering



Rebuilding a life

It's your first semester at a university in a new country and you're nearly 12,000 miles away from home. All of a sudden your world is turned upside down when a horrific accident changes your life forever.

That's what faced Mohammad Obaidul Haque, a 29-year-old student from Bangladesh seeking a master's degree in electrical engineering.

It was March 4, 2000 and Haque and four fellow graduate students were on their way to the Black Hills during spring break. While traveling on Interstate 90 near Murdo the van they were riding in blew a tire and rolled over seven times.

Four of the men were hurt and eventually recovered. However, Haque wasn't so lucky. He suffered a broken neck and spent five months, including forty days in intensive care, at Sioux Valley Hospital in Sioux Falls and Vermillion, undergoing extensive treatment and physical therapy.

The spinal cord injury left Haque a quadriplegic. Last August he moved into Bailey Hall and lives in a ground-floor apartment that was modified by SDSU's physical plant personnel in order to meet his living and academic needs. He has a hospital bed in his bedroom, and the bathroom is completely accessible to him in his wheelchair. The shower has grab bars and is level with the floor which allows him to simply roll into it.

In addition, Haque has a complete computer system in his apartment and a voice-controlled telephone. Not able to move his fingers, he uses tools that are inserted in a wrist band to operate the computer keyboard. In the classroom, he takes notes by using a tape recorder and he gets help from classmates.

Members of the SDSU faculty constantly visited Haque when he was in the hospital, including Lewis Brown, professor and head of electrical engineering. As time went on, the two formed a unique bond that sometimes results from a tragic event.

"Knowing and working with Obaidul is very inspiring," says Brown. "All it takes to lift my spirits is an e-mail from Obaidul or a visit with him. He has a lot

of reasons to be discouraged, but he's moving on with his life."

Indeed, Haque has no plans to stop now. A determined individual, he fully intends to be with his classmates and receive his diploma during spring commencement of 2003. "I plan on completing my education and getting my master's degree in electrical engineering," says Haque, with obvious pride. "I want to work and get a good job. I don't want to be too dependant all my life. Although I have my physical limitations my brain is working perfectly by the grace of our creator. I hope that I can still do something for me and for this world."

Like many underdeveloped countries, Bangladesh isn't conducive to life in a wheelchair. Consequently, Haque realizes his best chance for employment is in a country like the United States where there are wheelchair accessibility laws.

"To get a job in my country I would have to stay in my house, literally," he says. "There are no ramps, the roads are narrow, and it's crowded. There's no way to go outside in a wheelchair in my country. "From my experience America is a great country. I have met a lot of people here who are very helpful. I like this country. I see a lot of good qualities here. I want to do something for this country with my education and my knowledge." Haque, who obtained his undergraduate degree from Bangladesh University of Engineering and Technology in the capital city of Dhaka, adds that with the help of professors like Brown he is confident of landing a position in electrical engineering. "Due to my physical shortcomings now, I will

meet with my professors to see what field will be suitable for me," he says.

Brown says he took a personal interest in Haque simply from being a parent himself. "I tell people all these students are like my own kids. When one gets hurt we try to look after them. But, what really struck me about Obaidul was that it was his first semester here and I have four kids of my own.

I think it's a parent's worst nightmare to have your kid leave home, go to a strange country, have something like this happen, and be so far away and have no family to even visit you in the hospital. If I was a parent I would want to know somebody is there being a parent for my child." As it turned out, Haque isn't completely isolated from his family. His brother, Mohammad Emdadul Haque, 33, showed what sibling love is all about by giving up everything he had, including a full-time job in Bangladesh, to provide twenty



N·A·S·A: Earth, satellite results compared

Continued from Page 9

SDSU holds separate contracts with NASA to test the accuracy of images from the Landsat 7 and IKONOS satellites. "Dennis and I both have been involved in this work for eight or nine years. I guess our reputation has developed enough that they thought we could help," Schiller says of NASA's contact with SDSU.

A grant received six years ago from the National Science Foundation allowed the SDSU scientists to acquire much of the equipment they needed for this summer's work.

Schiller and Helder did benefit from a global positioning system, which was supplied by two associate scientists from Lockheed Martin's operation at Stennis Space Center in south Mississippi. The space center also sent a Learjet to South Dakota to do sophisticated aerial photography. Information collected by the researchers will be compared with that supplied by the satellites.

SDSU is verifying three aspects of satellite information—geometric, spectroradiometric and spatial. Geometric review examines the accuracy of latitude and longitude marks provided by the satellites. Spectroradiometric review judges whether the pixels are as bright or dark as they should be. Spatial review judges the amount of blur in the satellite image.

Information was collected four times this summer from global positioning system satellites and flyovers by the NASA Learjet. "We're going to have more data from this day than we've ever had before," Helder said after completing a June 30 ride on the NASA jet. The aircraft houses an ATLAS (Airborne Terrestrial Applications Sensor) sensor, a one-of-a-kind apparatus that was built by Lockheed Martin engineers at Stennis in 1994.

The ATLAS sensor and the Landsat 7 and IKONOS satellites were simultaneously recording remote sensing images of Brookings. The sensor can record fourteen different infrared wave bands—two in the shortwave range, six in the visible range and six in the thermal range.

Lockheed Martin provided the ATLAS operator with the pilot and co-pilot from NASA. But Helder, himself a pilot, was able to ride beside the operator in the backseat. "I got a perspective from the air and how the instrument works," says Helder before taking a picture of the flight crew at the Sioux Falls Airport. The crew passed over Brookings at 4,500, 9,000 and 18,000 feet above ground, collecting information that will later be sent back to Helder for review.

On ground, Schiller was walking the field south of the 3M Brookings plant to characterize the amount of energy in the atmosphere on a sun-filled June 30. A helium-filled, red weather balloon also was launched on this purely summer Friday morning. The balloon, about the size of a giant beach ball, measures temperature, atmospheric pressure and relative humidity as it ascends to 40,000 feet.

Armed with discs loads of data, the SDSU scientists headed to their respective labs (the Electrical Engineering Image Processing Lab and the Physics Department Astrophysics & Space Sciences Lab) to measure the accuracy of the satellite images. NASA was to receive their report this past fall.

Working with Schiller and Helder were graduate research assistants Rob Malo, Gyanesh Chander, Jason Choi, and Yoon-



Steven Schiller examines equipment he uses to characterize the amount of energy in the atmosphere. He was taking his readings on a field south of the 3M plant in Brookings on the same day Dennis Helder joined in a NASA Learjet flight over the Brookings area.

Pheng Law as well as Tim Ruggles, a fulltime research associate for Helder.

Applications for satellite imaging include transportation network mapping, disaster preparedness, urban planning, precision farming and telecommunications. During the June wildfires in the Colorado foothills, color images were collected to show homes that had been destroyed, and tree stands and grassy areas that had been burned.

"Because we received the imagery on the same day it was taken, we were able to place it on our web site so displaced residents could see how close the fire came to their homes," says David Gallaher, director of Information Technology Development for Jefferson County, Colorado.

Entrepreneur Center

becomes reality

To find evidence of Duane Sander's passion for entrepreneurship, one need look no farther than the SDSU Foundation.

Sander, director of special projects at the SDSU Foundation, has been the ramrod for a new venture called the Enterprise Center. The Foundation began a search for a full-time director after receiving strong support from the Foundation board this summer.

And that support was more than a loud "amen" and a pat on the back. One company and eleven of the board's forty-five members have agreed to fund the center at a rate of more than \$100,000 annually for the next three years.

Sander observes, "As successful entrepreneurs, these people see this as one way to give back and help the state that helped them get an excellent education, which contributed to their success. They want to help others, with similar visions, be successful and also benefit South Dakota and the region." The investors will serve as an advisory committee for the center, whose director will report to the Foundation director and will be under the overall guidance of the Foundation board.

While a new concept at SDSU, enterprise centers are common throughout the United States. Some are connected with schools of business at universities, "but some of the most

successful are university wide. The success is primarily dependent on the director and the leadership within the center," Sander says.

Though Sander's background is in engineering (thirty-two years within the College), he envisions the Enterprise Center connecting with all colleges within the University.

In fact, the first steps for the new director is to become familiar with the university in two areas—general areas of research and those researchers who are developing ideas, and become familiar with the experts in the university who can help start-up firms, Sander says. The center will have a threefold focus:

- Identify commercially viable opportunities within the University.
- Establish mentoring and support outreach for regional and University start-ups and expansions.
- Support and assist the development of an entrepreneurial atmosphere within the University.

Commercially viable opportunities may come from not only faculty research but also from class projects or some senior capstone projects where students are required to develop a product or service, Sander says. Mentoring could be for not only new companies but also companies moving from a regional focus to a national focus, or growing from five employees to fifty employees, Sander says.

The center can connect entrepreneurs with University expertise in a variety of areas—perhaps an economics faculty member, an instructor from Manufacturing Engineering Technology, a marketing and advertising expert from the Journalism Department, or a professor teaching a management class in a graduate program.

But the director will also connect entrepreneurs to mentors outside the University. Coming from throughout the state and the nation, the mentor might be a venture capitalist or an investment consultant, or an executive at a company that produces a similar product, Sander says. Involvement could range from a weekly telephone call to giving some helpful hints on becoming an investor in the company, Sander says.

To enhance an entrepreneurial spirit in the University, Sander suggests incorporating entrepreneurial topics to existing classes or forming new classes that would present entrepreneur topics.

"In addition, we might have . . . a business plan competition just to promote and start people thinking if their ideas might have a commercial use," he adds.

"Through the efforts of the center, we hope to help expand the economy of South Dakota. We'd hope that most of the companies we help would either stay in South Dakota or develop a significant presence in South Dakota."



"We'd hope that most of the companies we help would either stay in South Dakota or develop a significant presence in South Dakota."

Duane Sander
Director of Special Projects
SDSU Foundation

Student Achievement



Senior Design Conference

Jason Kautz, left, talks with Jacob Weaver at the Senior Design Conference November 14, 2000, at the Volstorff Ballroom. Kautz, from the Electrical Engineering Department, worked with fellow students Scott Hoberg and Matt Karlgaard to design an automated load bank system for the Crother's Hall Addition. Weaver teamed with Dustin Cameron to design an ethanol/ hydrocarbon instrument for measuring the ratio of ethanol to aviation gasoline. A total of twenty-five teams and ninety-two students gave presentations at the all-day event.

Four SDSU engineering students snagged fifth place at the International Student Design Competition of the American Society of Mechanical Engineers for inventing a contraction that automatically fills a bottle with water and caps it, without the help of human hands.

Kelly Van Duyn of Colton, John Sievers of Bridgewater, Andy Stoebner of Tripp and Cody Vining of Huron faced twelve regional teams and one international team at the November 7 competition in Orlando, Florida.

Although the teams had to follow the same guidelines, each device varied in looks and operation. Judging was based on speed of the device and success of the demonstration from start to finish, with points deducted for any spills during the fill or leaks after.

SDSU entered the meet after winning its third consecutive Region VII Student Conference championship March 30-31 in Kansas City, Missouri.

Baumberger receives \$2,000 scholarship from ASCE

Laura Baumberger, a senior civil engineering and Spanish major at SDSU, was one of twenty-six students in the nation to receive a \$2,000



Laura Baumberger

scholarship from the Samuel Fletcher Tapman Scholarship Fund. Given by the American Society of Civil Engineers (ASCE), the scholarship is for the 2000-2001 academic year. Chuck Tiltrum, advisor of the SDSU chapter of ASCE and associate professor of civil and environmental engineering, is one of five ASCE

Scholarship Committee members who select the scholarship recipients. Through her leadership in ASCE and high grade point average, Baumberger has proven her commitment to her academics and civil engineering, Tiltrum said.

Baumberger spent a semester studying in Venezuela last year, enhancing her Spanish-speaking skills and studying foreign methods of civil engineering.

She is a member of SDSU's student ASCE chapter, the Concrete Canoe Team, and the Society for Women Engineers. She also volunteers her time during the Engineering Expo and Phonathon, and has served on the High School Visitor Team. A native of Colton, she is the daughter of Pat and Julie Baumberger of Dover, Arkansas.

Engineers earning honors

The College recognized the special achievements of several students during the fall semester.

Students in three engineering chapters on campus were cited for their leadership, creativity, and dedication to the profession in which they aspire.

American Society of Agricultural Engineers (ASAE):

At the ASAE banquet in the fall, Travis Schenk of Spearfish, Andy Breuer of Hull, Iowa, and Ryan Jennings of Rock Rapids, Iowa, were saluted for their combined efforts in designing and building a one-quarter scale tractor and a one-quarter scale tractor pulling-sled.

At the ASAE national competition in May in Moline, Illinois, the team took twelfth out of thirty teams in a field that included the likes of Purdue and Kansas State. SDSU finished first among teams running on unmodified tires. The year before, the team saw their 800-pound, sixteen-horsepower creation place eleventh. Schenk, a 1996 graduate of Spearfish High School and president of ASAE, has been an active member of ASAE for four years. He graduated in

December 2000. Breuer, who began working on the tractor as a freshman, is a junior and a 1998 graduate of Boyden-Hull High School. He is the vice president of ASAE. Jennings, a 1998 graduate of Central Lyon High School, is a junior. Besides the tractor, Jennings became involved with a separate project. Last spring he wrote the data acquisition software system for the diesel engine. When the data was collected the characteristics of the diesel engine were studied.

American Society of Civil Engineers (ASCE):

The chapter recognized one student in each class based on academics and activities within the chapter. They were Christine Beall (freshman), Mike McCarty (sophomore), Teresa Kub (junior) and Brad Ludens (senior).

Beall, a native of Huron, is a 1999 graduate of Huron High School. She joined ASCE her first year and was a member of the concrete-canoe team. Beall also belongs to the Society of Women Engineers. McCarty, a native of Spencer, is a 1998 graduate of Spencer

High School. He is on the concrete-canoe team and plays in the Pride of the Dakotas Marching Band. He serves on the Ambassador's team that gives campus tours to high school students, and sits on the Athletic and Intramural Athletic Committee that deals with budget and athletic policy issues.

Kub, a native of Ipswich and a 1997 graduate of Ipswich High School, has been active in ASCE since receiving the Dynamic Doer Award as a freshman. She has been on the concrete-canoe team every year. Kub was elected president of ASCE last year and finished her term this fall. She has been involved in the Phonathon for three years, and this year chairs the event after serving as co-chair last year.

Ludens hails from Hartford and is a 1996 graduate of West Central High School. He has been president of the civil engineering honor society Chi Epsilon the last two years, and has been a member of the engineering honor society Tau Beta Pi for three years.

American Society of Mechanical Engineers (ASME):

Jessica Berens, a native of Milbank and a 1996 graduate of Milbank High School, was elected president of ASME. A four-year member of ASME, Berens also has served as vice president and secretary. She has belonged to the Society of Women Engineers for four years, and is the vice president of the mechanical engineering honor society, Pi Tau Sigma. Berens is in her fifth year as a certified high school gymnastics judge.

The American Society of Heating, Refrigeration & Air Conditioning Engineers is another chapter of mechanical engineering. Its president is Robert Lacher, a native of Lebanon and a 1996 graduate of Hoven High School.

Travis Geary is the president of Pi Tau Sigma. A native of Elk Point and a 1996 graduate of Elk Point-Jefferson High School, Geary has been a member of ASME since 1997.



Travis Schenk

Andy Breuer

Ryan Jennings

Christine Beall

Robert Lacher



Mike McCarty

Teresa Kub

Brad Ludens

Jessica Berens

Travis Geary

Discovering Dakota hospitality

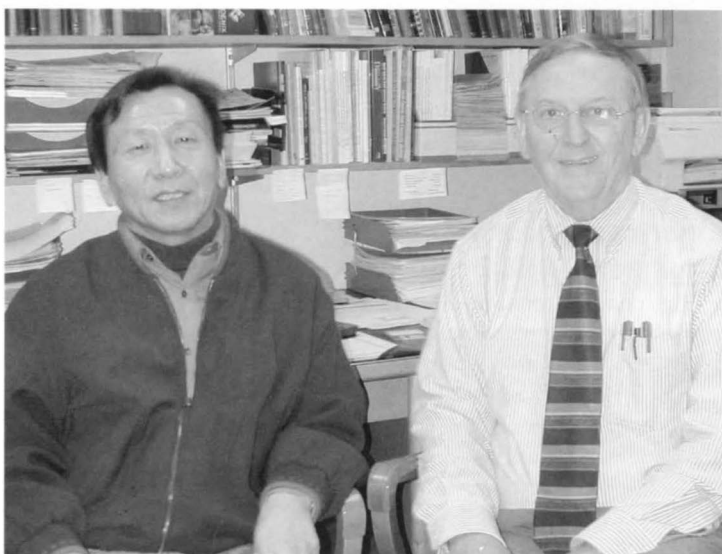
Although it was his third stay in the United States, visiting professor Sung Lai Kim encountered a number of new experiences this fall, not the least of which was the kindness he was shown during his four months at SDSU. Kim's first time in the United States was 1981-1987, when he earned his doctorate in statistics from the University of Illinois-Champaign. Kim then spent a year as a visiting professor at the University of Washington in Seattle in 1994-95.

"Seattle is a big city. This is a small town. Here is more, the feeling is more comfortable. It feels like my country," the Chungnam National University professor says in an interview in the office of Math and Statistics Department Head Kenneth Yocom shortly before his mid-December return to Taejon, South Korea. He complimented Yocom and Associate Professor Tim Wittig for the attention he was given. "In Seattle, no one take care of me."

But at SDSU, Yocom picked up Kim, his wife, and their 12-year-old son at the Sioux Falls airport. A week later his family participated in the department potluck at Hillcrest Park, and he was introduced by Harriet Swedlund at the new faculty orientation. Swedlund, the International Programs director, also encouraged Kim to participate in campus activities. All of this was unlike his University of Washington stay.

New experiences

Taking Swedlund's advice, the Kims went to Jackrabbit football games—a first for his wife and son, and only the second time for him—and saw their first live rodeo. And, of course, there was the



Visiting statistics professor Sung Lai Kim, left, with Department Head Kenneth Yocom.

Hobo Day parade. "My country has no parades," says Kim, noting that he has seen the Rose Bowl parade on television. Kim adds that he also was invited to the president's house for several events. He calls the transition from his Asian country to America, a "very easy adjustment" because of his previous stays in the U.S. and "this a is a more quiet, small town."

In comparing Chungnam National University (enrollment 20,000) and SDSU (8,700), Kim says the facilities are similar. But some student activities at Chungnam are peppered by anti-university and anti-government movements, he says. In his subject area, statistics, there is little difference in what students learn, Kim says. But there is a difference in how students are taught. Chungnam has no "smart" classrooms. Computers are in the office and there are overhead projectors in the classrooms, not the high-tech, full-

screen displays of computer monitors and PowerPoint presentations that SDSU has been adding in recent years.

Well schooled in English

Also, most textbooks for upper level collegians—in all subjects—are written in English. Therefore, the Korean professor speaks in his native tongue but writes in English on the blackboard, Kim says.

Koreans learn English from middle school to the first two years of college. Therefore, visiting American professors have no problem using English to teach Korean students, Kim says.

And most Chungnam professors want the opportunity to visit America. "Every five years I want to be in the U.S." So does Kim plan to return to America in 2005? "Everybody wants to, but there is a lot of competition to selection."

His son, Minsuk, isn't ready to leave. Initially worried about school because he couldn't speak English, Minsuk now enjoys school and has made a lot of friends in the seventh grade in Brookings, his father says.

Minsuk's transition was eased by following his father's order to study the Korean junior high English textbook. Kim was the first visiting professor to be hosted by the Math and Statistics Department, according to Yocom, who is in his thirty-ninth year at SDSU. He thanked Dean Virgil Ellerbruch for helping to accommodate Kim's visit. An open office was found in the Energy Research Center and the department was able to borrow a computer from its computer lab.

"Dr. Kim attended Dr. Wittig's classes and they had discussions concerning statistics and methods of teaching statistics. Dr. Kim conducted introductory and advanced seminars in his specialty of sequential analysis and sequential confidence sets, which is a new area to many of our faculty.

I think the visit was beneficial to the department, college and university as well as to Dr. Kim," Yocom noted.

A snapshot of South Korea

Touring on an annual SDSU exchange trip, two College leaders got a glimpse of one of the world's most robust economic powers. During the last forty years, South Korea has had the highest rate of growth of any nation, and it is the fourth-most densely populated country in the world.

"What we saw is a country half the size of South Dakota with 40 to 45 million people. . . . As you approach Seoul, you see lots of concrete buildings. There's not much green space there, so they're building up," recalls Reza Maleki, who made the May 14-27 trip with Dean Virgil Ellerbruch and seven others.

"I was impressed with level of technology," says Maleki, who heads the Engineering Technology and Management Department. Koreans emphasize value-added technology and work hard to make all kinds of products for export throughout the world, he notes. Among the group's stops was a Hyundai truck factory, which was less than 10 years old. "It was a very large facility; a very clean environment," Maleki remembers.

The SDSU delegation also visited an electronics research center. Guides spoke about efforts to enhance cellular communication and to make a new type of hearing aid, which was demonstrated for the Americans. A device is put on a person's forehead and it sends a frequency through the bone, allowing the

wearer to hear the message but not creating an audible sound for other ears. "They put on the best shows they can. The impression they leave is very important," Maleki observes.

Ellerbruch says, "The thing that I was most impressed with from my technical background was the extensive use of cell phones. Many of the young students we saw would be wearing a cell phone like a necklace." Maleki echoes that observation. "There is widespread use of technology. At least sixty percent of students had a cell phone hanging around their neck."

Ellerbruch adds, "They have made the use of cell phones and will not go back and install land lines like we have in the U.S. Basically, they've skipped a step from no communications to the cell phone instrument.

"That communication capability has allowed them to develop industrially in the last few years. I was certainly impressed with all of the activity—in the downtown, out on the streets, in the farmland area, a lot of commercial development." According to Harriett Swedlund, who coordinates the trips from her International Programs office, the purpose of the exchanges are to "develop a cross-cultural understanding between the two institutions and develop relationships that facilitate education."

Ellerbruch gave an example of how the trip bridged

thousands of miles and vast cultural differences. Among the faculty he met at Chungnam National University was Dr. Yong Kook Kim and his wife. Kim got his degree in dairy science at SDSU and now heads the department there. His daughter, Na-Young Kim, got her bachelor's degree in electrical engineering at SDSU December 16. "So it was especially interesting and fun to meet Professor and Mrs. Kim; and they graciously hosted us at their home."



It was another banner day in the Taejeon market, which was visited by Reza Maleki on May 17, 2000. He was one of nine from the SDSU campus that toured South Korea May 14-27.

Welcome to campus

Coming from backgrounds as diversified as the College they now serve, eight new faculty members began teaching at SDSU last semester.



Alvin Bahr

Alvin "Marvin" Bahr

As an instructor of mathematics, Alvin "Marvin" Bahr is eager to take in the college atmosphere. "I love teaching, and am very excited to be educating college students about mathematics," he says. Before joining the SDSU faculty in August, Bahr taught high school mathematics for two years in Roslyn. He was a teacher's assistant at SDSU for two years while completing his bachelor's degree (1996) and master's degree (summer 2000), completing all coursework in mathematics. A native of Turton and a graduate of Doland High School, Bahr resides in Brookings.



Deborah Leiferman

Deborah Leiferman

A native of Aberdeen, Deb Leiferman hopes that as an instructor of mathematics, she can help her students understand the subject clearly enough to take advantage of future opportunities that math provides.

"Math is a part of almost every field, and it's important that our students understand the subject," she says.

After earning a bachelor's degree in elementary education from Northern State College in 1980, Leiferman attended SDSU to earn a bachelor's degree in

mathematics (1984), as well as coaching certification in track and volleyball, and a master's degree in mathematics (1989). While she attended SDSU, Leiferman worked as a teaching assistant. She taught elementary math and



Frank Li

reading for summer students in the Brookings Public School System from 1988 to 1989, and adult education from 1987 to 1993. Since then she has worked as a substitute teacher and private tutor for math and computer science.

She was actively involved in the Medary Elementary Parent-Teacher Association, taught religious education for three years, and is currently a Boy Scout instructor. She is also a member of the Phi Kappa Phi Honor Society and the Pi Mu Epsilon Mathematics Honor Society. Leiferman lives in Brookings with Pete, her husband of sixteen years, and their two children: David, 11, and Amy, 7.

Frank Li

Frank Li joined the SDSU faculty in August as an assistant professor of statistics. He hopes to effectively teach the subject to his students while adjusting to the Brookings community. "It's going to be exciting to finally apply my education in statistics," he says.

A native of China, Li earned a bachelor's degree in mathematics from Nanjing Normal University in the Jiangsu Province in 1983, and a master's degree in mathematics from Jilin University in the Jilin Province in 1988. He came to the United States in 1996 to pursue a master's degree (1999) and doctorate (summer 2000) in statistics from the University of Memphis, Tennessee. Li and Leping Rui, his wife of fifteen years, have a 14-year-old daughter, Jieni. She is a ninth-grader at Brookings High School.

Todd Trooien

As a natural resources engineering in the Agricultural and Biosystems Engineering Department, Todd Trooien hopes to provide quality education for engineering and agricultural systems technology students.

"Teaching at SDSU is a great way to contribute to the advancement of science and engineering for natural resources in South Dakota," he says. "I'm happy to be back."

A native of Atwater, Minnesota, Trooien graduated from SDSU with a bachelor's degree in 1983 and a master's in 1985, completing all coursework in agricultural engineering. After earning a doctorate from Colorado State University in 1988, he worked for eight years as an agricultural engineer at the United States Department of Agriculture Research Station in Mandan, North Dakota.

In 1996, Trooien accepted a job as an irrigation engineer at the Kansas State University Experiment Station in Garden City, Kansas, which he held until joining the SDSU faculty in August.

Trooien lives in Brookings with his wife, Mitzi, who studies microbiology at SDSU. The two have been married for thirteen years. Their daughter, 10-year-old Kjerstine, is a fourth-grader at Hillcrest Elementary.



Todd Trooien

David Mathews

SDSU's newest instructor of electronics technology knew in junior high school that he wanted to pursue a career in the industrial technology. However, David Mathews had no idea that he would spend twenty years teaching the subject before moving to South Dakota.

Upon graduating from high school, the Craig, Colorado, native joined the U.S. Air Force to study electronics from 1961 to 1968. He earned a bachelor's degree in industrial technology, with an emphasis in electronics and a minor in industrial management from Southwest Missouri State University in 1970 and then entered graduate school and began teaching.

Mathews earned sixty credits of graduate work in industrial, vocational, technical, adult, and secondary education before accepting a job as a supply instructor of basic electronics, semiconductor fundamentals, and industrial electricity night courses at State Fair Community College in Sedalia, Missouri. He has since served as:

- Developer and chairman of the Electronics Technology Department at Southwest Missouri State University in Springfield;
- Head of the Computer Electronics Technology Program at East Central Community College in Union, Missouri;
- Electronics instructor at BNS Technical Institute in Anaheim, California;
- Applications engineer at Monterey Park College located in California.

Prior to joining the SDSU faculty in August, he also taught at B&K Precision in Placentia, California. Mathews has received government training in NASA Soldering Techniques and specialized training in electronic communications, and is a member in good standing of the International Who's Who in Electronics Professionals.

While serving SDSU as an instructor of electronics technology, Mathews plans to pursue a doctorate in the subject. His wife of eleven years, Anita, works at the SDSU Foundation. He has three children from a previous marriage: Tommy, 18, Adam, 21, and Nina-Kay, 26.

Ivan Ostfeld

While serving as SDSU's newest associate professor of engineering technology and management, Ivan Ostfeld plans to complete his dissertation and receive a doctorate in atmospheric environmental and water resources.

The New York City area native is enthusiastic about his first teaching job, after retiring from twenty-three years as general manager of Grinnell Fire Protection. His area of specialty is hydraulics and piping network systems, and his resumé includes four years as a project engineer for Turner Construction Company in Los Angeles and one year as a stress analysis engineer at Rockwell International. "I've

been in the industry for a long time, and I'm anxious to share with students what I've learned in the profession," he says. Ostfeld is a licensed professional engineer in seven states in various disciplines, including civil and mechanical engineering and fire protection.

He earned a bachelor's degree in aerospace engineering from New York University in 1971, and a master's degree in civil engineering from the University of Southern California in Los Angeles in 1974. He also completed a master's degree in business administration from Southern Methodist University in Dallas, Texas, in 1990.

Ostfeld's 27-year-old daughter, Jennifer Medley, is a physical therapist residing in Medford, Oregon. His son, 25-year-old Eric, is a graduate engineer who works for a private firm in Olympia, Washington.



David Mathews

Susan Taecker

A native of Mankota, Minnesota, Susan Taecker will teach computer science at SDSU while pursuing a master's degree in the subject.

After earning a bachelor's degree in computer science from SDSU in 1996, Taecker spent the next three years teaching business computer applications at Watertown's Lake Area Multi District. Before joining the SDSU faculty in August, she worked as a software engineer at Great Plains Software in Watertown. Taecker commutes every day from Watertown, where she lives with her three children: Ben, 19, David, 16, and Sara, 9.



Ivan Ostfeld

Peter Claussen

Howard native Peter Claussen is teaching Computer Science while completing a doctorate in biology at SDSU. He has three years of senior programming experience in the industry, and also is a judo instructor.



Susan Taecker

Familiar faces tabbed as department heads

Van Kelley, Lewis Brown, and Vernon Schaefer—all well-known names in the College—gained new or additional titles before the start of fall semester.

Van Kelley

Kelley was named head of the Department of Agricultural and Biosystems Engineering (ABE) and director of the Water Resources Institute on August 1.



Van Kelley

Kelley, a professor and researcher at SDSU for more than twenty-two years, had served as acting ABE department head since Darrell DeBoer retired April 1. As head of the ABE Department, Kelley will coordinate classroom teaching, research, and outreach components to ensure that agricultural and biosystems engineering students learn how to design, manage, and develop systems and equipment that produce, package, process, and distribute the world's food and fiber supplies.

As director of the Water Resources Institute, Kelley will coordinate research and training in water resources at SDSU and other affiliated educational institutions and agencies across the state. He will also supervise the Water Quality Laboratory and the Water Pesticide Laboratory, which provide analytical services to determine organic and inorganic constituents in water.

Kelley would like to see enrollment increase in the department's two majors: agricultural systems technology and agricultural and biosystems engineering. He would also like to increase the number of internships offered to agricultural and biosystems engineering students during the summer. Kelley is excited to work with faculty and staff in the ABE Department, whom he said have

many good ideas about the growth and future direction of the department. "I am looking forward to working with them as we shape the future of the department in the 21st Century," he said.

Vernon Schaefer

Schaefer is the new head of the Department of Civil and Environmental Engineering. He will remain director of the Northern Great Plains Water Resources Research Center at SDSU, a position he has held since 1994. He has also served as a professor of civil and environmental engineering since 1996.

As head of the Department of Civil and Environmental Engineering, Schaefer will provide leadership to the department and oversee department activities. He will also prepare the department for re-accreditation in 2004 by the Accreditation Board for Engineering and Technology.

As director of the Northern Great Plains Water Resources Research Center, Schaefer oversees the center's mission to safeguard the state's present water supply, develop existing sources, and minimize conflicts among competing concerns. He interacts with government agencies to catalyze research and leads a network of researchers and resource-persons in conducting comprehensive projects to benefit the residents of South Dakota. The projects require expertise in many disciplines, including biology, chemistry, engineering, economics, geochemistry, hydrology, and soil science.

Lewis Brown

Brown is now acting head of the Computer Science Department. He will continue to serve as head of the Electrical Engineering Department, a title he has held since 1993. As acting head, Brown plans to maintain and expand the strong, high-quality computer science program that Dr. Gerald Bergum led until his retirement last summer.

"Computers and computer technology are becoming very important in all fields, so we want to ensure that students in all the engineering disciplines have a strong computer knowledge," Brown said. He also hopes to establish more links between the Computer Science Department and local and regional companies that frequently employ SDSU engineering and computer science graduates.

Born to a military family in Arlington, Virginia, Brown traveled extensively during his youth. He spent four years in the U.S. Air Force as a precision measuring electronics technician, and then earned a bachelor's degree in electrical engineering from SDSU in 1984. He went on to earn a master's degree (1986) in electrical engineering and a doctorate (1988) in electrical engineering and biomedical engineering from Iowa State University.



Vernon Schaefer



Lewis Brown

Summer job sparks

Robert Finch's second career

At an age when most people retire, Robert Finch is starting a new career. After more than twenty-six years of teaching at SDSU, the 65-year-old professor of electrical engineering now heads to IBM in Rochester, Minnesota, with the excitement of a college graduate.

"IBM is one of the world's leaders in developing technology, and I'm excited to become a part of that," Finch says eagerly. "It's a great opportunity to be involved in that development." At IBM, Finch will conduct system analyses for high-data rate transmissions. The position is not new to Finch, who has spent thirteen summers working for IBM.

"My contract with SDSU was only for nine months, so I had to find something else to fill my time during the summers," he explains. "I was fortunate that my summer job turned into a full-time career opportunity." Born in Tennessee and raised in western Kentucky, Finch received his bachelor's and master's degrees in electrical engineering from Michigan State University in 1958 and 1960, respectively. He spent the following year designing radio receivers for Bendix Systems Division in Ann Arbor, Michigan, and the next six years designing and testing radio receivers for the radio astronomy lab at the University of Michigan's NASA Program. In 1974, Finch earned a doctorate from Purdue University, and has since taught electrical engineering at SDSU.

"Teaching was what I always wanted to do," he says, glancing around the office he's had for the past twenty-six years. "I love helping the students learn and seeing the excitement on their faces when they receive their first job offer. I will miss the students the most."

Finch looks forward to maintaining contact with SDSU students who snag internships or full-time jobs at IBM. One summer, he shared an office with an SDSU graduate who secured his first job with the company. "It's very satisfying to see our students landing jobs with such a prestigious company," he says proudly.

As an educator, Finch believes it is important to interact with students both in and out of the classroom. He served one year as

chair and six years as a member of the Academic Senate and enjoyed attending many of the cultural activities held on campus. He especially enjoyed getting to know his international students' cultural backgrounds and history.

The future continues to look bright for the College of Engineering, Finch believes. While it can be difficult, the Electrical Engineering Department must continue to advance with technology and meet the needs of the industry, he says. "It's a real challenge to stay abreast of technology, but that is what the department must do if its students are to graduate prepared to work in current technology," he explains.

"As educators, we need to enable our students to continue learning. One of the first things they'll learn on the job is that they will have to do a lot of learning on their own to keep up with the changes. We can't teach them everything they have to know, but we can give them the tools necessary to continue learning."

In his spare time, Finch enjoys running with friends, faculty, and family members. In October, he ran the Marine Corps Marathon in Washington, D.C., with his daughter and son-in-law for the third consecutive year. Finch's wife of forty-one years, Jessie, will accompany him to Rochester. The couple has three grown children: William, 40; Elizabeth, 39; and Brian, 29.



Robert Finch is joined by, from left, his wife, Jessie; Electrical Engineering secretary Margaret Lengkeek, and friend Jone Anderson at his farewell in December. Retirement took the Finches to Rochester, Minnesota, where he is working with IBM.

EerNisse

among SDSU's finest

South Dakota State has certainly had its share of outstanding benefactors who have offered their expertise with faculty, students, and the general public through the years. It's likely that very few have had the worldwide impact that Dr. Errol P. EerNisse has had. Like a five-star general, the 1962 electrical engineering graduate is a leader in his field and one of the most respected scientists around.

This year, EerNisse was selected as a 2000 Distinguished Lecturer by the Institute of Electrical and Electronics Engineers (IEEE). With more than 300,000 members in thirty-eight different technical societies, IEEE is the largest professional society in the world. EerNisse also is a Fellow in IEEE—the highest honor that IEEE can bestow on one of its scientists.

"It's quite an honor for Dr. EerNisse and for SDSU to be selected as a Distinguished Lecturer," say Lewis Brown, associated professor and head of electrical engineering. "He has definitely made a mark for South Dakotans. He is one of the most faithful givers to our program and is highly involved on our advisory council for the College. He loves SDSU with a passion and he loves teaching students with a passion."

EerNisse volunteers his time as a member of the SDSU Foundation Board. He donates money for a variety of causes because, in his words, "SDSU was important for my transition to adulthood, and because the teaching and social values that impacted me back then still exist at SDSU today." EerNisse is a top authority on quartz devices and frequency control. He has developed methods for cutting, shaping, and polishing cuts of quartz crystals that can be used in specialized electronic applications.

In 1979, EerNisse helped found Quartex, Quartztronics, and Quartzdyne in Salt Lake City, Utah. The three corporations work on research and development of quartz resonators as sensors to measure force, acceleration, pressure, and temperature. He is president of Quartex and Quartztronics, and vice president of research and development for Quartzdyne. EerNisse holds twenty-one U.S. patents and numerous foreign counterparts, and is an author or co-author of more than 100 journal publications and a book.

EerNisse, who received his master's degree (1963) and doctorate (1965) from Purdue University, was on the SDSU campus in October 2000 as part of his distinguished lecture series. He has been traveling throughout the world giving his noteworthy talk on quartz crystals and devices. It's an opportunity for EerNisse to share his knowledge view what others have to offer.

"The distinguished lecturer appointment allows me to travel in the U.S. and foreign countries to meet technical staff and see different facilities," he says. "I like to learn by

meeting and seeing people as well as sampling of local culture in the foreign countries. These lectures are one way I can repay the professional society that has accepted my scientific work and given me recognition." EerNisse's dedication and loyalty to the IEEE doesn't come as a surprise. It's a character trait that can be traced back to his alma mater. His appearance in October wasn't a one-act play. He has never forgotten where it all started and constantly keeps in touch with the institution that launched his career.

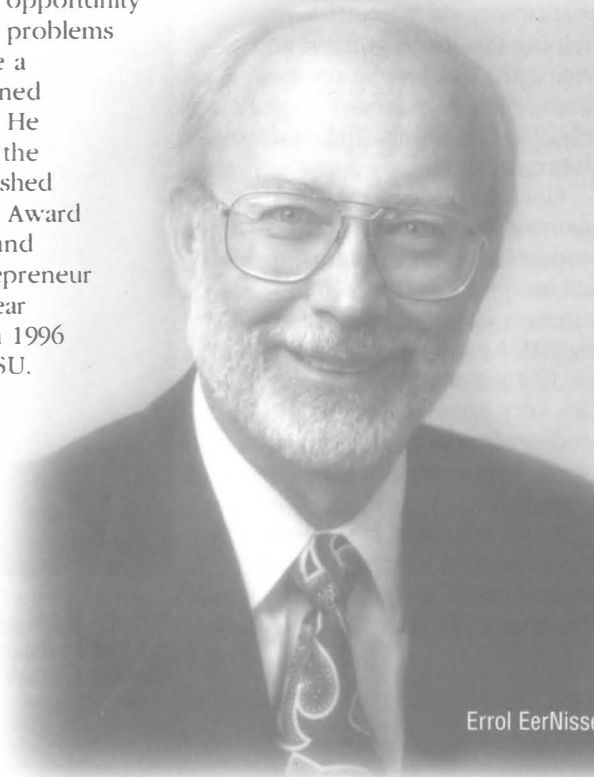
"I feel good about the quality of education I received," says EerNisse. "The level of classes I had at SDSU put me in a position to pass the qualifying exams at Purdue while competing with students from MIT (Massachusetts Institute of Technology) and other noted schools. The success that current graduates in engineering have in finding jobs speaks well for the SDSU programs."

A native of Rapid City, EerNisse has always been interested in problem solving and the feeling of success that comes when a project is finished. "It's always possible to find challenging problems," says EerNisse, who notes that his first experience with quartz crystals came in 1953 as a teenager working with a ham radio.

"An individual who maintains versatility and flexibility in handling both the type of project and the science behind it is a valuable employee or entrepreneur.

Science and engineering offer the opportunity to tackle problems

that have a well-defined closure." He received the Distinguished Engineer Award in 1985 and the Entrepreneur of the Year Award in 1996 from SDSU.



Errol EerNisse

Making a lasting impact

Thanks to the generosity of a California man, SDSU students may soon have new opportunities to pursue careers in electrical engineering in South Dakota.

Through a series of stock gifts that he started in 1994, Harold C. Hohbach ('44, electrical engineering) has funded the Harold C. Hohbach Chair in Electrical Engineering.

Chairs are valuable tools to expand learning opportunities both on and off campus. By bringing nationally recognized scholars to campus, endowed chair positions allow for professional development opportunities for students, faculty, and industry. Chairs also enhance economic development efforts and foster additional cooperative relationships with other institutions.

"What is really exciting about this chair is the entrepreneurial aspect of it," explains David Marquardt, executive director of the SDSU Foundation. "The person selected as the chair may or may not have an academic background; so, in theory, we could have someone like Bill Gates. "We are seeking an entrepreneurial person who can enhance our ties with businesses and can foster entrepreneurial activity among our faculty and students," he adds.

With the funding in place, University officials are now mapping out the procedures to select an individual to fill the chair. A search committee will be formed this spring. President Peggy Gordon Elliott commended Hohbach and his wife, Marilyn, for their efforts during a Foundation meeting in the fall. "The entire University, today and tomorrow, is substantially in the debt of the Hohbachs," Elliott said. "The Harold C. Hohbach Chair will allow the University to attract someone who is at the cutting edge in the profession. With the strong faculty already in the department, this additional intellectual energy can only bring exciting results."

Lewis Brown, professor and head of the Department of Electrical Engineering, says the Harold C. Hohbach Chair is a dream come true for the selected chair, the College of Engineering, and SDSU. "One of the most important parts of being a land-grant institution is conducting professional outreach to local and regional businesses," he explains. "By having an endowed chair, we will be able to develop and strengthen ties with local and regional high-tech industries. That will benefit the students as well as the University."

The person selected for the chair will need to demonstrate leadership qualities and experience in developing and enhancing industrial partnerships and economic development. He or she must also possess a national or international reputation and extensive experience in teaching, research, or outreach as embodied by the land-grant philosophy of SDSU.

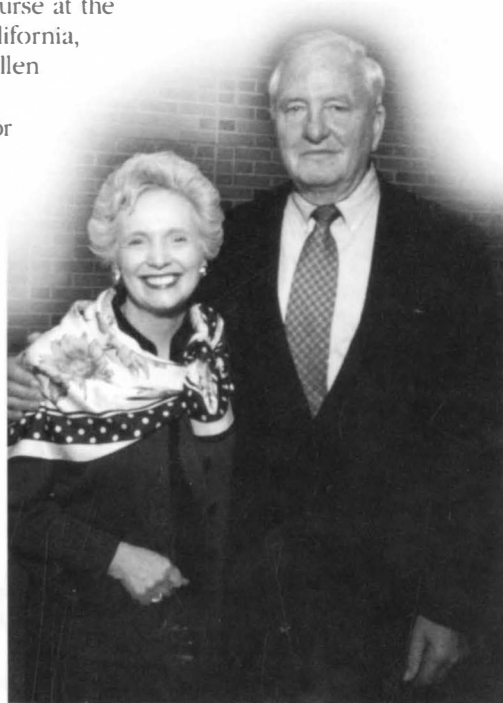
The gift also provides funds for undergraduate scholarships, graduate student stipends, equipment purchases, travel, and other activities related to the support and pursuit of the chair's responsibilities. Hohbach, a Plankinton native, hopes the new

position will benefit SDSU and the state of South Dakota in many ways. "In addition to great training for students, the teaching and research position should help attract quality teachers to SDSU and it should also help people start businesses here in South Dakota," Hohbach says. "I received a great education from SDSU, and this is my way of giving back." Hohbach is an attorney and partner in Flehr, Hohbach, Test, Albritton & Herbert, a San Francisco and Palo Alto, California, firm specializing in intellectual property law with more than thirty lawyers.

Hohbach has more than thirty-five years experience in the preparation and processing of patent applications for technology-related products, in particular semiconductors and medical devices.

After graduating from SDSU in December 1943, Hohbach served almost three years in the Army Signal Corps and was discharged in 1946. He then earned a bachelor's degree in business administration from the University of California, Berkeley, in 1947. He entered law school at UC-Berkeley in 1949 and received his law degree in 1952. After graduation, he began his first job as a patent lawyer with Flehr and Swain law firm in San Francisco.

The Hohbachs had four children. Douglas, of Palo Alto, is a principal in the structural engineering firm Hohbach-Lewin, Inc. Janet McCloy, of San Francisco, is a nurse at the University of California, San Francisco. Ellen Scheetz, of San Carlos, is director of the Teen Women Entrepreneur program of the Palo Alto YWCA. A daughter, Ann Williams is deceased. The Hohbachs also have eight grandchildren.



SDSU President Peggy Gordon Elliott and donor Harold Hohbach.

From tinkering tot to mechanical engineer

A boyhood interest in tinkering spawned a career that took an SDSU alum from one keystone project to another. While growing up on a Kimball farm, Arthur J. Helma "was pretty mechanically minded." He says it was just natural, given his father's penchant for making and working with tools in the single-car garage on their farmstead.

Helma, who turns 83 in April, used that mechanical mind to help him through college ('51, mechanical engineering), the U.S. Navy, and a career that had him working on projects of national significance, including space exploration.

Machinist mate discovers more power

Before owing his allegiance to the Yellow and Blue, Helma owed his allegiance to Uncle Sam. Helma was working in Berea, Ohio, when he joined the Navy during World War II and became a machinist in the aviation branch. Among his assignments was to test 1,850-horsepower, Pratt and Whitney aircraft engines being manufactured at a Ford Motor Company factory in Detroit, Michigan.

He was one of three naval enlistees testing the huge, eighteen-cylinder engines in a small concrete building within the factory. While the noise would "really rattle your ears and your nerves," it also was rather routine, says the Denver resident, who has worn hearing aids for years.

But one day an engine tested produced 2,000 horsepower. After re-testing confirmed the same output, the confounded inspectors told their superiors, who shut down production for the day. The Ford, and Pratt and Whitney officials also couldn't explain the higher engine power.

Later it was found that two extra vent holes had been inadvertently drilled in the three-quarters-inch thick

aluminum diaphragm that served as the engine housing.

That "fluke" on the assembly line and the discovery of the improved power lead to the entire plant inventory being redrilled, Helma remembers.

After the Allies won in Europe and Japan, Helma joined thousand of other servicemen who traded their dog tags for student ID cards. Helma earned his mechanical engineering degree and took a job with a road construction outfit in Burlington, Iowa.

Plant's purpose different than publicized

But it wasn't long before he was living in Aurora, Colorado, where he was working on the design of an "oil incineration plant." That plant was actually Rocky Mountain Arsenal, a nerve gas manufacturing facility on the northeast edge of Denver.

To prevent negative community reaction, the true purpose of the plant was initially kept secret, Helma says. The plant's actual mission was revealed shortly after he began work. It wasn't a shock for Helma. "The stuff they had didn't mix with oil, to put it bluntly."

However, "I had no qualms about working there," he says, noting that there was no nerve gas there during the construction phase and no leaks were reported after production began.

Efforts help man reach moon

Helma's next job landed him at Martin Marietta, a Denver firm that held major contracts during America's early years of the space program.

The mechanical engineer was put to work designing various buildings as well as launching pads. He had to determine tank capacity, pump sizes, and pipeline dimensions for oxygen and liquid fuels.

The launches were later viewed on films produced for Martin Marietta. "Of particular interest to me was the tremendous thrust and awesome power

of the engines. To witness eight-inch thick by ten-foot square slabs of concrete strewn about as if they were sheets of paper gives one respect," Helma recalls.

His other engineering jobs included a stint with a firm that developed working models of an airplane with flapping wings, several years with Great Western Sugar Company, and ten years with Stearns and Rogers figuring air conditioning designs.

Significance found in labor

"At the time, it was just a job, and when we did it, we went on to some other operation," the square-shouldered, smooth-topped Helma recalls of the work that helped turn America from an agricultural country to an industrial superpower and space exploration leader.

But the "nuts and bolts" work of Helma and others of his time left their mark in a very interesting and rewarding era, from fighting and winning World War II to landing on the moon. For Helma, it is all rooted in a small Kimball garage where he watched his father "make something out of something else that no one else had made."



Arthur Helma

Alums author sections of handbook

Three graduates of the College are among about 100 internationally recognized individuals that contributed to a massive volume printed last year.

Loren B. Wagenaar '65, John G. Kappenman, '76, and Charles W. Richter, '92, all wrote parts of *The Electric Power Engineering Handbook* by CRC Press and IEEE Press.

Wagenaar, of Pickerington, Ohio, principal engineer with America Electric Power, Columbus, Ohio, wrote a thirteen-page article on electrical bushings in the transformer chapter.

Kappenman, a manager of the applied power solutions divisions with Metatech Corporation, Duluth, Minnesota, wrote "Geomagnetic

Disturbances and Impacts on Power System Operations" in the transmission section. Richter, a power market engineer with ALSTOM ESCA Corporation, Bellevue, Washington, wrote "Generation Control: Economic Dispatch and Unit Commitment" in the power system operation and control chapter.

New electrical engineering scholarship established

A scholarship has been created in the Department of Electrical Engineering to honor a graduate who was many things to many people.

The James Thomas Novotny Memorial Endowed Scholarship in Electrical Engineering goes to a junior or senior who is majoring in electrical engineering, is a graduate of a South Dakota high school, and has participated in university and Electrical Engineering Department activities.

The recipient of the scholarship is selected by the Department of Electrical Engineering Scholarship Committee. The endowment was provided by James Novotny's parents,



James Novotny

Thomas and Marilyn Novotny of Sioux Falls.

James Novotny was a 1992 graduate of Brandon Valley High School and he earned a degree in electrical engineering from South Dakota State in May 1998. In August of 1998 he was diagnosed with cancer and died November 25, 1999.

"James was a very bright young man who really went out of his way to get involved in campus ministries and outreach activities," says Lewis Brown, professor and head of electrical engineering. "He helped a lot of people, including myself, and was just a very selfless student."

Novotny took a job selling electrical components at Comstrand in Fridley, Minnesota after graduation. He belonged to St. William's Catholic Church in Fridley.

In college he was involved in many areas. He worked for SDSU Computing Services, and served an

internship at Daktronics Industries in Brookings.

Novotny was a member of the Institute of Electrical and Electronics Engineers, the Statesmen choir, and played saxophone in the Pride of the Dakotas Marching Band. He was a resident assistant and was a hall government president. Novotny also worked as a disc jockey on the SDSU campus radio station, and played a leading role in establishing a chapter of the Sigma Phi Epsilon fraternity.

Along with his parents, Novotny is survived by two sisters, Kristan of Miami, Florida, and Rita Tyra, of O'Fallon, Illinois, and his grandmother, Mary Brand, of Duluth, Minnesota.

Those wishing to contribute to the memorial endowment fund may send their gifts to the James T. Novotny Memorial Scholarship Fund, SDSU Foundation, Brookings, SD, 57007.

Alumni notes

Mark Boes recently was promoted to managing director of aircraft engineering for American Airlines. Boes, of Owasso, Oklahoma, is a 1986 mechanical engineering graduate.

Jerry Buri is enjoying some rest and relaxation after retiring from a thirty-four-year career with Texaco. Buri, of Spring, Texas, is a 1965 civil engineering graduate.

Jerry Gaspar, electrical engineering '67, has been appointed vice president of engineering and technology at Rockwell Collins Inc., Cedar Rapids, Iowa. Previously he has held positions in strategic planning, program management, marketing, and engineering management. Gaspar and his wife, Olympia, of Marion, Iowa, have two grown children.

EE grads **Srikishen Bahudhanam** and his wife, **Viji**, of San Jose, California, had their first baby, a girl, Tanvi Bahudhanam. The couple hails from different southern cities in India and met each other at SDSU in 1993 while pursuing their master degrees. They were married in 1995. Srikishen '94 works for Cisco Systems. Viji works for Intel Corp.



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8,500 copies of this publication were printed with financial support of alumni and friends.

**The Coughlin Campanile
is getting a face lift!
See brief on inside
back cover.**

College of Engineering 2001 Events

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|-----------------|--------------|---|
| February | 16-22 | National Engineer's Week |
| | 23-24 | Briggs 2001 Weekend |
| March | 29-30 | College of Engineering Advisory Council Meeting |
| | 30 | Distinguished Engineers Banquet, Elks Lodge |
| April | 02-03 | Sioux Empire Quality Symposium,
Ramkota Inn, Sioux Falls |
| | 21 | Fundamentals of Engineering (EIT) and Fundamentals
of Land Surveying (LSIT) exams, ASC 126 & 127 |
| | 27 | Engineering Expo/Physics Bowl |
| May | 03 | RETIREMENT PARTY honoring Dean Virgil Ellerbruch,
2:30 - 4:30 p.m., USU Walder Room |
| | 04 | Space Day, Rushmore Plaza Civil Center, Rapid City |
| | 05 | Commencement/Order of the Engineer |
| October | 13 | Hobo Day |
| | 18 | Engineering Job Fair |

