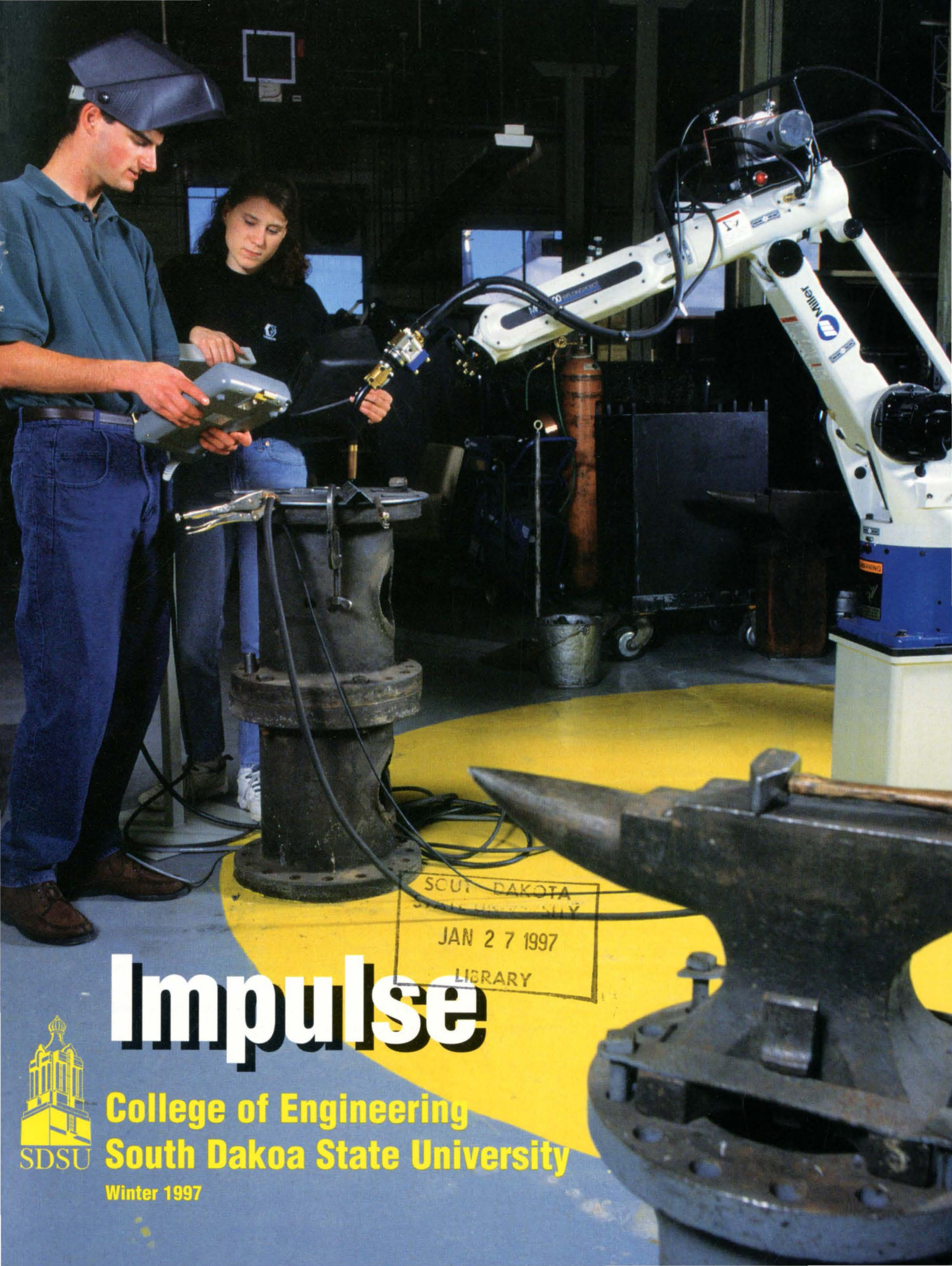
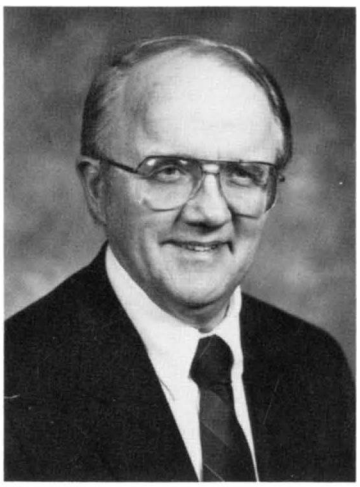


Impulse

SDSU

College of Engineering
South Dakoa State University

Winter 1997



Dear *Alumni:*

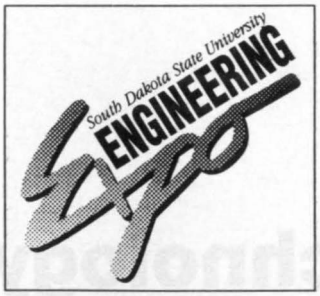
A major part of the vision we have for our College of Engineering is to enhance and support cooperative college and industry relationships that address the manufacturing, employment, training, and technical needs of industry on local, state, and regional levels. This interaction will provide information we need to develop a current and relevant curriculum for our engineers, scientists, and technologists. This Impulse describes some of the many ways we can interact: internships, tours, guest lectures, class or research projects, and seminars.

In response to the needs of industry, SDSU President Wagner has designated a Center of Excellence in Technology and Engineering within the College of Engineering. Funds have now been redirected to enhance and support the Construction Management and Manufacturing Engineering Technology programs to provide nationally recognized training in these areas. In addition, through interdepartmental efforts, we are enhancing the parallel engineering programs of Civil and Mechanical Engineering by sharing the state-of-the-art laboratory equipment which is jointly needed. Through the student interactions between these programs, the engineers and technologists learn to appreciate each other's roles in design and implementation of a product or idea. Both of these programs and our long-standing Electronic Engineering Technology program train graduates who are providing a critical workforce needed in our region.

Our space needs study is completed and we are developing a plan for an addition to Crothers Engineering Hall. We will be accommodating the most critical space needs of Civil Engineering, Mechanical Engineering and Electrical Engineering. As we visit with you, the alumni, we are truly encouraged and heartened by the tremendous interest and support you continue to provide. Many are providing funds to assist in the building program as well as supporting equipment and scholarship needs. With your help, we will continue to provide high quality, outstanding programs in our College.

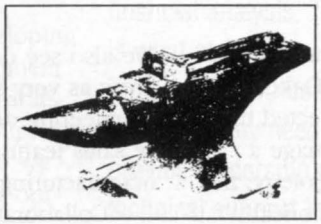
We do appreciate your interest and suggestions always.

Duane Sander, P.E., Ph.D.
Dean of Engineering



Engineering Expo, formerly known as Engineering Exploration Days, is set for April 18 and 19 at Frost Arena on the SDSU campus.

Harry Svec, after forty-two years of dedication to the College of Engineering, continues to invent, design and create during his retirement.



The fine line between sharp and blurry photos of earth has challenged SDSU professors to develop instrumentation that will give scientists a clearer picture.

■ About the Cover

Mechanical engineering seniors Dan Carey and Diane Schulte work with computer control panels of the new state-of-art welding robot. This high tech piece of equipment, which arrived this past summer, will create six work stations for welding class students. Students at the various stations will be able to program a sequence of welding operations with the robot, which can move from station to station up to a speed of 70 mph. In the foreground is a blacksmithing anvil, which students use when they learn the rudiments of welding.

■ Impulse

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Impulse

College of Engineering
South Dakota State University

■ Features

■ Faculty

■ Students

■ Contributors

■ Alumni

Engineering designated
Center of Excellence in Technology

When Robert T. Wagner, president of South Dakota State University, selected the College of Engineering to manage a Center of Excellence in Technology, he recognized one of SDSU's historical strengths and encouraged the College to continue excelling in technology education.

Duane Sander, professor and dean of the College of Engineering, said a major reason for the designation was the three technology degrees SDSU offers: electronics engineering technology, construction management, and manufacturing engineering technology. Each of the programs meets a specific need identified by related state and regional industries and would not exist without their support, Sander said.

"We have had excellent support and encouragement for the construction management program from the Association of General Contractors state and national organizations," he said. "Our manufacturing engineering technology program was just approved, and we were authorized to begin in the fall of 1997. For that program we have, again, excellent support from the manufacturing industries, and we have had great industrial support for years for the electronics engineering technology program."

Industry support for the programs is natural, Sander said, because the students will benefit industry when they graduate. "Our graduates from technical programs will have the background to develop high-technology manufacturing systems, and they will also have the skills for personnel management and financial analysis," he said. "This is what state and regional industries have indicated they need to provide leadership and technical support in their manufacturing and assembly operations. We also see our graduates in technical areas as very supportive members of engineering design teams and marketing or sales teams, as well as the manufacturing teams."

Collaboration between educators and professionals is nothing new for SDSU engineering, Sander said. "I think the College of Engineering has always emphasized a practically-oriented engineering program, and the technical programs are emphasizing hands-on, practical operating and management skills to support engineering designs from concept to production," he said.

"In addition, the College has always sought close interaction with state and regional industries in order to support economic development and thereby provide job opportunities for our engineers, scientists, and technologists. As we interact more with industry in designing and developing our programs, we can do a better job of training our people for the job market."

The College's ties to industry also benefit students while they are still in school, Sander said. "We will continue working very closely with industries to allow our students to take advantage of internship opportunities and industry tours, and we will be inviting industry managers, technologists and production people to campus to make presentations and share their expertise with our students," he said.

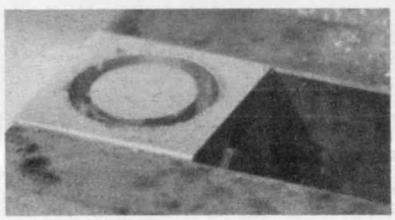
As a Center of Excellence, the technology mission of the College of Engineering will strive to expand its relationship with other educational institutions, Sander said. "We will continue working closely with the state's technical institutes, Southeast Technical Institute in Sioux Falls and Lake Area Technical Institute in Watertown, to assure their students of a seamless transfer of courses," he said.

■ "Our graduates from technical programs will have the background to develop high-technology manufacturing systems, and they will also have the skills for personnel management and financial analysis. This is what state and regional industries have indicated they need to provide leadership and technical support in their manufacturing and assembly operations."

"We will also be developing ways to utilize their equipment and facilities, when applicable, in order that we do not duplicate expensive equipment, and we will reciprocate in making our equipment available to them. That is another way we can work closely together to provide all our students with excellent educational opportunities."

The College of Engineering itself is organized to make the most efficient use of its resources, Sander said. For each of the three technical programs there is a parallel engineering program with similar interests and common equipment needs. Electrical engineering corresponds to electronics engineering technology, mechanical engineering to manufacturing engineering technology, and civil and environmental engineering to construction management.

Along with "excellent support" from the University administration, these connections between programs help continue the tradition of engineering excellence at SDSU, Sander said. "We are managing our laboratories to accommodate each of the similar need programs," he said. "As a Center of Excellence in Technology, we will continue to utilize our resources to assure that those programs are nationally recognized as quality programs."



Top photo, Dan Carey and Diane Schulte, senior mechanical engineering majors, receive instruction from Dennis Loban (center) on the operation of the 710IPM CNC (computer numerical control) Machining Center. A state-of-the-art piece of equipment, the 710 can move the cutting table up to 710 inches per minute when not in use. Although the simple physics involved in machining controls the speed of cutting metal, equipment such as the 710 allows industry to increase production speed between jobs.

Middle photo, Andrew Kubly and Diane Schulte, both senior mechanical engineering majors, set up the 710's flood coolant nozzle, which will project a cooling stream toward both the cutter and the metal being cut. The dispenser can be either manually set or programmed.

A student project in the machine tools application class: to design and machine free-floating letters in a metal cube.

entre

class acts as 'counterpart' to small business

When, after fourteen years of working for somebody else, Don Deibert decided to strike out on his own, he wanted to get involved in SDSU's ENTRE program. Unfortunately, he could not fit it into his schedule.

Now that his company, Counterpart, has been up and running for just over a year, Deibert has enrolled in the ENTRE business development course. The fact that he already has experience operating a small business does not mean he has nothing left to learn, he said.

"There are so many details of running a business that you might overlook," he said. "The class helps you keep on top of it all."

Deibert and Jeff Jacobson were both formerly employed in metal fabrication at Daktronics. The two incorporated their new company in December 1995. Along with one other full-time and one part-time employee, they soon had all the work they could handle.

One of Deibert's responsibilities as manufacturing manager at Daktronics was to find vendors to build products that the company could not manufacture efficiently. He and Jacobson, a certified welder, recognized the opportunity to fill a need and become their own bosses.

"Our business is designed to build parts for industrial companies," Deibert said. "With the amount of industry in eastern South Dakota, we're going to have plenty of work."

Although neither Deibert nor Jacobson had been through ENTRE when Counterpart opened its doors, Deibert had obtained a business plan format from the SDSU program. The format helped him organize Counterpart's plan, into which he now estimates he has put at least 100 hours.

"Writing a financial plan for a business is more complicated than people think it is," he said. "You can't walk into a bank with just an idea."

As a member of the ENTRE class, Deibert enjoyed networking with others in similar situations and learning more about financial paperwork and business regulations. He especially appreciated the information on marketing strategies.

"Marketing is a challenge because we're not selling a product, we're selling a service," Deibert said. "We really have to market our skills. That's probably been the end of it I've been most interested in."

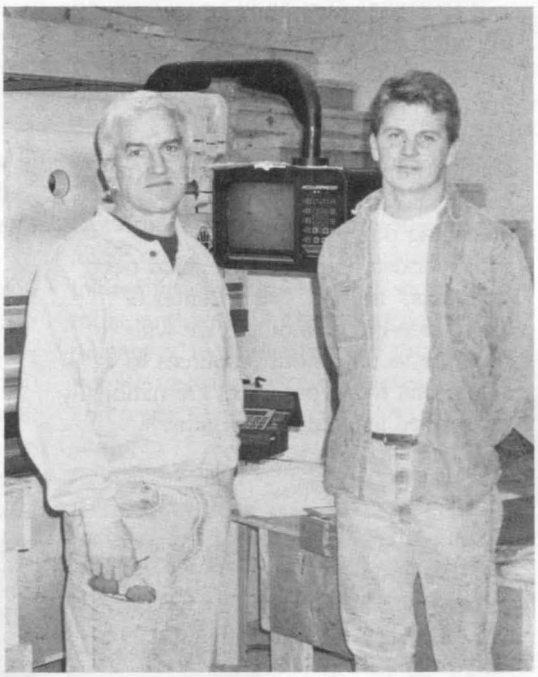
ENTRE is designed to serve those practical needs, said Kevin Dalsted, ENTRE administrator. Sponsored by the US West Foundation, the SDSU University/ Industry Technology Service and the South Dakota Marketing Alliance, ENTRE is in its third year of providing entrepreneurial training.

"It's basically a two-stage endeavor in which we try to assist two kinds of entrepreneurs: those starting new businesses and those already in business who want a refresher course," Dalsted said. "About 200 people have been through the program. Each year we've been growing about forty percent over the previous year."

Counterpart is growing, too, and the ENTRE course has helped Deibert plan for future expansions. "We hope to double in capacity and volume in 1997," he said.

The one thing ENTRE cannot teach may be flexibility. Entrepreneurs quickly learn that no two days are alike and nothing is predictable, Deibert said. "The thing you find when you start your own small business is that you are everyone from the janitor to the repairman to the manager to the guy who shovels snow," he said. "It's interesting, and it doesn't always go in the direction you think it will."

For information about ENTRE, call Kevin Dalsted at (605) 688-4184 or e-mail him at Dalsted@mg.sdstate.edu.

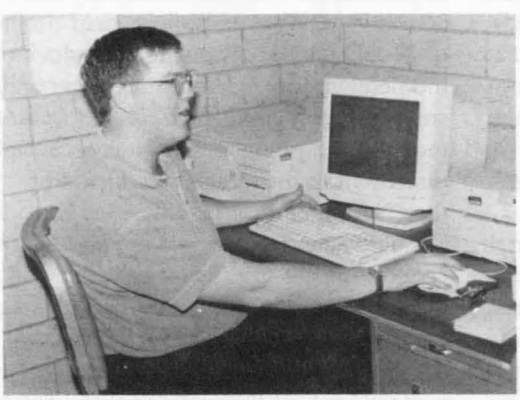


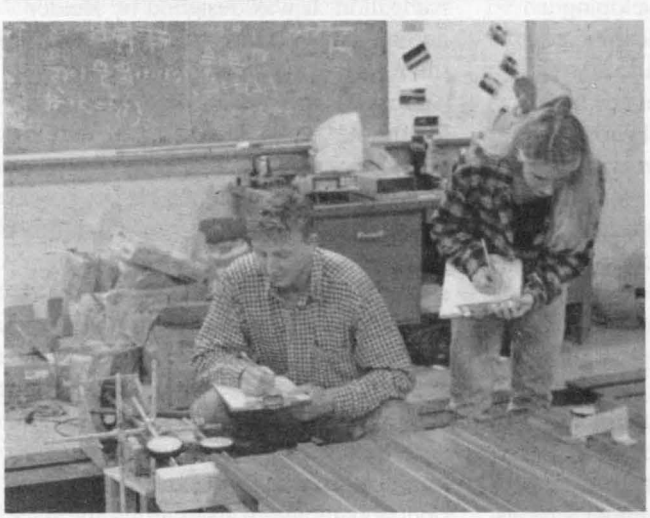
Don Deibert, left, and Jeff Jacobson are Counterpart's principal owners. The Brookings-based company is a vendor for Daktronics, Larson Manufacturing, and other area industries.

Farm building research

A special sector of the construction industry is benefiting from a unique research program within the Department of Agricultural Engineering.

Started in 1988, the farm and commercial buildings research program is geared toward the post frame industry. According to Van Kelley, assistant professor, the increased use of these buildings in urban areas prompted the beginning of the program. "Post frame buildings were developed thirty years ago and were used mostly in rural areas," he said. "It was well known that the metal sheeting made a large contribution to the strength and stiffness of the structure, but the actual amount was hard to quantify. Building code officials and building designers needed accurate numbers to approve or design economical buildings."





Top photo, Monte Mammenga, a junior civil engineering student, uses a computer program to graph the results from a load deflection test.
Bottom photo, Bill Garrett, left, and Sara Drake, seniors in Department of Civil Engineering, read dial deflection indicators following a test to determine buckling strength.

Kelley, along with Gary Anderson, associate professor and program director, enlist the help of students from agricultural engineering, and other engineering departments on campus, to complete their projects. "The students do all of the construction," said Anderson. "They also help with the testing and do all of the tear down." This year civil engineering majors, Sara Drake of Bellingham, Minnesota; Bill Garrett of Sturgis; and Monte Mammenga, a mechanical engineering major from Canistota, are assisting with the projects. "It really is great experience for them," Anderson said.

The group performs a number of different tests to determine the limits of the materials used in post frame buildings. Recent studies have included testing the strength of glued laminated posts; proving the advantages of diaphragm braced buildings; determining the optimum screw to use in metal through metal, and metal through wood construction; and truss plate testing. Both Anderson and Kelley feel this type of research is growing in importance as post frame buildings are being designed taller and wider than they were in the past.

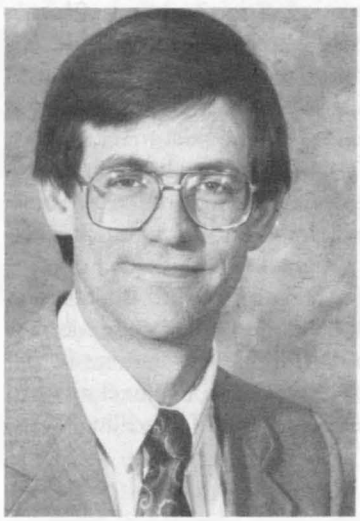
When the program first started, Anderson spent a good portion of his time recruiting companies that could benefit from the testing. Now the situation is reversed, as several companies within the post frame building industry approach Anderson and Kelley with research requests. Some of the companies that have benefited from the program include: Menard's of Eau Claire, Wisconsin; Wick Buildings, Inc. of Mazzamoney, Wisconsin; Metal Sales Manufacturing Corporation of Louisville, Kentucky; and Wheeling Corrugated Company of Wheeling, West Virginia.

Van Kelley

Gary Anderson

Experimental instrumentation

aims to create ideal earth imaging



Dennis Helder

The fine line between sharp and blurry photos of earth has challenged SDSU professors to develop instrumentation that will give scientists a clearer picture of our planet's surface.

As part of the National Science Foundation EPSCoR program at SDSU, four investigators in the environmental imaging cluster are conducting research aimed at developing a comprehensive understanding of how the atmosphere degrades images obtained by earth remote sensing satellites. Dr. Dennis Helder, associate professor of electrical engineering and director of the Engineering and Environmental Research Center; Dr. Stephen Schiller, associate professor of physics; Dr. Robert Schmidt, professor of mathematics and statistics; and Dr. Sung Shin, assistant professor of computer science, are developing a model to characterize atmospheric degradations. The team's model, commonly known as an atmospheric point spread function, will show how atmospheric scattering blurs remote sensing images.

"You may think you're observing a certain point on the earth, but actually you're observing light that is coming not only from that single point, but also from all points in the surrounding region," Helder said.

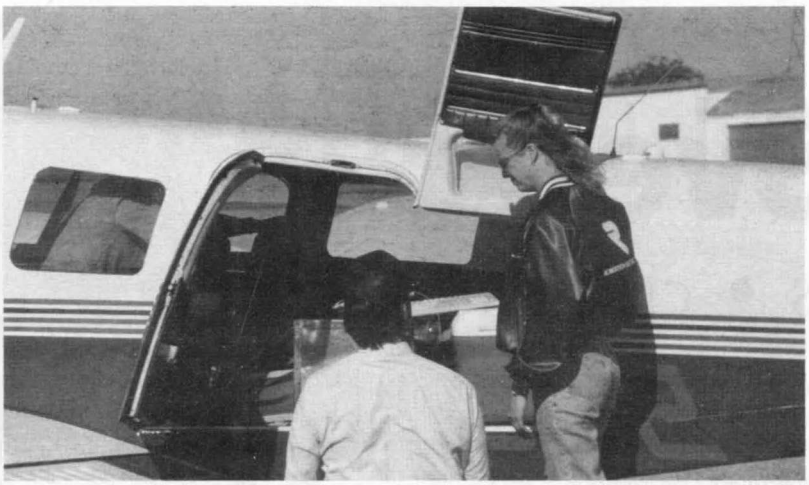
According to Helder, the team is first creating computer models that show what the atmospheric point spread function should look like under various atmospheric conditions.

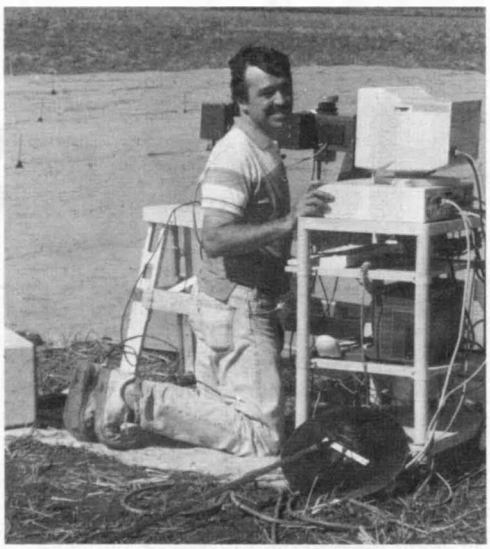
"The highlight of the project so far occurred last October when we undertook a field campaign to validate experimentally what the theoretical computer models were predicting," said Helder. "We measured the atmospheric point spread function in two ways: by an aircraft-based imaging system and by instrumentation placed on the ground."

The aircraft-borne imaging system, Spectra-View, was flown over a ground target: a large blue tarp stretched over a 30m x 30m area in a plowed field north of Brookings. By observing the values of the pixels in the image of the target and surrounding region, Helder could measure the point spread function directly from the imagery collected by the instrument.

The Spectra-View instrument collects images in the visible, near-infrared and medium-wave infrared regions and is integrated with a GPS (Global Positioning System) for precision navigation. It was designed by Helder and a team of senior design students at the request of a small company, Airborne Data Systems of Wabasso, Minnesota, when it was determined that equipment with the necessary capabilities was not available commercially.

Indirect measurement of the point spread function involves using a set of instruments positioned on the ground near and on the target. Operated by Schiller, the instruments measure various optical properties of the atmosphere, such as optical depth and scattering phase functions. By measuring the optical parameters and putting the data into a computer model Helder developed in his lab, he and Schiller can simulate what the point spread function should be.





"We're trying to use our theoretical model to predict reality, because in remote sensing activities you don't normally have the luxury of a perfect target, ground-based instrumentation, or aircraft imaging systems," Helder said.

Citing examples that ranged from the Brazilian rain forest to South Dakota corn fields, Helder said that generally information available from the imagery and target alone are not enough to determine the point spread function so that its effects can be removed from the image.

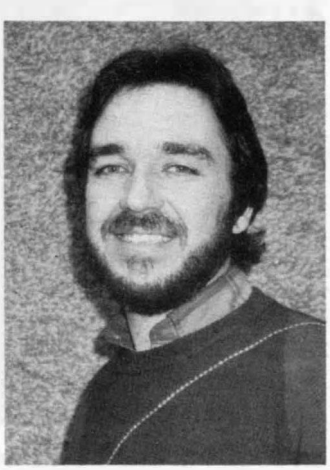
"One possible alternative is to include somewhere in the region where the image is collected, instrumentation on the ground measuring a few optical parameters of the atmosphere," he said. "Once we know what those parameters are, we can put them into our model and determine what the point spread function is. Then, we could correct the imagery.

"One of our goals is to get to the point where a standard weather report, and perhaps a simple instrument out in the field, can give us the information needed to remove point spread functions from the imagery."

Schiller said the ultimate goal is to remove the effects of the atmosphere on remotely sensed imagery, so that the images can be an accurate indication of what's happening on the surface of the earth. "Tracking global change through remote sensing would be ideal with the capability of removing distortion caused by the atmosphere or by the imaging system itself. However, it is impossible to place the necessary ground instruments to do this all around the world for global research."

The remote sensing community would like to see a technique developed to do this correction from information contained only in the image data. "Currently, the technology is not available. However, the results of this research program will bring us one step closer to achieving the ultimate goal," said Schiller.

"The unique ground instruments and aircraft instruments created by SDSU will help develop a niche area where SDSU will be nationally and internationally recognized as having expertise in radiometric calibration methods," Helder said. "The research also helps students learn practical skills that can contribute to the remote sensing community as well as society in general. We feel we have done some unique, useful work."



Stephen Schiller

Top left, Dennis Helder and Dawn Calar, an employee of Airborne Data Systems, get ready for the aircraft-based testing of their experimental instrumentation.

Top right, Stephen Schiller works with the on-ground instrumentation. Behind him is the 30m x 30m target for the airplane testing.

Middle, Schiller and Helder are at the testing site, a plowed field north of Brookings.

Harry Svec

invents • designs • creates

In the tidy workshop in the basement of his home, Harry Svec labors leisurely.

He took a well-deserved retirement fifteen years ago, after thirty-eight years of dedication to the College of Engineering at South Dakota State University. But Svec isn't used to sitting idle. Surrounded by lathes, presses, and grinders, Svec invents, designs, and creates. "I couldn't drop the work entirely," he said.

Svec's career centered around welding—working in the field and teaching the trade. He took it up at age fifteen, and he has used it ever since. He began by working at Huron Welding Shop in 1936. To perfect his skill and broaden his knowledge of the welding trade, Svec took classes in electric and oxyacetylene welding in Minneapolis. He taught for a semester at the University of South Dakota, before joining the faculty at SDSU in the fall of 1940.

Svec first taught classes in welding and blacksmithing for the National Defense Training Program, which prepared men for production work in shipyards. He also constructed laboratory equipment for different departments on campus.

The program ended in 1944, and Svec entered into a partnership, co-owning part of Commercial Weldery in Bruce until 1946. He returned to SDSU that year to teach classes for veterans returning to school on the G.I. Bill, as well as courses in forging and welding for the Aggie School. He was named Professor Emeritus of Engineering Shops upon his retirement in 1982. "It was a wonderful experience being associated with so many talented people through the years," Svec said.

During the summer months, when he wasn't teaching school, Svec did steam pipe welding for the SDSU physical plant and at the City of Brookings Power Plant. He also took additional training at Hobart Technical Institute in Troy, Ohio, for two summers.

Now at eighty, Svec continues to work. Though he no longer lives by a demanding work schedule, he still is demanding of himself, refusing to allow failing eyesight—which forced him to extinguish his welding torch for good, a few years ago—keep him down. "You reach a point in life where changes happen," Svec said. "You just have to learn to work with them."

From his workshop Svec produces rubber parts for obsolete equipment such as zone heating valves and portable water softener washers. In addition to designing and producing the pieces, he also creates the tooling necessary for the production. "Sometimes I just sit upstairs in my chair and dream," Svec said. "I get a good plan, and sometimes I make a drawing." Svec produces lots of about one hundred at a time. He then groups them by tens so they're ready when his customers—a hardware store and a wholesale plumbing company—call with orders. "I've always been impressed by his stick-to-itive-ness," said Harvey Svec, '68 & MEd'73, Harry's son. "Even in the work he does now, he sticks with it as best he can."

Top photo, Harry Svec pounds out a piece of steel on an anvil.

Bottom photo, Svec plays a violin he made himself.

Harvey and his brother, Roger '64, are instructors in the department their father left fifteen years ago. But neither felt pressure from him to go into the field. "He always encouraged us to do the best we could in whatever we chose to do," Roger said. But that isn't to say they weren't inspired by him. "He really enjoyed teaching," Harvey said. "He was patient and conscientious toward his students and helping them learn."

He helped his sons learn, too. "He's got the ability to visualize the solution to a problem," Roger said. "He always told us to have at least three solutions to every problem, so we'd always have two to throw away."

For his eightieth birthday, Svec's wife, Lillian, his sons and their families, and his daughter, Marilyn Goos, '77, and her family, held an open house in his honor at Tompkins Alumni Center. Although the party is past, the family wants to encourage former students and colleagues of Svec to send him their best wishes, along with an update of what they're doing now. "We'd also appreciate them sharing any stories or memories of Dad that they might have," Roger Svec said.

Sharing

For those interested in sharing best wishes or stories, please send them in care of Harry Svec, 1125 5th Street, Brookings, SD, 57006.

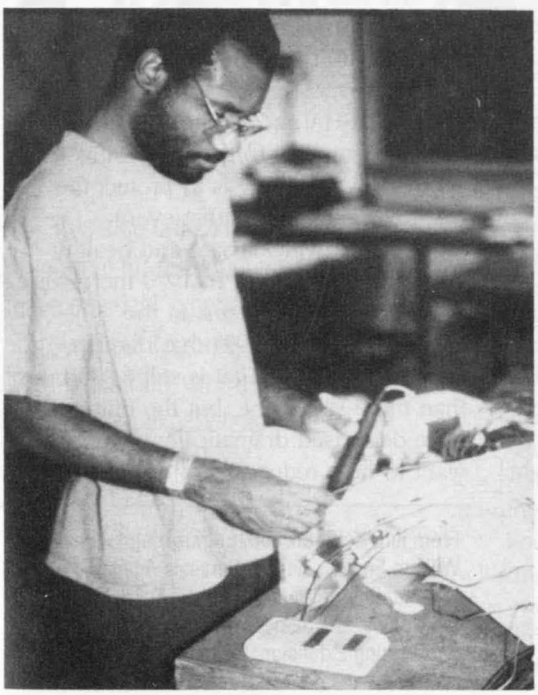
Ag Engineering

research improves meat safety

Warnings of *e. coli* outbreaks, originating from undercooked from meat, often surface in the news. Hoping to combat the dangerous bacteria, which can pose serious—sometimes fatal—health risks, researchers are working hard to discover safer ways of storing and preserving meat.

One way is through irradiation. Low doses of radiation of fresh ground beef have proven effective in reducing microorganism populations, which in turn reduces the risks of *e. coli.* A petition is currently on file with the United States Department of Agriculture (USDA) to approve this method of meat preparation.

Despite the reduction of micro-organisms, the irradiation also can induce lipid oxidation, or fat breakdown, which causes rancidity. Enter James Julson, Divine Njie, and Steve Moeller, researchers from SDSU's Department of Agricultural Engineering. The trio is studying the effectiveness of antioxidants in slowing down fat breakdown in irradiated ground beef.



Divine Njie, visiting professor from Cameroon

The process begins with adding antioxidants to the meat, then exposing it to the short wave electromagnetic radiation. Njie, a visiting post-doctoral instructor from the University of Dschang in Cameroon, West Africa, studied the heat and energy transfer during the irradiation. "We wanted to see what temperatures we would end up with, and how these temperatures might affect the enzyme action and overall quality of the meat," he said.

■ The trio is studying the effectiveness of antioxidants in slowing down fat breakdown in irradiated ground beef.

Moeller, a research associate, tested four synthetic antioxidants to analyze their effectiveness in reducing the lipid oxidation, and to record any changes they made to the meat's physical properties of odor, color, and texture. "If the physical properties are affected, the meat won't be consumer acceptable," said Moeller. So far he has discovered Propyl Gallate (PG) to be the most effective in reducing fat breakdown, in both irradiated and non-irradiated beef, by forty-one percent. The other three: Butylated hydoxyanisole (BHA), Tertiary butylhydoquinone (TBHQ), and S3, a combination of antioxidants, all reduced the oxidation by thirty-two percent. None of these antioxidants seriously changed the meat's physical properties.

Moeller stresses that the amount of antioxidants used is small. In a quarter pound hamburger, which is 114 grams, only .002 grams are used. Moeller also developed a method to distribute the small amount of antioxidants uniformly throughout the ground beef, which could be incorporated easily into a commercial operation.

In the future, the group hopes to evaluate consumer acceptance using a sensory panel. "With a sensory panel, the consumer can see, smell, and taste the product," said Julson, assistant professor and biomaterials engineer. "Their reactions may be much different than anything we can test in the lab. A sensory panel is really the final determination of consumer acceptability, since consumers are doing the evaluations and making the judgments." Future antioxidant studies also will involve natural antioxidants, such as those derived from sage and rosemary extracts.

According to Julson, the World Health Organization (WHO) is an advocate of irradiation as a safe way to preserve food, and states that it is neither detrimental to the nutritional value of the food, nor toxicologically hazardous to the consumer. "WHO approves irradiation up to ten kilogray. The current petition before the USDA requests approval for a maximum level of seven kilogray," Julson said. "One of the misconceptions of irradiated beef is that it will glow in the dark. But that isn't going to happen. The irradiation used is a high energy wave that ionizes and kills microorganisms. It does not make things radioactive."

Irradiation is already being applied to pork, poultry, fruits and vegetables, and is used in other countries for spices. Njie knows the process will have relevance someday in Cameroon. "It is something that can be applied there to increase the quality of the meat," he said.

The process does add ten cents per pound to the price of chicken and beef. According to Julson, the trade off is the added safety and shelf life. "By adding the antioxidants and using irradiation, we can greatly increase the safety and shelf life of meat," he said, "which makes this process very attractive, especially to people within the food service industry."

Engineering Extension

provides OSHA course

In an effort to extend its expertise in health and safety in the workplace, the Department of Engineering Extension offers a special course for industrial employers in South Dakota.

The Occupational Safety and Health Administration's (OSHA) Voluntary Compliance Safety and Health 10 Hour Course for General Industry helps companies organize their safety programs so that they can protect their employees from injuries and themselves from fines. Begun at SDSU in 1993, the course is part of a national OSHA outreach program to help employers to be in compliance. Nationally recognized as an effective general industry safety training course, it also helps answer questions and concerns about OSHA regulations and requirements.

"We did this so employers could be in compliance instead of being forced into it by OSHA fines," said James Ceglian, program director. "Our emphasis is on assisting employers in helping their employees to be safe in an inexpensive way."

In addition to Ceglian, course presenters include Keith Corbett, an industrial hygienist, and Jon Puetz, a safety consultant. A similar course, designed for the construction industry, is presented by safety consultant and engineer, James Manning. All of the presenters are trained and certified by the OSHA Institute. The group presents at least ten OSHA seminars each year in Rapid City, Sioux Falls, and other cities across South Dakota.

Through the course personnel learn to identify hazards and to develop hazard abatement methods. Eventually the employer will be able to locate, independently, problems within the workplace. According to Ceglian, the course will benefit the company by saving money on worker's compensation insurance, raising production, and raising morale. Topics for the course include: fire protection; walking/working surfaces; personal protective equipment; emergency evacuation; electrical maintenance issues; and noise level and air quality requirements, to name a few.

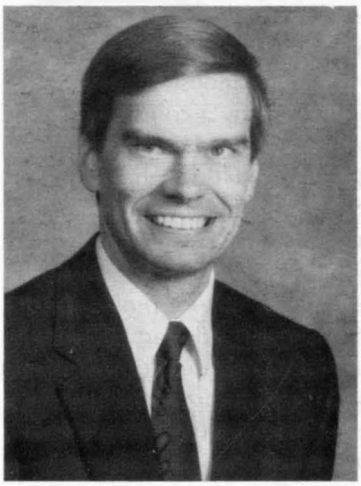
Response to the course has been very positive. "It's a fabulous course," said Bill Russell, safety director for Watertown Monument Works. "They cover many different topics. I've been the safety director here for seven years, so I know a lot about safety procedure, but I always learn something new," he said. "I would feel very comfortable if an OSHA inspector came through here right now."

The company is part of the government's SHARPs program which offers exemptions from OSHA inspections if companies submit to safety surveys and exceed OSHA expectations. The Department of Engineering Extension has provided more than two thousand of the surveys free of charge to companies in South Dakota. The service requires a member of the department, like Ceglian, to visit a company and help identify hazards. A follow-up visit is then scheduled to ensure that safety problems have been solved. Russell feels that the combination of the surveys and the ten-hour course helped Watertown Monument Works earn exemptions for the last three years, and says that after the first year in the program, the company saved more than $80,000 on compensation insurance.

While most people have a negative view of OSHA and its standards, Ceglian feels they tend to forget the positive side. "OSHA's first priority is to protect the employee—to ensure that every employer provides a safe and healthy workplace," he said. "In 1970 there were more than 14,000 deaths in the workplace. But in 1995 that number dropped to 6,000. That is still 6,000 more than there should be, but the numbers have decreased dramatically, and we want to help reduce them even more."

From left, Keith Corbett, Engineering Extension; William Endres, Human Services Agency; Peter Bullene, City of Watertown; Lori Eckrich, Daktronics; and James Ceglian, director of Engineering Extension.

Research
helps small town, rural water systems



Water is a vital commodity that many people always assume is safe to drink. A South Dakota State University researcher, in cooperation with local water system operators, is working hard to keep it that way.

Delvin DeBoer, SDSU associate professor of civil and environmental engineering, is studying treatment alternatives to control corrosion of household copper plumbing for small water systems across the state. Forty South Dakota community and rural water systems have copper levels high enough to require them to treat the water to make it less corrosive. Higher copper levels affect a small percentage of the population afflicted with Wilson's disease —a rare, hereditary disorder.

"We are examining treatment alternatives to make the water less corrosive in the copper plumbing systems in some homes," DeBoer said. "Our studies use a unique experimental method that takes less time to get results than traditional methods. In the space of a month, you can come to the same conclusion that normally takes a year or so to get with normal testing procedures."

DeBoer's research group is working with eight water systems in eastern South Dakota to test three treatment methods—orthophosphate, blended ortho-polyphosphate and raising the pH level. Preliminary results show orthophosphate worked best by reducing copper corrosion by at least fifty percent. The next step is to determine which dosage of the chemical works best.

"I enjoy the interaction with the water system operators and helping them find solutions to their problems," DeBoer said. "It's exciting to use our expertise to help provide quality drinking water for people in this state."

SDSU environmental engineering graduate students Joseph Honner of Tabor and Darin Larson of Madison, Minnesota, are assisting with the experimental and laboratory phases of the project.

The research was funded with a grant from the South Dakota Department of Environmental and Natural Resources. DeBoer and his colleagues presented a summary of the results at the South Dakota Water and Wastewater Association in Watertown in September.

For more information about the study, contact Delvin DeBoer at (605) 688-5210.

Soybean
plant visit

■ "It is also critically important for our students to have practical experience. Through our relationship with industries, we can help provide that experience, and eventually assist these students in their initial job searches after graduation."

Faculty members from the College of Engineering took a field trip of sorts last summer. But it was more than a learning experience for them, it also helped strengthen the College's ties to the community.

Dean Duane Sander and ten department heads and directors traveled to Volga last August to tour the South Dakota Soybean Processors Plant and to get acquainted with its executive director, Rodney Christianson. The group discussed internships and other ways the College might support the plant through academic programs and research.

According to Sander, it is important for the College to have close relationships with surrounding industries. "We want to be able to support their technical needs and to provide their employees with educational opportunities and additional skills to enhance their positions within their companies," he said. "It is also critically important for our students to have practical experience. Through our relationship with industries, we can help provide that experience, and eventually assist these students in their initial job searches after graduation."

One of the College's ultimate goals is to be recognized as a leader in developing cooperative relationships with industry, that address the manufacturing, employment, training, and technical needs of industry on local, state and regional levels.

For many years the College of Engineering has maintained strong relationships with many Brookings business, including Daktronics, 3M, MTR, and Falcon Plastics. The companies provide internships that often turn into permanent full-time positions for students after they graduate. In addition company employees often serve on the College's advisory boards to help position the college program to serve their needs.

UITS

at SDSU receives outstanding rating for innovative press project

■ "This project is an excellent example of how the resources of the University and private industry can come together for mutual benefit," said Kent Rufer, program manager for UITS. "Mike Monnens, program engineer on our staff, did a great job."

A project that created jobs and saved money at a Watertown manufacturing firm brought national recognition to the University/ Industry Technology Service (UITS) at South Dakota State University.

UITS received an outstanding rating for its work with Enercept Inc. in Watertown in developing an innovative press, enabling the company to add an additional sixteen jobs and initially saving the building panels company more than $25,000.

Chosen from forty projects, the UITS project "Building Panel Laminating Press," received its outstanding rating in the Technology Transfer category of the National Association of Management and Technical Assistance Centers (NAMTAC) Project of the Year Awards competition in Charleston, South Carolina.

"This project is an excellent example of how the resources of the University and private industry can come together for mutual benefit," said Kent Rufer, program manager for UITS. "Mike Monnens, program engineer on our staff, did a great job."

Enercept Inc. asked UITS to help design a new press that would enable them to assemble the foam core panels they manufacture using an EPA approved adhesive and to implement price-cutting automation. Work on the press design started in February last year. The press was commissioned in June 1995 with limited production.

The technical assistance Enercept needed is typical. Many South Dakota manufacturing firms lack the resources to maintain a full engineering staff. The University agency was able to provide engineering services to supplement Enercept's staff and help identify and utilize local suppliers, when possible. Enercept managers believe this press is unique within the industry and that it gives their company a competitive edge. The new process has been the envy of similar panel plants throughout the United States and is widely recognized as the most automated plant of its kind in the world.

NAMTAC is a not-for-profit association that provides advocacy, information, and a forum to enhance the performance of organizations providing business, economic development, and technical assistance to businesses and communities. The organization prides itself on being unique in that it provides a forum for a diverse membership of assistance and service providers with common goals to enhance enterprise competitiveness and community wealth.

The Project of the Year Awards Competition is held annually to identify outstanding efforts in assisting members' clients to become more globally competitive, more viable in their fields of expertise, or better able to deliver services to the public sector.

SHIN Outreach

Software Engineering Management

If you teach it, they will come. At least that is the case for Dr. Sung Yun Shin, assistant professor in the Computer Science Department.

Software Engineering Management, a course normally offered only once per academic year, recently was offered for three consecutive semesters, so officials in the Computer Science Department decided not to include it in the Fall schedule. But a group of eight students were determined to take the course.

The students, employees from software development companies in Watertown, all working toward their master's degrees in software engineering, needed the core course, and petitioned to have it reinstated. They were successful, and after hearing about the students, Shin planned to teach the course in Watertown. But red tape and rules prevented him from traveling there.

A recipient of EPSCoR funding for a research project, Shin is restricted to six credit hours of teaching time per week. The time involved in traveling to and from Watertown, plus the lecture time for that class and another course that he teaches on campus, added up to overtime. Instead of foregoing the opportunity to take the class, especially after their efforts to reinstate it, the students decided to travel to Brookings.

"All of those students have bachelor's degrees in computer science," said Shin. "At the time they were earning their undergraduate degrees, they didn't realize that software engineering was important. But now that they're working in that field, they know that it is."

Class members now number seventeen. Nine other students registered for the class after hearing about its reinstatement, fearing that it might not be available Spring semester. In addition to three hours of lecture each week, students work on two major projects that offer experience similar to what they will encounter upon earning their degrees.

The first was writing the program for the Brookings K-12 Kids Vote project used during the presidential elections. The class worked in teams of between two and four students, and operated as a company. Their responsibilities included going to their assigned precincts to install the programming; working at the precinct and maintaining the program throughout the election; and collecting the data at the end of the evening.

"I'm very proud of how they did," said Shin. "In ten to twenty years, voting may be more computerized because it is accurate and easy to count. This was a great prototype for future election reform."

The second project allows students to choose their own project for which to develop software. This project focuses on documentation: from the need requirements of the client, to writing the manual, to accompany the software. In its final form, the project is nearly 150 pages long.

German engineers *broaden students' perspectives*

Civil and environmental engineering students got a global perspective on wastewater treatment when two German engineers visited SDSU in November. Erich Zanders and Detlef Kaiser, both connected with Germany's Beratungsburo fur Okologie (Office for the Environment), gave SDSU students and faculty a chance to compare educational and engineering practices in the two countries.

Zanders and Kaiser came to the United States for a presentation at Krofta, a Lennox, Massachusetts, company. They then traveled to Brookings to visit Carl Edeburn, professor in the College of Education and Counseling, who met Zanders when they were both visiting Chungnam National University in Taejon, Korea.

"It's one of those fringe benefits or side effects of our exchange opportunities," said Harriet Swedlund, director of the SDSU Office of International Programs. "Our faculty meet people from all over the world and they come to South Dakota. The thing that's really significant about it is that acquaintances like this one have given SDSU the benefit of many visiting experts."

Such arrangements are extremely educational, said Dwayne Rollag, professor and head of the Department of Civil and Environmental Engineering. "We like to take advantage of these types of situations whenever we can," he said. "We learned a lot about German education in general through informal discussion. But the main reason we had them in is that they are very knowledgeable about the problems they have been experiencing with water pollution in Germany and how the country has solved them. They've also been instrumental in developing improved treatment processes themselves."

Kaiser holds a patent for a wastewater treatment instrument he developed through research for his master's thesis. "The patent is for an anaerobic flotation unit which is used for enhancement of a wastewater treatment plant," Kaiser said. "It will reduce the amount of excess sludge produced in the process. This is important in Germany because energy costs are very high and it is difficult and expensive to dispose of excess sludge."

Good environmental management is also essential in Germany because industrial and residential areas are often combined, Kaiser said. "In Germany the density of population is much higher than in the states," he said. "It is harder to get water treated so you can live with industries just next door."

Kaiser and Zanders agreed that competition for engineering contracts is more intense in Germany than in America. The competition results in some creative ideas for dealing with environmental pressures, they said. However, air and water pollution is still less severe in the United States because the country is so large, a fact which impressed them as they drove across South Dakota and visited some Southwestern states.

"This really, absolutely wide open land made a big impression," Kaiser said. "We don't have anything like it in all of Europe."

This trip to the United States is Kaiser's first. Zanders has been here before, but would like to visit again and stay longer. "For Germans, it's very important to understand American life and learn the English language," he said.

Zanders said he was especially excited upon first meeting Edeburn because he was familiar with the work of another SDSU faculty member, James Dornbush, former professor in the Department of Civil and Environmental Engineering. On his first visit to the United States, Zanders spent a day with Dornbush.

"It was very interesting for me to visit with him because I had read several of his papers," Zanders said. "It's always interesting to exchange ideas with someone from another country."

Top, Erich Zanders presented a lecture to SDSU students during his November visit to the United States.

Detlef Kaiser, left, discussed wastewater treatment and environmental issues in an SDSU classroom.

Chinese professor

exchanges ideas with American colleagues

■ "I have learned a lot of knowledge from Professor Chu and other professors," Wang said. "I could get very interesting ideas from them. People in China have a different way of thinking from people in Western countries."

Brookings, South Dakota, is a long way from Xian, China, but research is helping Quanjiu Wang bridge the gap.

Wang, professor at Xian University of Technology, is spending a year at South Dakota State University working with Shu-Tung Chu, professor in the SDSU Department of Agricultural Engineering. Their study of porous media flow focuses on how water infiltrates from the Earth's surface through an underground area called the vadose zone to the water table.

The research may impact future studies of groundwater pollution in the Midwest, Chu said. "The existing knowledge on the water infiltration does not consider the effect of the water table, and in South Dakota there are many areas with a water table," he said. "If you study the pollution of ground water, the first thing you need to know is how much water goes into the water table. Then you can consider the flow of the pollutants into the water."

Wang's visit also allows him to study academic life in the United States. American laboratory equipment is more advanced than equipment in China, he said. He has also observed that American professors tend to focus on either teaching or research, while Chinese professors carry heavy loads of both.

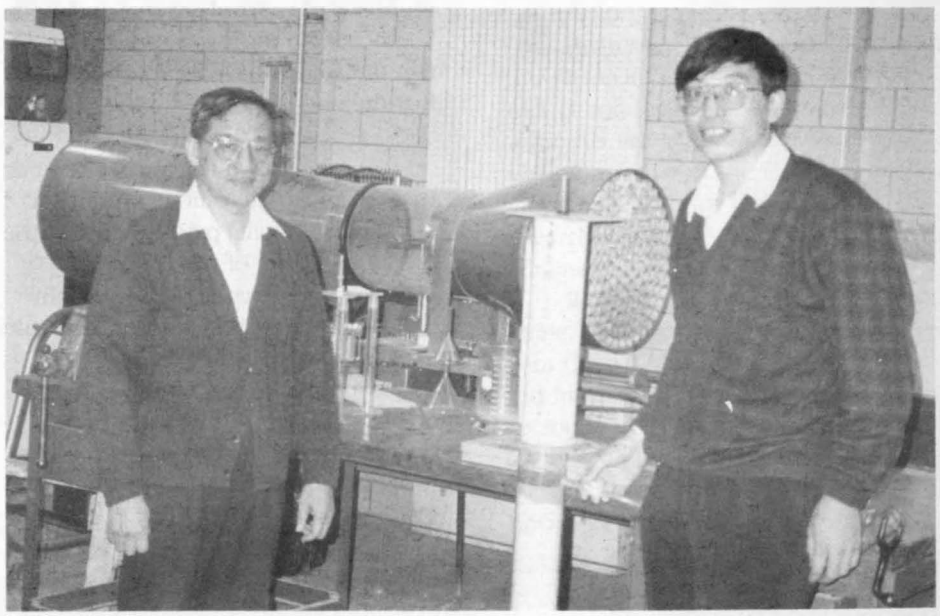
Faculty members at SDSU seem "kinder" than those in China, Wang said. That has helped him feel comfortable exchanging ideas with them.

"I have learned a lot of knowledge from Professor Chu and other professors," Wang said. "I could get very interesting ideas from them. People in China have a different way of thinking from people in Western countries."

While using English makes library research and other tasks difficult for Wang, he appreciates the learning experience. "This is a good environment for improving my English," he said. "I came here not only to learn a lot of knowledge about my subject, but also to improve my English."

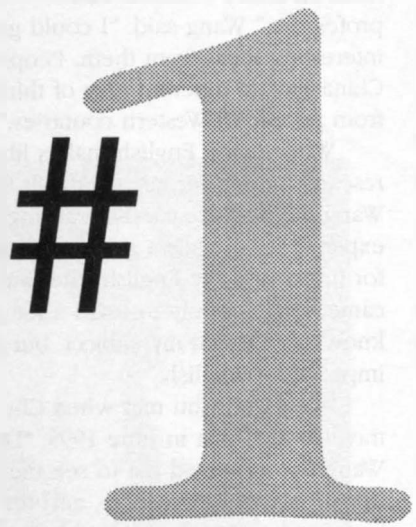
Wang and Chu met when Chu traveled to China in June 1995. "Dr. Wang accompanied me to see the irrigation work over there, and that's how we became acquainted," Chu said. "When I came back, I arranged for him to visit here."

Wang arrived in Brookings in February 1996 for a six-month visit, but Fred Cholick, director of SDSU's Agricultural Experiment Station, procured funding to allow him to stay another six months. The extension will allow Wang to finish his research before he returns to China in February 1997.



SDSU Agricultural Engineering professor Shu-Tung Chu, left, works with Quanjiu Wang, a visiting professor from Xian, China. The researchers are studying how water infiltrates the Earth's surface.

U.S. News
ranks SDSU



South Dakota State University is at the top of its class. U.S. News & World Report ranked SDSU first as the most efficient university in the Midwest and second in the category of best value, which considers the quality education received for dollars spent. The rankings appear in the magazine's Sept. 23 edition, its annual "America's Best Colleges" issue.

SDSU President Robert Wagner gives the credit to the dedicated women and men who teach and work at South Dakota State.

"We have great pride in our faculty and staff," Wagner said. "They are totally committed to what they do and do it efficiently and effectively. They genuinely care about the students, which is why students get quality education for their money at SDSU. We also work very hard to control costs for food and housing and other services for students.

"Being efficient and also providing quality education is made easier when the students attending classes bring academic vigor to the learning experience."

Robert Burns, distinguished professor of political science and 1995 South Dakota Professor of the Year, said that the faculty have long recognized that the undergraduate education at SDSU is a great value.

"Our emphasis has always been on undergraduate education," Burns said. "Although students pay higher than the ordinary portion of the cost of education, they have a lower cost in South Dakota than in surrounding states. SDSU is stacked well overall in efficiency. There is a limited administrative overhead, which contributes to the efficiency. One unspoken fact is salaries, which are lower by both regional and national standards. We get much done with limited cost."

Another contributing factor to both quality and value is that, unlike most universities, many full professors teach beginning level classes at SDSU. Burns is one of them.

"I enjoy teaching freshman classes and meeting the new class of students every year." he said. "The new class always brings freshness to the University. It is very important for full professors to teach freshman classes. These are the building block courses. If we do not do a good job with building block courses, we jeopardize the education of the students for the rest of the years they are at SDSU. Across campus, there are many full, veteran professors involved in freshman classes. The classes are not left up to graduate assistants to teach."

Jan Vandever, professor of mathematics and statistics, teaches freshman level math classes.

"Beginning-level courses are crucial to the student's success at the University," she said. "Every student should have the best possible teacher—one with experience. I think teaching experience enables a person to draw on the knowledge the student has coming in and to build on that. I make every effort to take the students from where they are and bring them to the level where they need to be. My biggest goal is to help them obtain self confidence and believe in their abilities."

That caring attitude is felt by the students, said Gina Peterson, president of the Students' Association.

"The faculty are interactive with the students," Peterson said. "I feel I can talk to the professors and they'll listen to me and my ideas. SDSU has an open, warm and friendly atmosphere and excellent leadership at all levels, from the president on down. It has a diversity of programs and a lot of activities to make you a well-rounded student."

Bassett and Wilcoxon receive doctorates

The College of Engineering is proud to announce that two of its alumni faculty members in the Department of Mechanical Engineering, Kurt Bassett and Ross Wilcoxon, have completed work on their Ph.D.s.

Kurt Bassett

Ross Wilcoxon

Bassett, a native of Wilmot, received his bachelor's and master's degrees in agricultural engineering from SDSU in 1981 and 1983. After filling an emergency teaching position within the department, he headed to NDSU, where he completed two years of coursework and experimental work for his doctorate. He returned to SDSU in 1985 to teach and to continue his research on engineering systems. He earned his Ph.D. last summer from NDSU. In addition to his position as an assistant professor, Bassett is coordinator of the IAC lab. He lives in Brookings with his wife, Sue, and their children, Casey, Rorey and Brennan.

Wilcoxon, a mechanical engineering graduate, received his bachelor's in 1986 and his master's in 1990. He was a research assistant at the University of Minnesota while working on his doctorate. In 1995 he accepted an emergency teaching position at SDSU, and upon earning his Ph.D. from the University of Minnesota last summer, was named an assistant professor. Among the courses he teaches are vibrations, dynamics, and aerodynamics. A native of Slayton, Minnesota, Wilcoxon resides in Brookings with his wife, Carolyn, and their children, Jacob and Margaret.

SDSU receives $260,000 software **grant**

Students will be able to get more practice for the "real world" because of a nearly $260,000 software grant received by the South Dakota State University Mechanical Engineering Department.

The Society of Manufacturing Engineers Education Foundation awarded SDSU four different types of software packages.

"As a whole, the software will help us key into the manufacturing side of engineering," said Mike Twedt, mechanical engineering instructor. "This is what industry is now using to cut costs and make an optimum product. Computers help find the best solution to each problem."

The DRAFT-PAK Productivity Software and Carr Lane Tool Designer Software will be used in the Engineering Shops area to help students learn how to program a machine to make cuts. The twenty-five E-Z Systems Software packages, worth $137,000, will focus on the economic portion of engineering projects. The EUCLID Software and training seminar, valued at $119,000, will help students create more technical designs and trials on the computer.

"Top manufacturing companies use computer software in everything from the design stages to formulating the plan to create the product," Twedt said. "Instead of having trial and error in the shop, they can test and correct several things in the engineering office."

The software will be used for manufacturing engineering technology, general engineering, industrial engineering, computer-aided engineering, senior design classes and graduate student projects.

"Each company may be using different software packages, but they are using this type of software," Twedt said. "Students who learn this software will be able to apply that knowledge to others they may come across in the workplace."

Reid presents research paper at Israel conference

When Dr. Richard Reid presented a paper in Israel recently, he was right back where his research started six years ago.

Reid, assistant professor of civil and environmental engineering at South Dakota State University, spoke about his research at an international conference attended by military groups and large research organizations representing a variety of countries. His paper, "Response of Reinforced Soil Walls to Explosive Loading," was part of the Specialty Symposium on Structures Response to Impact and Blast in Tel Aviv October 6 through 10.

His research, Reid said, deals with how detonated bombs affect structures built of soil for military purposes. Reid began his research in Israel in 1990 while a member of the U.S. Air Force, in which he served for thirteen years. His research was a five-year project, culminating in 1995.

Reid is a native of Kennebunkport, Maine. He earned his bachelor's degree from Citadel Military College in 1981, and his master's degree in 1987 and his doctorate in 1995 from the Georgia Institute of Technology. He joined the SDSU College of Engineering faculty in 1995.

Engineering Expo, formerly known as Engineering Exploration Days, is set for April 18 and 19 at Frost Arena on the SDSU campus.

Area high school and college students will once again have the opportunity to compete in various engineering contests. The general public is invited to observe student entries, the Senior Design projects, and inventions by area inventors and innovators. Viewers can also enjoy the annual Mr. Wizard Show, presented by Dr. Larry Browning, associate professor of physics.

Senior Design projects will be judged and prizes are awarded to the top three. The Manufacturing and Research segment of the Expo draws many companies from the surrounding area. These companies not only showcase their products, but are able to demonstrate the influence and impact of engineering.

The South Dakota Inventors Congress, also a standard feature of Engineering Expo, provides an opportunity for high school and college students, the engineering faculty, and inventors from throughout the state to meet one another and discuss inventions.

For more information about Engineering Expo, contact the College of Engineering, Crothers Engineering Hall 201, Box 2219, Brookings, SD 57007. Telephone 605/688-4161.

Scenes from past EED events.

Programming *team finishes fiftieth in world*

Thanks to the efforts of a very talented team of computer programmers from SDSU's computer club, the Computer Science Department will benefit from some valuable free software.

Two teams from SDSU's Department of Computer Science competed in the 1996-97 North Central Regional of Automated Computer Machines' International Collegiate Programming Contest in November. Team #2 finished in the top five in the North Central region, and fiftieth in the world, while team #1 finished in the top thirty in the North Central region.

The contest includes schools from the United States, Asia, Europe, and South America. Each of these large regions is divided into smaller regions. Within the smaller regions, are contest sites. This year, SDSU competed at Northwestern College in Orange City, Iowa. SDSU's team #2, took first place at the site and fifth in the entire region of more than 100 teams, including the University of South Dakota, South Dakota School of Mines and Technology, University of North Dakota, University of Nebraska Lincoln, Kansas State University, and teams from Minnesota, Iowa, and Wisconsin. This was the third year in a row that a team from SDSU won their site competition.

"Usually 1,500 universities from around the world participate," said Dr. Sung Yun Shin, assistant professor of Computer Science, and coach of the programming teams. "It is a very prestigious and famous contest, and we were in the top fifty overall. It teaches us that SDSU has a very strong Computer Science program."

Competing for SDSU this year were: Steve Roduner, Carla Steinle, and Bruce Carlson, all of Brookings; Tom Jibben, Curtis, Nebraska; Nicole Buss, Huron; and Ryan Neuharth, Sioux Falls.

Electrical Engineering names first recipient of Schultz scholarship

Ronald and Jeanne Schultz turned tragedy into tribute by establishing a scholarship in memory of their son, Brad, a 1994 SDSU graduate in electrical engineering. Last semester they had the pleasure of meeting the first recipient of the award.

Ted Hoffmann, a senior electrical engineering major, received the scholarship for use during fall semester. Hoffmann graduated in December and is working for Rockwell International in Rock Rapids, Iowa.

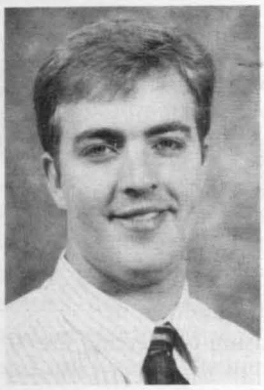
Receiving the award was even more special for Hoffmann, who has a connection to the Schultzes. "Winning the scholarship had special meaning because I know the family," Hoffmann said. He grew up just five miles from Brad and his family in Merrill, Iowa.

The Schultzes, along with Ed Cannon, President of Cannon Technologies in Plymouth, Minnesota, started the scholarship fund after Brad, died while vacationing in Mexico. At the time of his death, Brad had been working for Cannon.

The Department of Electrical Engineering awards the $500 Bradley D. Schultz Memorial Scholarship annually to a junior or senior with a cumulative grade point average of 3.0 or higher. Preference is given to students with an interest in pursuing a career in power systems engineering or a related area.

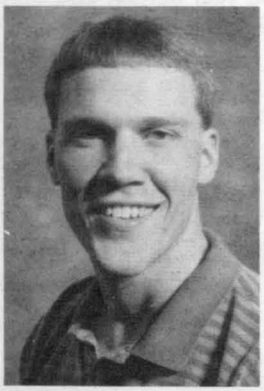
This winter, Lew Brown, department head, will begin a letter writing campaign to electrical engineering alumni who graduated one year before, and one year after Schultz, to encourage them to donate to the scholarship fund. Anyone interested should contact him through the Electrical Engineering Department.

From left, Associate Professor Dr. Lew Brown, Jeanne Schultz, Ronald Schultz, Ted Hoffmann, and Wayne Knabach, retired Professor Emeritus of Electrical Engineering. Hoffmann is the first recipient of the Bradley D. Schultz Memorial Scholarship. The Schultzes began the scholarship in honor of their son, Brad, a 1994 electrical engineering graduate.



Brian Rabenhorst

Doug Prairie



Adam Mauch

Kyle Tingle

Ag engineering

interns learn by doing

Brian Rabenhorst designed new parts and pieces for augers. Doug Prairie tested engine dynamometers. Adam Mauch programmed the central control system for a corn processing plant. And they did it all before they graduated from college.

These senior agricultural engineering majors chose to get professional experience through internships. Darrell DeBoer, professor and acting head of the Department of Agricultural Engineering, said that although the department's students are not required to have internships, many do.

"We encourage students to do an internship or at least get some kind of practical experience," he said. "Hopefully, it will make their engineering educational experience become a little more alive and meaningful because they will be able to see applications of engineering principles in the real world. Their enthusiasm for and commitment to engineering will increase."

Adam Mauch, who spent last summer working at Minnesota Corn Processors in Marshall, said that is exactly what his internship did for him.

"It seems like my classes now are a little more interesting because I can apply what I'm learning back to what I did while I was working," he said. "It gave me some experience in what engineers actually do and how the hierarchy of a business works."

The internship also taught Mauch some things he probably would not have learned in class, he said. He especially appreciated the opportunity to learn a new programming language and become familiar with specific instruments used at the plant.

Another benefit of the internship was that it made him more marketable, Mauch said. After he graduated in December, he took a permanent position with Prime Board, a board processing plant in Wahpeton, North Dakota.

Doug Prairie spent last summer at Ag-Chem Equipment, a custom chemical applicator plant in Jackson, Minnesota, assisting the company's engineers in testing new products and making modifications to those already on the market. He learned a lot on the job, he said, and discussing his experience with other students helped him understand how different companies and engineers operate.

After his experience, Prairie would recommend an internship to any engineering student. "It's really valuable work experience, and you get an idea of what qualities you would like and dislike in a job," he said. "You also get a chance to get to know the company and see if it's somewhere you would want to work."

Prairie said he is definitely interested in getting a similar position after he graduates in May.

Brian Rabenhorst's internship led directly to his current job. After graduating in December, he became a design engineer with Feterl Manufacturing in Salem, where he has interned the past two summers.

His duties as an intern ranged from programming a cutting machine to designing new auger parts to maintaining the company's computers. He also took the initiative to suggest that rather than sending instruction manuals to Sioux Falls to be designed and printed, he could design them himself, scan in photos and diagrams, and have them printed right in town. The management took him up on it, and those tasks are part of his responsibilities as a full-time employee.

"The internship got me the job," he said. "I think internships are definitely a necessity. If you don't end up going back to work for the company you had the internship with, you at least have some experience and some good references."

Students can also get experience through co-ops, in which they spend a several sessions working for a company. Kyle Tingle, a senior agricultural and mechanical engineering major, has a co-op with John Deere Harvester Works in East Moline, Illinois. He worked in the company's manufacturing division two summers ago and in supply management last summer. This semester, he is working in product development, and he will finish his co-op this summer with a stint in marketing and product support.

"A co-op is great because you get to look at the full circle of how a business is run," Tingle said. "With a large company, it's really a great program, because there are so many people and resources you can become familiar with."

Harvester Works has not committed to hiring Tingle when he graduates next December, but it is likely. "You aren't required to go back and work for them, but after they put all the time and money into training you, they usually hope you will," Tingle said.

The co-op has enhanced his education, Tingle said. "It makes school seem that much more important when you can see how it's applied and used in the field," he said. "It's easier to go through school if you know where you're headed."

Kleinjan

helps develop web site for Ag Engineering

Hoping to entice prospective students into attending SDSU, a current student in the department of Agricultural Engineering has developed a web page just for them.

Nick Kleinjan, of Bruce, a sophomore Agricultural Engineering major and Mickelson Scholar, began working for the department last summer, and was instrumental in developing the web site. "It was a goal of the department because it's an easy way for us to compete with bigger schools like Purdue," he said. "We may not have the same facilities, but we do have the same technology."

Kleinjan owns a computer and has Internet access, but knew little about it before working on the project. "I just learned more about it everytime I used it," he said. Kleinjan had assistance with programming from Eric Likness, a computer science student from Britton.

The site includes a photo of the Agricultural Engineering building, as well as a short address from Darrell DeBoer, department head. A scholarship page is available which eventually will allow visitors to download scholarship applications to their home computers. "People can access the information quickly and easily," said Kleinjan. "Plus they can avoid the slowness of the mail and the cost of the long distance phone call." The department also hopes to add an interactive element to the page in the near future.

"We are very happy with Nick's performance," said DeBoer. "Not only was it an extremely valuable experience for him, but it is a tremendous public relations asset for our teaching, research, and extension programs."

Other information available on the page includes: how to prepare for the major; career opportunities in agricultural engineering; degrees offered; estimated tuition costs; and a directory of faculty and staff members that includes e-mail addresses and phone numbers. "I think the content is good, but I do hope to upgrade the graphics," said Kleinjan. "I think pictures and sounds have helped increase the use of the Internet. Text alone wasn't as attractive."

Dan Humburg, an associate professor in the department, who supervised Kleinjan's work on the page, feels it will be invaluable as a recruiting tool. "Through the web page we'll be able to reach students at high schools where we don't normally have the time to recruit from," he said. "And for students in urban areas, who might not know what agricultural engineering is, we can interest them in our program and show them the exciting opportunities available in this field."

Humburg is in the process of editing and trimming the final version of the page, and hopes to have it up and running by the beginning of the spring semester. Interested surfers can access the Agricultural Engineering web site through the SDSU home page, or directly at:

http://www.ces.sdstate.edu/tempae/index.htm
or through the SDSU home page at: http://www.sdsu.edu

Electric companies *support SDSU engineering students*

Eight seniors in the Department of Electrical Engineering at South Dakota State University received scholarships from regional electric companies to enroll in a special course through SDSU's Center for Power Systems Studies (CPSS).

For twenty-eight years, CPSS, which is part of the Electrical Engineering Department, has provided a seminar in power systems to acquaint students with the opportunities and challenges within the electric power industry. The seminar offers field trips, videos, and guest speakers to help students broaden their understanding of the industry. Since its inception in 1968, electric companies have supported students interested in electric power systems.

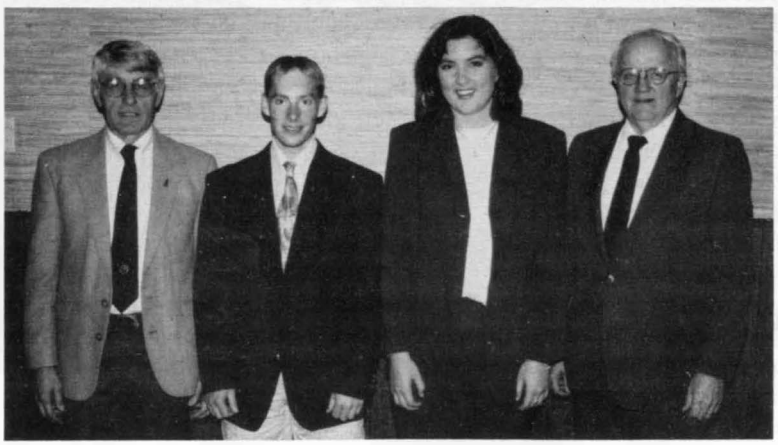
"We are always so pleased with the industry's cooperation," said Wayne Knabach, professor of electrical engineering. "The seminar really helps students learn of activities and topics not covered in the classroom."

Recipients of scholarships include: Crystal DeBates, Montrose; Deanna Funke and Richard Grismer, Sioux Falls; Jason Harper, Garrison, Minnesota; Martin Jobe and Tony Schumacher, Brookings; Corey Olson, Welcome, Minnesota; and Lee Thole, Big Stone City.

The companies also support projects involving mechanical engineering students. This year funding went to Glen Downing, Madison, Derek Hengeveld, Brookings, and Stephen Olson, Jr., Poway, California, who are assisting Dr. Kurt Bassett in the Industrial Assessment Center in the Department of Mechanical Engineering; and Lance Niewenhuis, Brookings, Chris Moller, Mount Vernon, and Eric Dorn, Adrian, Minnesota, who are assisting Dr. Charles Remund in the Ground Source Heat Pump Training and Research program.

Companies providing the scholarships and project support are: Basin Electric Power Cooperative, Bismarck, North Dakota; Black Hills Power and Light Company, Rapid City; East River Electric Power Cooperative and Heartland Consumers Power District, both of Madison; MidAmerican Energy Company, Des Moines, Iowa; Missouri Basin Municipal Power Agency and Northern States Power Company, both of Sioux Falls; Northwestern Public Service Company, Huron; Otter Tail Power Company, Fergus Falls, Minnesota; and Western Area Power Administration in Huron and Watertown.

Scholarship recipients, from left, Lee Thole, Crystal DeBates, Jason Harper, Corey Olson, Deanna Funke, Richard Grismer, Tony Schumacher, and Martin Jobe.



East River Electric Power Cooperative's 1996 scholarship winners were honored during a recognition dinner in Madison on November 6. Crystal DeBates, a senior in electrical engineering, is specializing in power systems and biomedical engineering. Matthew Klein, junior, is studying electronics and biomedical engineering. Both students are winners of the V.T. Hanlon Memorial Scholarship.

Pictured from left, Virgil Ellerbruch, assistant dean of the College of Engineering; Matthew Klein; Crystal DeBates; and Duane Sander, dean of the College of Engineering.

College of Engineering

High School Visitors Team

Pepe Negrin, electrical engineering and political science senior

■"We talk about the College, and the importance of science, engineering, and technology. During the demonstrations the students really focus, and they can see how engineering is involved in so much of their lives."

Remember your high school days when you just weren't sure what you wanted to do with your future? Students from the College of Engineering are working to make the decision a bit easier for some of today's high school students.

Since 1994, the College's High School Visitor Team has traveled to high schools in the region encouraging students to consider the many fields of science, engineering, and technology when choosing a career, and to acquaint them with some of the opportunities that are available. "We want to help them in their career decision making and to open their eyes to new ideas about science, engineering, and technology" said Virgil Ellerbruch, assistant dean. "We want to do more than just recruit them to SDSU."

During the visits, the team offers information on the College and all of its departments, and afterwards holds demonstrations to illustrate the prominence of engineering in day-to-day life. The presentations encourage students to enroll in math and science classes during high school, and to further their education through vocational-technical schools or junior colleges if a university-type education isn't feasible.

Currently nine students comprise the team, which last semester made visits to high schools in Alexandria, Baltic, Brookings, and Tracy, Minnesota, reaching more than 200 students. During the 1995-96 school year, the team held twenty-nine sessions at thirteen schools, with 640 participants.

Pepe Negrin, a senior in electrical engineering and political science, from the Canary Islands, is the team's student coordinator. He enjoys interacting with the students and seeing their interest. "We talk about the College, and the importance of science, engineering, and technology," he said. "During the demonstrations the students really focus, and they can see how engineering is involved in so much of their lives."

Negrin feels the sessions have positive effects on the students, and hopes they will remember that in the future. "We hope some will become engineers, and that they one day will help others become engineers," he said.

Matt Klein, a junior electrical engineering and engineering physics major from Rosholt, joined the team two years ago, and feels that he would have benefitted from similar sessions as a high school student. "I didn't know exactly what engineers did," he said. "I had a general idea, but I wasn't sure." Klein also feels that the encouragement the team gives the students is important. "We hope that if the students like what we're doing, it will give them an idea of what they might want to do in the future," he said.

Ellerbruch knows that the team is successful in helping to stimulate the thinking of the students it visits. "Students often contact me and want to interview me about a career in engineering," he said. "I know that's a direct result of the visits."

Engineering students receive $500 from Associated General Contractors

Nine South Dakota State University engineering students have an additional $500 each to apply to their college funds, thanks to scholarships from the Associated General Contractors (AGC) of South Dakota Inc.

To be eligible, students intending to pursue careers in construction complete applications, solicit sponsorship of AGC member firms and write one-page summaries of their career goals.

AGC Scholarship winners are:

Randy Reese, construction management major from Bridgewater.

Jacquelin Nerby, construction management major from Brookings.

Chris Lingemann, construction management major from Ethan.

Raven Hoffman, construction management major from Letcher.

Ryan Rhoades, civil and environmental engineering major from Rapid City.

Brian R. Wipf, civil and environmental engineering major from Sioux Falls.

Joshua Peterson, civil and environmental engineering major from Wakonda.

Sara Drake, civil and environmental engineering major from Bellingham, Minnesota.

Chris Sluiter, construction management major from Hanska, Minnesota.

AGC education and training director Drake Wood presented checks to the students at SDSU September 16, during Construction Awareness Week.

"The construction industry is making an effort to increase the number of people pursuing careers in construction management because the demand has increased," Wood said. "The scholarships are a continuation of our support to students as they progress through the construction management program."

AGC, an organization of construction contractors, supply and service firms of South Dakota, has two chapters, the Building Chapter in Sioux Falls and the Highway-Heavy-Utilities Chapter in Pierre. It awards two kinds of scholarships. One is for students pursuing two-year degrees in construction-related programs at technical institutes. The other is for students pursuing four-year degrees in construction management and civil and environmental engineering. In 1996, twenty-one scholarships totaling $10,500 were awarded to students pursuing careers in construction.

Society of Women Engineers officers elected

Michele Bessler, a mechanical engineering major, has been tapped as the president of the Society of Women Engineers at State. Bessler also serves as treasurer of the Society of Manufacturing Engineers and is a member of the American Society of Mechanical Engineers.

Michelle Kelly, a mechanical engineering/physics major and math/psychology minor, is treasurer. At SDSU she is also president of the Society of Physics Students and a member of Chi Omega women's fraternity, the American Society of Mechanical Engineers and the Joint Engineering Council, for which she was named 1995-96 Member of the Year.

Jennie Husman, an electrical engineering major, is vice president.

Institute of Electrical and Electronics Engineers club officers named

Ryan Stahl, an electrical engineering major, is the new president of the Institute of Electrical and Electronics Engineers at SDSU. He is the former treasurer of the IEEE student chapter and the SDSU Hockey Club and past hockey club president. He is currently involved in the SDSU Hockey Club and intramural volleyball and football.

Sara A. Horner, an electrical engineering major, is secretary. She is also a member of the Society of Women Engineers and participates in intramural softball, flag football, water polo, co-ed softball and basketball.

Donald A. Janvrin, also an electrical engineering major, is treasurer. He's also a member of the College of Engineering High School Visitors Team and treasurer of the Joint Engineering Council. He took part in the Center for Power Systems Study annual study, and is the recipient of the Black Hills Power and the Piper-Maynard scholarships.

Pi Tau Sigma names officers

Derek Hengeveld, a mechanical engineering major from Valley Springs, is the new president of Pi Tau Sigma. He is also vice president of Tau Beta Pi honor society and a member of Mortar Board honor society, Music Merchandisers, the American Society of Mechanical Engineers, and the American Society of Heating, Refrigeration and Air Conditioning Engineers.

Jon Giles, a mechanical engineering major and math minor from Montevideo, Minnesota, is vice president. He is also a member of the American Society of Mechanical Engineers.

Amy L. Lewis, a mechanical engineering and German major from Huron, has been elected secretary/treasurer. She is also secretary/treasurer for the American Society of Mechanical Engineers, a member of Tau Beta Pi honor society, the Society of Women Engineers, Mortar Board honor society, and the women's golf team. She is an admissions ambassador, a Briggs Scholar, and a University Lutheran Center peer minister.

Klinkenborg elected president of Joint Engineering Council

Monte Klinkenborg, an electrical engineering major and computer science/math minor, has been elected president of the Joint Engineering Council at South Dakota State University.

At SDSU Klinkenborg is also a member of Sigma Phi Delta fraternity, Eta Kappa Nu and Tau Beta Pi engineering honor societies and the International Society for Hybrid Microelectronics. He is vice president of the Institute of Electrical and Electronic Engineers (IEEE) and the recipient of 3M Engineering, Leaders for Tomorrow, IEEE/Kappenmann, Interstates Electric and Carghill scholarships.

Klinkenborg has done piezoelectric research work for the Electrical Engineering Department at SDSU and Department of Defense grant work for the departments of Chemistry and Electrical Engineering. He is Web site coordinator for the departments of Civil and Environmental Engineering and Electrical Engineering and the Northern Great Plains Water Resource Research Center.

Outstanding civil engineering students named at SDSU

Four South Dakota State University students received special recognition at the American Society of Civil Engineers student chapter banquet November 1.

The outstanding student awards are given on the basis of academic performance and involvement in ASCE and campus activities. The winners represent the "cream of the crop" in civil engineering at SDSU, said Chuck Tiltrum, associate professor in the Department of Civil and Environmental Engineering and adviser to SDSU's ASCE student chapter.

"It's really exciting to recognize these people for their hard work and involvement," he said. "To be recognized, they definitely have to be doing well above average."

Alisa Prunty of Tabor was named Outstanding Senior by the Department of Civil and Environmental Engineering faculty.

SDSU's ASCE student chapter officers selected the other outstanding students after interviewing three to five members of each class. Tracey Beyers of Roscoe was named Outstanding Junior, Eric Falken of Rosholt was named Outstanding Sophomore, and Trent Bruce of Custer was named Outstanding Freshman.

Janvrin elected treasurer of two SDSU engineering groups

Donald A. Janvrin has been elected treasurer of the Joint Engineering Council and of the Institute of Electrical and Electronics Engineers at SDSU.

Janvrin, an electrical engineering major and psychology minor, is a member of the College of Engineering High School Visitor Team. He is also involved in intramural football, track and basketball at SDSU and works as a circuit board assembler at Daktronics Inc. in Brookings. He is a graduate of the U.S. Marine Corps Officer Candidate School and the recipient of Black Hills Power and Maynard Piper and Michael Heier scholarships.

Holden named to engineering board; Society of Mechanical Engineers

Nathan Holden has been elected to the Board of Governors of the American Society of Heating, Refrigeration and Air Conditioning Engineers at SDSU. He is also the new chair of Society of Mechanical Engineers.

Holden, a mechanical engineering major at SDSU, is also a member of the American Society of Mechanical Engineers and program director for KSDJ, the campus radio station.

Rabenhorst elected to office for SDSU clubs

Brian Rabenhorst of Spencer has been elected to office for three organizations at SDSU.

Rabenhorst will serve as president of the American Society of Agricultural Engineers; as president of Tau Beta Pi, the engineering honor society; and as secretary of Alpha Epsilon, the agricultural engineering honor society.

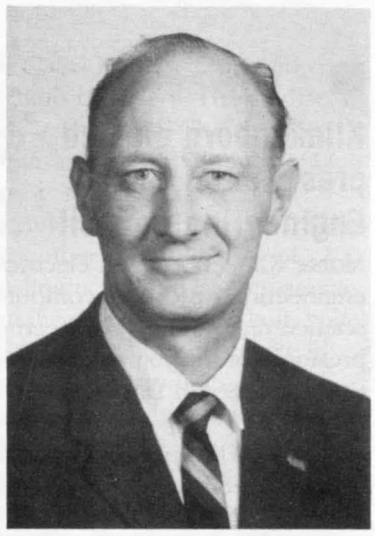
He is also a volunteer for the SDSU College of Engineering Phonathon.

Donohue named to Joint Engineering Council

Heidi Donohue has been elected vice president of the Joint Engineering Council. A mechanical engineering major from Madison, Donohue is also treasurer of the American Society of Mechanical Engineers and a member of the Society of Women Engineers and Pi Tau Sigma, the mechanical engineering honor society.

John R. Andersen

Scholarship inspires 'fun' in funding



It's a story of creative contributors and their unique ties to a South Dakota State University professor.

It's the story of the birth and growth of the John R. Andersen Memorial Scholarship in Engineering.

Andersen became an instructor in civil engineering at SDSU in 1954 and, at the time of his death in 1973, was a professor of civil engineering. In 1965 he co-founded the University's graduate program in sanitary engineering with now retired professor James Dornbush.

They started the graduate program, Dornbush said, "because we decided that not everybody who wanted to go into this field should have to go to Minnesota, Wisconsin or somewhere else. At that time, the federal government was providing training grants to increase the number of personnel in pollution control." In 1964 the two men wrote a proposal to the Federal Water Pollution Control Administration (FWPCA) and received a five-year grant for $150,000.

Along with co-founding the graduate program and teaching classes, Andersen became active in state and national engineering organizations. He was a Fellow in the American Society of Civil Engineers; a member of the National Society of Professional Engineers; national director and executive committee member of the Water Pollution Control Federation; member of the American Water Works Association; director of the South Dakota Engineering Society; and a member of Sigma Xi, Chi Epsilon and Sigma Tau.

In 1971 he was appointed to a two-year term on the State Board of Certification of Water and Wastewater System Operators and elected to a five-year term on the Brookings City Commission.

A slide-illustrated lecture Andersen gave in 1972 to the Brookings League of Women Voters on "Brookings and the Environment" has been made into a video and is available at the H.M. Briggs Library at SDSU and the Brookings Public Library.

After Andersen's death in 1973, his family and friends established the John R. Andersen Memorial Scholarship for SDSU environmental engineering majors.

The first winner of the scholarship was Robert Renner of Colorado, who recently became deputy director of the American Water Works Association. Graduate scholarship winners receive $1,200 and undergraduates receive $500 for the academic school year. The scholarhsip endowment has reached close to $36,000, Dornbush said.

To help support the scholarship fund, members of the South Dakota Water and Wastewater Association auctioned the same man's tie at their annual conferences from 1984 to about 1990.

The tie was no ordinary tie. The original, which dates back to 1970, was made out of environmental concerns material by Andersen's wife, Gwen. When Andersen wore the tie to the 1970 Water Pollution Control Federation Annual conference in Boston, Massachusetts, where he was representing South Dakota as a director, it was so well liked that Mrs. Andersen made eight more ties to give to each member of the national executive board.

Then, in 1983, Andersen's brother, James "Casey" Andersen of Sioux Falls, a longtime engineer with the South Dakota Department of Water and Natural Resources, attracted attention from the South Dakota Water and Wastewater Association president by wearing one of the ties to the association's annual conference. Doug Herron, then president of the association, offered Casey's tie for sale that year, with the money going to support the John R. Andersen Scholarship Fund.

For the 1984 conference, Casey's wife, Bonnie, made him a new tie using some of the same environmental concerns material her sister-in-law used back in 1970. This tie was sold to Richard Willer of Sioux Falls, who brought the tie back to the 1985 conference. That year, Don Ulrickson of Canton collected donations and paid $504 to the scholarship fund. For the next five years, the same tie was auctioned to officially support the scholarship fund.

Each year since discontinuing the tie auction, the South Dakota Water and Wastewater Association has given generously to the foundation. Dornbush said, "Students and staff at SDSU thank all past conference and tie auction contributors who have given to the endowment so that environmental contributions will continue from these scholarship winners long into the future."

Andersen became an instructor in civil engineering at SDSU in 1954 and, at the time of his death in 1973, was a professor of civil engineering. In 1965 he co-founded the University's graduate program in sanitary engineering with now retired professor James Dornbush.

Ladies first!

For the first time since 1973, the winners of the John R. Andersen scholarship for 1996 are exclusively women. Alisa Prunty of Tyndall and Jessica Werder of Willmar, Minnesota, were granted $1,200 and $500 scholarships to pursue environmental engineering degrees in the Civil Engineering Department.

Golf

Golf tournament
benefits scholarship

A BIIG time was had in the city last September, and engineering students will benefit from it.

The tenth annual Brookings Industrial Invitational Golf (BIIG) Tournament, held September 9 at the Brookings Country Club, raised $1,200 to support the Brookings Economic Development Corporation's (BEDC) Manufacturing Engineering Technology scholarship at South Dakota State University.

More than 100 golfers of varying abilities participated in the tourney, hosted by BEDC. Participants included employees from Brookings industrial businesses, as well as bankers, realtors, retailers, and printers. "We call it a mixer," said Don Patrick '62, director of BEDC. "It permits people within the community to make friends and contacts."

Each year foursomes are formed by BEDC to ensure that employees from different companies get to play together. "By the end of the day, the foursome becomes acquainted and friendly," said Patrick. "The next year they come back they'll be on a new team, but they'll wave to, and talk with, their golfing partners from previous years."

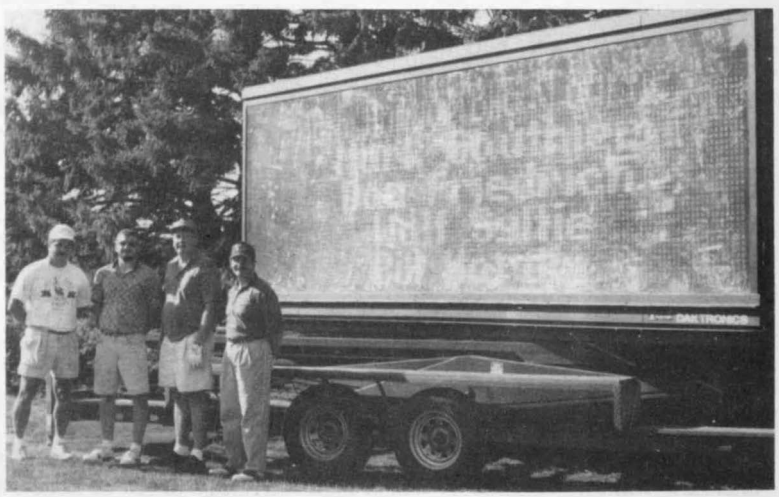
Daktronics started the tournament in 1986 as a way to acknowledge its employees and vendors. As time passed, the invitation list broadened to include more Brookings industry, and it became a Brookings Area Chamber of Commerce event. BEDC took over the tournament in 1996.

Along with BEDC, the tournament is organized by a committee which includes Jay Bender of Falcon Plastics, John Stark of Coast to Coast Warehouse, and Mark Steinkamp of Daktronics.

Many awards were given during the day, including door prizes and awards for the top teams. Money generated by a closest-to-the-pin contest, and a raffle was enough to support the scholarship.

Recipients of the $1,000 scholarship are junior or senior manufacturing engineering technology majors in the College of Engineering, in good academic standing, and demonstrate professional potential. Preference is given to students of Brookings and contiguous counties, and students exhibiting financial need. "We started the scholarship because we recognized that there was a need among students, and a need to promote the new MET program," said Patrick. "It was also a great way to recycle the money from the industrial golf tournament." The scholarship was started two years ago.

Following the tournament the BEDC offered a buffet dinner and program that recognized four new industries in town and congratulated three companies for $30,000-plus expansions. The companies each received a walnut plaque.



From left, Mark Gauthier, Dan Friedrich, Walt Syltie, and Bill Hardin.

Department of Electrical Engineering

receives grant from SDEC

An equipment grant from the South Dakota Electrical Council (SDEC) will benefit the Department of Electrical Engineering at South Dakota State University. The $1,000 donation will help purchase several isolation voltage probes for use in the Energy Laboratory. These specialized probes, when used in conjunction with multi-channel oscilloscopes, help measure three-phase voltages that are difficult to measure with regular probes.

"We are currently unable to measure and compare certain voltages effectively," said Steve Hietpas, assistant professor of electrical engineering. "This probe will give students new insight into three-phase voltage measurements with oscilloscopes, and will greatly enhance our capabilities in the energy laboratory."

On behalf of the South Dakota Electrical Council, Wayne Knabach, professor of electrical engineering, presents a $1,000 check to assistant professor Steve Hietpas.

Briggs / May

scholarship interviews planned

Several outstanding high school seniors will come to campus February 22 and 23 to interview for the most prestigious engineering scholarships offered at South Dakota State University.

The Briggs/May scholarship weekend provides SDSU's engineering faculty an opportunity to meet several top scholarship applicants, said Warren Hein, professor and head of the Department of Physics. "Each department in the College of Engineering is represented by a faculty member on the review committee," he said. "Prior to that weekend, we evaluate between fifty and 100 scholarship applications. Out of that group, we pick twelve to fifteen to bring in for interviews."

The students arrive in Brookings on Friday evening to meet with current Briggs scholars. On Saturday morning, they attend a breakfast and a brief interview with the committee, which then makes its final rankings. "The quality of the students is always excellent," Hein said.

The top six students are offered Stephen F. Briggs Scholarships. Two Philip and Viola May Scholarships are also awarded, and all students who interview are guaranteed a minimum of $1,000 support, said Jay Larsen, director of Financial Aid.

For the 1996-97 school year, the Briggs Scholarship provided $2,750 for resident students and $3,000 for non-residents, while the May Scholarship provided $1,500 for all recipients. The Briggs family made a significant increase in the amount of that award for next year, Larsen said. New and returning students will now receive $5,000 for the 1997-98 school year.

The Briggs Scholarship, awarded annually to six engineering majors and six other students, is renewable for four years if recipients maintain a grade point average of 3.0 or better. It was established by Stephen F. Briggs, a 1907 SDSU electrical engineering graduate who designed an experimental gasoline engine as a student project. During his career, Briggs was chairman of the board of the Briggs and Stratton Corporation, the Outboard Motor Corporation and the Outboard Marine Manufacturing Company. He received an honorary doctorate in engineering from SDSU in 1956 and was named a Distinguished Alumnus in 1961. He died in 1976.

The May Scholarship has been awarded annually to two engineering students, but in the future may be directed to National Merit semifinalists, Larsen said. The Mays are Distinguished SDSU Benefactors. Philip May, a Pierre native, attended SDSU and graduated from the University of Minnesota. He now lives in East Lansing, Michigan, and is retired as vice president of business and finance for Michigan State University. Viola May, a Brookings native and 1930 SDSU graduate, died in 1993.

SDSU's first female ag engineer tackles **ag safety issues**

When Carol (Gilbertson) Lehtola was looking into a college degree in engineering and soil and water conservation, one Minnesota school tried to steer her toward food processing instead.

SDSU, however, welcomed her into its program. In 1973, Lehtola became the first female to graduate from the Department of Agricultural Engineering.

Now, Lehtola is an assistant professor in the Department of Agricultural and Biological Engineering at the University of Florida. She also serves as the state's Cooperative Extension Service Agricultural Safety Specialist. While her career choice has often made her "a woman in a man's field," she has never thought of herself as a pioneer.

"I didn't even consider the fact that I was blazing any trails as the first female," she said. "My attitude was always, 'Well, nobody told me I couldn't do that.'"

Darrell DeBoer, professor and acting head of the Department of Agricultural Engineering, was Lehtola's academic adviser when she was a student. "She was a very unique personality in agricultural engineering, being the first woman," he said. "She fit right in, though. She was really 'one of the boys,' because at that time you almost had to be. She did very well as a student."

Lehtola has also done well as a professional, DeBoer said. "She has an excellent national reputation in farm safety," he said. "She is also very competent in disseminating information, which is important, since she is working in extension."

As she develops extension programs, Lehtola is discovering how safety issues in Florida differ from those in the area around her hometown of Ulen, Minnesota.

"In the Midwest, the traditional approach is to have safety programs packaged so that one is related to machinery, another is related to pesticides, and so on," she said. "Here in Florida, there are forty-three to forty-eight major commodities, like citrus or tomatoes, that bring in more than a million dollars a year, so we need to have commodity-based programs. That's going to be a challenge, but it's definitely the way we need to go here."

Lehtola works with county extension specialists to reach many farm and grove workers, but also has direct contact with everyone from agribusiness people to emergency medical personnel to golf course turf managers. Since she earned her Ph.D. in agricultural and biological engineering at Iowa State University in Ames, she has also been making an impact by working with students. She taught at Iowa State before moving to Florida.

"My philosophy of teaching is that I want students to do something with their education afterwards," she said. "My students always have term projects, and I really try to get them to focus on something that they can use when they get into the work force."

Lehtola's innovative teaching methods have garnered her several awards. She received a teaching excellence award from Iowa State University, and a video-taped safety course she developed won first place in the category of "courses offered via electronic media" from Ag Communicators in Education.

The video course required students to do something concrete to improve farm safety in the region. Through their projects, the forty-three students in the class impacted at least 2,000 Iowa farm families, Lehtola said. "They really got other people involved," she said. "It was just incredible."

Lehtola has also gotten good results from an interactive laboratory which lets students simulate performing farm tasks with a disability. The students choose the task they find most difficult and develop a technology to make it easier or more effective. Then, Lehtola sends the designs to Easter Seals, which has used some of them in the AgrAbility program to help people with disabilities continue farming.

Often, Lehtola said, agricultural safety education is relegated to a single, separate course or not offered at all. She hopes to change that.

"My long-range plan is to get safety issues integrated into the agricultural engineering curriculum," she said. "That's an issue not only in Florida, but across the nation. Industry is screaming for graduates to have more safety education when they get out in the job market."

Improving agricultural safety awareness is a "wide open" area because so much needs to be done, Lehtola said. She is doing her part in a variety of ways.

In Iowa, she created a program manual for retrofitting rollover protective structures on older tractors. It has since been published by the National Institute for Occupational Safety and Health. In Florida, she has helped develop the National Agricultural Safety Database on a web site. She is also active in several organizations dealing with safety issues.

Lehtola has chaired both the Agricultural Machinery Conference and the Iowa Section of the American Society of Agricultural Engineers. The Iowa Section, the largest in the country, also named her one of three engineers of the year in 1993.

In working toward her current leadership role, Lehtola said, she has experienced very little prejudice. "I've heard of women in engineering who have had a lot of problems, but that has not been my experience," she said. "I have to say that South Dakota State was pretty open and receptive. I didn't see any obstacles in my way."

Distinguished Alumni

1996

When the Alumni Association announced its Distinguished Alumni this year, graduates from the College of Engineering netted two of the six slots reserved for alumni.

The naming of its Distinguished Alumni is a traditional part of SDSU's Hobo Day homecoming activities. The group was honored at the Distinguished Alumni Banquet at the Brookings Holiday Inn on October 25, and the recognition culminated with the parade and football game on Saturday.

Charles Foster

Both graduates were recognized for Outstanding Professional Achievement.

Charles Foster, a Timber Lake native who graduated with an electrical engineering degree in 1943, went on to become the greatest land developer in the history of El Paso, Texas. He has built homes and created jobs for thousands of people and, through his "total community" concept, has turned thousands of acres of desert land into a city within a city. Foster has made significant achievements in the building trades, innovative home construction, land development, and finance.

Roland Jensen

Roland Jensen is a former Northern States Power executive and first president of NRG, an NSP subsidiary that owns and operates power plants around the world. A 1959 mechanical engineering graduate from Lake Norden, Jensen currently serves on the board of directors of MIBRAG mbH, a coal mining and power consortium headquartered in Leipzig, Germany; Daktronics Inc., a programmable display and scoring systems company headquartered in Brookings; and Louisiana Energy Services, a uranium enrichment company headquartered in Washington, D.C.

Alum

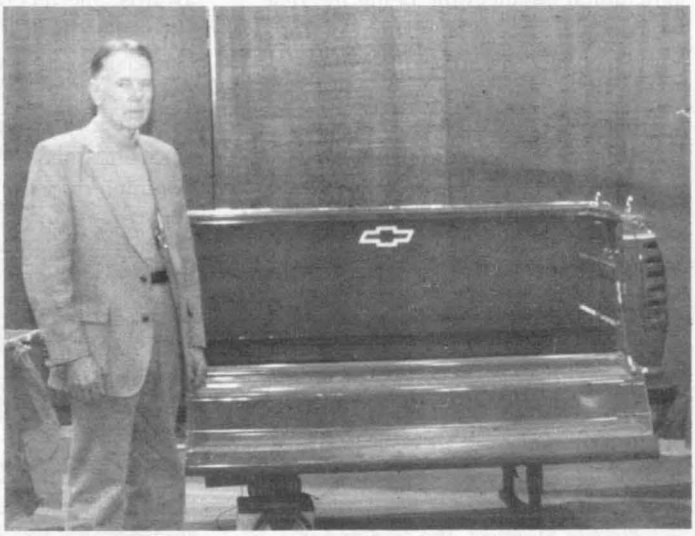
inducted into Trane's Top Ten Club

Selling heaters to people in Texas would be a challenge to anyone except James Horton. Not only can he sell them, he could build them, too.

Horton, a 1990 South Dakota State University mechanical engineering graduate, joined the Trane Company in La Crosse, Wisconsin, as a member of the 1990-II Graduate Engineer Training Program. The program is a five-month course that concentrates on specialized heat transfer theory and practice, in-depth coverage of Trane products, the systems approach and computer application to building design, and professional salesmanship.

Horton was recently named to Trane's Top Ten Club, which signifies achievement of full professional sales status. The qualifications for this honor involve exercising personal qualities such as creativity, responsibility and technical competence. Members of the Top Ten Club have demonstrated full expression of these personal skills in servicing accounts and in cooperative support of fellow sales engineers.

Membership reflects these ideals and is earned by achievement of challenging goals along with top ranking among fellow Trane sales engineers.

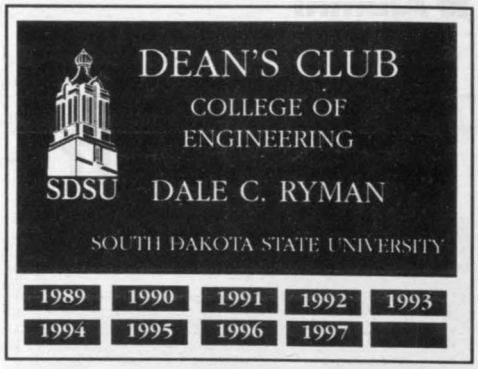


Correction

In this photo, Lief Sorenson is shown with the Step Gate invented by LaVern Quam. In the Summer Impulse, we incorrectly noted this was Harold Fratzke with his Hand-D-Ramp invention.

Dean's *Club*

As a Dean's Club member, you will receive a handsome walnut and brass desk plaque inscribed with donor name, a listing in the SDSU Honor Roll, invitations to special College and University functions, and updates from the College dean. (This list does not include anyone who qualified for membership, but has not yet accepted.)



Below is the listing for 1995-1996 (to-date) Dean's Club for Engineering.

Daniel and Virginia Amundson
Byron J. and Lynda A. Anderson
Delwyn D. Anderson
Harvey D. Anderson
Brent L. Bargmann
Glynn and Keith Bartels
Vernon L. Baumberger
Thomas B. Beason
Mary J. Bechtel
Herman I. Berg
Gerald and Shirley Bergum
Richard A. Berreth
Roger V. and Frieda A. Bigham
Francis M. and Beverly A. Blaze
C. Robert and Sara J. Blizzard
Lori S. Bocklund
Larry and Christine Boever
Duane D. Boice
William G. Borghard
Lewis and Danelle Brown
K. Marvin and Eleanor Bue
William R. Burge
Jerry R. Buri
Lynn D. Buri
Henry W. Callihan
Edward and Judy Cannon
Gregg A. Christiansen
Russell E. Christiansen
David and Barbara Christianson
Craig E. Christie
M. Lucille Christoffersen
Shu Tung and Alice Chu
Curtis J. and Julie I. Clemen
Darlo J. Clemens
Nancy J. and Jerry L. Cotton
Robert M. Crooks
Leon D. Crossman
Max M. and Marilyn R. De Long
Arlo B. and Barbara DeKraai
Marion K. Dempster
Donna R. and Gary L. Dettman
Rod Devine (deceased)
Richard and Nicole Doherty
Neal D. Drefke
Burdette H. Dugdale
Douglas A. and Krystal R. Dwyer
Parry R. Dybing
Delvin D. & Athene M. Eberlein
Doris S. Eisele
Virgil and Georgan Ellerbruch
Virgil A. Enke
Environmental Engineering Inc.
Wayne A. Fiebick
Marian L. Fillbrandt
David M. and Shelley R. Frazee
Russ C. Frerichs
Leif E. Frevik
Eugene B. Frykman
Carl and Virginia Furchner
Robert S. Garthune
Harold W. Grace
Timothy P. Graf
Frederick W. Grothem
Richard L. Gunderson
William and Carol Hagedorn
Bruce G. Haggar
James and Mary Lou Hammer
Lawrence L. and Sharon Hansen
Seth T. and Ann M. Hansen
Harold E. Harrison
Nancy W. Haselhorst
John D. Hauge
Richard B. & Barbara B. Hayter
Ronald and Margaret Hegge
Robert A. Heibult
Allen D. Heiden
James A. and Sandra L. Hembd
Robert A. Higgins
Wallace J. Hoff
Harold C. Hohbach
Warren and Denise Hovland
Thomas A. and Sandra B. Jacobs
Roland and Deloris Jensen
Hans G. Jepson
Dean H. Johnson
Gene A. Johnson
Vera Johnson
David L. Juttelstad
Irene A. and Robert W. Kane
Robert C. and Shirley R. Kay
David J. Keen
Daniel C. and Michele A. Kemp
William & Kathleen Kennealley
Harry J. and Denice Knapp
Craig E. Kreyger
Rodney W. and Diane L. Kruse
David L. and LaVonne I. Kurtz
Ronald J. La Vallee
Darrell and Vicki Larson
Les J. and Constance R. Larson
Lorys J. Larson
Allen E. Lee
Ronald H. Leech
Richard C. Levins
Dallas G. and Janice M. Lien
Dennis R. Little
Jerome J. Lohr
Vern D. Loken
Jonalyn and Kenneth Lorenz
William S. Lowe
Keith A. Lucke
Sue E. Mabee
Lyle and Melissa Mangen
Delpha L. Masson
Thomas and Connie Mc Laughlin
Duane L. McDonnel
K. John McNellis
Gregory L. Menning
Gregory D. and Karen J. Miller
Harlow and Carol Miner
Valerie M. Minor
Richard J. Monhardt
Anthony M. Mueller
James G. Nachtigal
Gary and Janet Nelsen
Dean C. Nelson
Allan F. Nereim
Peter W. Neyhart
Gordon D. Niva and Susan L. Lahr
Steven F. Oakland
Joseph E. Obr
George W. Olsen
Gordon W. and Dorothy M. Olson
Harvey M. and Doris A. Owren
Marvin and Carolyn Petersen
Terrence C. Peterson
Wayne M. Peterson
Daniel L. Pollmann
Richard and Vickie Potter
Shirley A. and Steven J. Quail
Mark W. and Katherine K. Rau
Robert G. Raymond
Tim S. and Mary K. Reed
Thomas H. Reiners
Guy F. Rhoades
Thomas and Ann Riebel
Frederick & Ardyne Rittershaus
Gerald and Angeline Ruden
Dale C. Ryman
James P. Samis
Duane E. and Phyllis Sander
Leroy V. Satrang
Vernon and Ruth Schaefer
Douglas W. Schindel
Ronald D. Schmidt
John G. Schnee
Robert J. Schrag
Donald H. Schroeder
Rejean and Richard Schulte
Robert E. Schwanke
Loren Schweigert
Ali and Salwa Selim
Lynn G. Seppala
Timothy D. Serlet
Paul S. Severson
Gary M. Shute
Daryl J. Siebens
Siouxland Engineering Assn, PC
Ernest R. and Jane M. Smith
Karen G. Smith
Ronald C. Soren
Francis Stern-Montagny
Dale M. Stevens
Laura A. Stoltz
Duane H. Stuerman
Helen Sundstrom
Richard A. Svanda
LaDell and Phyllis Swiden
Thomas L. and Susan L. Thelen
Loyl R. and Helen S. Thomas
Charles and Karon Tiltrum
Vernon L. Trimble
Donald A. Ufford
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Roy E. Van Orman
James and Kathleen Vellenga
John S. Voelsch
Joseph P. Vogel
Charles L. Waggoner
Stuart A. Wahlstrom
Carla B. Warfield
Thomas L. Weaver
Gayla D. Weber
Diane M. Wilaby
Charles J. Wondra
Greg A. and Edna M. Woodworth
William Woodworth

Yes, I wish to contribute to the SDSU College of Engineering through the Greater State Fund.

The College of Engineering appreciates the generosity of alumni and friends who have made gifts to the College, and asks that you encourage others to contribute. All donations should be made payable to the SDSU Foundation and designated for the College of Engineering. Mail to: **SDSU Foundation, Box 525, Brookings, SD 57007**

Name _____ Phone (_____) _____-_____

Address _____

City _____ State _____ Zip _____

Present employment _____

Amount of Gift Enclosed $ _____

Contribution preference _____
(i.e., research, scholarships, etc.)

Who am I?
Contest Winners

You guessed from Dean Duane Sander to SDSU President Robert Wagner to Vivian Volstorff ... but only two alums figured out that the dashing damsel on the back cover of the Summer 1996 issue of Impulse was none other than Larry Browning, associate professor of physics.

First place winner is **Dustin Simonson,** a 1993 graduate in physics. Second place winner is **Douglas Lucht,** who received his master's degree in 1995.

Congratulations to the winners and our thanks to everyone who not only offered a guess, but provided us with some alumni news!

Contributors

■ We recognize that support from our alumni, corporate donors, and friends has come to be essential to institutions of higher education. Contributions have made possible the development of activities that have won recognition for the SDSU College of Engineering as one of the nation's leaders in engineering education.

We have benefited and those who have been generous in their gifts share with us the satisfaction that comes from achievements of our faculty and students.

Look for the Greater State Fund contributor listing in the Summer 1997 issue of Impulse.

Alumni *notes ....*

Raymond Strom, BSME'51, passed away April 24, 1996, at the age of seventy.

Herbert Blake, BSEE'58, retired from General Electric after thirty-two years of service as an electronic design engineer and design engineering manager. He lives in Merritt Island, Florida.

Ronald Green, BSEE'58, is trying to get used to his forced retirement due to a disability. Green writes: "We both liked the desert so we moved to the Phoenix area. Winters are great here—no snow! Traveling is part of my rehab plan and I plan to be back in October during pheasant season. Looking for old friends to call and drop in for a visit this winter."

Darrel Reinke, BS'71 & MEd'79, after ten years as an investment executive, is now a vice president at Piper Jaffray.

Robert Renner, BS'73 & MS'75, began his new duties in May as deputy executive director of the American Water Works Association (AWWA). Robert is a principal and vice-president of Process Applications, a consulting firm in Fort Collins, Colorado.

Al Crowser, BSEE'81, is general manager of Alexandria Light & Power in Alexandria, Minn. He is a board member/planning committee representative for the Western Minnesota Municipal Power Agency.

Kris, BSAE'84 & MSAE'86, and Kelly Kohl, BSEE'85, are living in Storm Lake, Iowa. Kris still works for Iowa State University Extension Service as agricultural engineer for the fourteen counties in northwest Iowa. The hot issues are hog buildings and manure management. Kelly home-schools their seven children: Rose, Grace, Pearl, Kurt, Fern, Kit and Ken.

Keith Muhl, BSME'84, has started a contract electronics and magnetics company in Watertown. Newava Technology supports OEMs and component manufacturers in the areas of custom transformers, chokes and inductors, wire and cable assemblies, and hand solder PCB assemblies. Mulh planned to speak at the Assembly Technology Expo in Chicago in September on how smaller manufacturers handle automation costs and implementation. **Susan Runchey Muhl '85** had the couple's third child, Kaitlyn, on August 8, 1996.

Janet Fulton '84 is a teacher for the alternative school in Mora, Minnesota. The Neimanns are currently looking for housing in the Foley, Minn., area where Al will be the high school principal in Fall of 1996. They have three children, Amanda, Justin, and Jason.

Stacey Wahlstrom, BSEE'86, accepted a promotion and company transfer to the Silicon Valley of Northern California. He is design center manager at Wyle Electronics, an integrated circuit distributor, in Santa Clara, California. His wife, Efie, is a part-time software instructor at Gavilan College in Gilroy, Calif. Stacey, Efie, and their two daughters, Erika and Krista, live in Gilroy.

Jonathan Tolstedt, BSEE'88, has accepted a position as senior design engineer with Phoenix International in Fargo, North Dakota. Jonathan has been a software design engineer with the Collins Avionics Division of Rockwell in Cedar Rapids, Iowa, for the past seven-and-a-half years. Jonathan will live in Fargo with his wife, Margy, and their son, Maxwell.

Hock H. Heng, BS'89 & MS'89, received his Ph.D. in environmental engineering from the University of Connecticut, Storrs, in May 1996. He is currently a hydrologist/engineer in a consulting firm in Kuala Lumpur, Malaysia.

Chung Hee Goh, BSEE'90, is working for Novellus Systems, a San Jose, California, base semiconductor equipment manufacturing company. Chung is living in Singapore.

Matthew DeWitte, ME'92, and his wife, Yvonne, have moved to Eau Claire, Wisconsin. Matthew is working for National Presto, Inc., as a design engineer.

Tamara, BS'92, and Eric Salverson, BS'93, have moved to Luverne, Minnesota. Eric is employed by Berkely Information Services as a computer programmer/analyst.

Dustin Simonson, BS'93, is working for Los Alamos Technical Associates as a technical support contractor to the Department of Energy Headquarters in Germantown, Maryland. His work centers on radiation protection at DOE research accelerators around the country. He plans to begin a Ph.D. program in medical physics in the fall of 1997 or 1998. Dustin received his master's degree in hazardous waste management and health physics in 1994.

Douglas Lucht, MS'95, has been living in the Twin Cities area for the past year and is working for Wold Architects & Engineers.

■ **O.R. "Bob" Brancel, BSEE'58,** died August 9, 1996, at his home in Pierre of a heart attack. After his graduation from SDSU and his military discharge in 1961, he was employed by Martin-Marietta Corporation in the Aerospace Division as an electrical engineer. He worked at various engineering and management positions in the aerospace industry until 1972, when he returned to Pierre and began working for Pierre National Bank (currently BankWest). He retired from BankWest as executive vice president in 1991. At the time of his death, Bob was serving as a member of the South Dakota Board of Regents.

We want to **hear** *from you!*

We want to hear from you! Have you moved, accepted a new position, gotten married, given talks in your community, received an advanced degree or had an addition to your family? Everyone at the College of Engineering and your classmates want to know what has been happening with you.

Name_____ Year Graduated_____

Address_____

City/State/Zip _____

Telephone (_____) _____ Degree _____

Send to: College of Engineering
South Dakota State University
Box 2219
Brookings SD 57007-0096 phone (605) 688-4161

Phonathon

Feb. 9 - 14, 1997

California native chairs SDSU Engineering Phonathon

Under the organization of Steve Olson, Jr., students in the College of Engineering will burn up the phone lines in an effort to raise $125,000 during the school's annual phonathon, February 9 through 14.

Olson, a senior mechanical engineering student from Poway, California, is this year's phonathon chair. A veteran caller himself, Olson's main task is organization. "I organize people to organize the phonathon," he said. "I recruit people to help set up committees, and the committees actually run it."

For each of the six nights of calling, there are two shifts with thirty-five to forty callers per shift. Olson will do some phone work, too. "I really enjoy calling," Olson said. "I get to talk to people who've been through what I'm going through." Callers inform alumni of happenings within the College, as well as intended uses for their donations. As an added perk, students often receive job leads and internship information.

Olson came to SDSU thanks to a swimming scholarship and the former program that allowed children of out-of-state alumni to attend SDSU at resident tuition rates. His mother, Rae (Ruff) Olson, graduated from the College of Home Economics in 1967.

Olson preferred SDSU over larger schools near home because of what the school—and the state—had to offer. "I liked the swimming program, and the fact that the school is so people-oriented. You just don't get that at bigger schools," Olson said. "I also liked the wide open spaces. At home you drive from town to town and you don't realize it because they all run together." Even the extreme changes in weather throughout the year haven't soured Olson on his South Dakota surroundings. "Winter isn't so bad," he said. "It could be a lot worse."

During school breaks that aren't long enough time to allow travel to California, Olson is still able to visit family by trekking to Miller, where his grandparents, John and Doris Ruff, live. Even during some of his longer breaks, like summer vacation, Olson has opted to stay in Brookings, working on the line at Larson Manufacturing, and as a student designer at Daktronics. He is currently employed in the Industrial Assessment Center in the Department of Mechanical Engineering.

SDSU

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COLLEGE OF ENGINEERING
Crothers Engineering Hall
Brookings, South Dakota 57007

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