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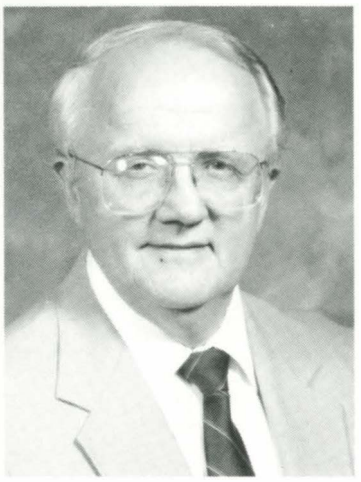
IMPULSE

SUMMER 1995

SOUTH DAKOTA STATE UNIVERSITY
COLLEGE OF ENGINEERING, BROOKINGS



Dear Alumni:

The College of Engineering, through on-campus and off-campus programs, has impacted many individuals and organizations throughout our state and region. This issue of the IMPULSE attempts, through representative illustrations, to show the many ways our faculty, staff and students have contributed to the educational, technical and entrepreneurial aspirations of people and organizations.

The practical application of science, engineering and technology to develop products, develop and improve manufacturing processes and protect our environment and natural resources, supports the entrepreneurial drive and ingenuity of the people in our region. This is important as we strive to develop more value-added products to our regional economy. Our role is to first train scientists, engineers and technologists who can provide practical and economical solutions and ideas not only to industry, but to governments and organizations that provide the infrastucture (such as roads, communications, structures, etc.) necessary for industry to function.

Second, our faculty and staff continually help state and local governments and industry through coordination of student projects, research and direct assistance. In a growing number of cases, our faculty are working with local organizations and entrepreneurs to support and assist the establishment of viable companies to produce and market a product or service. We feel these efforts not only provide a service to individuals and organizations, they challenge our faculty and students. The projects provide excellent practical problems and challenges to integrate into theoretical discussions in the classroom.

I am also pleased to report that we are now working with an architecture and engineering firm to study the present and projected space needs of the college, the most efficient use of present facilities and the need for future space. We should have some exciting plans to report to you this fall, when the study is completed.

Please read through this issue and see what we are doing. If you have further suggestions for the College, drop us a line or, better yet, stop in and visit.

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

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ABOUT THE COVER: The College of Engineering's outreach activities spread across the campus and the state as this aerial view of the campus and Brookings community does. Through projects, seminars and research the college impacts education, business and industry

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College of Engineering impact felt throughout the state

No matter where you travel in South Dakota, you're bound to run into someone who has been positively impacted by the South Dakota State University College of Engineering.

Whether training people to properly maintain gravel roads, providing an education for students outside Brookings, helping update companies on new Occupational Safety and Health Administration (OSHA) regulations or assisting with equipment design, the College does what it can to improve the state.

UITS helps develop new production process

One of the industries that requested assistance was ENERCEPT, an insulated building panel manufacturer in Watertown. The adhesive ENERCEPT used to laminate was to be discontinued by its supplier.

"To continue their manufacturing process, the only adhesive that would work for ENERCEPT required continuous pressure during assembly," said Mike Monnens, project engineer for the SDSU University/Industry Technology Service (UITS). "They approached us for help to design a machine to do this."

That call for help was answered, ENERCEPT executive vice president Ken Norberg said.

"We developed a completely new production process in an extraordinarily short amount of time and it's working beyond our expectations," Norberg said. "To design automated equipment and have it work right out of the chute is almost unheard of."

Monnens, Brian Brandriet from 81 Welding in Watertown and ENERCEPT employees started formulating a plan in late February; by June 15 the equipment was in production. Conservatively, this equipment provides production capability increases of 30 to 40 percent with the same number of employees.

"This equipment puts us in a capability range to do other types of products, so we don't know its full beneficial effect yet," Norberg said.

"Mike did an outstanding job for us. He wasn't just a consultant on the project, he took ownership of it and became part of the team. He continues to work with us to make sure everything is going smoothly."

Engineering Extension provides friendly, on-site safety inspections

SDSU Engineering Extension helps industries run smoothly by providing on-site inspections and keeping them up-to-date on new OSHA regulations.

Ray Paradis, manufacturing manager of TRAIL-EZE, a trailer manufacturer in Mitchell, Corsica and Platte, said his company has benefited from its 10-year relationship with Engineering Extension.

"We work on a lot better terms with SDSU than with OSHA," Paradis said. "They give as detailed or more of an inspection than OSHA, but it's all done on a friendly basis. They come out every year and do an annual review and follow-up.

"They do a thorough job of testing for contaminants in the air, noise level and related safety issues. I think the

"They do a thorough job of testing for contaminants in the air, noise level and related safety issues."

employees feel more safe working here because we're tested frequently and they can look at the results when they're posted."

On the road again with gravel workshops

Well-maintained roads make people feel safer, too, especially in the rural areas of the state. To assist personnel with this task, the SDSU Transportation Technology Transfer Service (T3S) conducts workshops on road maintenance and proper sign placement.

At a recent gravel maintenance course at Delapre Township in Lincoln County near Tea, T3S field services manager Ken Skorseth explained different aspects of road maintenance. "I've had a number of operators tell me they've never understood how to put a proper crown on gravel roads before, but after the workshop, they know," Skorseth said. "Also, I get comments when I tell them how to spread gravel on a road so a certain amount will stay even after rains or heavy traffic. No one had ever explained it to them before."

Delapre Township supervisor Al Schroeder found the course beneficial. "As traffic changes, the amount of maintenance required is greater," he said. "Our operator is maintaining our roads almost weekly. I feel whatever training we can get is always helpful."

In a heart beat; good measure with the School of Medicine

The College of Engineering also cooperates with other entities for the benefit of both. In one project for the University of South Dakota's School of Medicine, a system was created that processes information about blood vessels.

The School of Medicine is studying rabbit aortas to find different ways to treat coronary heart disease. The school had videotape of aortas, but couldn't measure changes occurring during a heartbeat. SDSU students Vijayalakshmi Ranganna and Judie Chen, under the direction of associate professor of electrical engineering Dennis Helder, created a system that captured, digitized and analyzed the images.

"We are quite pleased with the students' work," said Kaia Kloster, research associate for the USD School of Medicine in Sioux Falls. "The accuracy of measurements will increase and the data collection will be better. I showed my supervisor and he was very excited because he thought there may be other hospital applications in the future."

Below: Ray Paradis, manufacturing manager of TRAIL-EZE in Mitchell, Corsica and Platte, shows one of his company's semi trailers. TRAIL-EZE works with Engineering Extension to meet OSHA standards.
Bottom: Road supervisors learn about gravel maintenance at a workshop sponsored by the SDSU Transportation and Technology Transfer Service.

"I found the SDSU program to be practical-oriented, not just theory-oriented."

The students put together the hardware and software and provided a step-by-step handbook — all in the span of three months.

RDTN on-site masters program for industrial management

Other students don't have the luxury of traveling to Brookings to earn their degrees. To accommodate these students, the SDSU College of Engineering offers master of science in industrial management degrees in Sioux Falls, Pierre and other locations through on-site classes and Rural Development Telecommunications Network links.

Lon Clemensen, vice president of human resources for Norwest Bank in Sioux Falls, said he wouldn't have earned his master's degree without this program.

"I started thinking about the program when Dean Sander and program coordinator Frank Kornbaum came to Norwest to explain it," Clemensen said. "What sold me was the flexibility of coursework, both in the core courses and in the electives."

Clemensen began classes in fall 1991, taking one each semester and attending summer school. He completed his coursework in fall 1994 and defended his thesis this June. "In my job, I'm not only involved with financial matters, but also with computers and human relations," he said. "As part of my coursework, I took counseling, psychology and financial courses which I've had the opportunity to apply at work."

The group that started the Sioux Falls program in 1991 became close-knit, Clemensen said.

"What I miss most about being done is the interaction with professors and students," he said. "I found the SDSU program to be practical-oriented, not just theory-oriented.

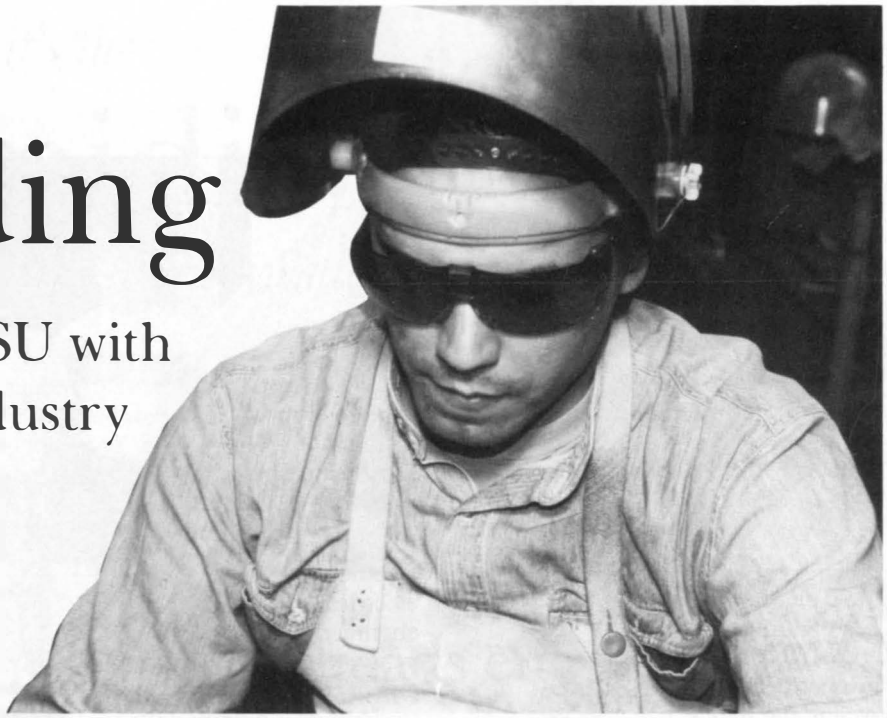
"I feel my job has been enhanced because of the background information and principles I've learned that can be applied to everyday decision making."

"The purpose of the College of Engineering is not only to teach students, but to impact business and industry in South Dakota and the surrounding area through our projects, seminars and research," engineering dean Duane Sander said.

Sioux Falls Norwest Bank vault teller Debbie Richter and vice president of human resources Lon Clemensen ensure the safety of the bank's money. Clemensen recently earned his master's degree in industrial management through an SDSU program offered in Sioux Falls.

Welding

binds SDSU with community, industry



Many Brookings industries are constantly short of welders. This inspired SDSU and the Brookings community and industry to start a welder training program.

The program began in December 1994 through SDSU's General Engineering Department. The majority of its graduates are already working in local industry.

A major problem the program faced was that there were not enough wire feed welders (the type that industry uses) to adequately teach the students. Recognizing this need, the Brookings Area Development Corporation donated the funds to buy an additional welder.

"With SDSU developing an excellent facility, the next problem came with a shortage of power sources. We decided to help," said Don Patrick of the Brookings Area Development Corporation.

A shortage of welders in the department still exists, however. Local industries have loaned four welders, but, according to general engineering instructor Roger Svec, the program needs five more to attain full capabilities.

Svec said they would eventually like to have different brands of welders to provide more diverse training. "This is a long-term commitment," Patrick said, because the need for welders is growing. Twin City Fan is currently doubling their facilities and many other companies are expanding.

"We have hired several students from the course who are now welding for us," said Barb Teal of Twin City Fan and Blower. "There is still a shortage."

The 80-hour training program is funded by the Job Partnership Training Act for qualifying students. Qualifications are based on mechanical aptitude and interest; a high school diploma or a GED is required. Students learn by doing and start welding the first day of class.

"It's important to get them started as soon as possible," Svec said. "You can't teach a person how to use a compass until they're lost, and the same goes for welding."

This is especially true of the class Svec is teaching now, because no one had any previous welding training.

"I think the information is complete and there is always room to ask questions," welding student Mark Hubert said. "Other courses cost $3,200 and money isn't always really accessible."

"The instructors are great," said welding student Gordon Redday. "It's a good opportunity to start a new career."

The program was made possible through the Brookings Area Development Corporation, the Career Learning Center, Job Service, local industry and SDSU.

For more information, contact Jane Kono at the Career Learning Center, 688-4370.

SDSU general engineering instructor Roger Svec, left, and Don Patrick of the Brookings Area Development Corporation look at one of the machines used in SDSU's new welder training program.

Engineering students create moving sign

A piece of South Dakota State University will be traveling the state's highways by early this fall.

SDSU senior engineering students, under advisors Alfred Andrawis in electrical engineering and Kurt Bassett and Don Froehlich in mechanical engineering, created a 750-pound Mobile Sign Support vehicle that is battery-operated and can be remote controlled by a flag person on a road construction crew.

During road maintenance, a "Flag Man Ahead" sign must be placed at the beginning of the work area. Now, crew members must move the sign as construction moves along, which takes them away from their jobs and puts them in potentially-dangerous situations.

The South Dakota Department of Transportation (DOT) asked students from SDSU and the South Dakota School of Mines and Technology to design a moving sign to lower the risk for highway crews.

"When workers move the sign, there is a time period when the sign isn't displayed," said Jon Becker, project engineer in the DOT Office of Research. "That's what we're trying to avoid."

The SDSU vehicle is 4.5 feet wide, 5.5 feet long and 2 feet high. It can operate for 12 hours before its batteries need recharging and withstand temperatures as high as 140 degrees and winds up to 80 miles per hour. It can climb a 6 percent grade, is easily serviceable and can be operated with one hand by a flag person 1,200 feet away.

Bryan Seaver, a senior electrical engineering major, was one of the students who designed the wireless remote control link to the vehicle.

"It was a lot harder than I thought," Seaver said. "You can have an idea for something, but putting it down on paper so other people can understand it is very hard."

Andrawis said the students learned about communication.

"They each took responsibility for their part of the project," he said. "Each group made sure their designs worked with everyone else's designs. They met at least once a week to update each other."

Now that the vehicle has been built, the DOT will test it in Pierre.

"We will make sure the vehicle passes several tests," Becker said. "For example, it has to be able to hold itself parked on a grade. After we are satisfied with it, it will be taken out to a work zone and tested there. Workers will be trained to use it and will be able to make suggestions."

The DOT in Sweden has developed a full-size remote control vehicle that pulls a trailer with a sign. Minnesota's DOT has developed a full-size remote control vehicle which is used as a crash cushion on work zones. Becker said the South Dakota vehicle is more lightweight and less expensive.

Senior engineering students Pat Smith, Mike Peterson and Bryan Seaver, as shown in top photo, display the remote-controlled Mobile Sign Support Vehicle they designed under the guidance of advisors Alfred Andrawis and Don Froehlich.

"Some other places have attempted this on a much larger scale," he said. "This is a less costly approach that will pay off in safety."

The ultimate goal is to design a vehicle that can be manufactured for less than $6,000 and be used at DOT work zones throughout the state.

It's not so much the heat it's the

humidity

Galipeau devises new humidity sensor

Before blaming the hot, uncomfortable stickiness of summer on humidity, consult David Galipeau's new humidity sensor. Galipeau, assistant professor of electrical engineering at SDSU, is the owner of Microconversion Technologies Company in Brookings.

Galipeau's company received a six-month $65,000 Small Business Innovation Research (SBIR) Phase I Award from the National Science Foundation to build a better humidity sensor. Microconversion Technologies is researching the development of a high-precision ultrasonic chilled-surface dew point sensor that is less subject to aging than low-cost sensors. This sensor could be useful for companies that manufacture electrical or integrated circuits.

"Humidity is a contaminant which can prevent these devises from working," Galipeau said. "Weather forecasters, climatologists, paper producers and farmers would also find the sensor useful."

Galipeau received his bachelor's degree in electrical engineering at the University of Rhode Island, Kingston. He gained several years of industrial experience working for AT&T before earning his master's and doctoral degrees at the University of Maine, Orono. Galipeau has taught at SDSU since 1992.

The key product of Microconversion Technologies will be the dew point sensor they are researching and developing. The six months of research ended July 31, Galipeau said, and a final report will be drawn up and the results analyzed. If the feasibility study is successful, the company may apply for a two-year Phase II award of up to $300,000 to create a prototype of the sensor.

SBIR is a federal program designed to assist small businesses research and develop new technologies and products. There are 11 federal agencies that offer the program to small businesses, which can receive up to $100,000 to conduct six-month feasibility studies.

Microconversion Technologies Company employs four SDSU students.

Alumnus heads engineering building project

He attended classes in Solberg and Crothers Engineering Halls. Now, Dick Gustaf is project manager for the new SDSU Engineering Complex.

A 1973 SDSU mechanical engineering graduate, Gustaf is a principal of Spitznagel Inc. in Sioux Falls, the architectural firm that with Ellerbe Beckett Inc. of Minneapolis, Minn., is developing plans for the new building and remodeling of current facilities.

"As a high school graduate going to college at SDSU, I developed a tremendous amount of respect for the intelligence and capability of these professors," Gustaf said. "It's absolutely sheer pleasure that I can help them out after they helped me so much."

College of Engineering Dean Duane Sander said he is anxious to see the results of the space utilization master plan that will be completed this summer.

"I'm looking forward to the plans from the architects that will provide us with new space as well as renovating existing space," Sander said. "This will help us to more efficiently pursue our missions of teaching, research and service with state-of-the-art technology."

Spitznagel and Ellerbe Becket representatives have met with the dean, department heads and faculty members to address the College's needs and its vision for the next 10 years.

"It's very apparent that the College needs more space and to improve its facilities," Gustaf said. "I observed a strong need to improve facilities for professors and researchers of this caliber."

The Spitznagel, Ellerbe Beckett team will present its preliminary findings to Sander and SDSU administrative officials in early August. During the August Board of Regents planning session, the team will outline the results of the space utilization plan and give an overview of the College's needs and estimated project cost.

During the October Board of Regents meeting, Spitznagel, Ellerbe Becket will give its final presentation with a complete layout of new and remodeled space. The presentation will include a time table for completing the project in phases.

"I feel extremely fortunate to come back to the place where I learned the fundamentals for my current job," Gustaf said. "I'm excited to get a chance to work with those I hold in such high regard."

"This is really the experience of a life time," Andrawis said. "For Quentin, it will expose him to a work environment not many people ever get ."

Andrawis, Flippin spend summer researching at NASA

SDSU senior Quentin Flippin and assistant professor Alfred Andrawis, right, worked together at Kennedy Space Center this summer, researching and implementing the conversion of television links connecting the space shuttle launch pad to the control room monitors from analog to digital.

Working at NASA is an engineer's dream. For Alfred Andrawis and Quentin Flippin, it's a dream come true.

Andrawis, an SDSU electrical engineering assistant professor, and Flippin, a senior SDSU electrical engineering student, worked at Kennedy Space Center in Cape Canaveral, Fla.

Only 20 professors and five college students are selected each summer to work in one of NASA's many research labs.

"It's such a great opportunity to work with the most up-to-date lab equipment, advanced technology and qualified professionals you could ever find," Andrawis said. "You can't beat it. I worked at NASA last summer and I am deeply honored to be able to work there again, as well as bring one of my students to assist me."

Flippin was selected as a NASA intern after successfully completing a two-step process. First, he wrote a proposal to the South Dakota Space Grant Consortium asking them to fund half of his internship. After they accepted, he wrote a proposal to NASA asking them to fund the other half.

"When I received word they had accepted me, I was excited and overwhelmed, to say the least," Flippin said. "Other than that, I was just full of joy. This has been a dream of mine since I was a little kid. Now that it has come true, I plan to make the most of it."

Flippin worked directly under Andrawis' supervision in NASA's fiber optics and communications laboratory. Together, they researched and implemented the conversion of television links connecting the space shuttle launch pad to the control room monitors from analog to digital.

They hope to make the actual conversion by the end of the summer, Andrawis said. If they can't, he said, they will make recommendations on whether or not the project is feasible. If it is, they will provide details on how to carry it out.

"This is really the experience of a life time," Andrawis said. "For Quentin, it will expose him to a work environment not many people ever get to experience and provide him leverage when he looks for a job after graduation. For myself, it gives me more practical experience in the latest technology that I can bring back to SDSU."

A member of SDSU's faculty since 1984, Andrawis received his bachelor of science in electrical engineering from Alexandria University, his master's in electrical engineering from SDSU and his doctorate from Virginia Tech.

SDSU landscape architect wins Summer Faculty Fellowship at EROS

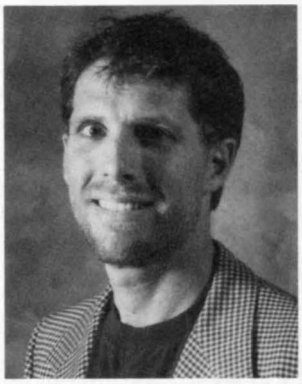
"We want to document existing conservation lands and native plant and animal species' habitats to find out if the conservation lands actually service the intended species,"

David Gilbertson has broken new ground. He is the first landscape architect — and the first faculty member from the SDSU College of Agriculture and Biological Sciences — to win the Summer Faculty Fellowship at EROS Data Center. Gilbertson has been an assistant professor of landscape design at SDSU since 1993.

The Summer Faculty Fellowship is funded by the South Dakota Space Grant Consortium, a joint program between NASA, SDSU and the South Dakota School of Mines and Technology. During his 10-week stay at EROS, Gilbertson primarily performed bio-diversity mapping and analysis.

"We want to document existing conservation lands and native plant and animal species' habitats to find out if the conservation lands actually service the intended species," Gilbertson said. "If not, policy makers can use computer 'smart maps' and consider moving existing conservation lands or establishing new ones."

Smart maps are created through a digitized drawing process called a Geographic Information System (GIS). EROS scientists can access or create maps of specific properties they want to study. They then develop overlays that show information categories, such as vegetation or wetlands, or add any other information they want to include, such as wildlife habitats, to make a composite map of the property. Because GIS is also available at SDSU, Gilbertson hopes to collaborate with EROS and promote the use of GIS as a research tool for faculty and students.



David Gilbertson

Kevin Kleinjan

Objectives of the South Dakota Space Grant Consortium are to engage faculty members in EROS research programs, to establish continuing relationships among faculty members and their professional peers at EROS and to enhance the research interests and capabilities of science and engineering faculty members.

"This is quite an opportunity to develop a professional relationship with specialists at EROS. They can become familiar with what I do, and I can fit into what they do," Gilbertson said. His experience will also benefit SDSU students who use a computer-aided teaching facility and GIS software to design environmentally-sound landscapes.

Working with Gilbertson this summer was Kevin Kleinjan, a senior SDSU landscape design and geography major. Kleinjan was awarded a $2,000 South Dakota Space Grant Consortium Undergraduate Research Assistantship to begin producing a multi-media GIS data set for the Brookings Historic Preservation Commission.

Looking at 12 blocks in one of the city's historic neighborhoods, Kleinjan assembled existing data from a variety of city and/or county agencies and EROS. The data included: aerial photographs and/or satellite images; city plat maps; the assessor's data base; any existing surveys of record; infrastructure and utility information; old maps, drawings or Sanborn Insurance maps that show building footprints; new or historic photographs of home and streetscapes; and written historical narratives. Kleinjan produced any drawings, maps or photographs needed to complete the study area. Overlays of the data categories can then be used for historic preservation planning and analysis.

"The eight-week summer research grant provided a way for me to learn more about GIS and its applications," Kleinjan said. "It gave me the opportunity to get more background and experience that will open doors and help with future career decisions." Eventually, Gilbertson would like to see the process continued to the rest of the historic neighborhoods, then on to the entire city. In addition to the Historic Preservation Commission, the digital data set could be used as a decision-making tool by city engineers, the planning and zoning commission, elected and volunteer commissioners, public safety officials, economic development groups, the real estate industry and for marketing applications. The process can be applied to the county and beyond to address rural economic development and sustainable agriculture issues, such as precision farming.

"Ultimately, the sky's the limit," Gilbertson said. He and the Historic Preservation Commission have applied for a $35,000 grant that would provide for the acquisition of two computer work stations, one at city hall for inter-agency use by officials and one at the Brookings Public Library for public use.

South Dakota's space involvement highlighted at

Space Day

South Dakota may be a long way from the moon, but people in the state benefit from the everyday applications of space research.

To celebrate this connection, the South Dakota Space Grant Consortium at SDSU and the South Dakota School of Mines and Technology sponsored South Dakota Space Day April 6 in Pierre.

"We want to increase public awareness of space-related activities in South Dakota," said Dennis Helder, director of SDSU's Space Grant Consortium and associate professor of electrical engineering. "We also want to excite students about a very interesting field of study."

The highlight of Space Day was the speech by South Dakota's own astronaut, Lt. Col. Charles Gemar to middle school students across the state at Rural Development Telecommunications Network sites. He also spoke at the Pierre Chamber of Commerce Conference Room.

Space-related displays were available for viewing in the South Dakota Discovery Center. Booths provided information on a variety of topics, including the Space Grant Consortium, the SDSU engineering students balloon project, NASA/SDSU food research, SDSU's Image Processing Lab and Astrophysics and Space Science Lab and SDSU's use of global positioning equipment for precision agriculture.

Space Day included presentations for K-12 students and the public given by the following SDSU personnel:

- "Correcting Satellite Image Errors," Dennis Helder, director of SDSU's Space Grant Consortium
- "Effects of Irradiation on Apples," Andrew Schmidt, nutrition and food science graduate student
- "An Overview of the Space Grant Consortium Balloon Project," Tom Mittan and Andy Giddings, electrical engineering graduate students
- "Speeding Up Image Processing Applications on Parallel Workstations," Sung Shin, assistant professor of computer science
- "Expert Systems Applications in Image Processing," Ali Salehnia, associate professor of computer science.

Students and faculty from the SDSU College of Engineering participate in South Dakota Space Day in Pierre. South Dakota's own astronaut, Lt. Col. Charles Gemar, was one of the highlights of the day.

Up up and away

Graduate students coordinate South Dakota Space Grant Consortium balloon project

James Feldermann and Joseph "Andy" Giddings, graduate students majoring in industrial management at SDSU, have been named 1995-96 South Dakota Space Grant Consortium balloon project leaders.

The project is a cooperative effort between students at SDSU and the South Dakota School of Mines and Technology. As coordinators, Feldermann and Giddings will supervise a team of undergraduate engineering students as they plan and conduct the launch and tracking of a high altitude research balloon.

In its third year, the balloon project provides practical experience in working cooperatively for all students involved, Giddings said. "This project gives you more realistic experience than sitting and doing problems in the lab," he said. "Hundreds of items pop up out of nowhere that can change the way things operate, and you have to work together to deal with them. It's good job experience that way."

The project also promotes math and science to younger students by soliciting experiment ideas from middle schools in South Dakota, Feldermann said. The engineering students working on the project then choose and design an experiment to send up with the balloon.

"I see so many youths who couldn't care less about math and science," Feldermann said. "I would like to do all I can to prepare them for a future in math and science. It's a worthy project and the goals are worthy things to do."

Feldermann and Giddings receive a $7,500 stipend and reduced tuition during the year of the project.

Byron Garry, instructor in the Department of General Engineering, said Feldermann has the experience, intellect and talent to direct the balloon project well. "He has always shown a lot of understanding of the big picture, and that helps him know what has to be done and when."

Feldermann earned his bachelor's in electronic engineering technology from SDSU in May 1995. He also holds associate degrees in math and engineering from Pierce College in Tacoma, Wash., and in electronic engineering technology from the Community College of the Air Force, Maxwell Air Force Base, Ala.

He has extensive supervisory experience in the military, including positions at Ellsworth Air Force Base, Al Karj Air Base in Saudi Arabia, and Pruem and Zweibrucken air bases in Germany. He intends to focus his graduate work on aerospace studies, a field he has been interested in since working as an electronics technician at Cape Canaveral Air Force Station.

Feldermann and his wife, Julie (Stibral), have one son and expect another child this fall.

Giddings is a hard worker and strong student, said his adviser Dr. Jerry Sorenson, acting head of the Department of General Engineering. "One of his greatest attributes is his diverse background," Sorenson said. "As a result, he has a broader perspective than a lot of students."

Giddings earned his bachelor's in electronic engineering technology from SDSU in May 1995 and holds an associate degree in applied science/biomedical engineering from Regis College in Denver, Colo.

He has worked in various fields, ranging from military to medical. As an undergraduate, he participated in the first two balloon projects as a coordinator and a power systems engineer, which confirmed his interest in aerospace technology.

James Feldermann

Joseph "Andy" Giddings

NASA space grants fund undergraduate research assistantships

NASA funds $2,000 South Dakota Space Grant Consortium eight-week undergraduate research assistantships to encourage students to pursue careers in fields related to aeronautics or space. Recipients participate in aerospace-related research projects under the guidance of faculty mentors. A project might be part of the professor's ongoing research or a separate research activity developed jointly by the student and the faculty mentor.

Along with Kevin Kleinjan, who is featured with professor David Gilbertson in a story on page 11, and Quentin Flippin, featured with professor Alfred Andrawis on page 10, South Dakota Space Grant Consortium Undergraduate Research Assistantships were also awarded to Dan Nesthus, Jason Schuetz and Steve Fox. Here are their stories.

Nesthus to research gas sensors

The Apollo 13 mission had to alter its flight plans when a problem occurred in the oxygen tanks. To help avoid similar problems, NASA is interested in developing sensors that can detect small gas leaks.

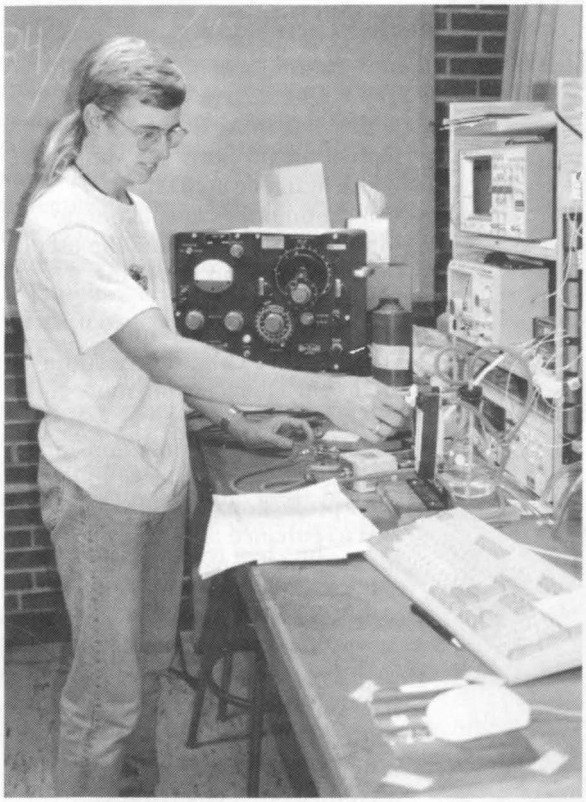
"With the space shuttle, there are many lines in the system that carry fuel to the engine," said Dan Nesthus, a senior electrical engineering major who has tested polymers (plastics) that detect hydrocarbon gases like those used in the oil industry. "If seals leak, there could be a potential problem. If NASA had a sensor that could register leaks in parts per million, they could potentially avoid those problems."

The main advantage of using a gas sensor is time savings. Most testing is done by taking samples and analyzing them in a lab. With sensors, readings can be taken on site.

"Sensors need to be tested for sensitivity, selectivity and long- and short-term stability so results can be reproduced," said David Galipeau, assistant professor of electrical engineering and Nesthus' supervisor. "Now, we're doing the initial phase of sensitivity and selectivity."

Nesthus' results show that the sensor can detect the presence of various hydrocarbon gases, but cannot determine its type. Galipeau is working with a polymer chemist from IBM to identify other polymers that may be more selective to these gases. They will analyze current results and determine what research should be conducted next.

The information gathered could also be used by the oil industry to detect leaks, assist in the production process and help protect workers' safety.



Senior electrical engineering major Dan Nesthus tested polymers that detect hydrocarbon gases through a South Dakota Space Grant Consortium undergraduate research assistantship funded by NASA.

Schuetz spends summer playing with fire

Jason Schuetz, a senior mechanical engineering major, spent the summer playing with fire.

Using a specially-equipped propane burner and a Schlieren optical system, Schuetz observes the effects of annular counterflow, or suction applied around a flame. It has been shown that premixing fuel and air in gas turbines increases combustion efficiency, that postmixing of exhaust in these engines can reduce production of nitrous oxides and enhanced mixing in jet engine exhaust systems could lead to significant reductions of noise pollution and make military aircraft more difficult to detect on an infrared scanner by reducing the temperature of the aircraft exhaust.

Schuetz is studying the potential of using counterflow to enhance combustion. He expects the results of his research to lead to a better understanding of using counterflow to control the mixing of reacting jets.

"This is a great opportunity for me to learn how to conduct research," Schuetz said. "It's been a

Senior mechanical engineering major Jason Schuetz' research involved observing the effects of annular counterflow.

slow process, but that's to be expected. All in all, it's been enjoyable and interesting."

Ross Wilcoxon, Schuetz's faculty mentor, helped formulate the plan for the project.

"Jason is learning to set up an experiment," Wilcoxon said. "He is trying to affect and control how propane burns to make it more efficient with less pollution."

An adviser to Schuetz, Donell Froehlich, SDSU professor and head of Mechanical Engineering, said Schuetz' research could prove especially beneficial to the aerospace industry for use in rockets and planes.

Fox assists with remote sensing research

For Steve Fox, a junior engineering physics and mathematics major, the assistantship is a perfect fit with his current interests and future plans.

"I'm interested in a career in astronomy, so this assistantship will help me learn the basic terminology and become familiar with the solar and earth coordinate systems. It will also help clarify my career choice," he said.

Fox's faculty mentor is Stephen Schiller, associate professor in the SDSU Department of Physics. Schiller, who holds a doctorate in astrophysics, has worked with NASA for five years on a remote sensing project important to "Mission Planet Earth," which involves developing a satellite earth observation system.

Because of Schiller's experience and background, he was invited to collaborate with NASA scientists on a remote sensing project to correct for atmospheric effects in satellite images of the earth's surface.

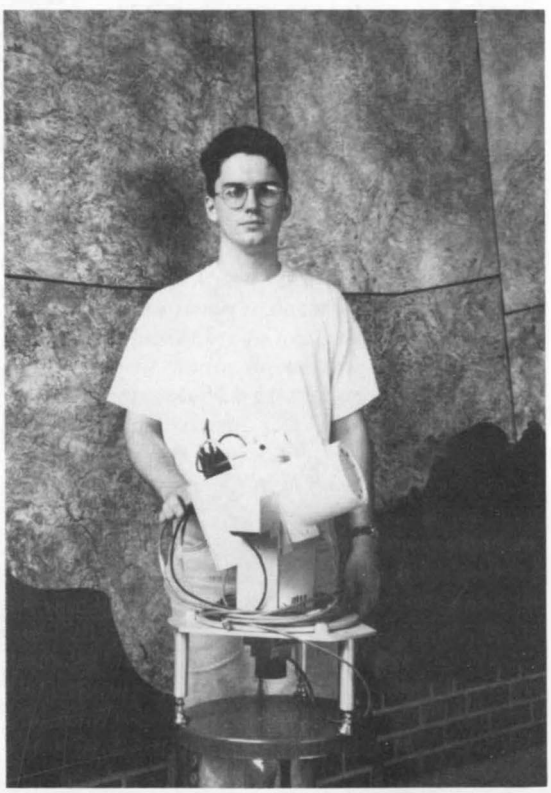
Marshall Space Flight Center in Huntsville, Ala., awarded Schiller a grant to construct an instrument package to monitor the atmospheric conditions from the ground during a satellite overpass. As the satellite takes photos of the earth, the instruments take photometric and spectroscopic observations from the ground to measure the amount of direct and scattered solar radiation reaching the earth's surface. The initial system was constructed last fall. Fox and Schiller tested the accuracy of two components of that system. Using a sun photometer and a shadowband solar spectroradiometer to measure the intensity of 10 wavelengths of direct sunlight reaching the earth's surface, Fox collected and calibrated data useful in remote sensing at SDSU. As satellites send photographs to the earth's surface, sunlight scattered and absorbed by the atmosphere changes the true color and reduces the clarity of surface features recorded in satellite images.

Schiller and Fox want to measure how much light intensity is actually scattered and absorbed by the atmosphere, so that SDSU's remote sensing analysis system can correct for the atmospheric effects and improve the color and clarity of the satellite's pictures of the earth.

"A perfect day to measure the sun's intensity is a clear day with no clouds," Fox said. "We set up the instruments on the roof of Crothers Engineering Hall at around 7 a.m. and tracked the path of the sun until noon."

The shadowband radiometer has the ability to measure separately the amount of light illuminating a horizontal surface by direct sunlight and light scattered by the hemisphere of the sky. The objective of Fox's work was to calibrate the shadowband measurements.

Fox's data will compare the shadowband spectroradiometer's accuracy in measuring direct sunlight with the measurements made by the sun photometer which tracks the sun and measures the sun's direct intensity only. If both instruments show the same results, Fox and Schiller can assume the spectroradiometer's measurement of the scattered intensity from the sky is also correct.



Junior engineering physics/mathematics major Steve Fox conducted research to help determine the amount of light intensity absorbed by the atmosphere.

Volga student assists SDSU ACE Camp

The goal of the camp is to provide information on careers in the aerospace field and give the young men and women an inside look at the industry.

She enjoyed herself so much last year, Gretchen Monson, a senior from Volga, decided to return to the Aerospace Career Education (ACE) Camp at SDSU — this time as an assistant.

ACE Camp is a week-long camp for students interested in aviation and aerospace careers. The camp, held July 9 through 13, gave the 37 participants the opportunity to fly in an airplane, tour regional airports and listen to professionals in various aerospace-related fields. The goal of the camp is to provide information on careers in the aerospace field and give the young men and women an inside look at the industry.

Besides airplanes rides, ACE campers toured other places in southeast South Dakota, including Aerostar International, the South Dakota Air National Guard, Sioux Falls Regional Airport, the McKennan Hospital helicopter pad and the Great Planes Airport. At SDSU they received classroom instruction and demonstrations from professionals in the field.

Monson heard about ACE Camp two years ago at her school, but couldn't attend at that time. "Since my mom works at the Brookings Post Office, MaryJo Benton Lee (Space Grant Consortium coordinator) would talk to her about ACE Camp," she said. "MaryJo sent me information, so I went last year and had a great time."

Having the opportunity to participate in so many aerospace activities helped Monson decide she likes to fly planes.

"Last year was the first time I got to hold the controls of a small plane and move the aircraft," she said. "When I was learning to drive, I wasn't that anxious to do it because so many other people can drive. But in an aircraft, there is three-dimensional movement that has its own feeling."

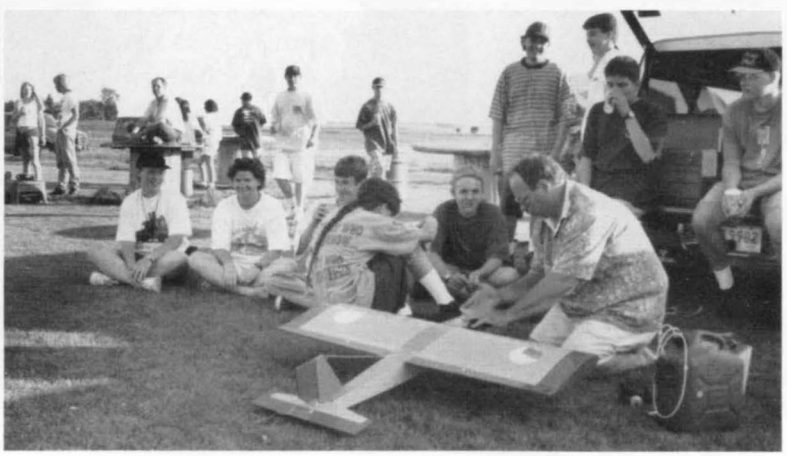
Monson's experiences helped her assist other students at this year's ACE Camp. She put together the binders that were given to all participants, helped with registration and explained camp activities to students. In general, she assisted ACE Camp coordinator Jill Anderson in a variety of ways.

Aviation is in Monson's genes. Her father flew helicopters in Vietnam and was a mechanic for United Airlines for many years.

"I thought about being a pilot before coming to ACE Camp, but attending the camp helped me decide I might have aviation as a career," she said. "I'm also thinking about being a math teacher. But, no matter what, I want to save enough money to get my pilot's license."

Monson recommends ACE Camp to other students.

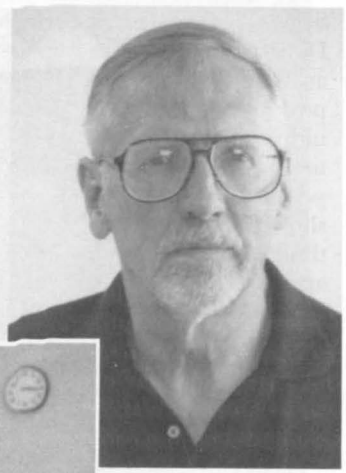
"Anyone who doesn't know much about aviation, but is interested, should come," she said. "You learn a lot about different aspects of aerospace and aviation."



Above, ACE campers watch a radio-controlled model airplane demonstration . Volga high school senior Gretchen Munson, at right, served as an assistant at this year's ACE Camp, the first time such a position was created.

Engineering professor Ritchie Mikesell retires

"Teaching, particularly in my specialty field which is engineering materials and metallurgy, both graduate and undergraduate, and also design of machine elements, has been the most enjoyable," Mikesell said.



After a number of years, Ritchie Mikesell, professor of mechanical engineering, has retired and moved to Colorado.

"Teaching, particularly in my specialty field, engineering materials and metallurgy, both graduate and undergraduate, and also design of machine elements, has been the most enjoyable." Mikesell said. "It has also been very hard work." He built up the metallurgy/materials lab because he considers it important for students to have hands-on experience.

Another important aspect in engineering is communication, both verbal and written, Mikesell said. "You may have the most beautiful data in the world, but if you can't write, you can't put it across, then it's almost worthless."

Mikesell received his bachelor of science in engineering and physics in 1952 and his master of physics in 1958 from the University of Colorado in Boulder. In 1974 he received his doctorate in metallurgical engineering from the University of Denver. He began his career in 1953 with the National Bureau of Standards in Boulder, Colo. From 1966 to 1970 he was with the Denver Research Institute. He was with the University of Southern Colorado in Pueblo for three years, a part-time teacher and consultant at the National Bureau of Standards for two years and with the Metropolitan State College Mechanical Engineering Technology Program for three years. Before coming to SDSU in 1980, he taught at the University of Colorado in Boulder and consulted for the National Bureau of Standards. SDSU recently awarded Mikesell his 15-year pin.

Don Froehlich, head of the Department of Mechanical Engineering said, "Dr. Mikesell has been involved with instruction, service and advising, and he has always displayed a positive, rewarding attitude toward students. He has consulted on projects state-wide relating to material problems and has brought these experiences into the classroom as information for the students."

Mikesell is leaving a legacy that will continue to benefit SDSU teachers. Because of his initiative, the spouse option benefit for teachers will be extended past age 65 and teachers writing textbooks will not be required to share their royalties with the Board of Regents.

He and his wife, Janice, moved to Denver this summer. Mikesell plans to teach part-time and finish writing a textbook on mechanical engineering. Dr. Mikesell has five grown children and five grandchildren. Janice Mikesell, a writer and photographer, had her fourth book published in June by the University of South Dakota Press.

Ritchie Mikesell is feted during a reception this summer in honor of his retirement. In photo at left, he toasts the occasion with his wife, Janice. Below, Dean Duane Sander presents Mikesell with a gift of appreciation.

Knabach retires after nearly 40 years at SDSU

"He has fostered a close relationship with the power industry which not only helps students, but also helps our College develop programs that support the industry's viability."

They showered him with presents and praise, but for Wayne Knabach's colleagues and former students, that only begins to express their gratitude.

During a banquet honoring Knabach's many years.of service to the SDSU Electrical Engineering Department and the power industry, nearly 300 people showed their appreciation for the impact Knabach had on their lives.

"Wayne has been an exemplary faculty member through his concern for students as they go through our electrical engineering program and after they graduate," said Duane Sander, dean of the College of Engineering. "He has fostered a close relationship with the power industry which not only helps students, but also helps our College develop programs that support the industry."

Goodbyes were both plentiful and heartfelt when faculty and students bid retiring electrical engineering professor Wayne Knabach farewell. At top, Dean Duane Sander presents Knabach a plaque. Above, Knabach shares the moment with his wife Kathy and their daughters Linda, left, and Carol.

After graduating from the SDSU electrical engineering program in 1949, Knabach worked for Northwestern Public Service in Yankton and Huron. He started teaching at SDSU in 1957 and earned his master's degree in engineering in 1961.

His students appreciated his care and concern.

"I'd describe Wayne as a very special, extraordinary educator," said Jeff Nelson, 1971 graduate and general manager of East River Electric Power Cooperative in Madison. "He was a partner to the students in their education."

"Wayne was instrumental in encouraging me to pursue power engineering," said Jim Wilcox, a 1976 graduate and manager of Customer Service for Northern States Power (NSP) in Sioux Falls. "He helped me attain a scholarship and get a job with NSP. He's done many other things for me and other students that were outside the call of his duties."

In 1971 Knabach was appointed coordinator of the Center for Power System Studies. During his tenure at the center, membership has increased from five to 10 full members and 12 associate members in four states.

"He has created a lot of friends in the power industry, not only for himself, but for SDSU," said Bob Schulte, a 1974 graduate and vice president of Customer Service for NSP in Minneapolis, Minn. "His ongoing contributions are valued by both students and people in industry."

Schulte said Knabach is even-tempered and pleasant, but recalls a time during a 1974 lab when he was pushed to his limits.

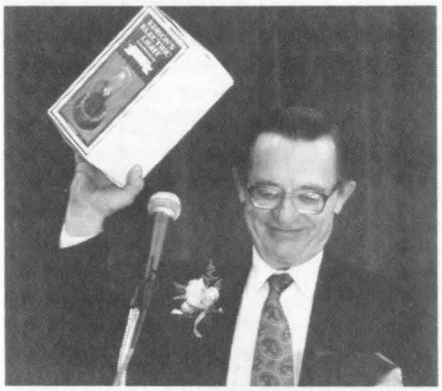
"Wayne had just purchased a new oscilloscope and reminded us to take

care of it," Schulte said. "He started to tell us to remember to keep it grounded when someone touched the leads together and blew it up.

"It was the only time I've ever seen Wayne totally speechless. It was almost as if you could see him thinking to himself, 'If you can't say anything good, don't say anything at all.' We didn't see him for the rest of the day."

Knabach has received numerous awards, including 1991 Siouxland Institute of Electrical and Electronics Engineers (IEEE) Teacher of the Year, 1993 Siouxland IEEE Engineer of the Year, 1994 East River Electric Power Cooperative Eminent Service Award and 1995 SDSU Distinguished Engineer.

He and his wife, Kathy, live in Brookings. Their daughter, Linda, lives in Sioux Falls with her husband, Jorge, and their three children. Daughter Carol is working on her master's degree in social work at the University of Iowa.



In top photo, Knabach gets a charge out of a going-away gift.
In center photo, students, colleagues and friends gather at his retirement banquet.
Above, Knabach teaches his last class.

SDSU professor named to national board of governors

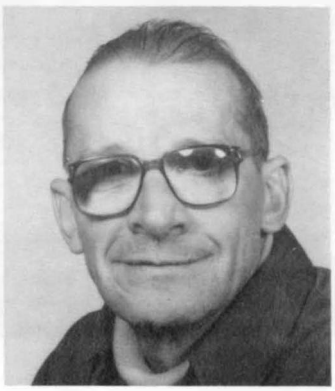
An SDSU professor was named to the Board of Governors of the Mathematical Association of America (MAA).

Gerald Bergum, head of the Computer Science Department at SDSU and professor of mathematics, was elected to represent the MAA North Central Section, which includes Minnesota and parts of Canada, North Dakota and South Dakota.

"We are very pleased to have a member of our faculty be the first person from South Dakota to be elected by the North Central Section to this very responsible position in the MAA," said Duane Sander, dean of SDSU's College of Engineering.

Bergum began his duties July 1 and will serve for three years. The board meets twice a year to discuss problems associated with math in the U.S., Canada and the world.

Bergum began teaching mathematics at SDSU in 1970 and has been head of the Computer Science Department since 1985. He received his bachelor's degree from the University of Minnesota, his master's degree from Notre Dame University and his doctorate from Washington State University, all in mathematics.



Tiltrum honored for work as adviser

"The best part of my job is being the adviser," Tiltrum said. "It's working with the cream of the crop, students who are really interested in engineering. Their work ethic, ambition and interest far surpass those of the average student."

On the strength of his students' testimony, Charles "Chuck" Tiltrum, associate professor in the Department of Civil and Environmental Engineering, was awarded a $500 stipend and a certificate of recognition as Outstanding Faculty Adviser in Zone III from the American Society of Civil Engineers.

The award honors one faculty adviser in each of ASCE's four zones who devotes time and energy to the activities of the student chapter, said Mike Peralta, national manager of student services for ASCE. "We look for chapters that are real active and advisers who offer support and guidance, rather than running the whole show," he said.

Officers of the SDSU student chapter of ASCE nominated Tiltrum, who has advised the chapter since 1982, by completing an application and an essay. Chapter president Alisa Prunty wrote, "He offers a common link for our student chapter to build on year in and year out and expects nothing more from the students than he is willing to give himself."

Tiltrum willingly gives a great deal to the chapter, said chapter vice president Jason O'Mara. "He spends a lot of time doing things he really doesn't have to do for our organization," he said, "and he enjoys it."

Prunty agreed. "He really cares about students and likes to give them all the benefits of ASCE," she said. "He doesn't do it to look good or to get recognition. He does it because he wants to."

Tiltrum said that he definitely does love working with students. "The best part of my job is being the adviser," he said. "It's working with the cream of the crop, students who are really interested in engineering. Their work ethic, ambition and interest far surpass those of the average student."

The SDSU ASCE student chapter meets biweekly, often bringing in professional engineers as speakers. The chapter also participates in the annual Engineering Week Phonathon fund raiser conducted by the College of Engineering.

Members can attend regional and national events, such as annual conferences and the concrete canoe competition. Officers attend the annual Workshop for Student Chapter Leaders.

Tiltrum encourages students to participate in as many activities as they can, and he travels with them to out-of-town events. "He goes to all the conferences and spends a lot of time on the road with us," Prunty said.

Surprised and honored to receive the award, Titrum said, "I'm pleased. I'm involved and active because I enjoy it, but it's nice to see that someone else recognizes it."

Tiltrum shared the credit for his award with his wife, Karon, for her support. He also credited Dr. Dwayne Rollag, head of the Civil and Environmental Engineering Department, and Dr. Duane Sander, dean of the College of Engineering.

"My involvement and time commitment would certainly not be possible without their support," Tiltrum said. "Such real-world, down-to-earth admmistrators can see the benefits of getting students involved in a professional society."

Those benefits include making contacts with other professional and future engineers across the nation, as well as seeing the diversity in civil engineering programs, Tiltrum said. "We all have the same goal, to graduate the best engineers we can, but different parts of the country have different methods and expectations."

Tiltrum's participation in ASCE on the national level has included membership on the Committee on Student Services and such positions as section president, branch president and District 16 council representative.

He earned two degrees in civil engineering from SDSU, his bachelor's in 1972 and his master's in 1974.

Tiltrum belongs to the National Society of Professional Engineers, the American Society of Photogrammetry and the South Dakota Water and Wastewater Association. He also belongs to the South Dakota Society of Professional Land Surveyors and has served as its president and first executive director.

He has also served as planning commission member, park board member, city councilman and mayor in Aurora, where he lives.

The Tiltrums have two adult children and two grandchildren.

Vandever recognized for service to Alpha Lambda Delta

Vandever, a professor of mathematics and statistics in the SDSU College of Engineering, was cited for 13 years of service as an outstanding faculty advisor by the National Office of Alpha Lambda Delta.

Freshmen honor students at SDSU find it easier to meet each other through the help of Jan Vandever, faculty advisor to Alpha Lambda Delta, the honor society for freshmen earning grade point averages of 3.5 or above.

Vandever, a professor of mathematics and statistics in the SDSU College of Engineering, was cited for 13 years of service as an outstanding faculty advisor by the National Office of Alpha Lambda Delta.

"It takes many hours of hard work, time and attention, but I enjoy working with these students," Vandever said.

Founded at the University of Illinois in 1924, Alpha Lambda Delta encourages superior academic achievement among students during their first year in higher education. Goals are to promote intelligent living and a continued high standard of learning and to help students recognize and develop goals for their roles in society.

Faculty advisors play a vital role in meeting the organization's goals.

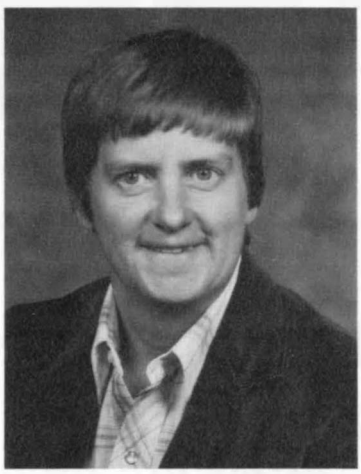
"The work and influence of the faculty advisor is very important for the student, the institution and the organization," said Barbara Quillings, national executive director of Alpha Lambda Delta. "Alpha Lambda Delta appreciates Jan's support of academic excellence."

Greg Bartles, vice president of the SDSU chapter, said Vandever gives many hours of her time.

"We are a very active chapter," Bartles said. "The more activities we plan and carry out, the more we take up her time. She is sacrificing her free time to give us a chance to do things for the community and for our group. One project involved making a Christmas ornament for each one of the 89 residents of a local nursing home. Later, she let us have a pizza party in her home."

Dean Duane Sander praised Vandever for her work, not only with the freshman honor society, but the additional work she does with the Society of Women Engineers and with students who have difficulties in math.

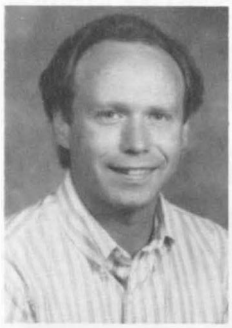
Vandever earned her doctorate from the University of North Dakota, her master's degrees from Rutgers University and Colorado State University and her bachelor's degree from Monmouth College.



FYI

Physics faculty and students picnic, Sept. 13
Center for Power Systems Studies meeting, Sept. 19-20
ENTRE business planning program, Sept. thru Dec.
ASME North Central Regional meeting, October
ASME/Pi Tau Sigma banquet, November
Actuarial Exam, November
Putnam Math Contest, December
Fall graduation, Dec. 16

Rufer, Monnens step up at SDSU



Kent Rufer

Mike Monnens

Kent Rufer, former assistant program manager of the University/Industry Technology Service (UITS), has been promoted to program manager. His new position includes managing UITS activities and its day-to-day operations.

Since UITS is a University service designed to help industry, business and government with technological problems, Rufer will coordinate and oversee outreach programs conducted through UITS. Other responsibilities include sponsoring symposiums and workshops to educate industry on topical issues, as well as finding solutions to industrial problems.

"UITS is a great program," Rufer said. "I'm excited to have the opportunity to enhance and further its prospects of helping industry and the overall economic development of South Dakota."

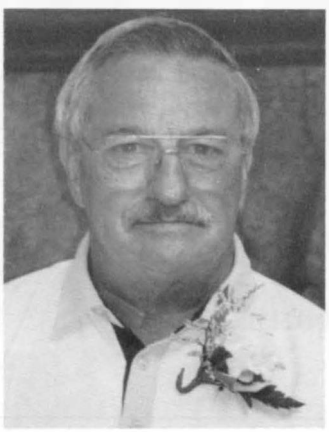
Before Rufer came to SDSU in June 1993, he was an area director for the University of South Dakota's School of Business's Procurement Technical Assistance Center in Aberdeen. He earned a bachelor's degree in history and geography at SDSU and a master's in business administration at USD.

Mike Monnens has been named UITS program engineer. His job role includes technically assisting a wide variety of industries with product and process design problems and contributing to UITS' goal to increase industry utilization of the program.

Monnens earned a bachelor's degree in agricultural engineering at SDSU and is currently working on his master's. Before joining UITS, he worked as a graduate research assistant in SDSU's Agricultural Engineering Department and worked 10 years in the fluid power industry as a sales representative and service technician before returning to college.

Since its inception in 1988, UITS has facilitated more than 161 projects involving 54 faculty members from 19 departments across the SDSU campus. Businesses interested in UITS services are encouraged to contact SDSU's Engineering and Environmental Research Center at (605) 688-4184.

Durland retires after 40 years as SDSU extension ag engineer



Bob Durland grew up in Brookings and liked it so much, he decided to stay.

After graduating from South Dakota State University in 1953, Durland served two years on active duty in the Air Force. After Korea he returned to Brookings to become the SDSU extension agricultural engineer. Durland retired July 31 after 40 years in that position.

"He's an individual who made long-term contributions to the Agricultural Engineering Department," department head Ralph Alcock said. "He was uniquely able to apply his skills in dealing with people to the benefit of South Dakota agriculture."

Mylo Hellickson, who served as Agricultural Engineering Department head for six years and is now director of SDSU Cooperative Extension, said, "Bob was an outstanding professional who dedicated his life to serving the needs of his clientele in South Dakota." During his career, Durland wrote numerous publications, including information bulletins on tractor operation and care, grain harvesting, minimum tillage and sanitary landfills. He received the SDSU Distinguished Alumnus Award in 1977, the South Dakota Extension Specialists Distinguished Service Award in 1987 and the F.O. Butler Faculty Award for Excellence in Extension in 1992.

Durland earned the rank of lieutenant colonel through service to the Air Force Reserves. He served on the Brookings Planning Commission, the SDSU Alumni Board of Directors and the HPER Fund Raising Committee and helped initiate and chair the Stan Marshall Golf Classic that raises money for SDSU athletic scholarships. He played varsity football at SDSU for three years and was a first team All-Conference offensive guard.

Besides his bachelor's degree in ag engineering, Durland earned his master's degree in the same field in 1968 at SDSU.

Durland plans to stay in Brookings and pursue his hobbies of golfing, hunting and traveling.

New SDSU civil engineering professor knows concrete, explosives

When the large department store collapsed in South Korea, killing hundreds, Rich Reid wasn't surprised.

Reid, an assistant professor of civil engineering since March, saw similar construction when in South Korea with the Air Force.

"A problem the Air Force has in South Korea is getting contractors to actually use the concrete that was specified," he said. "Because of the rapid growth there, contractors are having a hard time getting enough materials to keep up with the expansion and are sometimes cutting corners. This was the worst collapse, but it certainly wasn't the first one."

Reid developed an expertise in soil mechanics, pavement design, blast-resistant construction and environmental engineering while in the Air Force. He spent three years as environmental engineer at Ellsworth AFB. At Georgia Tech, he earned his master's in civil engineering.

His next job was as survivable structures program director at the Air Force Civil Engineering Lab at Tyndall AFB in Panama City, Fla. There he conducted research on the effects of explosives on buildings.

"We had a testing range where we conducted tests to see if structures could withstand enemy attacks. We came up with better designs for aircraft shelters and other buildings. Then, as the Gulf War approached and the Cold War ended, our focus changed to creating protective structures that could be built quickly."

While in Florida, Reid spent time in Israel studying the hardened shelters within all of the buildings designed to protect occupants during terrorist or enemy attacks. He also conducted explosive testing on shelters as part of a joint research program between the U.S. and the Israel Air Force.

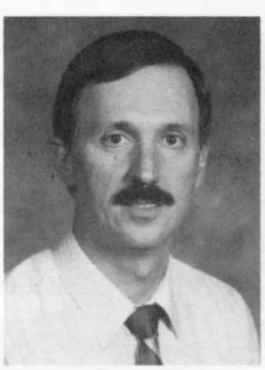
Reid's glad to be back.

"I really liked living in South Dakota when I was in the Air Force," he said. "I decided to get into teaching, so when the ad for this job came out, SDSU was on the top of my list. It's a nice place to work and raise a family."

Reid grew up in Kennebunkport, Maine, received his bachelor's degree in civil engineering from The Citadel in South Carolina and his master's and doctoral degrees in civil engineering from Georgia Tech. He ended his Air Force service as a captain in 1994.

Reid's wife, Kathy (Kreger) Reid, a Huron native, received her associate degree in secretarial science from SDSU in 1977 and her bachelor's in business education from Georgia State University in 1988. The Reids have three children, Lindsey, 7; Tim, 5; and Rebecca, 2.

Brown to serve on technical program committee for workshop



Lewis Brown, assistant professor and acting head of Electrical Engineering, will serve on the technical program committee for the 1995 Workshop on the Technology of Ferroelectric Polymers in Albuquerque, N.M., Oct. 17 through 19. Brown will participate in the review and selection of papers for the international workshop, sponsored by Sandia National Laboratories.

The goal is to promote research and collaboration among ferroelectrics experts around the world, Brown said. He has been involved in research in the relatively new field for several years.

Clarke begins new position with SDSU

Once a medical assistant, then co-publisher/columnist for the Estelline Journal, Carla Clarke has decided to pool her skills in her new job at SDSU.

Clarke began her position as secretary for the South Dakota Transportation Technology Transfer Service (T3S) Jan. 13.

Setting up workshops for highway personnel, corresponding with constituents, working with mail and printing, Clarke said she enjoys working at T3S.

"What impresses me the most about working here is the cooperation I've seen amongst everyone," Clarke said. "It's a nice atmosphere, friendly, supportive and everyone goes the extra mile to help each other."

One reason Clarke applied for the position was to experience university life. Since she had never attended college, she wanted to see what it's like. "Now that I'm here, I am really enjoying it."

Clarke lives in Estelline with her husband, Tom Clarke, and children Justin, 12, Jameson, 9, and Nolan, 4.

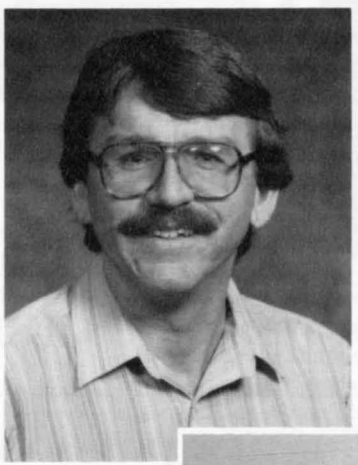
Dalsted studies cropland use intensity in Niger

"We're looking for conservation practices," Dalsted said. "If they work in one place, they should work in similar climate and soil areas in other places."

Kevin Dalsted, acting associate director of the Engineering and Environmental Research Center at SDSU, is becoming familiar with the way the rugged, sandy terrain of western Africa looks from the air.

In mid-June Dalsted made his third consecutive summer trip to Niger. Based in the capital city of Niamey, he spent four weeks continuing his previous research using aerial videography to determine cropland use intensity.

For his research, Dalsted has twice flown over parts of Niger taking notes while a video camera filmed. "I can see more detail out the window with my eyes than the camera records," he said. "Being able to tie the imagery to specific areas and features helps me interpret it later."



Video technology is convenient and easy for researchers to use, Dalsted said. "We don't need a photo lab like we would with aerial photos," he said. "We can start working with the data as soon as we collect it. It also provides a relatively permanent record of a given transect."

Dalsted got involved in this research through an earlier project assisting the U.S. Geological Survey's EROS Data Center in interpreting satellite imagery for cropland use intensity in western Africa. Since the video data he is now collecting represents lower levels and smaller areas than the satellite images did, it will verify his previous interpretations.

"If we choose our flightlines to go across representative areas, we are validating the earlier interpretations and confirming the actual percentages of cropland in a given area," he said.

Research determining the intensity of cropland use and its effects on soil and plants has several benefits, Dalsted said. One goal is to determine various effects of drought on the population. "Drought has a direct effect on cropland and a lesser effect on pastureland in terms of the population, because there are fewer people living in the pastureland areas," he said.

Dalsted also expects the videography to help researchers learn more about conserving natural resources. "We're looking for conservation practices. If they work in one place, they should work in similar climate and soil areas in other places. In one place we saw a lot of trees used as field boundaries. That helps prevent wind erosion."

This expanded knowledge will benefit Niger's subsistence farmers, Dalsted said. "Trying to help the people of Niger is the ultimate goal, so they can produce enough food for themselves and maybe even produce some for the market. One problem is that population growth continues at three percent or higher; that puts additional pressure on the land to produce. We're beginning to see even more marginal lands come under cultivation."

Kevin Dalsted, at top and in bottom photo with a group of young Nigerian boys. Dalsted said that whenever his plane was being refueled, any children nearby would come to watch.

Dalsted said effective farming in Niger presents a challenge because much of the land is of such poor quality that U.S. farmers would probably not even use it. "These lands are not highly productive areas," he said.

Farming methods in Niger are quite primitive compared with those in the United States, Dalsted said. "Cropping is pretty much done by hand," he said. "There are a few places that might have tractors and maybe some that have animal traction, but, by and large, it's just people walking around, digging holes. It's very different from here."

Dalsted plans to return to Niger this fall to fly some of the same paths and develop more specific procedures for comparative analysis. With regular observation over a number of years, researchers can document changes in plant density and identify trends in land degradation, he said.

Dalsted's work in Niger is funded by the U.S. Agency for International Development through the World Meteorological Organization, for whom he works as a consultant. He also works with AGRHYMET, a multinational center for the study of agriculture, hydrology and meteorology in western African countries.

Although the main application of his research will be in Niger and other western African nations, Dalsted plans to get the information to the U.S. public as well. "I have forged a connection with the World Resources Institute and will be generating research papers out of it," he said. "So we'll be publishing some of these results."

Ag engineering students design new egg carton

If you build a better egg carton, the world will "beat" a path to your door.

If this is true, the road leading to the South Dakota State University Agricultural Engineering Department will be well-worn.

A goal post-shaped egg carton was designed by four students in department head Ralph Alcock's Introduction to Agricultural and Biological Engineering class — Brad Meyer of Pollock, Brian Rabenhorst of Spencer, Leroy Ask of Kenneth, Minn., and Travis Winters of Jeffers, Minn.

"I gave them the task to come up with ideas for storing eggs either in horizontal or vertical packs," Alcock said. "I wanted to introduce them to a common biological material, show them how to test it and improve how it is handled."

The student designed egg carton interlocks, like puzzle pieces. This allows egg packers and grocery store personnel to pack and handle them more easily. Alcock has shown the new carton to a grocery store produce manager and an egg distributor to get their comments.

To make the best egg carton possible, the students tested eggs in a pressurized steel box to determine their weak points.

"They found that eggs break in the same place — about three-fourths of the way down toward the wider part of the egg," Alcock said. "In the traditional egg carton, eggs are packed so they are sitting on the weakest part of the shell."

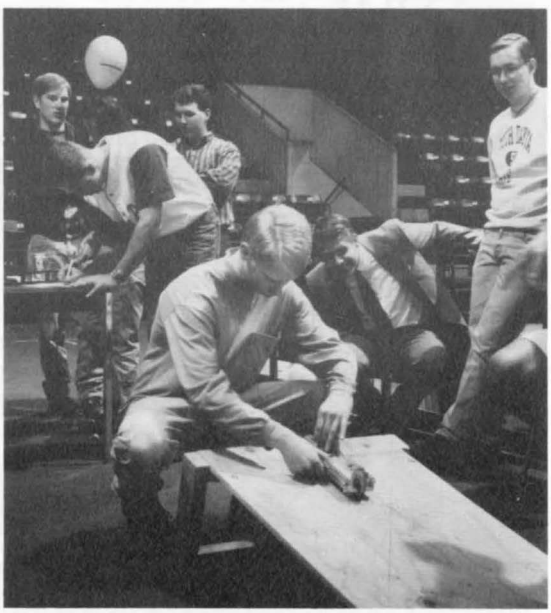
In the students' carton, the eggs are laid sideways and held tightly by the carton. The model was created from cardboard and masking tape, but if the product were manufactured, Alcock said it would be made of a biodegradable, starch-based foam. The carton would be able to withstand dropping and its shape would include a "leg" that could be used as a handle for easier gripping. The top half of the carton would be translucent so handlers could see damaged eggs.

"The students did a great job for their first design project," Alcock said. "It made them think about engineering for a biological system. That was the whole objective."

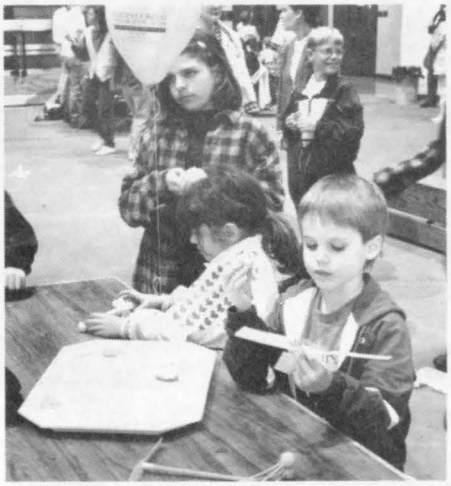
FYI

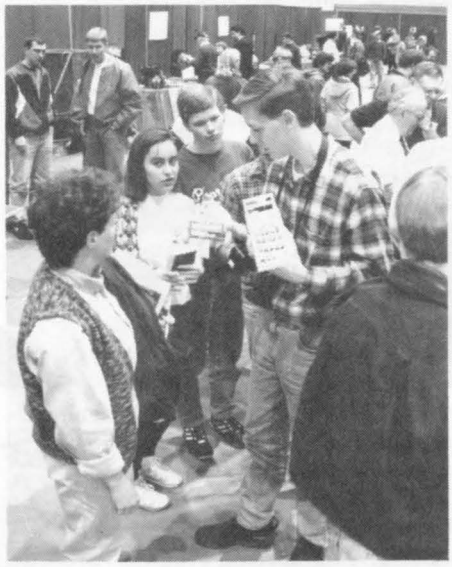
Engineering Phonathon, Feb. 19-23
TQM Symposium, March 4-5
Senior Design Projects Conference, April 10
Engineering Exploration Days, April 25-27
Physics Bowl, April 26
IEEE Awards Banquet, April
ENTRE business feasibility program, April thru May
Spring graduation, May 4

EED
ENGINEERING EXPLORATIONS DAYS



Inventors displayed their products and college and high school students competed in a variety of contests, in categories ranging from bridge building to figure eight vehicles, during Engineering Exploration Days and the South Dakota Inventors Congress April 21 and 22 at SDSU. This year, Tim Aughenbaugh of Iroquois won the $500 Ron Reed Economic Development Award for his most marketable invention, the Pivot Commander, a computer-operated irrigation control system.





Two honored as SDSU Distinguished Engineers

A professor and a computer developer were honored as SDSU Distinguished Engineers. Wayne Knabach, SDSU professor of electrical engineering, and Delvin Eberlein, vice president of technology for Cray Research in Chippewa Falls, Wis., were recognized during the Distinguished Engineers Banquet April 21.

Knabach has taught in the Electrical Engineering Department at SDSU since 1957. The Harrisburg native graduated from SDSU in 1949 in electrical engineering, then worked for Northwestern Public Service Company (NPS) in Yankton. After two years in the U.S. Army, he returned to NPS in Yankton, then was transferred for two years to the general NPS office in Huron. While an instructor at SDSU, he completed his master's degree in engineering in 1961.

In 1971 he was appointed coordinator of the Center for Power System Studies. During his tenure at the center, membership has increased from five to 10 full members and now includes 12 associate members in four states. He developed a five-day field trip for students that includes touring 15 power sites in the Midwest.

Knabach has received numerous awards, including Siouxland Institute of Electrical and Electronics Engineers (IEEE) Teacher of the Year in 1991, Siouxland IEEE Engineer of the Year in 1993 and the East River Electric Power Cooperative Eminent Service Award in 1994.

Knabach and his wife, Kathy, live in Brookings. They have two daughters, Linda and Carol.

Eberlein oversees all aspects of integrated circuit fabrication and packaging for custom and semi-custom logic circuits used in present and future Cray product lines. Cray Research produces state-of-the-art supercomputers for research and weather-forecasting.

The Cray 16 Gate Array circuit created by Eberlein was the cornerstone for two large Cray computer systems. During his tenure, he has overseen the design and construction of two cleanroom facilities and expanded the circuit fabrication department from three employees to 65.

Before joining Cray Research, Eberlein worked for five years for Univac of Minneapolis, Minn., where he designed integrated circuit memory chips. During his three years as senior research scientist for the University of Minnesota, he designed and launched the Explorer 46, a small satellite.

Eberlein has spoken at several national conventions and is the recipient of nine U.S. patents. He earned his bachelor's degree in electrical engineering from SDSU in 1962 and his master's degree in electrical engineering from the University of Minnesota in 1970.

A Volga native, Eberlein and his wife, Athene, live in Eau Claire, Wis., and have three children, Peggy, Gregory and Christopher.

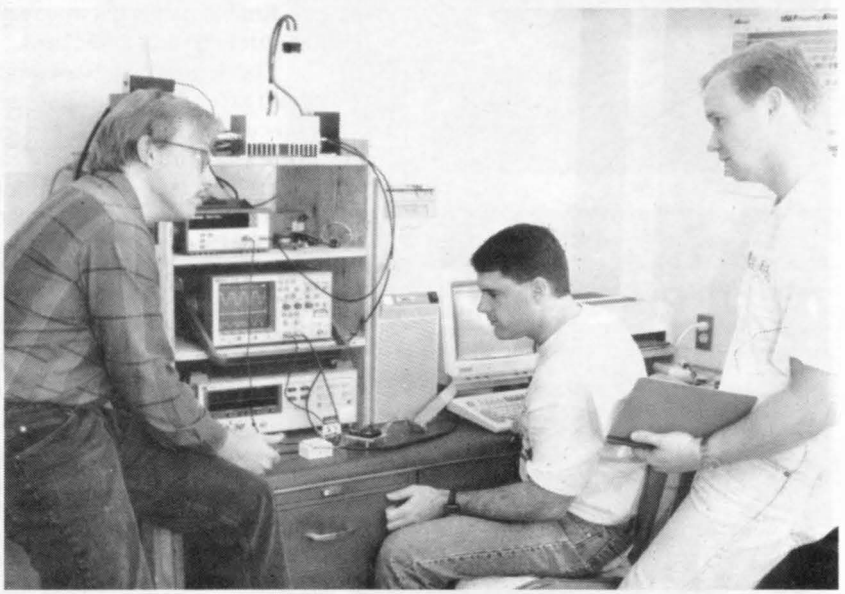
Wayne Knabach

Delvin Eberlein

Senior engineers present design projects at conference

In the top photo, SDSU engineering seniors Dale Brovold (seated), Barry Olson and Ron Morfitt work on their design project of an environmental imaging system.

In the bottom photo, Russ Mileham, Ron Koerner and Loren Petersen discuss their senior design project about microsensor characterization.



For the first time ever, the SDSU College of Engineering presented the Conference on Senior Engineering Design Projects April 12.

Every year, senior engineering students are required to participate in Senior Design Engineering Projects. This year, they went one step further than previous seniors when they presented their designs to sponsors and businesses from across the region.

Though a snowstorm closed campus until afternoon the day of the conference, it was a success, nonetheless. Attendance was good and only two papers cancelled because students couldn't make it.

Doug Miron, SDSU electrical engineering professor, said the projects allow students to get hands-on experience by solving problems they will face in industry. With two to six students involved in each project, he said, they collaborated as a team and applied all the class material they have learned.

The 17 project designs, ranging from an electric lawn mower to a human-powered submarine, were displayed in a professional setting, said Steve Hietpas, electrical engineering professor and conference coordinator.

"Students spent a tremendous amount of time researching, designing and building these projects," Hietpas said. "Now, for the first time, seniors presented their projects in a professional manner as they might in their future engineering careers."

The conference was a new and creative way for students to present the challenges they faced during the past year, Hietpas said. The caliber of the projects was extremely high and complicated for seniors coming out of their junior year, he said. Project sponsors saw what was accomplished and how they and the students have benefited.

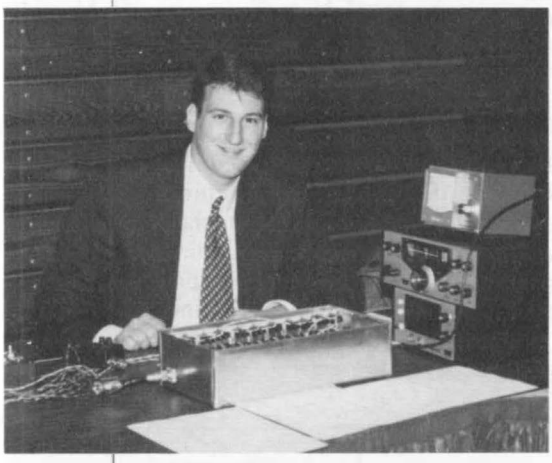
"SDSU wants always to be changing and addressing the needs of the students," Hietpas said. "This conference increased their communication skills before leaving to a professional career and could lead to job opportunities. It's also a great way for the College to create future projects with current and future sponsors."

The College of Engineering, which plans to hold the conference again next year, is grateful to the following firms and individuals for providing financial and technical assistance to the students of this year's Senior Design Engineering Projects: Airborne Data Systems, Amp Corporation, Daktronics Inc., Harvey M. and Doris A. Owren, Dr. Robert Rodgers, Raven Industries and the South Dakota Space Grant Consortium.

Sebert strives for success

South Dakota weather often wreaks havoc on the best-laid plans. Mark Sebert of Nunda, a 1995 SDSU electrical engineering graduate, is an example of that phenomena.

On Wednesday, April 12, the day of SDSU's first Conference on Senior Engineering Design Projects, the sun rose to find streets and roads clogged by slushy, heavy, wet snow. SDSU morning classes were canceled, and many students settled back into their warm beds for a few extra hours of sleep. Sebert was not one of them. He shoveled out his 300-foot gravel driveway by hand, drove his vehicle out and promptly got stuck in the middle of the road beyond his driveway.



"I planned to spend the morning practicing my delivery," Sebert said. "But instead, I spent the whole morning working to get there."

Sebert was scheduled to present his senior engineering design project, a remote control amateur radio antenna tuner, at 1 p.m. He pulled his dress pants up to his knees to keep them dry, put on coveralls and trudged two miles to his brother's house to borrow his 4-wheel-drive pick-up. Driving 15 mph for 25 miles, Sebert made it to campus with just 10 minutes to spare.

Sebert said his presentation went better than he thought it would.

"Usually, I like to go over my delivery about 10 times," he said. "I only practiced this presentation twice. When I got there, though, things just flowed naturally, and it went pretty well. I guess pressure does weird things to you."

Doug Miron, SDSU electrical engineering professor and Sebert's adviser, said Sebert's design, like many others, forms a good foundation for a final product.

"Mark has a lot of enthusiasm," Miron said. "He's very interested in radio frequency electronics."

Sebert, the son of Al and Rita Sebert of Aberdeen, is married to Rhonda Stein Sebert, a 1994 SDSU psychology graduate. The couple attended Holgate Junior High school together and graduated from Central High School in 1989.

"We started seeing each other a little after high school," Mark Sebert said, "but we didn't really date seriously until we both came to SDSU. I guess you could say SDSU got us together."

The Seberts celebrated their second anniversary this summer.

ASCE chapter wins certificate of commendation

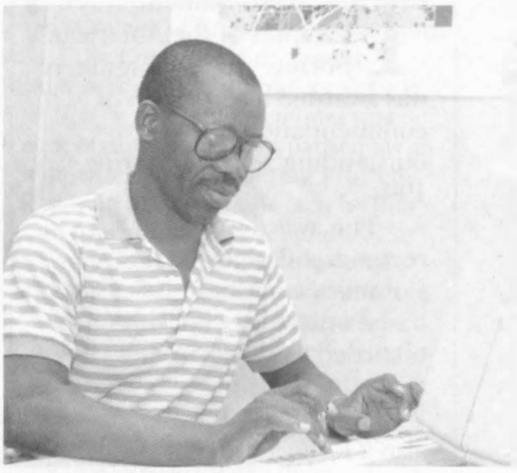
The SDSU Student Chapter of the American Society of Civil Engineers was awarded a certificate of commendation for its outstanding activities during 1994.

The award was recommended by the Committee of Student Services based on chapter activities recorded in the chapter's 1994 annual report.

SDSU's ASCE Chapter was also a Robert Ridgway Award Finalist this year, a distinction earned by less than five percent of all student chapters. This year's Robert Ridgway Award winner was the Mississippi State University student chapter.

Chuck Tiltrum, associate professor of civil and environmental engineering, is faculty advisor for the SDSU ASCE Student Chapter.

South African enjoys SDSU education



Mokgwakgwe Mashatola, a South African native, came to the United States to study agricultural education and learn American agricultural techniques. He earned his master's degree at SDSU through the help of the South African Kellogg Foundation and said he learned a great deal about soils, soil mapping and teaching agriculture because the U.S. and South Dakota have so many different soils.

He also said South African schools are not that much different from SDSU.

"Most of the things are similar, except for the testing," Mashatola said. "The United States tests on application. South Africa tests on how much you can stuff into your head."

The U.S. requires a thesis and lecture to achieve a master's degree, whereas South Africa only requires a thesis, he said. South Africa is much less formal than the U.S., however. South Africans don't always make appointments to meet with someone; in many cases, they just meet with them.

To get Kellogg Foundation funding, Mashatola's employers and the South African government recommended him to the Kellogg Foundation, then Mashatola applied and interviewed with several foundation agencies.

With funding secured, he applied to many U.S. schools. SDSU responded first and so positively, he knew it was the right school for him.

Mashatola is a soil technician at the University of the North in South Africa. He completed his master's degree in July and returned to South Africa as a soil technician and teacher.

His wife, Mphaludi, who studied early childhood education at SDSU, returned home with him this summer.

Schultz, Sikkink write outstanding research papers

Writing outstanding research papers won two seniors from the College of Engineering Schultz-Werth Awards, established to promote and recognize the scholarly achievements of undergraduate students at SDSU.

Theodore F. Schultz's paper, "Recycling Rubber Tires for Use in Highway Projects." explores the current landfill shortage, as well as methods and options available in recycling scrap rubber tires in road construction projects.

Schultz said Raja Taha, his research adviser and former instructor, gave him the idea two years ago. Taha was researching the addition of rubber to asphalt, a topic that interested Schultz. Paul Koepsell, professor of civil and environmental engineering, was Schultz's major adviser.

"I learned a lot about the importance of recycling," Schultz said. "There are billions of tires taking up space in landfills that, shredded or whole, could be used beneficially."

An engineer at Clark Engineering in Rapid City, Schultz plans to earn his master's degree in environmental engineering and obtain his professional engineer's license.

"This was a good project and I learned how important recycling has become in today's world," Schultz said. "I hope it encourages others to work on projects to help the environment. The environment is an invaluable resource and it should be treated in a better fashion."

Marc Sikkink's paper, "Color Stability of Fresh Ground Beef when Potential Antioxidant Carriers are Added," explains his preliminary research in finding which carriers of antioxidants didn't cause a color change in ground beef.

Assistant professor James Julson, who worked with Sikkink on the project, said, "Marc provided valuable information for use in the next step of research, which will be to use the identified carriers to distribute various types of antioxidants in ground beef."

Each antioxidant will be evaluated for its effectiveness in retarding the rate at which fat in irradiated meats goes rancid. Rancidity is the natural chemical reaction of fat breaking down, Julson said. The rate of this reaction is increased when animal fat is irradiated.

"Marc's work helped us to determine which carriers could be used to distribute the antioxidants in ground beef and not cause a color change that would be unacceptable to the consumer," Julson said. "This will be timely information for the beef industry due to the high probability ground beef will be irradiated for consumer safety by reducing the chances of food poisons."

After completing graduate school, Sikkink hopes to work in the corn wet-milling industry. His goal is to become a plant manager within seven years.

The Schultz-Werth Award was established by two distinguished SDSU alumni: Theodore Schultz, Nobel Laureate in Economics, and his wife, Esther F. Werth.

Regional electrical companies support SDSU engineering students

Every semester 11 electrical companies provide scholarships for senior electrical engineering students enrolled in SDSU's seminar in power systems class.

Organized through the Center for Power System Studies, an entity within SDSU's Electrical Engineering Department, the class has helped supply the electric industry with quality graduates and top-notch technical manpower.

"The support of these companies has encouraged and enabled many students to find a job in the regional electric industry," said Wayne Knabach, electrical engineering professor. "The seminar class presents students with speakers and topics that otherwise are unavailable in a formal class setting."

The South Dakota Board of Regents established the Center for Power System Studies in 1968 to foster interest in power system engineering careers. This approval empowered the Center to solicit financial support from electric utilities and manufacturers to provide young engineers with scholarships and fellowships.

Area electric companies and manufacturers who provide support are: Basic Electric Power Cooperative. in Bismarck, N.D., Black Hills Power and Light Company in Rapid City, East River Electric Power Cooperative. in Madison, Heartland Consumers Power District in Madison, Midwest Power Systems in Sioux City, Iowa, Missouri Basin Municipal Power Agency in Sioux Falls, Northern States Power Company in Huron, Northwestern Public Service Company in Sioux Falls, Otter Tail Power Company in Canby, Minn., and Western Area Power Administration in Huron and Watertown.

Wayne Knabach, professor of electrical engineering, poses with CPSS scholarship recipients: Back row: Steve Rogotzke, Chad Timmer, Jason Reed, Corey Huber and Darin Gerhart. Front row: Brian Hines, Adam Abele, Tara Padik and Jerry Schmoll.

Chen receives National Science Foundation fellowship

Like most engineering students, Judie Chen has spent the last four years of her academic career studying, studying and studying.

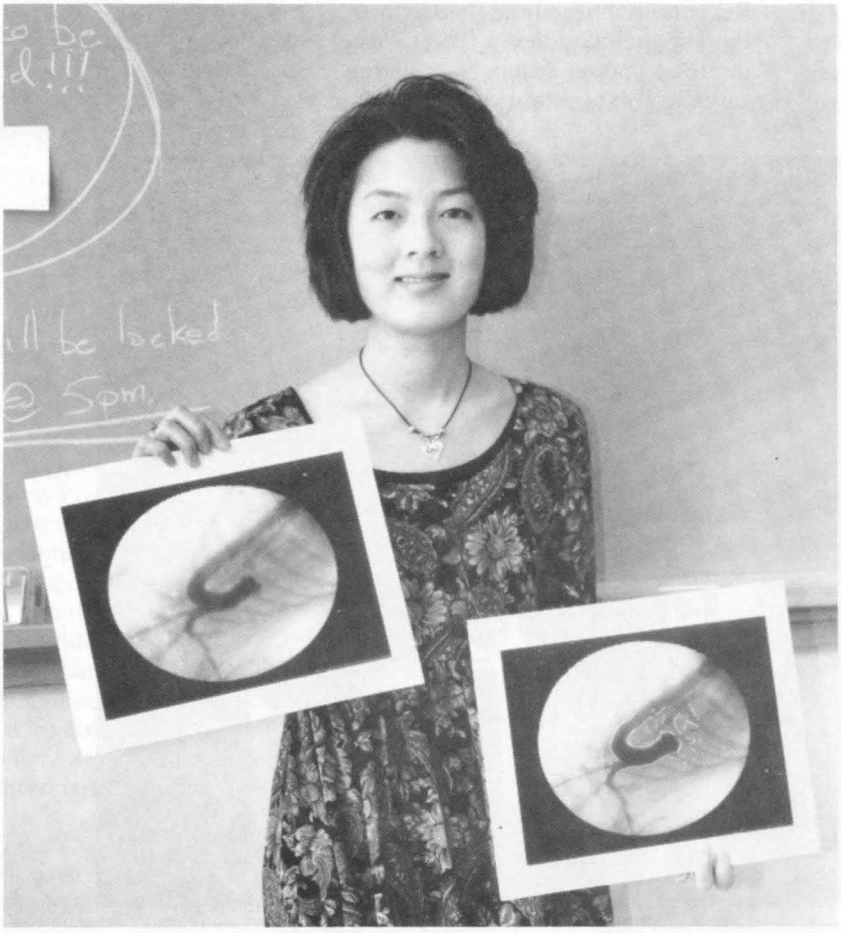
A 1995 SDSU electrical engineering and engineering physics graduate, Chen's intensive studying has paid off. She has been awarded a National Science Foundation (NSF) graduate research fellowship, which pays for three years of her graduate school tuition and living expenses at the University of Michigan beginning this fall and an additional fellowship from the university.

"I can't even put it into words how I felt when I found out that I received the fellowship," Chen said. "I was very excited, or you could say, I was more like blown away by it all. I didn't think I would have a chance considering the high number of students who applied and the actual number of grants awarded."

The NSF seeks to ensure the vitality of the human resource base of science, mathematics and engineering in the United States and to reinforce its diversity. To that end, the NSF awards about 1,000 graduate and minority fellowships every year.

Lewis Brown, Chen's academic adviser and acting head of the Department of Electrical Engineering at SDSU, said the NSF fellowship is prestigious and difficult to receive.

"Judie is really one of our top students, there's no doubt," Brown said. "I give my highest recommendations to very few people and she's one of them. She's going to be a top engineer and scientist."



The last two summers, Chen interned through NSF's Research Experiences for Undergraduates program. She worked at the Radar and Remote Sensing Lab at the University of Kansas in 1993 and the Center for Compound Semiconductor Microelectronics at the University of Illinois last summer.

Overall, Chen's academic career has been a busy one. A member of the Society of Women Engineers, IEEE, the Society of Physics Students, the Engineering Phonathon committee and concert band, she is also an honorary member of Eta Kappa Nu, Phi Kappa Phi, Tau Beta Pi and Sigma Pi Sigma.

As for her future, Chen plans to do research in biomedical imaging, although she has not yet selected a specific topic. After obtaining her master's degree, she intends to get her doctorate and eventually work in research at an imaging company.

SDSU graduates win Engineer of the Year

Four SDSU graduates recently won awards from the South Dakota Engineering Society (SDES).

Dwayne Rollag, Brookings resident and head of the SDSU Civil Engineering Department, won the Engineer of the Year award for the Northeast chapter of SDES. He received his master's degree from SDSU in 1966 and has served as president of SDES and director of the National Society of Professional Engineers.

Rollag is a member of the American Society of Civil Engineers and chairman of the South Dakota Water Management Board.

Seth Hansen of Brookings won the Young Engineer of the Year for the Northeast chapter of SDES. He attended SDSU for electrical engineering, receiving his bachelor's degree in 1985 and his master's degree in 1986.

Hansen works as a design engineer at Daktronics Inc. and is currently helping to design the Olympic scoreboards. He is an advisor for Tau Beta Pi, a student honor society at SDSU, and is active in SDES.

Laurie Schultz of Pierre, a 1979 SDSU graduate, won the Engineer of the Year award for the Central chapter of SDES. She is an urban systems engineer for the Department of Transportation, where she supervises more than 200 projects.

Schultz belongs to the American Association of University Women and is a member of Faith Lutheran Church of Pierre.

Michelle Lauritzen of Pierre, a 1991 SDSU graduate, won the Young Engineer of the Year award for the Central chapter of SDES. She works as an ag engineer for the Natural Resources Conservation Service and is coordinator of the Mathcounts program for Pierre 7th and 8th grades.

"We are extremely proud of our graduates, as well as our faculty, for their outstanding professional work," said Duane Sander, dean of the College of Engineering at SDSU. "These awards stand as a testimony of the support of their colleagues."

Engineer of the Year awards are given to the engineers who exemplify service to the profession and engineering competence.

Engineering alumni named SDSU Family of the Year

Dale and Mary Lou Crothers have had fond memories of SDSU since they met in the old Student Union "Jungle" nearly 50 years ago. Now the Crothers are the SDSU Family of the Year.

The Crothers were honored at the Family of the Year dinner Feb. 11 as part of Family Day activities at SDSU. They attended SDSU in the late 40's and early 50's and now live in Laguna Hills, Calif.

Dale's ties to SDSU began with his grandfather, Percy Crothers, a pre-statehood pioneer and state constitutional legislator who helped establish SDSU. His father, Ralph, graduated from State in 1910, as did his uncle, Harold, former SDSU College of Engineering dean who served as acting SDSU president three times. Crothers Engineering Hall was named for Dean Crothers.

"I am quite prejudiced toward SDSU," Dale said. "A lot of that has to do with my uncle and my grandfather. When I graduated from high school, I wanted to enlist in the Marines. Then I talked to my grandfather. He said he'd help me go to school and that was the turning point of my life."

Mary Lou's family also has SDSU connections. Her mother, Emma Dickson Kundel, was a mathematics professor at State and has a scholarship named in her honor. Her sisters, Ruth Kundel Spanjers and Virginia Kundel Dahm, and her brothers, Keith and Ivan Kundel, all attended SDSU. Dale's sister, Dorothy Crothers Kellar, and brother, Lloyd Crothers, also attended SDSU.

The Crothers started dating when they took advanced engineering math together. Dale was an electrical engineering major; Mary Lou majored in physics engineering.

"We were in Professor Walder's class and we started studying together," Dale said. "Her grades went up and mine went down."

They were married July 17, 1950. Shortly after, Dale, a National Guardsman, was federalized as part of the Korean War effort. He served in Colorado, Georgia and Alaska. They visited California a few years after the war and ended up staying.

For 32 years, Dale designed weather and communications satellites for Northrup, Hughes and TRW; the last 10 years as assistant program manager. He has several patents and space industry awards and is listed in Who's Who in California. Mary Lou completed her degree in science technology and society at California State University in Dominguez Hills.

When they first retired in 1984, the Crothers bought a farm near Lake Poinsett. They sold the farm in 1992 after Mary Lou had heart surgery. While farming, Dale took several graduate courses in counseling at SDSU and now counsels senior citizens in his community. Mary Lou acts in television commercials.

Both South Dakota natives, Dale from Arlington and Mary Lou from Lake City, the Crothers may look for another house in the country near their former Lake Poinsett home.

"This time we'll rent first," Mary Lou said.

The Crothers have four children, Cecilia, John, Teresa and Patricia, and seven grandchildren.

Anderson contracts to clean up Arizona water

Anderson credits his education at SDSU for helping him learn the basics of the civil engineering profession. "I was amazed to see that the techniques we learned in school actually worked that way out in the field."

As a young engineer, Harvey Anderson started his contracting company in Phoenix, Ariz., in 1964, with a wheelbarrow, some shovels and a rented pickup.

Today, Anderson Contracting Company continues to provide vital services in waste water and pollution treatment, pumping, storage and conveyance of water to the desert communities in the Phoenix area. One of the company's major jobs is cleaning up a Goodyear Corporation "Superfund" site near the Phoenix airport. This involves chromium stabilization and removal of solvents used in Goodyear's rubber production dating back to World War II. Another recent, $3 million project involved installing water and sewage on an Indian reservation.

The company's work, Anderson said, often involves extraction wells to pump contaminated water, installation of a treatment plant, then putting treated water back into the aquifer.

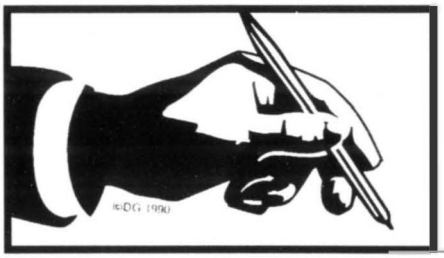
A common water treatment task is removal of supposedly helpful substances like fluoride and chlorine from water systems. "It turns out that too much fluoride is bad for your teeth," Anderson said.

"It is rewarding work because it helps people and helps communities. Some communities are really grateful when we can come in and correct an environmental problem for them."

Anderson credits his education at SDSU for helping him learn the basics of the civil engineering profession. "I was amazed to see that the techniques we learned in school actually worked that way out in the field."

He gratefully recalls mentors such as Emory Johnson, John Andersen, Cal Vaudrey and Jim Dornbush. He said his experiences working for Harvey Mills '50 at the Mills Construction Company were also valuable.

Anderson, a Minnesota native, headed for Arizona and a job with the state highway department after receiving his degree in 1956. After many years in the contracting business in the Southwest, he names the main advantage with no hesitation. "We can work 12 months a year," he says with a smile.



Alumni notes ....

Terrance Alexander, BSCE '77, recently moved from Chicago to accept the position of Environmental Program Coordinator for the University of Michigan in Ann Arbor. He manages air and water pollution, site investigation and remediation and property assessments for the University. He is a licensed professional engineer, certified industrial hygienist and has a master's in environmental science from the University of Idaho in Moscow.

David Bucholz, BS '94, of Decatur, Ill., is an agricultural engineer for the ADM soybean processing plant.

James Hammer, BSAE, '60, of Des Moines, Iowa, owns a company that deals mainly in magnetics and makes superconductors up to 16 feet square and eight feet thick.

Jason Handee, ME '92, recently moved from Florence, S.D., to Abbots Ford, Wis., where he works for Creative Automation.

Darrel Koupal, MSEE '94, who married Jeralyn Placek '91, is a payload channel systems analyst engineer for a top secret project at TRW in Redondo Beach, Calif. A member of technical staff (MTS II), he analyzes the performance of the communications system and distributes performance requirements to the design engineers.

Harlow Miner Jr., ME '53, of Severna Park, Md., retired in May 1994 after 41 years with the Westinghouse Electric Corp. He was with the electronic systems division in Baltimore, Md., the last 34 years. His wife, Carol, still works part time.

Tracey Olson, PE, BSEE '89, has joined The Clark Enersen Partners, a Lincoln, Neb., firm offering services in architecture, engineering, landscape architecture and interior design. He became a Registered Professional Engineer in 1994.

Leo Soukup, BSAE, '62, of Farmington, N.M., manages a system of 600 pivots which irrigates 110,000 acres. Water is obtained from the Navajo Dam and is operated by the Navajo. It is the largest system in the United States.

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