

A DYNAMIC FORCE THAT INITIATES MOTION TO A BODY OR SYSTEM

IMPULSE

SUMMER 1989

COLUMBIA CHALLENGER ENTERPRISE ATLANTIS DISCOVERY COLUMBIA CHALLENGER

ATLANTIS DIS

CHALLENGER

DISCOVERY C

ENTERPRISE

COLUMBIA C

ATLANTIS DIS

CHALLENGER

DISCOVERY C

ENTERPRISE

COLUMBIA C

ATLANTIS DIS

CHALLENGER

DISCOVERY C

ENTERPRISE

COLUMBIA C

ATLANTIS DIS

CHALLENGER

DISCOVERY C

ENTERPRISE

COLUMBIA C

ATLANTIS DIS

CHALLENGER

DISCOVERY C

ENTERPRISE

COLUMBIA C

ATLANTIS DIS

CHALLENGER

DISCOVERY C

ENTERPRISE

COLUMBIA C

ATLANTIS DIS

CHALLENGER

DISCOVERY C

ENTERPRISE

COLUMBIA C

DISCOVERY C

R ENTERPR

COLUMBIA

ATLANTIS

CHALLENGER

DISCOVERY C

R ENTERPR

COLUMBIA

ATLANTIS

CHALLENGER

DISCOVERY C

R ENTERPR

COLUMBIA

ATLANTIS

CHALLENGER

DISCOVERY C

R ENTERPR

COLUMBIA

ATLANTIS

CHALLENGER

DISCOVERY C

R ENTERPR

COLUMBIA

ATLANTIS

CHALLENGER

DISCOVERY C

R ENTERPR

COLUMBIA

ATLANTIS

CHALLENGER

DISCOVERY C

R ENTERPR

COLUMBIA

ATLANTIS

CHALLENGER

ATLANTIS DISCOVERY COLUMBIA CHALLENGER ENTERPRISE ATLANTIS DISCOVERY

CHALLENGER ENTERPRISE ATLANTIS DISCOVERY COLUMBIA CHALLENGER ENTERPR

Coming home, again



Dear Alumnus:

Homecoming is important to those of us who graduated in engineering at SDSU. At Alumni Days in June or at Hobo Day in October, everyone is invited to revisit the campus, reestablish roots, and revel in the restoration of youthful spirit that comes from nostalgic experience.

I must be the most fortunate of men. I have been privileged to enjoy not only the weekend homecoming experience. In the fall of 1983, after a full 36 years of absence, I returned to the College of Engineering to work and enjoy the nostalgic thing all day every day. It was great!

Then two and a half years ago, I went on leave-of-absence to work in Pierre for Governor Mickelson and, later, for the Board of Regents as the Executive Director of the six institutions that form the South Dakota System of Higher Education. These temporary assignments were unforgettable; but now, again, I've returned (on July 1) to SDSU. I am serving as a part-time consultant to the Regents, but I'm at home in Brookings and busy in the Dean's Office.

Returning, it was no surprise to find that the College of Engineering has done very well without me. Acting Dean Duane Sander has done, as expected, a wonderful job. The entire staff has performed with its traditional dedication; and the students, led by the Joint Engineering Council, continued to demonstrate the efforts of enthusiasm, creative thinking and hard work.

In my absence, the Dean's Advisory Council met, deliberated and made appropriate recommendations to faculty and administration. Their advocacy of actions desperately needed for the College of Engineering have had worthy impact.

Engineering Exploration Days programs were effective in telling the "engineering story" to students, alumni, and friends of the college. The phonathon continues, each year, to be more successful and serves as an example to all the other colleges on campus. Several now conduct their own telephone solicitations, following our lead.

Extending upon our pace-setting role, Teresa Hein and the JEC leadership conceived and are preparing for a major event, of regional or even national scope, to be held immediately in advance of Hobo Day. The content of the program, called MAKING CONNECTIONS, will feature an Ethics Seminar, dedicated to the memory of the late professor Emory E. Johnson. It will provide opportunities for engineers and other professionals to hear from national authorities on ethics in practice. No subject is more critical in this country today.

All participants will be invited to attend Hobo Day festivities, where engineers are dedicated to winning the parade awards, and the SDSU team is determined to win the centennial year homecoming football contest with Morningside College.

Coming home, again, is a splendid experience. It is my pleasure to report that we are holding our own at the forefront of engineering education, in this country, and in all areas of associated professional development activity.

Ernest L. Buckley, PE PhD
Dean of Engineering

COVER: The dramatic successes and failures of the NASA Space Shuttle Program have served as an example of how engineering ethics impacts our technological society. SDSU engineering students and faculty are organizing a major ethics seminar so that those interested can learn more about this gripping topic. For further information, see the special section inside. Photo courtesy of NASA.

IMPULSE is published twice each year by the Office of University Relations and the College of Engineering, South Dakota State University, Brookings, S.D. 57007

CARRIE SWORD / editor

VIRGINIA COUDRON, RICH STREET / design graphics

DAN MERRITT, CARRIE SWORD AND LOIS HATTON / information specialists, contributing writers

DIANNE HOFF, LONNA JENSEN / editorial assistants

LYNN TAYLOR / photographer

Engineering extends hand to business and industry

South Dakota State University's College of Engineering has stepped up its economic development efforts in recent years both locally and throughout the state.

As part of the effort locally, officials are urging that people with business-related ideas and people anticipating business expansion or relocation contact either the College of Engineering's Engineering and Environmental Research Center or local Brookings economic development personnel.

"We'll assist them in meeting the right people for both their research and economic needs. We don't have a pot of money, but at least we can get them to the right contacts," says LaDell Swiden, acting director of the EERC.

The College of Engineering takes part in economic development to better carry out its mission to do research, Swiden says. "Governor Mickelson has emphasized that there should be university research in support of industry," he says.

Also, through economic development, the college is helping provide a job market for SDSU graduates, says Dr. Duane Sander, a professor of electrical engineering.

"We want to be a resource both in an educational role as well as a research and development role for companies. The university should be considered the training and consulting resource for our companies in South Dakota," Sander adds.

The fact that SDSU is in Brookings is considered a plus by local economic development officials. "SDSU and specifically its College of Engineering are very involved in the direction that our community is taking in economic development. They offer tremendous assistance that sets Brookings apart from other communities. We're very much interested in identifying

those companies that could use this resource," says Tom Manzer, executive vice president of the Brookings Area Chamber of Commerce. Manzer is in charge of industrial development for the Chamber.

Although he's still in the process of identifying them, Manzer said the companies that can benefit from SDSU's expertise appear to include those involved in electronics, agricultural processing, medical equipment, pharmaceuticals and printing, to name a few.

Some of the key people on economic development boards in Brookings work for the College of Engineering. They include Sander, a member of the board of directors of the Brookings Economic Development Center and a member of the Brookings Area Chamber of Commerce industrial development committee; Swiden, who is vice-chairman of the industrial development board; and Dr. Paul Koepsell, a professor who is also a member of the board of directors for the Brookings Economic Development Center.

"Frequently we consult with SDSU engineering faculty and often they participate in industrial hostings that we have," Manzer said. The hostings are meetings with top officials of companies.

One of the focal points of economic development in Brookings is the Brookings Economic Development Center. It was created in 1987 through the efforts of SDSU, local businesses, and civic groups, Manzer says. The center is a business incubator, providing space for companies that are starting up, and meeting some of their other needs.

"The belief is that the best economic growth is from within and that is the reason for having a facility like this," Manzer says.

In January the SDSU College of

Engineering's EERC created the University Industry Technology Service to assist businesses, industry and manufacturing. UITS helped arrange a summer research project at SDSU to improve adjustable arms or "flexarms" for the Moffatt company of Watertown.

The company manufactures industrial lighting fixtures, and the "flexarms" are an essential part of the fixtures. The research is being done by Dr. H. R. Hamidzadeh, a mechanical engineering professor at SDSU.

Companies can also get help from the state to pay for research at SDSU. The funds come through the recently established Center for Innovation Technology and Enterprise on campus. Each state campus in South Dakota has a CITE office.

There are also College of Engineering courses designed to help train employees at area businesses. For example, the college established a welding course to train employees of Twin City Fan and Blower in Brookings, and it offers undergraduate and graduate courses to employees of Sencore in Sioux Falls.

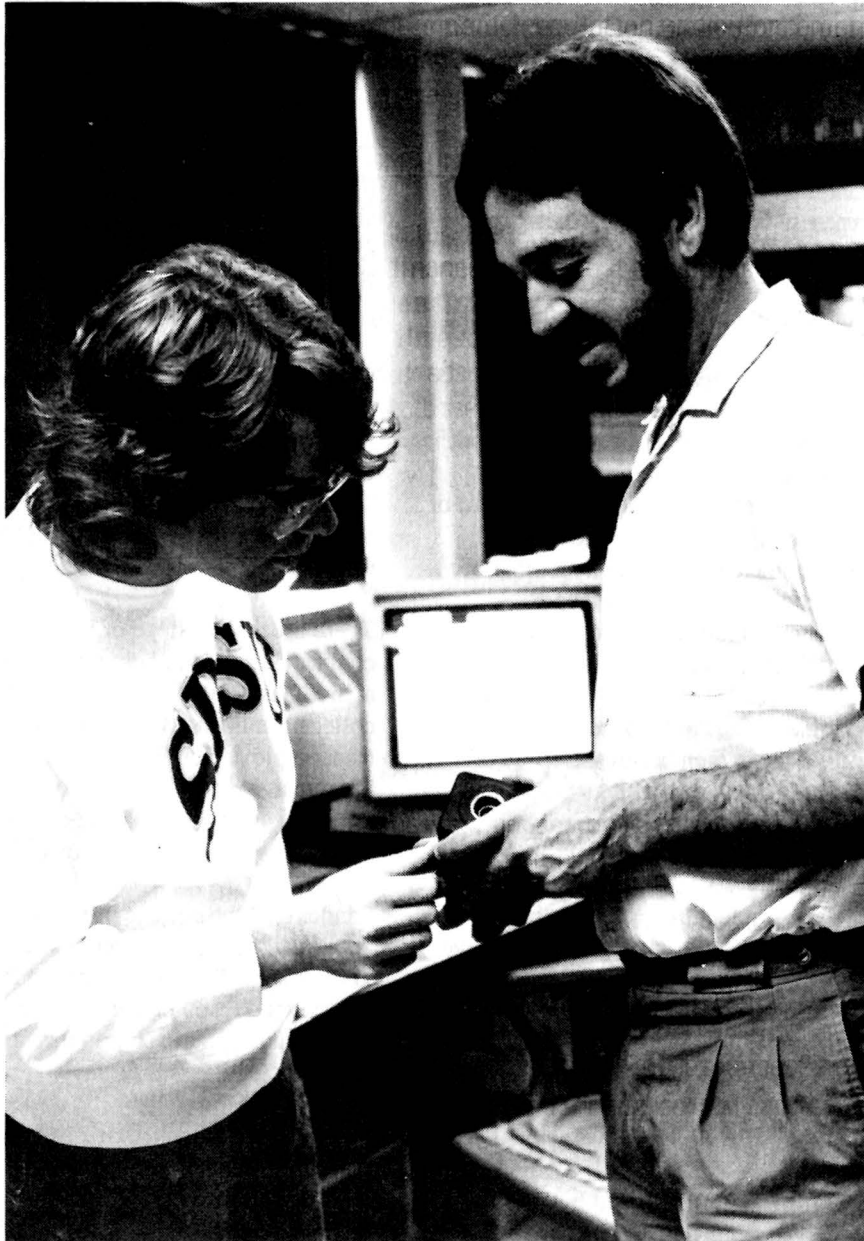
Sander said the college offers one additional help toward economic growth in the state. "The faculty and students are a very good resource for new product ideas that might develop into successful economic ventures," he says.

Sander has first hand experience with that type of entrepreneurship. It was he and a fellow engineering professor, Al Kurtenbach, who began the Daktronics company of Brookings 20 years ago. The company now serves a worldwide market and employs 400. In recent years engineering professors and SDSU graduates have also begun local companies involving bio-genetics, computer software, and other products.

*by Dan Merritt
SDSU Information Specialist*

Astrophysics

Schiller and students trace the evolution of stars



Tom Ortmeier, a senior engineering physics major, and Dr. Stephen Schiller, assistant professor of physics, examine part of a new integrated Charge Coupled Devices (CCD) video camera. The camera provides digital reproductions of telescopic images of the sun, moon, planets and star fields.

Most people can see an eclipse once every few years, but Dr. Stephen Schiller sometimes sees them twice a day.

An astrophysicist and assistant professor of physics at SDSU, he travels to sites such as Table Mountain Observatory in California and McDonald Observatory in Texas to gather information about the evolution of stars. He's also setting up special cameras and computers so students and faculty can study the universe at SDSU.

The university was able to buy the equipment when Schiller obtained a \$20,000 grant in May, 1988, from Research Corporation, a foundation for the advancement of science and technology.

The grant supports Schiller's current research project on stellar evolution, which involves the new equipment. Funding also provides summer support for an undergraduate assistant.

At first Schiller worked with Bill Baker, an engineering physics and electrical engineering major. Since Baker's graduation, Schiller has been working with Tom Ortmeier, an engineering physics major.

Their project is complex, but their goal is easy to comprehend. "What we want to do is take this information and determine how stars are formed, how they grow old, and how they die," Schiller said.

Understanding stellar evolution will help scientists predict changes in the sun and other stars. "We find that stars, as they get older, get larger, and a star the size of the sun would eventually swallow up the Earth," Schiller said. "We'd also like to understand why some stars explode, and that's been tied to the evolutionary

process determined principally by the mass of stars."

The study of stellar evolution may also reveal the source of the materials that make up the Earth and the rest of the solar system, because when a star dies it releases materials into space that can form new stars and planets.

One other application is the search for extraterrestrial life. Scientists believe they're more likely to find life in space if they can locate a star that could support an Earth-like planet.

Schiller hopes to help the scientific community refine its theories about stellar evolution. His results will go into a data bank used to test the evolutionary models developed by theoreticians. "Our time scales are on the order of millions and billions of years. We want to predict what stars will look like in a million years," he said. "The same theories should also tell us why the universe appears as it does today."

As a teenager, Schiller was inspired by the Apollo missions to the moon, and he started his own space exploration projects. "It was exciting to find that I could do this from my back yard with a small telescope and camera. I bought a 6-inch reflecting telescope and built a domed observatory with an office and darkroom," he said.

Years later, Schiller still has his eyes on the stars. Most recently, he and an undergraduate student have been gathering information about a cluster of stars called NGC 752, and two stars within that group called eclipsing binary DS Andromedae. They're using deductive reasoning, photometry, spectroscopy, and computer modelling to find the dimensions of each star.

Schiller explained that more than half of the stars in the universe belong to binary or multiple star systems. "Stars in these systems are gravitationally attracted, so they revolve around each other. When two stars revolve around each other with an orbital orientation, such that one passes in front of the other as seen by an observer on Earth, they eclipse. These are called eclipsing binary stars."

"When you look at eclipsing binary stars, most of them are so close together they look like a single star, but what happens during an eclipse is that the brightness decreases in the single point of light--one star blocks out the light of the other," he said.

By using photometry, Schiller measures the changing intensity of light as one star passes in front of the other. By using spectroscopy, he examines the movement of features in the stellar spectrum. These observations allow him to calculate the brightness of both stars, their orbits, their gravitational pull toward each other, their velocity, and their mass.

"The most important physical property of the star that determines its characteristics--its size and its temperature--is the mass of the star. We study binary stars, because only in binary stars can we determine masses. If you've got a single star (like the sun) sitting out in space, you can't determine how much material makes up that star--that is, its mass. You have to have another object orbiting around it so you can look at their mutual gravitational pulls on each other. And that other object must be a second star."

From the observations, Schiller can calculate a star's mass in kilograms, its size, its separation from the other star, and the amount of energy the binary

components emit into space. That information provides a factual basis for testing theoretical models of stellar evolution.

The models are based on two ideas--that all stars in a cluster are created at the same time, and that the more massive a star is, the faster it evolves. By comparing stars of varying mass within a cluster, scientists can estimate their age and predict how they'll change.

"It seems that the evolutionary process depends upon the mass of the star. So that's why it's important to know the mass of the star, and that's why we study binary stars . . . You can study clusters, and you can study binary stars, but when you can combine the two by finding binaries that are members of clusters, you get information you wouldn't have otherwise. It's that type of information that we're trying to generate in our research," he said.

Schiller, 35, moved to Brookings in August, 1987, leaving a research and teaching position at the University of Calgary, Alberta, Canada. He received a bachelor's degree in physics from Walla Walla College, College Place, Wash., and a master's degree in astronomy from Ohio State University at Columbus. He also earned a doctorate in astrophysics from the University of Calgary. He lives in Brookings with his wife, Marilyn, and sons, Kurtis and Matthew.

*by Carrie Sword
SDSU Information Specialist*

Buckley pursues health with positive attitude

Dean Ernest Buckley was diagnosed with lung cancer in February of this year and immediately chose to adopt a positive response to the illness. Optimism and hope are his watch words as he continues to work while undergoing chemotherapy and radiation treatments.

He says he has his eyes on God. And he has prayed for strength to do his job and for the necessary strength to defeat the cancer.

While receiving encouraging words on the progress of his treatment from his doctors, Buckley returned to his position as dean of the College of Engineering at SDSU--effective July 1.

While on leave, Buckley served as a special advisor on job creation, science



Dean Ernest Buckley and his wife, Betty Bob

and technology for the Governor's Office of Economic Development in Pierre. He later served as Acting Executive Director for the South Dakota Board of Regents.

Last spring, after details of his illness were made available and printed in several newspapers, he received hundreds of cards, letters, flowers, inspirational gifts and telephone calls from around the state and nation from government officials, business associates, personal friends, parents of students in the College of Engineering, SDSU faculty, staff and students.

"I am thankful and grateful for the love and concern expressed by these kind people," Buckley says.

He says he believes words of hope and faith have had a positive effect on his health. In his response to the cancer he says he works with his doctors and with God while applying all the faith and optimism he can muster.

Michael Burke, a radiologist from Sioux Falls, reported that Buckley has had a complete response to the treatment and that the results are encouraging, according to Buckley.

"I have kept my thoughts positive. I don't have time to be pessimistic," he says.

Buckley is devoting 80 percent of his time to his position as dean and 20 percent to his position as a consultant to the Board of Regents.

Dr. Duane Sander, who was acting dean for the past two years while Buckley was in Pierre, will serve as Assistant to the Dean this year, in addition to his role as an electrical engineering professor.

*Lois Hatton
SDSU Information Specialist*

Technology transfer co offers opportunities for

A symposium bringing industry and university personnel together to address topics relevant to South Dakota industrial needs is scheduled for September 20 and 21 at South Dakota State University. This technology transfer symposium is sponsored by the University Industry Technology Service (UITS) at SDSU. Attendance will prove to be an excellent opportunity to form and strengthen university and industry relationships.

Dr. David H. Swanson, division chief at Georgia Tech Research Institute, is the keynote speaker. Swanson will talk about his successful experiences with university/industry relations.

The symposium format includes general plenary sessions to inform industries about a variety of assistance services, including those available from UITS, SDSU, the Center for Innovation, Technology, and Entrepreneurship, and the state Office of Economic

Susan Quam



ference progress

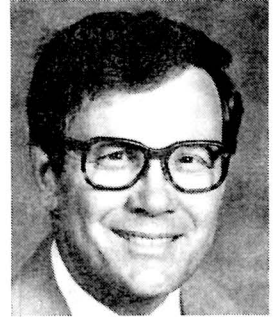
Development. The plenary sessions will conclude with a panel discussion involving industry leaders, university administration and faculty, and economic development personnel.

Concurrent sessions will also be offered on specific technologies such as CAD/CAM for mini and personal computer systems, Computer Aided Engineering (CAE) and computers in industry. Representatives from NASA's Central Industrial Applications Center, the Federal Laboratory Consortium, and the National Institute of Standards and Technology will also speak on their roles in industry assistance.

For more information and registration details, contact LaDell R. Swiden, acting director for the Engineering and Environmental Research Center, at (605) 688-4184.

*by Susan Quam
UIITS research assistant*

Dear Friends of South Dakota State:



You are cordially invited to attend a major seminar on ethics in a technological society to be held on our campus beginning at 8 p.m. on October 26 and continuing through October 27.

This seminar will include lectures, workshops and panel discussions that will help professional engineers and engineering students confront the ethical issues related to high technology and their impact on the ethical and value standards of our society.

In addition to members of our own university and College of Engineering staff, outstanding guest lecturers will participate. They include Roger Boisjoly, who worked on the O-ring seals for the Space Shuttle Challenger; Arthur Schwartz, coordinator of the Institute of Ethics, National Society of Professional Engineers; Dr. T. Al Austin, engineering professor at Iowa State University; and Dr. Kent Druyvesteyn, staff vice president for ethics at General Dynamics Corporation.

You will enjoy this seminar and benefit greatly from it. Our College of Engineering has done a fine job planning this event. It addresses issues important to the engineering profession, the nation and South Dakota.

We are eager to have you join us for this seminar and heartily await your coming.

Cordially,
Robert T. Wagner
President

Students and faculty thrill over record phonathon

With donations still coming in, last February's Engineering Phonathon appears to be a record breaker. "I think it will go over \$65,000 when it's all done," said Teresa Hein, faculty chairperson for the event.

"We are thrilled. It's a 20 percent increase above last year's totals. I guess we're all getting better at it and we had a good crew of students."

The event has become an important source of support for engineering students. "The phonathon funds so many things--it buys equipment, it pays for scholarships for students. It's something that the departments couldn't live without now," Hein said.

"And it's something that would not be possible without the cooperation of all the faculty and all the students. It takes everyone's help and everyone's work," she said.

Besides collecting contributions during the phonathon, students made contacts with professionals and gathered plenty of job lead information, she said.

About 450 students and 50 faculty members manned the telephones during the sixth annual phonathon this year. Hein, a physics instructor and coordinator for instruction, worked with student chairpersons, Carmen Fink, a civil engineering major, and Troy Erickson, a mechanical engineering

major. They coordinated a cooperative student-faculty committee.

Information collected from alumni during the phonathon was entered directly into the SDSU Alumni Center data base, helping make the files on engineering alumni some of the most complete the center has, Hein said.

Besides helping students raise funds and gather job leads, the phonathon helps prepare students for professional careers. "It helps students build their communication skills and learn about what's going on in the real world," Hein said.

*by Dan Merritt
SDSU Information Specialist*

Executive Proclamation

State of South Dakota

Office Of The Governor

WHEREAS, The people of South Dakota are characterized by integrity, honesty, and ethical standards based upon application of the Golden Rule; and,

WHEREAS, In a technologically-based society, the human welfare of all the citizens of our state, our region, and our nation depend upon the conduct of ethical practice by all professional people in law, medicine, theology, education, and engineering; and,

WHEREAS, The College of Engineering at South Dakota State University has scheduled MAKING CONNECTIONS, a two-day seminar on Ethics in a Technological Society for October 26-27, 1989; and,

WHEREAS, Invitation to participate is extended to professional practitioners from throughout the Northern Great Plains Region; alumni from our institution of higher education; and representatives of industry, business, agriculture and agencies of government; and,

WHEREAS, An outstanding program will include sessions involving presentations by nationally and internationally recognized authorities who will make significant contributions to even greater ethical awareness of all of our citizens:

NOW, THEREFORE, I, GEORGE S. MICKELSON, Governor of the State of South Dakota, do hereby proclaim October 26 and 27, 1989, as

ETHICS AWARENESS DAYS

in South Dakota, and I urge all persons to consider attending the MAKING CONNECTIONS program and staying over to celebrate the homecoming football game on Hobo Day, October 28, 1989, when SDSU competes with Morningside College.



IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of South Dakota, in Pierre, the Capital City, this Third Day of July, in the Year of Our Lord, Nineteen Hundred and Eighty-Nine

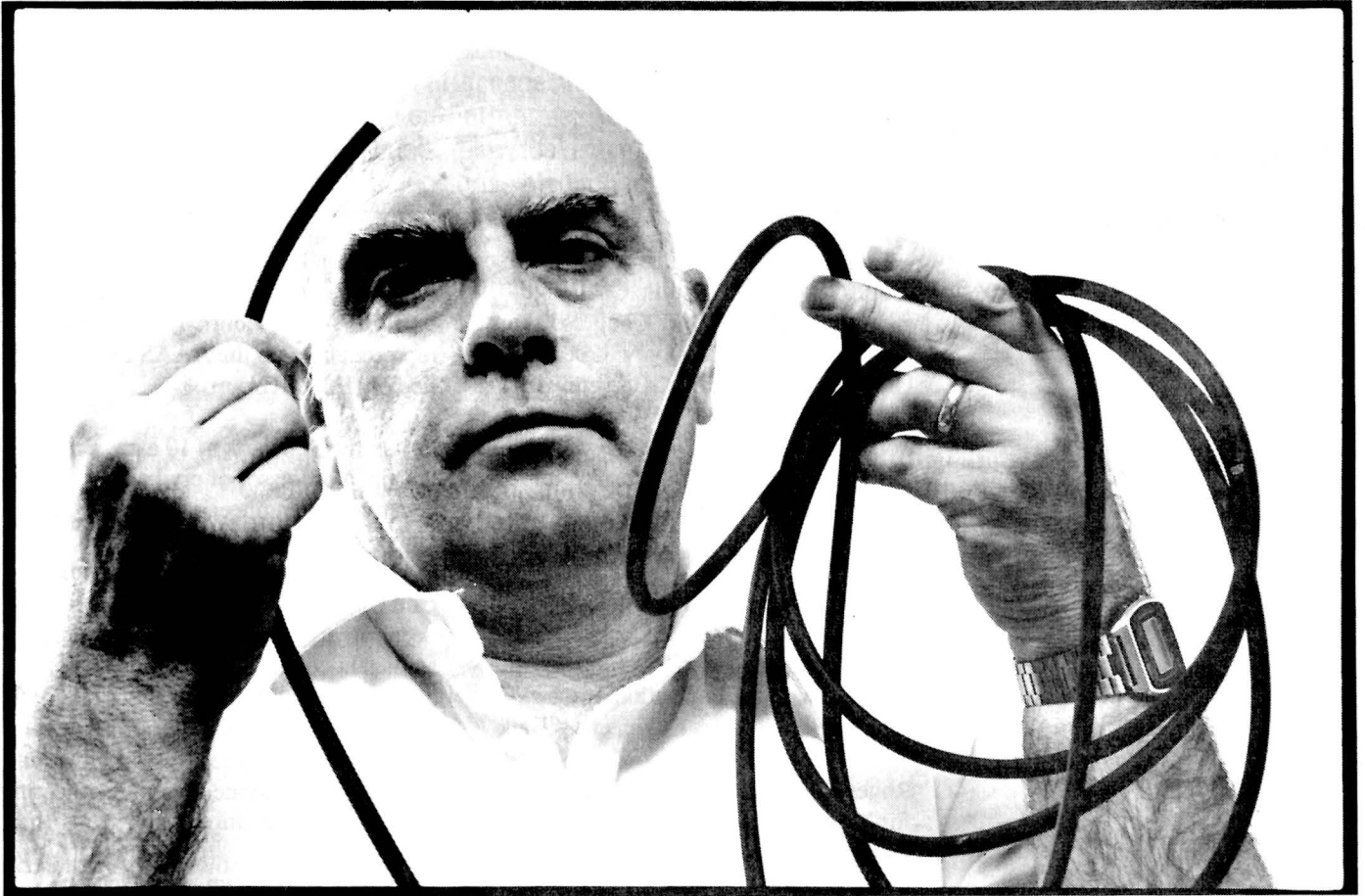

GEORGE S. MICKELSON, GOVERNOR

ATTEST:


JOYCE HAZELTINE, SECRETARY OF STATE

MAKING CONNECTIONS

A Seminar on Ethics in a Technological Society, October 26 - 27, 1989



Roger Boisjoly will speak about "Ethical Decisions and the Space Shuttle Challenger Disaster."

"Never have we, as engineers, had the opportunity to do so much good or the power to create so much harm. We read about the deterioration of the ozone layer, the danger of nuclear weapons, the disposal of radioactive or hazardous waste. We see the horror of mechanical or human error in plane crashes, bridge collapses, building failures, and even the disastrous crude oil spill in Prince William Sound in Alaska.

Never has it been more important for us, as engineers, to live up to the words of the obligation we just spoke, being 'conscious always that my skill carries with it the obligation to serve humanity by making the best use of earth's precious wealth. In my performance of duty and in my fidelity to my profession I shall give my utmost.' "

-comments by Gregg Jongeling, an SDSU civil engineering alumnus, during his "Charge to the Recipients" at the Order of the Engineer ceremony in May.

MAKING CONNECTIONS

Ethics in a technological society

*October 26 - 27
1989*

The engineer who worked on the O-ring seals for the Space Shuttle Challenger and later testified before Congress about their role in the explosion will be the keynote speaker at an ethics seminar hosted by the College of Engineering at South Dakota State University Oct. 26-27. The seminar will feature several experts on ethics from throughout the United States.

The seminar, held in the University Student Union on the SDSU campus, will directly precede Hobo Day, and it will coincide with the dedication of a new sculpture at Crothers Engineering Hall.

Roger Boisjoly, a former seal specialist for Morton Thiokol, will speak at 8 p.m. on Oct. 26. Boisjoly had predicted possible failure of the O-rings at cold temperatures and opposed the launching of the Challenger. Management overruled his decision and Boisjoly went public with his testimony after the Challenger exploded. He has since been invited to speak about ethics at 63 universities and professional society meetings. In October 1988 he took the Professional Engineering Exams, and in February 1989 he became a certified consulting engineer.

Arthur Schwartz will begin Friday's slate of speakers at 9:15 a.m. with an address titled, "NSPE--Current Initiatives in Engineering and Ethics." Schwartz, who holds a law degree from American University at Washington, D.C., is the General Counsel for the National Society of Professional Engineers. In addition, he's co-editor of the "Ethics and Public

Policy" column in an American Association for the Advancement of Science (AAAS) journal, and he's a representative on the AAAS Professional Society Ethics Group.

Following Schwartz at 10 a.m., Dr. T. Al Austin, a professor of civil and construction engineering for Iowa State University at Ames, will speak on the topic, "Ethics in the Design Classroom--One University's Approach." Austin has been researching the addition of ethical studies in college engineering design curriculum, and he'll talk about his findings. Austin is director of the Iowa State Water Resources Research Institute and holds a doctorate in civil engineering from Texas Tech University.

Dr. Kent Druyvesteyn, staff vice president for the ethics program at General Dynamics Corporation, and Paul Towne, corporate director of ethics for Honeywell, Inc., will begin the afternoon sessions with a lecture about corporate and business ethics at 1 p.m. Druyvesteyn is currently a member of the Department of Defense Advisory Panel on Government-Industry Relations. Prior to joining the General Dynamics Corporation, he was director of the Master of Business Administration program at the University of Chicago. He holds a doctorate in history from the University of Chicago.

Paul Towne oversees Honeywell's voluntary disclosure program, and he manages investigations involving violations of conduct policies, as well as the corporation's ethics training program.

Connie Ingle



He has a bachelor's degree in finance and economics from Jamestown (N.D.) College and has done post graduate work in government contract law at George Washington National Law Center in Washington, D.C.

Also Friday afternoon, Dr. Eric Johnson, head of the Division of Liberal Arts at Dakota State University, Madison, will give a talk titled, "Computer Ethics." Johnson is a professor of English who also teaches computer science. His two areas of expertise, plus his interest in ethics, will provide the foundation for his address.

There will also be panel discussions and video screenings during the conference. A panel discussion at 10:45 a.m. Friday will explore the issue, "Ethics in Academia--Can and/or Should Ethics be Taught?" The panelists will include Dr. Robert Wagner, president of SDSU; Dr. David Nelson, professor of philosophy and religion at SDSU; Austin; Boisjoly; Towne; and Druyvesteyn.

A panel discussion at 3 p.m. Friday will examine "Ethical Implications of High Technology on Society." Panelists include Dr. Robert Burns, a professor of political science at SDSU; Dr. James Shekleton, an assistant professor of philosophy at Northern State College, Aberdeen; Dr. Norma Wilson, associate professor of English at the University of South Dakota, Vermillion; Boisjoly; Druyvesteyn; and Nelson.

The video sessions shown continuously on Friday will focus on ethics in a variety

of professions. The videos include "Gilbane Gold," produced by the NSPE National Institute for Engineering Ethics; a recording of Roger Boisjoly's first public appearance following the space shuttle explosion; "Code Gray: Ethical Dilemmas in Nursing," and "Deception," which both involve the medical field; and "The Anatomy of a Lie," which explores ethics in journalism.

All of the speeches and panel discussions will take place at Volstorff Ballroom in the University Student Union, and all of

the videos will be shown in Room 255 of the student union. Question and answer sessions will follow each of the speeches and panel discussions. There will also be a social at Tompkins Alumni Center Thursday evening and a luncheon Friday at 11:45 a.m. Further information about the conference and registration forms are included in this special Ethics Section of the Impulse.

by Connie Ingle, a senior electrical engineering major from Pierre

National Society of Professional Engineers Code of Ethics

PREAMBLE

Engineering is an important and learned profession. The members of the profession recognize that their work has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness and equity, and must be dedicated to the protection of the public health, safety and welfare. In the practice of their profession, engineers must perform under a standard of professional behavior which requires adherence to the highest principles of ethical conduct on behalf of the public, clients, employers and the profession.

FUNDAMENTAL CANONS

Engineers, in the fulfillment of their professional duties, shall:

- 1. Hold paramount the safety, health and welfare of the public in the performance of their professional duties.*
- 2. Perform services only in areas of their competence.*
- 3. Issue public statements only in an objective and truthful manner.*
- 4. Act in professional matters for each employer or client as faithful agents or trustees.*



Boisjoly

O-ring engineer tells his side of the story

Six months before the Space Shuttle Challenger exploded, Roger Boisjoly wrote a memo to the management at Morton Thiokol. "We stand in jeopardy of losing a flight" if the O-ring seals are not redesigned, he explained.

The 51-year-old aerospace engineer will talk about his involvement in the Challenger disaster during the keynote address at 8 p.m. Oct. 26 in Volstorff Ballroom, during the College of Engineering's seminar, "Ethics in a Technological Society."

Ever since the shuttle was destroyed due to failure of an O-ring seal joint, Boisjoly has been campaigning for ethical awareness in industry. He's known as the man who "vigorously opposed the launching of the Space Shuttle Challenger," as noted on his business card.

He worked for 27 years at 11 different companies before the shuttle disaster put him in the media limelight. Throughout his career he followed a personal guideline that influenced his ethical decisions. He says he would ask himself, "Would I want my wife and children to use this product?"

Boisjoly was hired at Morton Thiokol in 1980 as a structural analyst for the solid rocket boosters used in NASA's Space Shuttle Program. He became deeply

involved working on the rocket joints and soon was considered a resident expert on the joints and sealing surfaces, he says.

On Jan. 14, 1985, he found some indication that the O-rings would not seal if unusually cold temperatures preceded a launch. He confirmed his suspicions in testing and reported his findings, he says. He also asked that a team be organized to solve the problem.

Morton Thiokol's management gave him permission to form a team, but he says it didn't receive the management support, staffing and resources needed to accomplish the task. On Jan. 27, 1986, engineers at Morton Thiokol were informed that the temperature for launch the next morning would be well below that of the previous successful January 1985 flight. They quickly gathered all available information to convince management the launch would be dangerous, Boisjoly explains. At first, they persuaded management to vote against a launch during a telephone conference with NASA, but Larry Mulloy, NASA booster manager, called the information inconclusive and pushed for a launch vote from Morton Thiokol, Boisjoly says. He claims Morton Thiokol changed its vote in favor of launching to satisfy NASA officials.

The next morning the Challenger exploded seventy-one seconds into flight,

killing the seven crew members and halting the shuttle program for three years.

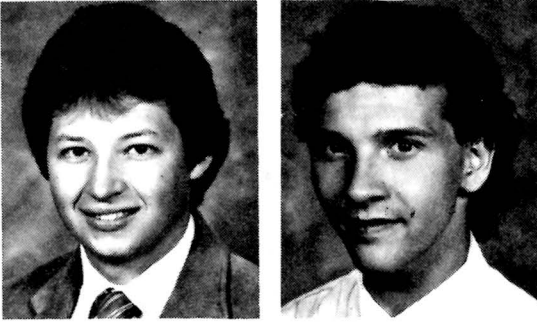
During the investigation that followed, Boisjoly and Arnie Thompson, Morton Thiokol's supervisor for structural design, presented facts to a presidential commission. Boisjoly says the company chastised them for "airing the company's dirty laundry."

In the months that followed, Boisjoly and Thompson sensed they were being "eased out" of their duties at Morton Thiokol, according to Boisjoly. They retained their titles but were isolated from redesign efforts and other projects dealing with NASA, he says.

Later diagnosed as suffering from traumatic stress disorder, he decided to go on extended sick leave with the understanding that he wouldn't return.

Since then he's been job-hunting and promoting ethical awareness in industry. He says he's concerned about the future of the space program and distressed by the "business as usual" attitude at NASA and Morton Thiokol. "They are going to preserve the launch schedule any way they can, by doing things that are necessary to preserve it . . . Maybe not to the same extent as before, but the schedule still drives the program."

Boisjoly advocates the teaching of ethics at the elementary, high school, and



Schwartz says engineers face two scenarios related to ethics

Though there have recently been many news accounts about ethics in engineering, there have been few court cases, according to Arthur Schwartz, general counsel and legal director for the National Society of Professional Engineers (NSPE).

Schwartz provides legal services to the 75,000-member group on internal and external operations, including legislation involving corporations, construction, copyright and ethics.

He'll speak on the topic "NSPE--Current Initiatives in Engineering Ethics" at 9:15 a.m. Oct. 27 in Volstorff Ballroom, as part of the upcoming ethics conference at SDSU.

Schwartz says widely publicized cases often involve whistleblowers. Cases can revolve around the issue of ethical standards among management as well as the issue of undetected errors by engineers.

"That's always a tricky question in ethics. If an engineer makes errors, does that mean he's unethical? I think probably not," Schwartz says.

A recent ethics case involved engineers in Maryland. "It was a case where some engineers who work for the United States government were convicted of violating the law by illegally storing and dumping certain types of hazardous materials," Schwartz says.

Such cases convey a message to engineers "particularly in the government, but also in the private sector that they will be accountable for their actions . . . They cannot rely on the fact that they were doing what their employer asked them to do . . . They are going to be judged as professionals and if they want to be considered professionals in our society, they need to be responsible," he says.

"There are two ways of looking at the situation. On the one hand, you might find a situation where the engineer does something which is negligent or unethical, and action is taken against the engineer. Then there's the other situation where the engineer is trying to do something that is ethical and . . . he finds his employer or client is acting in a way that is inappropriate. It places the engineer in a difficult situation," he says.

In a scenario where engineers are acting unethically, "they need to be educated as to what is the appropriate thing for them to do, so they can act properly and responsibly," Schwartz says.

In cases where the engineers want to do right and are opposed by employers or clients, "engineers should have . . . some kind of resource available so they can address these issues in a responsible way and do what is consistent with public health and safety," Schwartz says.

"I think it's a question of education, a question of understanding what their responsibilities are and providing some sort of networking in which they can address these kinds of problems."

by Teresa Peterson, a junior electrical engineering major from Boyd, Minn., and Forrest Weston, a junior engineering physics major from Sioux Falls



Arthur Schwartz

college levels. He believes the best method is to study case histories. He disagrees with professors who believe "the die is cast" by the time students reach college. "That's baloney. The die is cast, but there are many fence-sitters, and if you can get a lot of the fence-sitters down on the right side of the fence and some of those who are on the wrong side to the right side, then you have accomplished a great deal," he says.

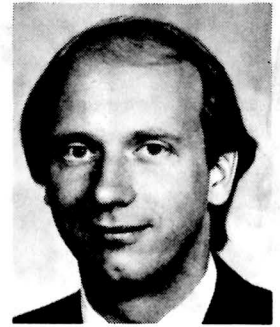
It will take commitment from managers to change the way certain companies do business, he says. The presidents of these companies will have to meet with employees and ask them not to let shoddy workmanship go out the door. People must be encouraged to bring problems forward instead of being punished as "troublemakers," he says.

Boisjoly thinks engineering graduates can make an ethical difference in industry. He recommends they become professional engineers and join professional societies. This will give them a stronger voice, he says. Engineering graduates should also seek employment with companies that have good communication and high-quality products. Other companies will then be forced to improve their management practices and product lines to compete for the top engineering students, he says.

by Troy Erickson, a junior mechanical engineering major from Summit

Conference speakers oversee ethics for Honeywell, General Dynamics

Mark Minyard



Dr. Kent Druyvesteyn

Dr. Kent Druyvesteyn, staff vice president of the ethics program for General Dynamics, and Paul Towne, corporate director of ethics for Honeywell, will pool their expertise on ethics when they speak at SDSU Oct. 27.

Druyvesteyn says learning about ethical concerns in the classroom or through company training is helpful, "but having a course in ethics doesn't make someone more trustworthy." It's through performance on the job that ethical conduct is measured, he says.

In recent years many companies have developed programs to increase awareness of ethics. The ethics program at General Dynamics was formally established in August 1985. To help employees understand company policy, the company created a Standards Booklet, which tends to be more specific in defining company policy than a standard code of ethics. The standards address a broad range of issues and aren't restricted to engineering concerns.

General Dynamics issues its Standards Booklet to all employees, and they must then sign cards indicating they've read and understand the policies. New employees also attend workshops on ethics.

In the same vein, Honeywell created the Honeywell Principals. These standards were developed about 20 years ago along with an education program. A Director of Ethics position was created in 1986 to coordinate and oversee the program. Honeywell uses the policy standards to "articulate its principles so the employees know what the corporation wants," says Towne.

The standards within Honeywell's code of ethics are decided by a corporate

committee on ethics staffed by most of the higher-ranking executives. They meet on a monthly basis to address policy changes and new policies. The code is completely generated within Honeywell and includes many specifics that are unique to doing business with the federal government, one of Honeywell's largest customers.

New employees at Honeywell receive a copy of the Honeywell Principals and view an accompanying video tape. People who work in the defense-related division also receive annual training.

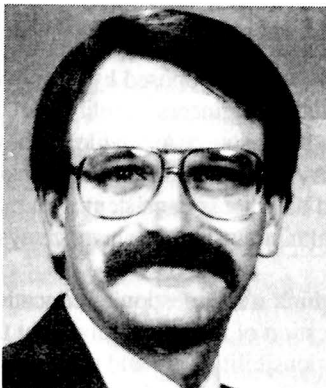
Towne and Druyvesteyn agree that education at universities is helpful for dealing with ethical dilemmas. "We've got to take an approach to integrate it into each and every curriculum," says Towne. He suggests using recent case studies of a multidimensional problem.

Druyvesteyn also recommends case studies but suggests using the issue identification method first, in which students identify problems and solutions from their experiences and then study related issues.

"We have a more ethically aware society, no question about it. They are conscious of it, therefore corporations need to be more ethically aware," says Towne. He says the issue of ethics is an important and complex subject on which there will be an increased emphasis at least over the next five years.

Druyvesteyn and Towne will give their speech at 1 p.m. Oct. 27 in the Volstorff Ballroom, University Student Union. Their joint presentation is titled, "Corporate Ethics Programs/Business Ethics."

by Mark Minyard, a senior computer science major from Brookings



Paul Towne



Teresa Peterson

Computer program simulates sticky ethical situations

Faculty at Iowa State University have been trying for ten years to heighten engineering students' awareness of ethics by offering lectures, seminars, and a course in ethics. None of the efforts was found to be totally satisfactory.

About three years ago Dr. T. Al Austin, a professor of civil and construction engineering at ISU, learned about the National Science Foundation's Ethics and Value Studies Program. Through the program, he and his colleagues developed a computer-based simulation for studying ethics in civil engineering design projects.

Austin will speak about the project during the ethics seminar at SDSU this fall. His talk is scheduled for 10 a.m. Oct. 27 in Volstorff Ballroom.

Austin says the computer design simulation ISU developed presents alternatives in design that have different ethical implications. One example deals with highway design. "In that simulation, they would be faced with the issue of trying to resolve an alignment alternative in a highway. One alignment would go through a low-income area; another would go through a very wealthy, higher-income area, both of which would meet the highway design (criteria)," he says.

The engineering students would make a decision, bearing in mind the impact of the project on people's lives. "It forces the students to face the issue of what the social implications are . . . particularly the impact on the lives of the low-income," he says. Those residents would have less opportunity to relocate, but the high income residents would be more influential in the community, he says.

The research team at ISU is composed of two engineers, a philosopher, a sociologist, and an attorney.

The team wants to make the design simulation curriculum available to students nationwide. They're building computer modules that can be transported to different universities and incorporated into senior-level design projects. ISU may be able to complete up to five scenarios before NSF funding runs out in December.

The objective is to encourage students to start thinking about engineering ethics before they have to make an ethical decision. "There's no intent on our part to believe that anyone is ever going to encounter exactly the same scenarios we have in our simulation. That's not the point," Austin says. "The point is that hopefully we can heighten people's awareness as they go through the designing and (encourage them to) start asking some critical questions."

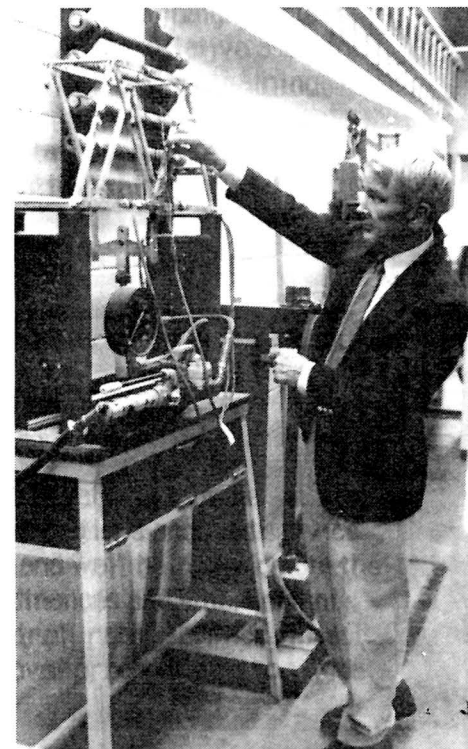
Austin believes the ideal engineering ethics course would be taught by people from both the humanities and engineering. "It's almost as if there's a great chasm between the two groups sometimes," he says.

The best approach will ultimately be incorporating engineering ethics materials into existing curriculum and presenting it to students at every level, he says. "Hopefully, by the time they're seniors they will have heard it enough maybe something will stick."

by Teresa Peterson, a junior electrical engineering major from Boyd, Minn.



Dr. T. Al Austin



Engineering students can learn about the practical impact of professional decisions by working with models. Researchers at Iowa State University are developing a computer model to reflect the effect of ethical choices in engineering design. Above, Dr. Dwayne Rollag, head of the SDSU Civil Engineering Department, demonstrates a more concrete type of model. This model enables students to measure the load capacity of a bridge. They can then compare the results with their original calculations.

MAKING CONNECTIONS

A Seminar on Ethics in a Technological Society

October 26-27, 1989

*University Student Union
South Dakota
State University
Brookings, S.D.*

THURSDAY, OCTOBER 26, 1989

5-8 p.m. Check-in and Registration, University Student Union (USU) Dakota Room 159

8 p.m. "Ethical Decisions and the Space Shuttle Challenger Disaster"
Speaker: Roger Boisjoly, an engineer who worked on the O-ring seals for the Space Shuttle Challenger and later testified before a presidential commission about the role of the seals in the explosion, will give the keynote address. His speech is free and open to the public. USU Volstorff Ballroom

Reception immediately following keynote address. Those attending the keynote address are invited to a reception to welcome seminar speakers. Shuttle bus service will be provided between the University Student Union and the Tompkins Alumni Center. Busses will return participants to their motels following the reception.
Tompkins Alumni Center

FRIDAY, OCTOBER 27, 1989

7:30 a.m. Check-in and Registration, USU Dakota Room 159

9 a.m. Seminar Welcome and Opening Remarks
Speaker: Teresa L. Hein, ethics seminar coordinator and SDSU physics instructor
USU Volstorff Ballroom

9 a.m. Video Sessions
Continuous showings of videotapes dealing with ethical decisions affecting various professional groups will run throughout the day. Tapes to be shown may include "Gilbane Gold" (engineering), "Code Gray: Ethical Dilemmas in Nursing" (medicine) and "The Anatomy of a Libel" (journalism). USU Pasque Room 255

9:15 a.m. "NSPE - Current Initiatives in Engineering Ethics"
Speaker: Arthur Schwartz, general counsel for the National Society of Professional Engineers and coordinator of its Institute of Ethics. USU Volstorff Ballroom

10 a.m. "Ethics in the Design Classroom -- One University's Approach"
Speaker: Dr. T. Al Austin, professor of civil and construction engineering at Iowa State University. USU Volstorff Ballroom

10:30 a.m. Coffee Break, USU Gallery Lounge

10:45 a.m. "Ethics in Academia -- Can and/or Should Ethics Be Taught?"
A panel discussion will feature several of the seminar speakers.
USU Volstorff Ballroom

11:45 a.m. Luncheon, USU Campanile Room 169

1 p.m. "Corporate Ethics Programs/Business Ethics"
Speakers: Dr. Kent Druyvesteyn, staff vice president at the corporate level for the ethics program at the General Dynamics Corp., and Paul Towne, corporate director of ethics for Honeywell Inc. USU Volstorff Ballroom

3 p.m. "Ethical Implications of High Technology on Society"
A panel discussion will feature several of the seminar speakers.
USU Volstorff Ballroom

4 p.m. "The Ethics of Computing"
Speaker: Dr. Eric Johnson, professor of English and head of the Division of Liberal Arts at Dakota State University. USU Volstorff Ballroom

5 p.m. Seminar Closing Remarks, USU Volstorff Ballroom

SEMINAR INFORMATION

LOCATION

The seminar will be held at the University Student Union on the campus of South Dakota State University in Brookings. Maps of Brookings and the campus will be mailed with the registration confirmation.

REGISTRATION

Location: Pre-registration by mail is strongly encouraged since space is limited. Those who register by mail should stop by the check-in desk during the registration hours listed below to pick up seminar packets. The check-in desk will be located on the first floor of the University Student Union in Room 159 (Dakota Room). Signs at each entrance will provide direction.

Hours: Registration (for those who have not registered by mail) and check-in (for those who have pre-registered) will run from 5 p.m. to 8 p.m. on Thursday, Oct. 26; after the keynote speech to 10 p.m. on Thursday; and from 7:30 a.m. to 4 p.m. on Friday, Oct. 27.

Tickets: The cost of tickets for the Friday luncheon are covered in the registration for professionals and alumni. SDSU faculty, all students and others desiring to attend the luncheon can order tickets, for \$12 each, using the designated section of the registration form. All luncheon ticket orders must be accompanied by payment. Since space is limited, luncheon tickets will not be sold during the on-site registration.

CEUs: Participants can earn 0.7 hours of continuing education credit (equivalent to seven professional development hours) for attending the seminar. Sign-up for continuing education credit will take place at the check-in desk during registration hours. A fee of \$5 will be assessed at that time to cover processing costs.

Refunds: Cancellation of seminar registration and ticket orders must be

FEES:

	Postmarked by Sept. 30	Postmarked after Sept. 30
Professionals and SDSU Faculty*	\$75	\$100
SDSU Alumni	\$50	\$75
SDSU Students	No charge	\$5
Other Students	\$5	\$5
Group Rates	Call (605) 688-4161 for details.	

*SDSU faculty fees, except for the cost of luncheon tickets, will be paid by the College of Engineering dean's office for those registering by Sept. 30.

received in writing no later than Oct. 10, 1989. Be sure to include your name, address and registration number to expedite the processing of your refund. A refund check, less a \$20 processing fee, will be mailed to you at the end of the seminar. No refunds will be given to students or SDSU faculty. No refunds will be given after Oct. 10.

For further information contact:
Ethics Seminar
Crothers Engineering Hall 201
College of Engineering
South Dakota State University,
Brookings, S.D. 57007
or phone: (605) 688-4161.

TRANSPORTATION

Air: The Brookings Municipal Airport is five minutes from the campus. Transportation to campus and hotels is available through Brookings City Cab by calling (605) 692-8294. Conveyance Vans Inc. provides round-the-clock limousine service between the Sioux Falls Municipal Airport and Brookings. Arrangements should be made in advance by calling (605) 692-2236. Several rental car agencies operate out of the Sioux Falls airport. They are:

Avis Rent A Car - 1-800-331-1212
Budget Rent-A-Car - (605) 334-4211
National Car Rental - 1-800-328-4567
Sears Rent-A-Car - (605) 334-1130

Bus: Jack Rabbit Bus Lines provides regional service into Brookings,

connecting with Greyhound. Call 1-800-759-8687 for rates and schedules. The terminal is located just outside of Brookings at the intersection of Interstate 29 and the Highway 14 Bypass. Transportation to campus and hotels is available through Brookings City Cab by calling (605) 692-8294.

Automobile: Brookings is located in southeastern South Dakota. It's about 50 miles north of Sioux Falls, S.D., at the intersection of Interstate 29 and U. S. Highway 14 (Sixth Street). Proceed west on Sixth Street and turn right at 12th Avenue to reach the campus. Twelfth Avenue will become a dead end at the campus entrance. Bear right onto Ninth Street and then make an immediate left onto Rotunda Lane South. You will pass the Rotunda and the Home Economics Nursing Building on your right. The University Student Union is the third building you will see on your right. Parking is available to the east and west of the student union.

Shuttles: Shuttle busses will run between the University Student Union and the motels where pre-registered participants are staying, on a continuous schedule from 5 p.m. until after the reception on Thursday and from 7:30 a.m. until 5 p.m. Friday. Shuttle bus service will also be provided Thursday night between the University Student Union (the location of the keynote speech), the Tompkins Alumni Center (the location of the reception following the speech) and these motels.

ACCOMMODATIONS

The ethics planning committee has reserved a limited number of guest rooms for seminar participants at the Staurolite Inn. If you wish to reserve rooms, call the Staurolite Inn directly for reservations and indicate you are part of the ethics seminar group. Make your reservations early as space is limited. The ethics seminar coincides with SDSU's homecoming weekend.

Best Western Staurolite Inn
2515 Sixth St. E.
Brookings, S.D. 57006
(605) 692-9421
Rates: \$45 (one to four persons in the room)

Other motels which may have space available include:

Holiday Inn, 2500 Sixth St. E.
Brookings, S.D. 57006
1-800-HOLIDAY
Rates: One person \$39; two persons \$45; each additional adult \$4

Super '8' Motel, 108 Sixth St.
Brookings, S.D. 57006
1-800-843-1991
Rates: Not available

Wayside Motel, 1430 Sixth St.
Brookings, S.D. 57006
(605) 692-4831
Rates: One to four persons \$19.95-\$30.95

PARKING

All registered participants will be issued a two-day parking permit which will allow them to park anywhere on campus free. The parking sticker will be sent with the registration confirmation. Those people who register on-site can pick up parking stickers at the campus police station. The station is directly across Rotunda Lane South from the University Student Union. The police station offices adjoin the power plant building. The offices are open around-the-clock.

MEALS

Full meal service on campus is available in the student union. Additional food outlets can be found at other campus locations, such as the Dairy Sales Bar in the Dairy Microbiology Building. The Dairy Sales Bar is noted for its university-made ice cream. A list of Brookings restaurants will be enclosed in the registration packet.

A continental breakfast will be available to all conference participants, spouses and children from 7:30 a.m. to 8:45 a.m. Friday in the Gallery Lounge on the second floor of the University Student Union. Beverages will be served for participants and their families from 8:45 a.m. to 5 p.m. in that location.

More details on the Friday luncheon can be found in the section on registration.

CHILDREN

Supervision for children of all ages is available free, courtesy of the Brookings Convention/Visitors Bureau. The bureau will be using licensed child care centers near the campus to provide this service. Those interested in child care should indicate on the registration form the number of children attending and their ages. Interested persons will be contacted by the convention/visitors bureau before arriving in Brookings to arrange the specifics. Due to space limitations, child care cannot be provided for those who register on site.

SPOUSES

Spouses are invited to attend the keynote speech, which is free and open to the general public, at 8 p.m. Thursday in the University Student Union. Spouses are also invited to attend a complimentary reception directly following the keynote speech in the Tompkins Alumni Center.

Anyone not registering for the seminar but wishing to purchase tickets for the Friday luncheon, should indicate this on the registration form and enclose \$12 for each ticket desired. Due to space

limitations, luncheon tickets will not be sold during on-site registration.

The Brookings Convention Visitors/Bureau will arrange free programs for spouses and children of seminar participants who indicate an interest on the registration form. Those interested will be contacted before their arrival in Brookings concerning family program plans. Those interested in family programs must register by mail. No on-site registration for family programs will be accepted.

SPECIAL NEEDS

The University Student Union and the Tompkins Alumni Center are equipped with facilities for the physically challenged. If you have a special request or special transportation needs, call (605) 688-4161.

INTERESTING PLACES

There are many points of interest in and around Brookings and the campus. In addition, complimentary tours of local industry can be arranged for those participants, spouses and families who express interest on the registration form. More complete information will be available at the seminar check-in desk.

HOBO DAY

The ethics seminar is scheduled for the day preceding Hobo Day, SDSU's homecoming. Several events have been planned for the week before Hobo Day, culminating on Saturday, Oct. 28, with a parade and football game. For details, see the Impulse schedule on Hobo Week.

How to Register for Ethics Seminar on October 26-27 at SDSU

All participants must pay registration fees. All registration forms must be accompanied by payment. Use one form for each person registering. The form may be duplicated if additional copies are needed. Forward forms to: College of Engineering - Ethics Seminar, Box 2219, South Dakota State University, Brookings, S.D. 57007. Those registering before Sept. 30 will receive confirmation at the mailing address given on the form. Those registering after Sept. 30 can pick up confirmation at the seminar check-in desk during the hours indicated.

REGISTRATION DATA (Please print clearly or type.)

Name _____ Female Male
Last First Initial
 Preferred Badge Name _____ Accompanied by _____
 Organization _____ Children _____
 Mailing Address _____ (1) Name _____ Age _____
 City, State, Zip _____ (2) Name _____ Age _____
 Phone Office () _____ Home () _____ (3) Name _____ Age _____
 (4) Name _____ Age _____

For SDSU Alumni Only _____ Graduation Year _____ Major _____ Name on Diploma _____
 For Students Only _____ Major _____ Class Year _____ University's Name _____
 I _____ do _____ do not plan to register for continuing education credit.
 Disability Requiring Special Services _____

TRAVEL INFORMATION

Means of Travel _____ Car _____ Bus _____ Air _____ Arrival _____
Departure Date Time Flight
Departure Date Time Flight

FAMILY PROGRAM - INTEREST SURVEY

_____ I will attend the seminar alone.
 _____ I will be accompanied by others. They might enjoy:
 _____ Campus Tours _____ Professional Tours _____ South Dakota Art Museum _____ South Dakota Agricultural Heritage Museum
 _____ Other Activities Specify _____

REGISTRATION FEES

	Postmarked by Sept. 30	Postmarked after Sept. 30
Professionals and SDSU Faculty*	\$75	\$100
SDSU Alumni	\$50	\$75
SDSU Students	no charge	\$5
Other Students	\$5	\$5
Group Rates	Call (605) 688-4161 for details	

*SDSU faculty fees, except for luncheon ticket costs, will be paid by the College of Engineering dean's office for those registering by Sept. 30. Faculty wishing to attend the luncheon should indicate this below.

Registration Fees (Pay amount indicated above.) \$ _____
 Additional Luncheon Ticket Fees
 Figure Quantity _____ x \$12 = \$ _____

PAYMENT SECTION

Note: Make checks or money orders payable to "SDSU Foundation - Ethics"

Total Registration Fees \$ _____	For Office Use Only
Total Luncheon Tickets \$ _____	Total Due \$ _____ Balance Due \$ _____
Total Fees Due \$ _____	Payment \$ _____ Payment 2 \$ _____
Enclosed is a check or money order for \$ _____	Postmark _____ Postmark _____
Purchase order number is _____	Check Number/Cash _____ Check Number/Cash _____
	Registration Number _____

Education

Students learn important ethics tenant

Throughout the history of their profession, engineers have taken pride in commitment to high ethical standards. The code of ethics accepted by practitioners of medicine, law, and engineering are based upon one tenant: the public interest, safety, health, and welfare come first, with a priority that ranks above all others, in all decisions of practice.

While ethical practice has long been the requirement accepted by individual professionals, public interest and awareness have recently been focused on the subject. Much publicity has been given to failures of facilities and of systems that impact the environment. A fraction of the failures were the result of unethical practice, and the public has become aroused by such incidents.

According to Dr. Ernest Buckley, dean of the College of Engineering, critical life or death decisions must be guided by the highest standards of ethics. Of only slightly less importance are those decisions and conduct that contribute day-to-day to the image of the professional practitioner, he said.

Students at SDSU, through specific courses in ethics and as a component part of design courses, are given the background to assess their individual ethical responsibilities. By studying case histories and other ethics materials, they can also explore their own moral values and decide what they feel is right before they're faced with a stressful ethical decision on the job. "If students are prepared, they will be a cut above the rest," says Teresa Hein, instructor of the Introduction to Engineering course.

Steve Healy, a 1982 mechanical engineering alumnus, became concerned about ethics after leaving SDSU. He was impressed with the need for the

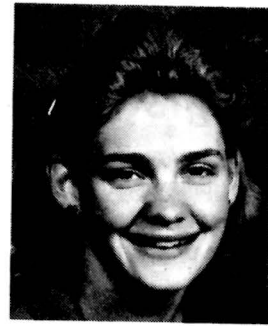
individual graduate to thoroughly understand the obligation. He provided cash gifts to the College of Engineering for the purpose of developing appropriate course materials.

Professor Emory Johnson, former head of the SDSU Civil Engineering Department, used the money donated by Healy to gather information about ethics. At the time of his untimely death, he was preparing materials to be used in a handbook for Hein's class and other classes. Hein currently uses Johnson's materials in the Introduction to Engineering course.

There are also extra-curricular opportunities for SDSU students to learn about ethics. Faculty and students attended an ethics conference last October at Iowa State University. Soon afterward Troy Erickson, a mechanical engineering major who attended, started a column about ethics in SDSU's Engineering Newsletter.

Now SDSU engineering students and faculty are planning their own ethics conference, to occur in conjunction with Hobo Day. A slate of nationally recognized authorities on professional ethics will present lectures of benefit to SDSU's engineering alumni nationwide, to representatives of all the learned professions in our region, and to students from all disciplines in the South Dakota System of Higher Education.

After a rigorous two-day seminar, everyone will be invited to stay and enjoy Hobo Day festivities, including the homecoming football game between SDSU and Morningside College.



Janel Berger

Johnson s a solid fou

Emory Johnson was a driving force behind ethics curriculum for engineering students during his service at SDSU, and he also filled many other roles.

He collected about 600 pages of material about ethics and intended to compile an ethics handbook for students. Teresa Hein, who teaches the Introduction to Engineering course, said she uses the information as a starting point for introducing students to the study of ethics.

A native of Cresco, Neb., Johnson earned a bachelor's degree from the University of Nebraska. He worked for the Nebraska Highway Department and the Nebraska Irrigation Office before pursuing a master's degree at the University of Michigan. He went on to teach at the Missouri School of Mines and Metallurgy, the University of Kansas, Colorado A & M, and SDSU.

He was active in professional societies, and filled many leadership roles. In South Dakota he helped form a branch of the Northwestern Section of the American Society of Civil Engineers and served as president and secretary-treasurer of the branch. He was president of the South Dakota Society of Engineers and Architects when the first efforts were made to organize a state society to affiliate with the National Society of Professional Engineers. He also served as executive secretary of the South Dakota Engineering Society and as editor of the "South Dakota Engineer."

He introduced the "Dean's List" to the SDSU campus by starting a list for the Civil Engineering Department. He also secured funds for the first scholarship for SDSU engineering students.

His primary focus was serving students, and that objective went beyond the

Sought to give students foundation in ethics

classroom. He was faculty adviser to the ASCE student chapter and adviser for Sigma Tau, Chi Epsilon and Tau Beta Pi.

As head of the Civil Engineering Department from 1947-1979, he's credited with initiating substantial growth in the department.

He was honored as a Distinguished Engineer in March 1988 and has been remembered since his death in April as an important guiding force in the development of the college.

"His contributions to the College of Engineering and to the increased awareness of ethics in the classroom will be remembered for a long, long time," said Hein.

by Janel Berger, a junior computer science major from Britton



Emory Johnson

Hein assumes leadership in ethics activities and curriculum

When students have questions about ethics in engineering, they often stop at Teresa Hein's office.

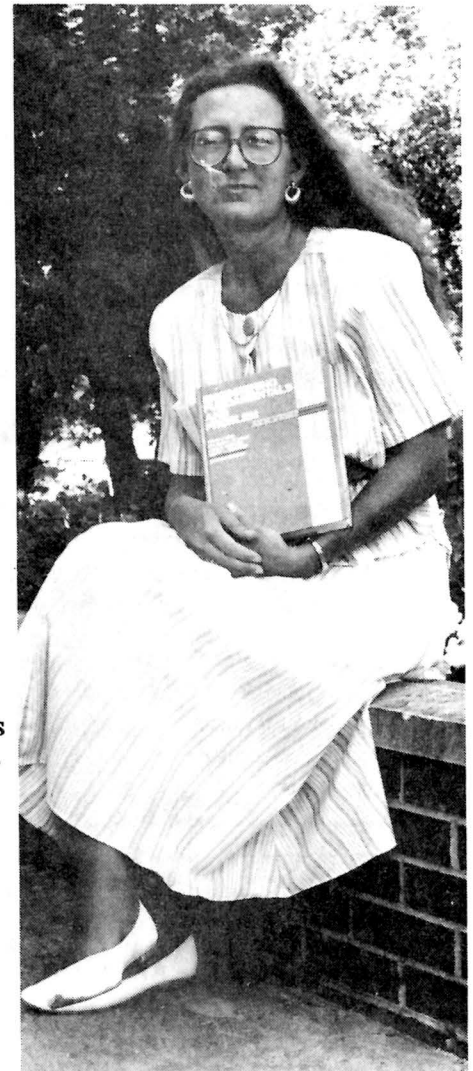
She's become known for her concern and expertise on issues of ethics. As instructor of the Introduction to Engineering course, she gives new engineering students their first taste of ethics curriculum during a four to five year learning process. The two-semester course is required of all freshman engineering students.

Members of Hein's class study engineering safety, ethics, and professionalism, as well as the history of engineering, the various engineering disciplines, economics, microcomputers and other topics. The ethics portion of the curriculum focuses on case histories.

"When they get out (of college) they're immediately faced with making decisions that affect other people. Public safety has to be up there at the top of the list, and that's where ethical decisions come into play," she says.

"Ethics is something I try to incorporate at as many stages as I can. We usually talk about the code of ethics, and this year we studied the space shuttle disaster in some detail," says Hein, who is also the coordinator for instruction for the college.

The enthusiasm of students to learn about ethics inspired Hein to become even more involved, she says. Students started visiting her office when they had questions or concerns about ethics. Then she went with a group to an ethics conference at Iowa State University in October. Now she's the coordinator of the upcoming conference, "Ethics in a Technological Society."



Teresa Hein guides engineering freshmen through their first collegiate encounter with problem solving, computer systems and ethical dilemmas during her course called Introduction to Engineering.

Alumni reveal their views on ethics



Gregg Jongeling

The integrity of the technological infrastructure of America has much to do with the integrity of engineers. The stability of airplanes, highways, water systems, skyways, spacecrafts and sidewalks depends on engineers and manufacturers. Alumni from the SDSU College of Engineering deal with ethics on a daily basis, and some of them offered their insights.

Gregg Jongeling, a 1971 civil engineering graduate, said he feels his job as city engineer in Brookings has an advantage over jobs in private industry, due to the lack of profit motive. He believes profit motive is the basic reason behind unethical decisions in business. The goal of some private businesses is to make money and get ahead of the competition, he said, and in such a business there may be added pressure to cut funding or compromise safety, especially when those decisions assure job security.

He doesn't feel that pressure while working for a city government, he said, because the need for profit isn't there. Regardless, there are decisions involving ethics that must be made. For example, Jongeling often travels as part of his job, and he must decide when a trip should be paid for with city funds. City employees must also make decisions about whether to accept free gifts and how many working hours to report each week.

Jongeling believes one way to prevent unethical behavior is to include ethics curriculum in college courses. He said it's important to expose college students to the kinds of decisions they may be making in the work force, whether they are engineers, pharmacists, nurses, or other types of professionals. He believes the best way to teach ethics is by discussing case studies of past decisions and by having professionals speak in

classrooms about their experiences. For the past two years, Jongeling has spoken to the Introduction to Engineering classes at SDSU.

Fred Rittershaus, a 1958 civil engineering graduate, has insights on how ethics affect everyday decisions in private business. He's worked as a consulting engineer at Banner and Associates in Brookings since 1958. He earned a master's degree from SDSU in 1962 and served in the U.S. Air Force and Air Guard for 36 years, reaching the rank of brigadier general.

"It is very imperative that a high degree of ethics is practiced in the professional world," he said. "Our projects can't be hidden. They are constantly open to criticism by the public and owners of the projects themselves." He believes unethical practice would degrade the profession.

Rittershaus said in his position every step of a project involves ethical decisions, from telling a client of job-related qualifications and experiences to making a ruling on the quality of materials being used.

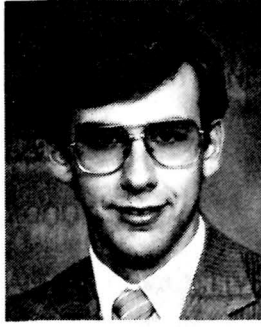
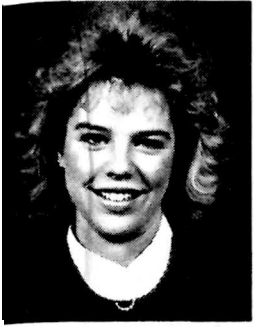
The management at Banner and Associates tries to "train" people to be honest employees, he said. The atmosphere is one where a dishonest person would not feel comfortable, he explained, and he believes this technique would work with students also. If students developed an honor code in school, such as those at military academies, they would be likely to carry it with them when they graduated, he said. Such a code would involve enforcing policies on cheating and other forms of dishonesty, such as copying homework papers, labs or reports. Rittershaus also stressed the importance of ethics seminars such as the one to be held in the fall at SDSU.



Fred Rittershaus



Dr. Bruce Miller



Steven Poessnecker

What would you do?

Dr. Bruce Miller has a background in the academic world and insights about the role of ethics there. He received a degree in physics from SDSU in 1948 and then earned master's and doctoral degrees from the University of Kansas. He returned to SDSU to begin a teaching career in 1955, and now he's a professor emeritus of physics.

He believes ethics and morals are connected. He said someone with firm moral values will have less difficulty separating a right decision from a wrong one. A person who doesn't lead a moral life may make unethical decisions without thinking about them, he said.

In the academic field, Miller believes unethical behavior, like cheating on tests, should be punished. He said it's important that students learn the seriousness of making the right decisions. He supports the teaching of ethics at all levels and in all disciplines.

In summary, ethics affects professionals in government, private industry, and academia. Three SDSU alumni agreed that ethics should be taught at the college level so students know what kinds of decisions they'll face in the professional world. They also stressed the importance of maintaining high ethical standards in professional practice.

by Michele Neyers, a junior engineering physics and mechanical engineering major from Redwood Falls

Suppose you're an engineer responsible for developing a product that enjoys instant popularity on the consumer market. To date, sales have risen steadily. Acting on a hunch, you conduct some additional tests on the product and results indicate there's possibility of product failure at extreme conditions. The product literature states that operation of the product should not be conducted under extreme conditions. If a recall is made or sales fall, your company could experience severe financial difficulty. Should you refrain from telling anyone about your discovery because the product literature already warns against use under extreme conditions? Should you tell your manager? If your manager refuses to do anything, would you be willing to appeal the decision to the manager's superior?

Harley Halverson, a resident of Liberty Lake, Wash., is an SDSU electrical engineering alumni and a member of the Dean's Advisory Council. He's also the engineering services manager for the Hewlett Packard Corporation. He says that with any new product there will be the possibility of a defect. In the hypothetical situation posed above, an employee should consult the manager and discuss the seriousness of the problem with peers, he says. In this way, people from the working environment can provide input. At Hewlett Packard, a quality assurance department handles product quality problems by consulting with company lawyers and engineers. According to Halverson, the company also conducts routine checks and audits to assure ethical integrity. He says that in 32 years of service, he's never been asked to compromise his integrity for the company.

Neal Patterson, a resident of LaCrosse, Wis., is an SDSU mechanical engineering alumni and director of market development and product

development for the Trane Company. He says that in the situation posed above, an employee should definitely tell the manager, and if necessary go over the manager's head. The problem will not simply go away, and it's best to "jump in and get it fixed right away," he says. A recall might be costly, but if lawsuits are filed against a company because of a defective product, the company could be forced into bankruptcy, he notes.

Dean Van De Wiele, a freshman civil engineering major at SDSU, studied ethics in the Introduction to Engineering class taught by Teresa Hein. He says if the product in the above situation did fail, the company could stand to lose more money than if a recall was conducted. Failure to recall a defective product could also damage the company's reputation. "The big thing that we've been taught in our classes is that the engineer's first responsibility is to keep people safe," he says.

by Steven Poessnecker, a sophomore mechanical engineering major from Atkinson, Neb.

Hobo Week festivities

- Mon.** Carnival, Volstorff Ballroom, USU.
- Tue.** Game Show, Grand Marketplace, USU.
- Wed.** Bum Olympics, campus green at 3 p.m.; T-shirt and Button Day.
- Thur.** Cavorts talent show, intramural building at 7 p.m.; Bum Clothes Day; scavenger hunt.
- Fri.** Blue and Yellow Day; Hobo vs. Hunger food drive; beard and pigtailed contest, Grand Marketplace.
- Sat.** Parade at 9:45 a.m.; SDSU vs. Morningside College football game at 2 p.m.

Communication

Lee helps students reach the public

Most people would agree that being able to communicate and work with people are essential skills for an engineer. Corporate recruiters actively seek engineering graduates who have these skills in addition to technical abilities.

Ten students each semester have an opportunity to acquire these skills by participating in a two-credit course called "Promotional Techniques for Engineers" (GE 493). They learn the skills needed to publicize a major College of Engineering event, and they receive a mini-scholarship from the dean that covers the cost of the course tuition. The semester after the course, the promotional "class" becomes the promotional "team" responsible for publicizing an event like this fall's ethics seminar. (See related stories.)

Promotional Techniques for Engineers is a course about publicity -- how to produce it, how to place it and how to plan it. The course begins with a general introduction to communication, but quickly moves on to more specific information about public relations, promotion and publicity.

First students learn how to produce various kinds of publicity. They learn how to:

- write news and feature stories for print media like newspapers and magazines.
- edit copy so it's written in a style acceptable to the news media.
- interview sources to gather information for stories and "be interviewed" should they find themselves in the role of media spokesperson for an organization.
- shoot photographs appropriate for publication.
- prepare news stories for broadcast media like radio and television stations.
- write public service announcements for radio and television.
- use direct mail.
- design printed materials ranging from brochures and tickets to posters and programs.

Students also learn about newspaper and broadcast advertising from representatives of the South Dakota Newspaper Association and KBRK/KGKG Radio in Brookings.

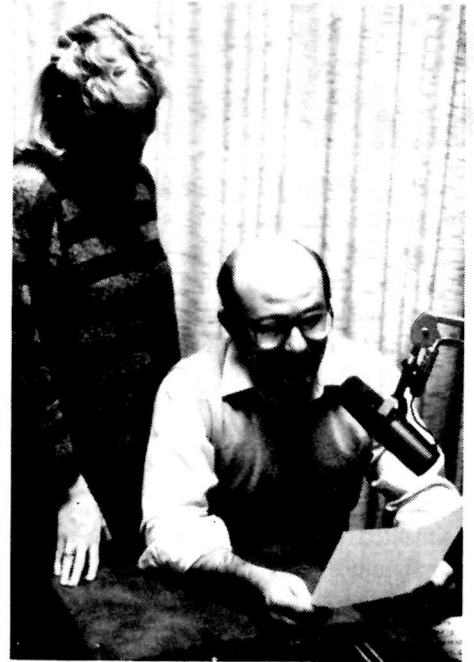
Instructor MaryJo Benton Lee described the first part of the course as a "hands-on writing workshop that stresses learning by doing."

"While my goal is to teach methods of communicating through the mass media, it is impossible for students to complete this class without becoming generally more effective writers and readers, speakers and listeners," she said. Next students learn how to work with the media to place their publicity before the publics they want to reach. All publicity produced by the students is released to the media through SDSU's Office of University Relations. The students have also relied heavily on the Agricultural Communications Department and its head Emery Tschetter for radio production help.

The class has toured KELO-TV in Sioux Falls to watch the taping of the evening news. Students have also visited the Sioux Falls Argus Leader to observe the daily news conference.

Finally, students learn how to plan a publicity campaign. A written publicity plan, developed by the class as its final project, includes a calendar that lists all promotional tasks, when the tasks will be done and who will do them. This plan enables students to move easily from their role as a publicity class to their role as a publicity committee.

Gary Sheeley, the director of SDSU's Instructional Media Center, teaches students how to prepare a professional oral presentation of their plan. The class culminates in a formal unveiling of the promotional plan at an evening reception at Tompkins Alumni Center. An audience, including the dean, faculty and students, listens to -- and critiques -- the class's presentation.

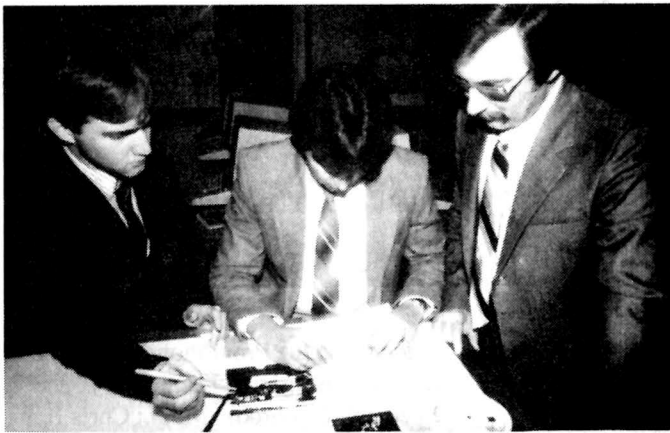


Janel Berger, a student, and Emery Tschetter, head of the Agricultural Communications Department, work with radio equipment and scripts.

The first class planned the promotion of Impact '87, a statewide trade fair held on the SDSU campus in April 1987 and sponsored jointly by the College of Engineering, the Governor's Office of Economic Development and the Industry and Commerce Association of South Dakota. The students ran a promotional campaign that reached into 30,000 homes across the state and operated on a budget (contributed jointly by the three sponsors) of \$18,000.

The next two classes promoted Engineering Exploration Days, an annual spring event that attracts hundreds of prospective students and professional engineers to the college for a two-day series of programs, contests and other happenings. The most recent class is publicizing a seminar on engineering ethics scheduled for Oct. 26-27 at SDSU. (See related stories.)

Lee advises the student promotions committees in addition to teaching the class. She owns a public relations consulting firm in Brookings called The Publicity Workshop, which offers seminars that teach organizations and businesses how to use the media effectively.



Kevin McCarville and Troy Erickson, both students, demonstrate their new graphics design skills for Dr. G. Howard Nielsen, Engineering Exploration Days faculty advisor.



Mary Knudson, a 1989 mechanical engineering graduate, used her promotions knowledge to help Dr. Ali Selim produce a publication called The Connection for the Transportation Technology Transfer Service Center.



Students Michelle Lauritzen, Chris Neuzil and Cindy Berens evaluate posters for promotion of Engineering Exploration Days.

The promotions class began when Dr. Ernest L. Buckley, dean of the College of Engineering, asked Lee if she would handle the promotion of Impact '87. "I told Dean Buckley that The Publicity Workshop was not really set up to handle a project like that," Lee recalled. "But, I said, 'What would you think of finding me a group of students I could train to do the job for you?'"

And that's what happened. The promotional campaign for Impact '87 was a success. The dean decided the promotional techniques for engineers class should continue.

"This is an important class in engineering because it develops our students in a different area important to their careers," said Dr. Duane E. Sander, professor of electrical engineering. "The class also assists in the promotion of major events in engineering."

The class is now approaching its fifth semester, and 38 students have participated. Although it's gone from being offered once a year to being offered twice a year, more students

express an interest in the class than there are seats available for them.

The dean, faculty members and former students recommend people for the class, which is limited to ten students per semester. The dean invites those recommended to complete application forms for the class. These applications then go to a committee named by the dean and composed of Lee; Dr. G. Howard Nielsen, an Engineering Exploration Days faculty adviser; and the student chair of the next event.

The committee chooses the class for the next semester. Those students selected in any given semester range from freshmen to seniors and represent each of the college's eight majors.

Buckley said he sees the promotions class as a recruitment center and training ground for student leaders.

"I tell the students the first night we meet to think of themselves not as a class, but as a team -- and they do," Lee said. "I encourage the students who are more experienced in writing to help those who are less experienced."

Lee listed some of the ways she and the students work together to build a team:

- The class has regular social events.
- Everyone checks the class bulletin board in the dean's conference room each Monday for messages. On the bulletin board are pictures of all promotional techniques students, past and present.
- A revolving seating plan ensures that the same students seldom sit next to each other in class two weeks in a row.

•A networking list contains the names, numbers and majors of present and former class members.

"Many students who have taken the class have blossomed into the best student leaders we've ever had," said instructor Teresa Hein, who's worked closely with the class in her role as ethics seminar coordinator. "The veterans (of the class) are the key leaders in what we're doing with ethics and in other aspects of the college."

For example, Troy Erickson, a junior mechanical engineering major, and Eric Moser, a junior engineering physics major, edit "ENL," a college newsletter. Susan Quam, a senior electrical engineering major and the outgoing president of the Joint Engineering Council, writes a regular column for the Impulse. Chris Haug, a freshman mechanical engineering major, has covered College of Engineering activities for the campus newspaper.

Lee cited other examples of class members who have parlayed writing skills into job opportunities. Mary Knudson, a May 1989 mechanical engineering graduate, last semester helped civil engineering professor Dr. Ali Selim produce a newsletter published for the Transportation Technology Transfer Service Center. Quam is working this summer with LaDell Swiden, director of SDSU's Engineering and Environmental Research Center, to produce "Infogram" and "Engineering Research Bulletin."

"The promotions class is one of the most important classes I've taken in college," Quam said. "You not only learn how to promote your product and your company, but also how to promote engineering and yourself."

Leadership

Ethics groups offer opportunities

Leadership and cooperation are two of the skills that make an otherwise ordinary student into a student leader. Nineteen students have been sharpening their leadership and cooperation skills during work this year on a special project for the College of Engineering.

These students have been planning and promoting the upcoming ethics conference, "Ethics in a Technological Society."

Originally there were two committees. Students in the Promotional Techniques for Engineers course formed the Promotions Committee, and enthusiastic volunteers formed a Planning Committee, with support from Teresa Hein, coordinator for instruction for the college.

When it became clear in April that an ethics conference at SDSU would be feasible, Hein and Troy Erickson sought volunteers to serve on a planning committee.

Erickson, a junior mechanical engineering major, was joined by nine other students, with Hein acting as a coordinator.

"I just think it's outstanding that the students are willing to do this," Hein said. "They're doing it simply because of their own interest and pride in the engineering profession."

The Planning Committee soon joined forces with the Promotions Committee to assure cooperation and efficiency in arranging the many details.

They've been planning the budget, selecting menus, contacting speakers, handling the records and bills, writing promotional stories and accepting many other responsibilities. The Promotions Committee has been focusing on

publicity, while the Planning Committee's been handling other arrangements.

Students on the Planning Committee are: Erickson, of Summit; Cindy Berens, of Sioux Falls; Teresa Cooper, of Sioux Falls; Michele Neyers, of Redwood Falls; Teresa Peterson, of Boyd, Minn.; Steve Poessnecker, of Atkinson, Neb.; Sheila Van Sambeek, of Milbank; Forrest Weston, of Sioux Falls; Kate Mensch, of Avon; and Susan Quam, of Burnsville, Minn.

Students on the Promotions Committee are: Janel Berger, of Lake City; Bruce Byers, of Westbrook, Minn.; Chris Haug, of Alexandria, Minn.; Connie Ingle, of Pierre; Michelle Lauritzen, of Centerville; Bill Lohr, of Raymond; Kevin McCarville, of Brookings; Mark Minyard, of Brookings; and Eric Moser, of Lake Preston.

*by Carrie Sword
SDSU Information Specialist*

Students enjoy taste of professional life

Ten engineering students from SDSU spent the 1989 March spring break putting their classroom knowledge to the test in real-life job settings. They participated in engineering externships, lasting from two to five days each, through a program established by the Joint Engineering Council.

Benjamin Lao, of Brookings, observed Brookings city engineers and participated in such duties as making maps and repairing sidewalks. Jim Kadoun, Brian

Brandt and David Wade, all of Britton, and Tad Broschat, of Brookings, spent five days at Horton Ind., a company that makes fan clutches for diesel engines. Wes Hoffart, of Dallas, Texas, spent an externship at Missouri Basin Municipal Power Agency in Sioux Falls. Gregg Welch, of Parkston, and Janel Berger, of Lake City, toured Daktronics, Inc., at Brookings. Helmann and Lisa Lyons, of Worthing, observed the bio-med department at Rapid City Regional Hospital.

Five receive Briggs awards

The five freshmen engineering students to receive Briggs Scholarships this year are Steven Moeller and Timothy Olson, both of Brookings; Scott Stoneall, of Harrisburg; Carmon Dunn, of Hartford; James Morrison, of Leola; and Bryan Johnson, of Rapid City.

They will each receive a \$1,650 scholarship renewable for four years, provided they maintain a 3.0 grade point average on a 4.0 scale.

Moeller plans to major in agricultural

engineering. Olson plans to study math, and Stoneall intends to study general engineering. Dunn plans to major in mechanical engineering with a computer science minor, and Morrison plans to study electrical engineering. Johnson intends to major in mechanical engineering.

The scholarships are given in honor of the late Stephen F. Briggs, a 1916 graduate of SDSU and inventor of the familiar Briggs and Stratton engine,

Students test their mettle in bridge building contest

Two teams from SDSU competed with teams from two other schools in a student bridge building contest April 1, sponsored by the American Institute of Steel Construction. The contest was held in conjunction with the Midwest Regional Conference of the American Society of Civil Engineers March 30 through April 1 at SDSU. The SDSU teams took first and fourth places in the bridge building contest. The team from the University of Wisconsin won second place, and the team from the University of Iowa won third. Speakers for the conference included William "Bud" Carroll, ASCE national president; Ted Johnson, ASCE District 16 director; and Dale Swanson, a 1972 SDSU alumnus and the city engineer at Willmar, Minn. Students from seven universities attended the conference. In June the ASCE student

chapter from SDSU received notice that it was selected for a Certificate of Commendation for outstanding student

chapter programs for 1988. The top 12-15 percent of student chapters nationwide receive the award.

Juniors welcomed into Mortar Board

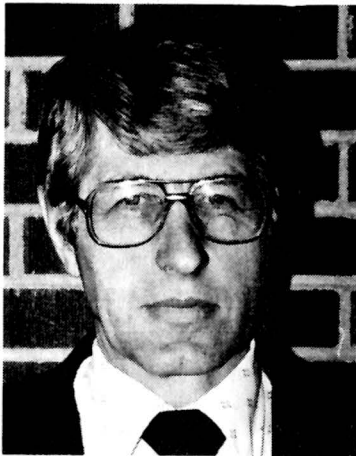
Several engineering students were among the SDSU juniors initiated into Mortar Board national honor society this year. To be initiated, a student must rank in the top three percent of the SDSU junior class and exhibit leadership ability and service to the community. Members must also have a minimum grade point average of 3.25 on a 4.0 scale.

The engineering students initiated were: Keith Moe, an electrical engineering major from Alexandria; Lisa Mettler, an electrical engineering major from Brookings; Thomas Haensel, an electrical engineering major from Brookings; Karl Ulmer, an electrical engineering major from Canton; Jonathan Davis, an electronics engineering technology major from Forestburg; and Steve Schemm, an agricultural engineering major from Valentine, Neb.



SDSU students concentrate on assembling a winning bridge during a recent bridge building contest. Sponsored by the American Institute of Steel Construction, it was one of five such contests in the nation this year. Entries were judged on the basis of load capacity, time to assemble, capacity-to-weight ratio, cost, lightness, and aesthetics.

Faculty members excel at profession



Dr. Virgil Ellerbruch

Dr. Virgil Ellerbruch, head of the Electrical Engineering Department, was chosen Teacher of the Year by students in the College of Engineering this year. He began teaching in 1962 and joined the SDSU faculty in 1967. His major fields of interest are bioengineering and semiconductor circuits.

Dr. Donald Moore, associate professor of electrical engineering, spent 10 weeks this summer helping develop a NASA probe to Jupiter. He was one of 12 summer fellows at NASA's jet propulsion lab in Pasadena, Calif. He worked with a crew of regular NASA scientists to develop satellite computers that can resist the heavy amounts of radiation surrounding Jupiter. Ordinary computers with silicon chips would lose memory in the radiation zone. Moore was exploring the possibility of using semi-precious garnet crystals instead of silicon.



Dr. Donald Moore

Dr. Ali Selim, professor of civil engineering, received the \$1,500 Burlington Northern Foundation Faculty Achievement Award for excellence in scholarly activity at SDSU this year. He

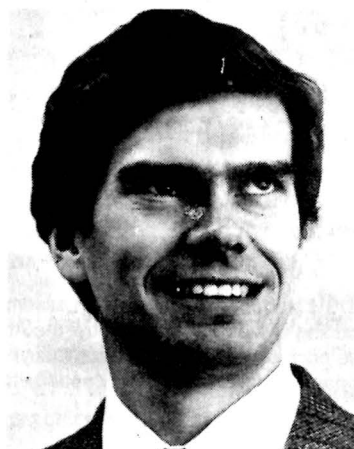
is a native of Cairo, Egypt, and a registered engineer in both South Dakota and Missouri. His major field of interest is transportation engineering, and his research has appeared in many publications. He came to SDSU in 1977.

Delvin DeBoer, assistant professor of civil engineering, was named Outstanding Young Civil Engineer this year by the Eastern Branch of the South Dakota Section of the American Society of Civil Engineers (ASCE). A native of Reville, he earned bachelor's and master's degrees from SDSU in 1978 and 1980, respectively. He is currently working at SDSU and finishing work on a doctorate in environmental engineering from Iowa State University.

Marion Heusinkveld, associate professor of electronics engineering technology, presented a paper at the 26th National Conference on Technical Education, at Fort Worth, Texas, in March. The conference was sponsored by the American Technical Education Association. Heusinkveld's paper focused on the characteristics of ATEA members. His results indicated that many teachers



Dr. Ali Selim

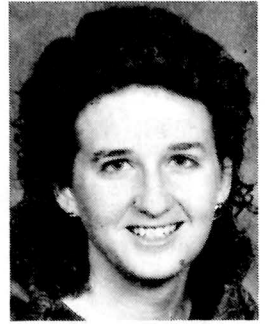


Delvin DeBoer



Marion Heusinkveld

Carmen Fink



al pursuits

of engineering technology are approaching retirement, and salary levels seem to be keeping younger people out of the profession. The study also showed that work experience in a related field is a strong asset for engineering technology faculty.

Greetings Alumni!

The Joint Engineering Council (JEC) is very excited about the coming school year. There are many activities that you can become involved with on campus. Come and see what's happening at State.

The ethics conference this fall will be another great event organized and planned by the students and faculty. It is a unique opportunity to highlight an aspect of engineering that has been overlooked for too long.

I would like to tell you about the officers for next year's JEC.

I am Carmen Fink, a senior civil engineering student from Armour, S.D. I will represent the college as president.

Kent Klemme will be the vice president. He is a senior ag engineering major from LeMars, Iowa.

Michelle Lauritzen, a junior ag engineering major from Centerville, S.D., will be the secretary.

Tim Stroschein is the treasurer for next year. He is a senior engineering physics major from Sturgis, S.D.

We hope to expand our visibility on campus this year. With 1,100 of the 7,300 students at SDSU, we need to let the other students know what we are doing. Many of our activities are geared for the general audience. Engineers need to be able to work with the public after graduation.

As always, we are striving to get younger students involved. There are many outstanding freshmen and sophomores that should be involved. If you know students just starting out in college, strongly encourage them to get active and stay active throughout college. It's a great way to meet others with similar interests, and to work with the faculty on a less formal basis than the classroom.

I hope to see you at our ethics conference, Hobo Day, or at SDSU, helping South Dakota "Celebrate the Century."

Respectfully,

Carmen Fink
JEC President

Businesses:

Place free employment ads in Impulse

If your company has an engineering need and is looking for engineers with expertise in a particular area, SDSU can help you. Take advantage of the free advertising service in the Impulse. The Impulse, an alumni publication of SDSU's College of Engineering, has added an advertising section for South Dakota Businesses seeking engineers, computer scientists, mathematicians and physicists. Your job announcement must include: position title, name of company, experience requirements, and name, address and telephone number of a contact person. If you would like to take advantage of this free service, contact the College of Engineering at (605) 688-4161. Please submit your announcement by Nov. 30 to be included in the next issue of Impulse.

"Ethical engineering is the application of science and craftsmanship to the solution of problems that are subject to legal and moral standards. It includes law as well as the moral standards that govern the profession."

--Dr. T. Al Austin, Iowa State University



ENGINEERING EXPLORATION DAYS

Many professional engineers came to Engineering Exploration Days in late March this year to take advantage of the top-notch seminars offered, said Chairman Damon Pistulka. The conference was also an opportunity to honor this year's Distinguished Engineers, the Dynamic Doer, and student winners of a design and demonstration contest.

This year's Distinguished Engineers, James A. Larson and Robert C. Olson, were honored at a special banquet. Richard Tucker, with the University of Texas at Austin, delivered the keynote address on "Creating the Future." Tucker is a professor of management and the director of the national Construction Industry Institute.

Distinguished Engineer Larson is the senior project manager and chief geotechnical engineer for Severdrup, Parcle and Associates, Inc., a consulting firm at St. Louis, Mo. The company is involved with major bridge and tunnel projects, marine facilities and environmental systems.

Before retirement, Olson was employed by Control Data Corporation and was instrumental in bringing two new computer products to the Control Data product line--the first, Cyber 170, and the second, Cyber 180.

Student winners of a major design and demonstration contest also were selected during EED. They included design winners Robert Schrunk, Don Ness and

Dean Kallevig, for their automatic Christmas tree trimmer idea. Demonstration winners were Paul Carrette, Tracy Steiger and Chris Nelson, for their hand-operated boat trailer mover.

Michele Neyers, a physics and mechanical engineering student from Redwood Falls, Minn., won the Dynamic Doer award. She was selected based on her involvement, enthusiasm and leadership in engineering activities. Other students were also honored during EED as scholarship recipients and leaders in extra-curricular activities.

The traditional trade fair booths during EED were dropped this year in favor of seminars for professional engineers and college students on such topics as CAD/CAM and statistical process control. About 100 professional engineers came, and that made EED planners happy, Pistulka said. Events for high school students included a bridge building contest and on-site tower building contests.

*by Dan Merritt
SDSU Information Specialist*



Pictured clockwise from left front are: Susan Quam, outgoing president of the Joint Engineering Council; Dr. Ernest Buckley, dean; James Larson, a Distinguished Engineering Award recipient; Dr. Richard L. Tucker, the main speaker for the EED awards banquet; Robert Olson, a Distinguished Engineering Award recipient; Dr. Duane Sander, professor of electrical engineering; and Michele Neyers, recipient of the Dynamic Doer Award.

Turner returns to coordinate SORD

The College of Engineering will welcome back an old friend when Steven Turner, a 1987 mechanical engineering graduate of SDSU, returns as coordinator of Student Originated Research and Design projects and as a staff member of University Industry Technology Service for 1989-90. As an undergraduate student he was a coordinator of the SORD light aircraft project from 1986 to 1987.

The SORD projects will be bolstered not only by Turner's leadership, but by money from the South Dakota Future Fund. Fourteen thousand dollars will be available to pay student coordinators, designers, and assemblers, and \$16,000 will be available to cover costs of materials for an airplane, robotics, a fuel efficient vehicle, a hazardous waste processing system, and other projects. Turner's salary for the half-time position will also be paid this year by the Future Fund.

The funds are part of an \$82,500 allocation from the Future Fund to support senior design projects in the SDSU College of Engineering. The purposes of the Future Fund are to develop and support the capabilities to train engineers and technologists for South Dakota industries, and to assist in job development. The funds are viewed by the college as seed money for an enhanced senior design program, and additional funds will be sought as they are needed, according to Dr. Duane Sander, who was acting dean last year.

Turner returns with added expertise in aircraft design. He most recently worked as a graduate research assistant at George Washington University/NASA-Langley Joint Institute for Advancement of Flight Sciences at Hampton, Va. His project involved conducting wind-tunnel research and analysis of stability and control of various aircraft models for

NASA. At GWU he completed the major requirements for a master's degree in aeronautics.

He'll also work half-time at UITs making contacts with industry representatives in South Dakota. He'll help them solve technical problems or put them in contact with SDSU faculty and resources that can help.

UITs is a function of the Engineering and Environmental Research Center at SDSU, and its mission is to link university researchers with industry to solve technical problems and enhance economic development in South Dakota.

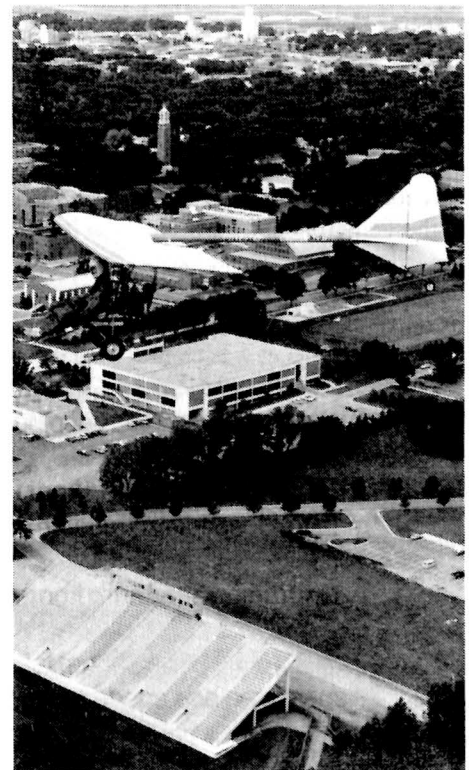
*by Carrie Sword
SDSU Information Specialist*

Ugly tie

An ugly tie has helped the John R. Andersen Scholarship fund at SDSU escalate to more than \$23,000.

Andersen was an engineer and professor of civil engineering at SDSU who died suddenly following a heart attack in 1973. He'd been recognized nationally for his work in rural wastewater and water pollution, and he was co-founder of the SDSU graduate program in sanitary engineering.

In 1970 Andersen's wife, Gwen, gave him a tie made of environmental concerns material to wear to the Water Pollution Control Federation Annual Conference. The tie was a hit, and Gwen



Steven Turner worked on the SORD 1A aircraft project from start to finish. Now, after gaining experience with NASA, he's returning to coordinate the SORD projects.

made ties for all members of the national executive board. The ties became notorious, and members of the South Dakota Water and Wastewater Association coveted the one worn at the annual convention by Andersen's brother, James. In 1985 a "tie auction" was officially started, with proceeds from the highest bid going to the John R. Andersen Scholarship fund.

In 1988, Charles Singer, of Edina, Minn., offered the top bid of \$1,100, including \$500 contributed by manufacturers' representatives. The tie will be re-sold during the South Dakota Water and Wastewater Association's convention in Pierre Sept. 13-15.

Alumni notes . . .

Clarence C. Oster, CE '60, recently won the prestigious individual Army Environmental Quality Award, the highest environmental award given by the federal government. Oster, an environmental and remedial project manager at Twin Cities Army Ammunition Plant, was commended by the former Secretary of Defense, Caspar Weinberger, for outstanding accomplishments to benefit the natural environment. A Bloomington, Minn., resident, Oster is currently the project manager on groundwater contamination from hazardous waste sites for the U.S. Army.

John M. Hanson, CE '53, was recently named vice president of the American Concrete Institute. He is president of Wiss Janney Elstner Associates, Inc., a consulting and research engineering firm in Northbrook, Ill. He holds engineering degrees from SDSU, Iowa State University, and Lehigh University.

Bob Miller, economics '49, returned to SDSU May 22-26 to give a short course called "The Art and Science of Selling." A retired IBM sales executive, he conceived the idea of offering the course to help SDSU students who'll be involved with sales during their careers. Miller worked for IBM as a sales trainee, salesman, sales instructor, sales manager, branch manager, and sales and marketing manager at the company's headquarters before founding a computer leasing company called Centron DPL, of Bloomington, Minn. He retired in 1986 and moved to Sarasota, Fla.

Richard Todaro, EE '60, of Bowie, Md., started teaching a graduate course for the College of Engineering at the University of Maryland last year. It's a core course in a new master's program in system engineering, and his students range from those with BSEETs to those with PhDs in physics. He reports that his company, Todaro Engineering Consultants, Inc., is doing well as long as the federal budget holds up. His son, Richard, graduated from the University of Maryland this year with a degree in engineering.

R. Wayne Hardie, PHY '64, is Group Leader of the Energy Technology Group at Los Alamos National Laboratory. He presented a colloquium to the SDSU Physics Department Feb. 23 titled "Systems Analysis at Los Alamos National Laboratory: An overview of Los Alamos Laboratory and a Discussion of the Central American Energy Program."

Botolf Petersen, ME '60, of Hutchinson, Minn., reports that he retired from 3M in 1985.

Daniel P. Roesler, MS '84, is a propagation engineer at Rockwell International at Cedar Rapids, Iowa. He presented a colloquium to the Physics Department on April 24 titled "Trans Auroral HF Radio Communications."

Lt. Mike Morgan, PHY '85, is an instructor with the United States Air Force in the Missile Launch Operations division at Grand Forks, N.D.

Dr. Glen E. Vanden Berg, MSAE '52, is an employee of USDA-ARS at Beltsville, Maryland. He is the author of a new book titled "Agricultural Sensors."

Dr. Leslie Christianson, MSAE '76, a faculty member in the Department of Agricultural Engineering at the University of Illinois, recently received a UI College of Engineering award for superior student advising.

Mohd. Yusoff Abdullah, CE '87, is a civil engineer at the National Petroleum Company (Petronas) in Selangor, Malaysia.

Dr. Niaz Latif, ME and AE, '83 and '85, is an instructor of engineering in the applied science and technology division at Louisiana State University, Eunice, La.

Raymond O. Opland, EE '64, is a retired electrical engineer for Aviation Systems Command at St. Peters, Mo.

Lt. Col. Rex P. Waltz, ME '40, retired from Phillips Petroleum Company in 1983 after six years overseas working as a construction engineer on a project in Norway. He retired as a lieutenant colonel in the Air Force Reserve in 1978.

Kenneth D. Wyman, ME '51, retired from his position at General Electric in March, 1989, after 38 years of service.

Maurice D. Ruch, ME '49, retired from his position with the state of Minnesota in April, 1988. He is a resident of Minneapolis.

Keith A. Lucke, EE, '60, took early retirement from Control Data Corp. and moved south. Now he works for Compaq Computer Co. in Spring, Texas.

Floyd W. Dehnert, EE '29, reports that he worked for two years at General Electric and for 42 years and six months, at Niagara Power Co. in Syracuse, N.Y., working up to the position of supervisor of Electric and Gas Operation.

Clint Kohl, EE '88, is working toward a master's degree in electrical engineering at the University of North Dakota, Grand Forks.

SEND NEWS! . . . about yourself and your job. Enclose a photo if you have one!

Name _____

Address _____ City _____ State _____

Graduation Year _____ Degree Earned _____ Major _____

Present Employment _____

What do you think of IMPULSE? _____

Clip and return to the College of Engineering, SDSU, Brookings, SD 57007

Contributors to the Greater State Fund Dec. 1, 1988 - June 30, 1989

Support from alumni has come to be essential to institutions of higher education. Contributions have made possible the development of activities that have won recognition for the SDSU College of Engineering as one of the nation's leaders in engineering education. We have benefited and those who have been generous in their gifts share with us the satisfaction that comes from achievement.

BENEFACTORS (Gifts of \$1,000 or more)

Gerald Bergum, professor and head of the Computer Science Department, and his wife, Shirley, provided funds for advanced studies support for engineering faculty who want to pursue an advanced degree in computer science.

Lori Bocklund, EE '83, provided funds for the scholarship established in memory of her father, Dan Bocklund. His enthusiasm for SDSU and, after his untimely death, the family's appreciation for what SDSU did for Lori in her four years as an engineering student and athlete, are continued in the Dan Bocklund Memorial Scholarship.

Nancy Wilz Haselhorst, wife of the late Donald D. Haselhorst, the former president and chief executive officer of Nicolet Instrument Corporation in Madison, Wis., provided funds for engineering equipment.

Jerome J. Lohr, CE 58, owner of the J. Lohr Winery in San Jose, Calif., is a newly elected member of the board of directors of the SDSU Foundation and an SDSU Distinguished Alumni. He contributed to programs in civil engineering and entrepreneurship at SDSU.

Larry and Gail Nelson, CE '63, contributed funds for a scholarship in memory of Larry's father, Kline E. Nelson, a 1928 alumnus in mechanical engineering.

Florence Paulsruide, of Olympia, Wash., contributed to the scholarship in mathematics established in memory of her sister, Helen J. Engebretson. Engebretson was a professor of mathematics at SDSU from 1945 to 1980.

Dale Ryman, AE '35, CE '38, donated a substantial sum to the agricultural and civil engineering programs. He is a former member of the U.S. Navy Seabees and a retired Chief Construction Engineer of California Division of Highways. In 1984 he was recognized as the first benefactor of the SDSU College of Engineering. He received the Distinguished Engineer's Award in 1985.

Irene L. Wente, professor emeritus of mathematics at SDSU, established a scholarship endowment for math and is financing the scholarship with annual gifts.

SENIOR CENTURIONS OF THE SECOND CENTURY (Gifts of \$200-\$999)

1922
Brinker, Charles
1927
Gamble, Deda Rae
1928
Sundstrom, Raymond & Helen
1929
Stiles, Merrill
1931
Berg, Herman & Alice
Bue, K. Marvin
Lowe, William
1940
Emmerich, James
1947
Buckley, Ernest & Betty Bob
1948
Wondra, Charles
1950
Olsen, George
Helma, Leonard
1951
Berg, Arnold
Burge, William
1953
Wilcox, Archie
1956
Monahan, Maurice & Patti
Anderson, Harvey
1959
Sinnott, Richard
1960
Lucke, Keith
1961
Christensen, Noel & Rita
Manwarren, Linda
VanDierendonck, A. J.
DeLong, Max & Marilyn
Waggoner, Charles
1962
Eer Nisse, Errol
Ellingson, Ronald
1966
Roitsch, Franklyn & Carolyn
Omundson, Arthur
1967
Bartels, Keith & Glynn
Wang, Franklin & Teresa
Kanaan, Mahir
1968
Gamble, William
1970

Werner, LeAnn & Hal
Middleton, Glen
1972
Tiltum, Charles & Karon
Holton, Patrick & Carol
Hovland, Warren
1974
Clarke, Joseph
1975
VanOrman, Roy
1976
Wittig, Timothy
Trygstad, Joan
1978
Kreyger, Craig
Mabee, Sue E.
1983
Smith, Ernest & Jane McKee
Lentz, Jeff
1986
Mangen, Lyle
Friends
Ellerbruch, Virgil & Georgan
Hellickson, Mylo & Lillian

ENGINEERING CENTURIONS (Gifts of \$100-\$199)

1922
Funk, Virgil
1925
Olesen, Calvin
1928
Joseph, John A.
1929
Hanly, Thomas
1930
Bjorklund, Elvin & Eloy
Johnson, Loys
1931
Yost, Light
1932
Taylor, Martin
1933
Sisson, Maurice
1937
Eanby, Marcus
Walseth, Tracy
1938
Vick, Maurice & Lenore
1939
Ellis, Marvin
Kane, Robert & Irene
Larsonm Lorys J.m.
1940
Webster, M. Keith & Mary
1941
English, Marvin
Hodges, Lyle & Virginia
Lien, Ray
1942
Emsay, Merle
Grace, Harold
1944
Olson, Delbert
1948
Bentson, Ben
Endahl, Lowell & Vronna
Miller, Bruce & Marian
Roberts, Leslie & Wanda
1949
Dornbush, James & Maxine
Knabach, Wayne
Severson, Donald
Smith, Spencer
1950
Gillen, Lawrence
Huchendorf, Kenneth
1951
Beck, Billy
Boeshart, Harold
1952
Christie, Craig
Doering, Eugene
Frykman, Eugene
Koeppell, Paul
1953
Miner, Harlow & Carol
Way, Howard
1954
Keller, Albert
1955
Edwards, James & Evelyn
Iverson, Norman
1957
Forsyth, James & Jane
Isaak, Merlyn & Faye
Marion, Gene
1958
Berg, Robert & Sharon
Kay, Robert & Shirley
Trautman, Arthur
1959
Anderson, Frances
Fodness, Donald
Hansen, Lawrence & Donna
Leech, Ronald
Yocorn, Albert
Nelsen, Gary & Janet
Olson, LeRoy
Solem, Lyle
Soren, Ronald
1960
Allender, Charles
Burr, Arthur
Dooley, Eugene
Knudson, A. Bruce
Macek, Joseph
Oster, Clarence
Todaro, Richard
Van Den Berg, Lowell & Nona
Windedahl, Larry
Wruble, Donald
Hoff, Wallace
1961
Ballard, John
Neyhart, Peter
Reiners, Stanley
Sour, Larry
Walkins, John
Crossman, Leon & Barbara
Silver, George
Wigdahl, A. Gerald
1962
Juttelstad, David
Putnam, Richard
Swanson, Richard
1963
Hemb, James & Sandra
Hillmer, John,
Schmidt, Ronald
1964
Druyvestein, Terry & Loretta
Mittelstedt, Dennis & Sharon
Westbrock, David
Rust, Ronald
1965
Backer, Ronald
Buri, Jerry
Harter, Richard
Johnson, David & Norma
Levins, Richard
Lyon, Glee
Parrish, Paul
Gammon, Thomas & Marilyn
Hayter, Richard & Barbara
1966
Jorgensen, Donald
Keane, John
Rollag, Dwayne & Helen
Wangsmess, Dennis
1967
Peterson, Steven
1968
Hagedorn, William & Carol
1969
Kodis, Robert & Cynthia
Mullen, James
Hauge, John
1970
Devine, Rodney
Paulson, Virgil
Willard, David & Kathy
1972
Bliss, Gary
Christianson, David & Barbara
Corothers, James
Graf, Timothy
Jensen, George & Gail
Thelen, Thomas
1973
Healy, William
1974
Potter, Richard & Vickie
1975
Beason, Thomas
Lange, Duane
Sippel, Mark
Spilde, Daniel
1976
Strandell, William
Tobin, Patrick
Hartford, Gerald & Leslie
1977
Hilmoe, David
Severson, Paul
Baumberger, Vernon
Kelly, M. Thomas & Margaret
Merrill, James
1978
DeYoung, Barbara
Heiden, Allen
Hirrichs, Timothy
Hofland, Rick & Cynthia
Smith, Karen
1979
Baumberger, Perry
Lentz, Scott
Heilman, Warren & Tamara
1980
Dybing, Parry
Nachtigal, James
Nuese, Gerald
1981
Geracts, Lawrence
1982
Allen, Mark
Juntti, Charles
Kau, Deanna Thomas
Lynch, Michael
Wilaby, Diane
Wright, Mark
1983
Clemen, William J.
Englund, Terry
Ulrich, Scott
Weisz, David
Nash, Joan
1984
Christensen, Gregg
Wahlstrom, Stuart
1985
Dwyer, Craig
1986
Pollmann, Daniel
1987
Dooley, Scott
1988
Mazumder, Quamrul H.
Friends
DeBoer, Darrell & Ruth
DeLong, Oscar
Rakness, Kathryn
Yocorn, Kenneth
Vandever, Jan

ALTRUISTIC ALUMNI (Gifts up to \$99)

- 1927
Seeley, George
- 1928
Bartle, Ervin
Miller, George
- 1929
Dehnert, Floyd
DeLong, Louise
- 1930
Sparks, Estel A. "Jack"
- 1931
Anderson, Clarence
Larson, Sidney
Lauster, Kenneth
Rempfer, Harvard
Jepson, Hans
- 1932
Rohde, Florence
Fromke, Fred
Mitchell, Robert
Neufeld, Wesley
- 1933
Anderson, Richard
Scott, Clara
Cotton, L. Eugene
Fauquet, Raymond
Johnson, Leslie
Kortan, Steven
- 1934
Landdeck, Norbert
Fryer, Robert
Dannenbring, Gareld
Fitzgerald, George
Silberberger, Leon & Verna
Miller, Melvin
Grothm, Frederick
- 1935
Hoover, Robert
Miller, Kenneth W.
Hermanson, Ingram
- 1936
Bonell, John
Kuliah, Leonard
Svec, Harry & Lillian
- 1937
Herbert, Richard
Bentson, Robert
- 1938
Bartling, Lawrence
Bonell, William
Davis, Arthur
Robinson, Jesse
Test, Howard
Noble, Robert
Snethen, Elbert
Stoner, James
- 1939
Ellingson, Paul
Jones, Clayton
Searis, Ronald
Welsh, Clifford
- 1940
Klosterman, Paul & Dorothy
Olsen, Ernest
Sisson, Lowell & Agnes
Waltz, Rex
Williams, Perry & Dora Mae
Ordung, Philip
- 1941
Mickelson, Tharral
St. John, Roger
Durland, John & Doris
Rasmussen, R. Clifford
Walsh, Don
Mermaugh, LeRoy & Isabelle
Johnson, Herbert
Dirksen, Robert
- 1942
Dill, Everett
Storry, Junis & Laurel
Crothers, Milton
Downs, Arnold
Wangness, Harold L.
Johnson, C. Robert
- 1943
Timmerman, Harold
Janett, Earl
Lothrop, Eugene & Jean
Malmstrom, Edward & Elda
Weidenbach, Donald
- 1944
Zettle, Eugene & Carmen
Healy, Donald & Helen
- 1945
Baddeley, Robert & Doris
- 1946
Jacobson, Delbert
Eric, Leonard
- 1947
Berg, Sherwood & Elizabeth
Case, Eugene
Kvinge, Stanley
Sederstrom, Emil
Willett, Leonard
- 1948
Board, Lester
Dooley, Delmer
Moe, Dennis & Hazal
Rogness, Aaron
Wiersma, Frank
Winkler, Paul
Aisenbrey, Andrew & Doris
Anderson, Robert
Haag, Marvin & Nina
Hunt, Eugene
- 1949
McLaughlin, Paul
Simmons, Paul & Frances
Johnson, Elliott
Ohlson, Raymond
Albertus, Ferdinand
Dyson, John & Margaret
Loken, Vern
Peterson, Clarence
Ruch, Maurice
Thompson, James
Western, Ralph E.
Crisp, Ralph
Lundquist, Charles
Stem-Montagny, Francis
Thomas, Loyl & Helen
- 1950
Bessler, Derwood
Pahl, Darrel & D. Jean
Smith, Roger
Kohmen, Eugene
Schaeffer, Marvin & Jean
Wyland, James & Harriett
Beesley, George
Cooley, William
Coyle, George
Henken, Ferdinand
Jacobson, Henry
Lien, Neil
Payne, Lloyd
Schwiesow, William
Snyder, Russell
Dowd, J. Larry
Andersen, Carl
Dyrdaahl, Robert
Seiler, Eugene
Amdahl, Lowell
Cherney, Robert
Hawkins, Andrew
Leinbach, Harold & Ruth
Mills, Harvey & Midge
Anderson, Alton
- 1951
Christianson, Harold
Wyman, Kenneth
Aaslen, Robert
Bies, John
Froschth, Willard
Wilken, Robert & Barbara
Westlund, Clarence
Anderson, Charles & V. Jo Ann
Leppke, Delbert
Dimick, Niel
- 1952
Ice, Lawrence
Larson, Eugene & Joanne
Quickstad, LaRon
Wanstedt, Jack
Kerner, George & Inez
Kukuik, Duane
Nash, John
Schmidt, Lyle
Wika, Donald
Wilson, Richard
Strobel, Kenneth
Borghard, William
Bloom, Kay
Dylla, Anthony
Fenner, Melvin
Loen, Orlin
Smith, James
- Tribuzi, Albert & Marjorie
- 1953
Andersen, Robert
Durland, Bob
Larson, Charles
Nelson, Ruth
Bue, Richard
Wiedenman, Charles
Sexton, George & Marjorie
Strom, Oren
Vea, Donald
Lohr, George E.
- 1954
Coddington, Dean
Hartman, William
Hendricks, Charles
Kidman, Bruce & Mary
Stout, James
Walker, Richard
Yetter, LeRoy & Helen
- 1955
Miller, Fredrick
Cotton, Robert
Hamam, Donald
Hanson, Warren
Marshman, John
Mathrani, Madanmohan
Williams, Henry
Brosz, Donald & Pearl
Tobias, Thomas
Ninneman, Gene
- 1956
Haase, Richard
Egan, Noel
Boyd, Darrell
Falk, Harold & Eleanor
Hackbart, Carroll
Karin, Mansour
Lee, Lloyd & Mildred
Miller, Verle
Peppers, Norman & Sandra
Nyggaard, George
Brotsky, Robert & Eleda
Fenner, Thomas
Ohman, Neil
Rowlands, Mary & Bill
Schindler, Marvin
Simonson, Rodney
Waby, Conrad
Keating, Donald
- 1957
Coddington, Richard & Eleanor
Aldrich, Odell
Currier, Robert & Arnette
Eilts, Leonard & Arlys
Hinderaker, Philip
Mann, Jack
Odde, Raymond
Olhausen, Dale
Sears, Ralph
Smcins, Virgil
Audeh, Nadeem
Woolworth, Donald & Barbara
Brunke, Robert
Zaiser, Gary
Wiles, Robert & VerDell
- 1958
DeGroot, Glenn
Liepa, Arnold
Stribley, Gary
Anton, James
Payne, Clarence R.
Pochop, Virgil
Canon, Jack & Donna
Davies, James
Dittman, Albert & Thelma
Eggen, Charles
Hall, Lyle
Hentges, Virgil
Kari, Richard & Shirley
Kastner, James
Krull, Darrell
Larson, Kenneth
Melbourn, John
Oines, Ronald
Peterson, Robert
Reed, Charles & Shirley
Stange, Dennis
Green, Ronald
Peterson, Darcy
Rittershaus, Fred & Ardyne
Schnarr, Clayton
Yotter, Richard
- Bymers, Ronald
1959
Blesi, William
Gatzmeyer, Chester
Horsted, W. Burton & Gladys
Gehring, Glenn
Huhn, Robert
Beckmann, Dietrich
Lewison, Leland
Moore, Edward
Bultena, John
Craig, James
Dam, N. James
Deily, Walter & Lois
Fendrich, George
Frederickson, Lyle & Jone
Halvorson, James
Jackson, Roy & Karen
Jones, Larry & Janice
Knodel, Orval
Larson, Richard
Likness, James
Nagel, Norman
Peterson, Dean
Peterson, John & E. Blanche
Schierling, Hartmut
Strain, David & Sheryl
Strohmeier, Richard
Swanson, Robert
Zebarth, Roger & Helen
Borchard, Richard
Lundberg, Barry & Glenmis
Peterson, Leonard
Singer, Rexford & Doris
Pope, Dale
Rowe, Larry
Allender, John
Clemens, Darlo
Dammeier, Garry
LaBrie, John
Martin, Robert
Potter, Roland
Roske, Warren & Patricia
Sater, John
Siebens, Daryl
Fejar, Adolph
- 1960
Jensen, Roland & Deloris
Parkin, James
Pokorney, Ladialaus
Strand, Delbert
Hafner, Donald
Bergeleen, Leo
Bierman, Ordean
Kost, Robert
Lang, Donald
York, Dennis & Beverly
Blizzard, C. Robert & Sara
Buse, Richard
Byers, Lora
Johnson, Lyle
Kaiser, Melvin
Kellen, Kenneth
Kirby, James
Kohl, Vance
Lippert, George & Dorothy
Pautzke, James
Peterson, Botolf
Pierson, Gary & Gayle
Quam, Larric
Sestak, Robert
Simunek, William
Stanga, Donald
Starken, George
Tripp, Leslie
Weaver, Thomas
Stern, Wallace
Brush, Robert
Sandene, Arthur
Bierbaum, Richard
Christenson, Helmer
Kuhns, Richard
McGregor, Lauren
Owens, Francis & Diane
Nelson, Donald
Smith, Larry
Swum, Duane
Williams, Dennis
Elsasser, Thomas
Kopel, James
Mielke, Ronald
Huebner, Virgil
Kramer, Donald
Peschong, Alan
Tagtow, Eugene
Torgerson, John & Mary
Christiansen, Clarke
Cornelius, James
Gorsuch, Robert
- Haack, Dale
Hoscheid, Terrence
McVay, James
Opfer, Bill
Schofield, Jerald Dean
Tande, Paul
Vander Woude James
Weeks, Dennis & Marie
Wight, Wayne
Isaak, Larry
Pickart, Gail
Dahms, Arthur & Florence
Davis Edward
Madden, John
Nagelhout, Maynard & Sharon
Nelson, Dean
Stoddard, James
Tanberg, Robert
Tilstra, Cornelius
- 1962
Seversky, M. David
Wheeler, Clifford
Barrett, James
Lagas, Robert
Patrick, Donald
Pedersen, Derald
Schmidt, John
Sisk, Michael & Donna
Winter, Marilyn & Janice
Wolles, Walter
Ove, Paul
Hill, Charles
Jensen, Volmer & Vonda
Maum, Vernon
Dutcher, Robert
Paradise, Judith
- 1963
Beauzay, Louis
Volk, Rodney
Larson, Roy
Bollinger, Jacob
DeBlonk, Donald
Folkerts, James
Gnach, Dennis
Green, Roger
Gulbranson, Glenn
Holzworth, Robert
Jarf, John
McCracken, William
Nielson, John
Nordstrom, Dennis
Peterson, Alan & Janice
Witham, Lomnie
Day, Alvin
Hanson, Jon
Nielsen, G. Howard
Pederson, Darrell
Wiedenman, Douglas
Jarf, John
Richter, Gerhard
- 1964
Auer, George
Opland, Raymond & Linda
Ellwein, Leon & Sarah
Jones, Russell
Reimers, Dave
Serreyn, Donald
Siverhus, Ardeell
Tillma, Robert
Tyler, Douglas
Zellmer, Gary
Oakland, Richard
Molohon, Thomas
Raffety, Michael
Broez, Delvin
Schlingen, William
Sunds, Jon
Lockwood, Donald & Cleo
- 1965
Lien, Kenneth
Michael, John
Wolman, Glen & Marian
Sauer, Val
Tekrony, Kenneth
Nelson, Donald
Clark, Robert
Dalager, John
Fennig, David
Klos, Kenneth
Kopel, James
Mielke, Ronald
Wagenaar, Loren
Williamson, Sidney
Rasmussen, Virgil
Jones, Roger
Lorenz, Kenneth & Jonalyn
Monhardt, Richard
Nelson, Howard
Rassel, Richard
- Stubben, David & Gladys
Vandenhoeck, Allen
- 1966
Hurlbut, Alan
Kallesen, Douglas
Spahr, Ronald & Barbara
Snapp, Richard
Beckler, Marvin
DeRaad, Robert
Engle, Roger
Foreman, Larry
Page, Edward
Trefz, Harlin
Van Den Berg, Max
Pier, Bruce
Stavig, Helen
Buri, Lynn
Cotton, Jerry & Nancy
DeVries, David
Griep, Kenneth
Hickey, Charles
Pieper, Wendell
Porter, Gary
Sawinski, Richard
Voell, Anthony
Willmott, Harry
Hauksen, Terrence
- 1967
Ekstrom, Arne
Hendrickson, Dean
Scott, Gary & Jane
Thieman, S. Lynn & James
Cleveland, David
Cothem, Joseph
Dutcher, Robert
Foley, John & Betty
Gaspar, Jerome
Hejl, Frederick
Henry, Eugene
Iverson, William
Janzen, Kenroy
Miller, Donald
Nelson, Kenneth
Proehl, Klaus
Ryland, Dennis
Hauge, Paul & Sandra
Lucas, James
Pedersen, Robert
Friedrich, William
Herbst, Lloyd & Mary
Knapp, Harry & Denise
Sigl, Arden & Lavonne
- 1968
Holden, Robert
Huntimer, Dennis
Juwe, John
Klosterbuer, Shirley
McMahon, Carole
Micko, Dennis & LaDonna
Pruets, David
Stegeman, Michael
Aho, James
Gerjets, Marilyn & Dennis
Gillam, Fred
Johnson, Charles
Bennett, Thomas
Schoen, Charles
- 1969
Hames, Anthony
Boulais, Charles
Davis, Robert
Karnitis, John
Tschetter, Wesley & Lois
Aamold, Carroll
Danielson, James
DeBerg, David E.
Flammery, Gerald
Gillispie, John & Melody
Pettigrew, Douglas & Mary
Poppenga, Bernard & Patricia
Snoozy, Robert & Teresa
Tschakert, Carol
Lutter, David
Owen, Gary
Ekanger, Theodore
Thormodsgard, Paul & Eileen
Eastman, Roger & Patricia
Lindbloom, Leon & Marlis
Pavlis, Roger & Karen
Rakness, Kerwin & Cheryl
Schricker, Joe
Seefeldt, Michael
Svanda, Richard
- 1970
Alsaker, Vincent & Myla
Jensen, Douglas
Eidet, James & Margrethe
Ireland, Roy
Isakson, Robert & Melanie

Tulson, Burton
 Brenden, LaVene & Vivian
 Caldwell, Gordon
 Farr, Marvin
 Heirigs, Henry
 Hoppe, Paul & Pamela
 Matkins, Kip
 Morgan, James & Dorothy
 Murra, Carl
 O Neal, William & Mary
 Rokens, James & Kathryn
 Sereyn, David
 Snapp, Robert
 Wilkens, Paul & Susan
 Smith, John & Kathy
 DeKraai, Arlo
 Schultz, Steven
 Shea, LeRoy
 1971
 Espeset, Paul & Patty
 Mettler, Earl
 Parrott, Douglas
 Shelbourn, Joseph & Laura
 Benting, Gary
 Berger, Gerald
 Berkland, Douglas
 Bjerke, Daniel
 Boettcher, Robert
 Dais, Delbert
 Folk, Twyla & William
 Foreman, Craig & Sharon
 Gelderman, Charles & Joyce
 Hofer, Dallas & Cynthia
 Johnson, Thomas
 Jongeling, Gregg
 Kuck, Michael & LeLonnice
 Leholz, Rodney & Veta
 Nelson, Jeffrey & Trudiann
 Phillips, Mark
 Berger, Brent
 Hoffart, Victor
 Rath, Thomas
 Weghaupt, Lynn
 Healy, David
 Hagin, Terry
 Kallemeyn, David & Sharon
 Lam, HongTo & MayFung
 McLaughlin, Thomas & Connie
 Studheim, David
 Zender, Thomas E.
 Larson, Darrell & Vicki
 1972
 Peterson, Ronald & Celia
 Hicks, Robert
 Holzbauer, Owen & Edith
 Harrison, Robert & Karyl
 Thomas, Roger
 Larson, Elwin & Mary
 Nestor, David
 Roe, Thomas
 Kub, Francis & Joan
 Lee, Robert
 Schricker, Jack
 Arndt, James & Patti
 Austin, Gerald
 Brinkman, Darwin & Nancy
 DeVries, Mary
 Durick, Michael & Sandra
 Heilman, James
 Jorgenson, Kenneth & Cheryl
 Busse, Jan
 Saienga, Steven & Judy
 Flanagan, Stephen
 Forest, Terry & Debara Sue
 Graves, David
 Schuman, John
 Olson, Norman & Betty
 1973
 Peterson, Roger
 Buum, Martin
 Morgan, Larry
 Nelson, Rodney
 Quissell, Steven
 Russell, Dale & Luanne
 Dilly, Virgil
 Brinker, William
 Koehn, Rodney
 Manning, James
 Erickson, Ralph
 Gustaf, Richard
 Holdahl, Robert & Mary
 Huffman, Lester & Vickie
 Huza, Gregory
 Jacobson, Robert
 Johnson, John
 Rother, James
 Wegmann, Diane
 Zoellner, Kenneth
 Goetz, Dale & Cynthia

Thompson, M. Clark & Betty
 Welch, Michael
 Roing, John
 Pickart, Bryce
 Keating, Timothy & Mary
 DeHaai, Alan
 Haag, Gerald & Jacqueline
 Halsey, Gene
 Klein, Michael & Diane
 Knabe, Douglas & Tanis
 Phillips, Reuben
 Redman, Alan
 Schoen, Daniel
 Tomac, Donald
 1974
 Walkes, David & Mary
 Boyer, Dan & Laurie
 Brewer, Karen
 Brockmueller, Steven & Jean
 Christianson, Leslie & Linda
 Haver, John
 Gehring, Dale
 Bertsch, Roger & Judy
 Pattanayak, Anil & Mary
 Sanford, William
 Sherman, William
 Silver, Thomas
 Bosanko, Gary
 Egan, Robert & Judith
 Eide, Gary
 Kaufman, Kenton
 Kortan, David & Cheryl
 Satlak, Van
 Suniga, Xavier
 Heig, H. Geoff
 Oterby, Michael
 Gosmire, Terry
 Feind, Rand
 Beason, Michael
 Goehring, Dale
 Haggard, Bruce
 Rethke, John
 Heller, Julie
 Serlet, Michael & Julia
 Udem, Howard
 Woodworth, Greg & Edna
 Jensen, Lyle
 1975
 Duffy, Gary
 Alsaker, Dayton & Lisa
 Bauer, David
 Bies, Charles
 Bloemendaal, Brent
 Deniger, John
 Endahl, Robert
 Harrington, John
 Hemmer, Ronald
 Jans, Dale
 Jorenby, Howard
 Kellogg, Stuart & Mary
 Larsen, Floyd
 Larson, Alan
 Melstad, James & Vida
 Miller, Eugene
 Schmit, Allen
 Vande Vooren, Darryl
 Wheeler, Rodney
 Yesley, David & Joyce
 Paulson, Michael
 Trudeau, Curtis
 Archer, Scott
 Bettmann, Martin
 McNellis, K. John
 Stevens, Larry & Debbie
 Klaassen, Curtis
 Cole, John
 Stenson, Loren & Susan
 1976
 Cramer, Jay
 Schaefer, Eugene
 Trapp, Dick & Kathy
 Egge, John
 Holthe, Craig & Sandra
 Thompson, Robert & Susan
 Tobkin, Daniel
 Foss, Ann M.
 Gilkerson, David & Deanna
 Gilsrud, Thomas
 Holmberg, Douglas & Julie
 Kappenman, John
 Koch, Robert
 Lampy, Russell
 Macziewski, Keith & Judy
 Pleinis, Craig & Connie
 Skubic/Fischbach Marjorie & Dan
 Veverka, Nick
 Lein, Steven & Cynthia
 Dill, Leon & Patty

Ewy, Keith
 Seeley, Richard & Dawn
 Smedsrud, Duane
 Swihart, Daniel
 1977
 Dellanian, Fereidoon & Christie
 Schroepfer, Dennis
 Dexheimer, Ronald & Kathy
 Ellwein, Neil
 Gillen, Ronald & Carol
 Hoisington, Robert
 Hughes, Frank
 Meyer, James
 Sherman, Craig
 Turner, Steven
 Jemmings, Bruce & Debra
 Amundson, Daniel & Virginia
 Arment, Elmer & Pamela
 Bich, Gary
 Dettman, Gary & Donna
 Heisel, Robert
 Mayer, Michael
 McMartin, Janet
 Tvinnerheim, Curtis
 Clark, Robert
 McCartney, Kim
 1978
 Ochsner, Rodney
 Gilley, Arthur
 Holoch, Harold
 McMahon, Timothy
 Ness, Steven
 Pierson, Daniel
 Beukhof, Cornelius & Heather
 Egge, Alan
 Gilkerson, James & Kysa
 Roskens, Duane
 Bente, Frederick
 Brown, Rodney
 Card, Bruce
 Christianson, Steven
 Froehlich, Janice & Donell
 Russell, Julie
 Helmer, Richard
 Marion, William
 Stoebner, Richard & Barbara
 Sydow, Michael
 Lee, James
 Emier, Kiran
 Holzberlein, P. Sue
 Schuelke, Greg
 Baumberger, Patrick
 Biesheuvel, David
 Blecker, Gary
 Lee, Allen
 Schaal, Timothy
 1979
 Brockshus, Larry & Nancy
 Huber, Roger
 Jackson, Corey
 Schultz, Laurie & Bradley
 Minder, Darwin
 Siegelmeier, John & Laurie
 Swedeon, Kendall
 Risch, Loren & Cindy
 Baker, Paul
 Colombe, George
 Foerster, Timothy
 Schmidt, Robert
 Wilaby, Donald
 Wollman, Robert
 Patera, John & Ginger
 Reckmeyer, Andrew
 Schwarting, David
 Schjodt, Steven
 1980
 Conocchioli, Daria
 Gall, Rodney
 Biesma, Kenneth & Jill
 Larson, David & Joanna
 Olson, Karen
 Schroeder, Michael
 Anderson, James
 Polly, Jerald
 Swanda, Kenneth
 Blazey, Gerald & Jean
 Carlson, Todd
 Clemenson, Doug
 Deibert, Keith
 Gruber, Scott
 Heiden, Richard
 Holbeck, Randall
 Jameson, James
 Peterson, Terrence
 Kaspar, Beth
 Johnson, Alan & Mariys
 Paradise, John
 Smith, Francis
 1981

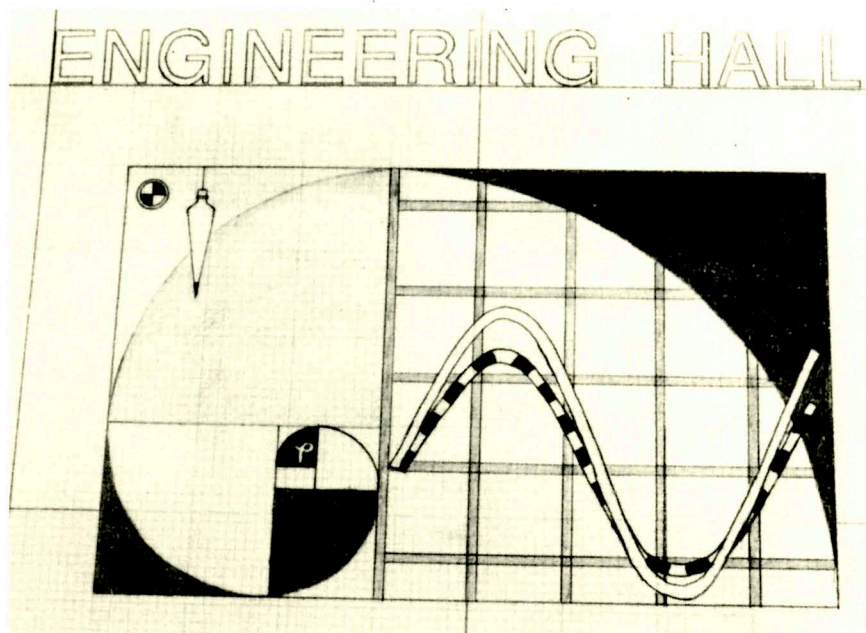
Anderson, Barry
 Erickson, Robert
 Larson, Joanna & David
 Powell, Gregory
 Kjellsen, Larry
 Graber, Daniel
 Minor, Alan & Linda
 Dahlen, Keith
 Fischer, Gregory
 Rubingh, Gerus
 Schwalbach, Joseph
 Van Zweden, John
 Waples, Michael & Cheryl
 Fink, Richard
 Nelson, Joel
 Blanchette, Jeffrey
 Dunlap, James
 Dwyer, Douglas & Krystal
 Healy, Roderic
 Joens, Douglas & Colleen
 Miller, Monty
 Sellner, Darold
 Johnson, Dean
 Lunde, Larry
 1982
 Hansen, Kyle
 Lindstrom, Randy
 Palm, Nestor
 Bareis, Stephen
 Depoe, Mark
 Stampe, Scott & Angela
 Youngren, Keith & Trudy
 Augustin, Richard
 Des Lauriers, Jeffrey
 Duvall, Ronald
 Forman, John & Brenda
 Graff, Thomas
 Hardie, Jan
 Harvey, Matthew
 Kraemer, Ronald
 Lee, Davin
 Lenning, Craig
 Mahoney, John & Joan
 Moran, William * Juliann
 Nelson, Van Peter
 Pohl, Dennis
 Putnam, Kenneth
 Schlimmer, Marvin
 Schuchardt, Jay
 Willcuts, Robert & Kathleen
 Zavadil, Robert
 Elverson, Thomas
 Paulson, Robert L.
 Thoreson, Kelly
 True, John
 Bisgard, Curt
 Coleman, Brenda
 Evenson, Wayne
 Hein, Teresa & Warren
 Pitchford, Clark & Diane
 Remund, Charles & Mary
 Tjoland, Loren
 Wirt, Gregory
 Frazee, David
 1983
 Kor, Steven
 Schindel, Douglas
 Waltz, Jeffrey
 Knofczynski, Michael & Celeste
 Kollmansberger, Lew & Mary
 Behrend, Philip & Patricia
 Consoer, Jeffrey
 Stenzel, Donald
 Thorne, Tracy
 Amert, Timothy
 Bakken, Paul H.
 Christians, Craig
 Huber, Todd
 Kaufman, Kim
 Pladsen, Scott
 Ryan, Robert
 Stoick, Diane & Alan
 Trooien, Todd
 Sudman, Brian
 Miller, C. Jeffrey
 Stocking, Timothy
 Gronlund, Eric
 AlQuraini, Isam & Miles
 Anders, Gary
 Doeden, Craig
 Iverson, Robert
 Smith, Charles
 Solsaa, Arvin
 Brown, Jeff & Rosamie
 1984
 Howard, Katherine
 DeVries, Kevin
 Meyer, Cevyn

Morissette, David
 Brisk, Debra
 Bushong, Todd
 Mack, Todd
 Michal, Debra
 Olson, Craig
 Rasmussen, James & Elizabeth
 Schat, Brian
 Abraham, Ronald
 Gallagher, John
 Golden, Robert
 Ivey, Clair & Lucy
 Ibray, Richard & Susan
 Jutelstad, Eric
 Kirschenman, Daryl
 Kozitza, Lisa
 Mager, David
 McLouth, Todd
 Meyer, David
 Nash, Jeffrey
 Carrette, Laurie
 Giere, Stuart
 Tjoland, Kevin
 Manlove, Diane L.
 Swenson, Jonathan
 Clemens, Julie M.
 Forster, Danny
 Harberts, Kristi
 Jarchow, Daniel
 Nystrom, Matt
 Otman, Willard Jr.
 Petersen, Daryl & Laura
 Pilker, David
 Roester, Daniel
 Schwanke, Robert
 Urman, Stephen
 Vockrodt, Daniel
 Uphoff, Lori & James
 Hargreaves, Roger & Jana
 1985
 Clifton, Janet A.
 Hanson, Gregg
 Herrboldt, Jay & Sharyl
 Johnson, Bradley
 Morgan, Michael
 Sydow, Thomas
 Fry, Roger & Althea
 Heronimus, Kevin
 Joffer, Mark
 Kniffen, Todd
 Palm, David & Tamara
 Vortherms, Kenneth
 Wagner, Michael
 Broderick, Brian
 Croymans, Thomas
 Diesch, Mark
 Grave, Duane
 Hagen, Kevin
 Hoellein, Brian
 Kantack Kelly & Ronda
 Lawler, Steven
 Lichter, Patrick & Ann
 Lutter, Deneil
 Miller, Paul
 Niemeyer, Beth E.
 Pederson, Barbara & Daniel
 Rambough, Frank
 Rath, Kevin & Marsha
 Reiff, Jill
 Rohde, Joseph
 Sieve, Daniel
 Thies, Patrick
 Mundt, Christopher
 Odens, Melvin
 Olson, Keith
 Brooks, Frances Prunty
 Dickes, Steve
 Miller, Dale & Nancy
 Price, Gregg
 Barnett, Andrew & Angela
 Determan, Beth & Mark
 Jurek, Kevin
 Kurtz, Eric & Connie
 Lewis, John
 Magstadt, Jay
 Merritt, Layne & Paula
 Sippel, Walter
 1986
 King, Mark & Cindy
 Carey, Scott & Patsy
 Christensen, Jeff
 Everson, Robert & Debra
 Hayden, Joseph
 Jones, Marlo
 Lammers, Paul
 Lansdowne, Brian
 Anderson, Darrel
 Bietz, Wayne
 Brost, Michelle

Chung, Chin Wha
 Reder, Wanda
 Swanson, Howard
 Sweep, Scott
 Van Diepen, Todd
 Burckhard, Suzette
 Elsassner, Dan & Keely
 Kingery David
 Meyer, Christopher
 Peterson, Randy
 Pierson, Rodney D.
 Poelstra, Rick
 Pohl, Curtis
 Skogstad, Keith
 Stefanich, Timothy & Pamela
 Wynia, Steven & Janel
 Thiele, Kent
 Doll, Timothy & Michele
 Glawe, Regg & Barbara
 Meintsma, Eric & Julie
 Voelsch, John
 Bowen, Richard & Laura
 Davies, Robert
 Dodson, Hugh
 Healy, Terry & Rita
 Janvrin, William & Jill
 Schmidt, Heather
 Schroeder, Phil
 Stowsand, Wayne
 Sutter, Kurt
 1987
 Derby, Jane Resen
 Guenther, Larry
 Harms, Terrance A.
 Moe, Chris
 Poppen, Joel
 Stolz, Laura A.
 Trebesch, Emil
 Bierschbach, Dan
 Einspaar, JonAnne
 Fehl, Randal
 Hallaway, Jay
 Nadenicek, Jonathon T.
 Pearson, Douglas
 Wolterstorff, Sieve
 Taylor, Douglas
 Haag, Michael
 Harrington, Bruce
 Hoffman, Michael
 Hoffman, Wade & Kristi
 Napier, Guy
 Osberg, Rick & Gwenn
 Osberg, Rick & Gwenn
 Sentieri, Paul
 Tunheim, Marcia & Jon
 Wenzel, Krista K.
 Christensen, Kari & Brad
 Juba, Mary
 Jun, Chang Seak
 Mandujano, Celeo R.
 Tunheim, Jon & Marcia
 Watson, Mary L.
 Whitson, Richard V.
 1988
 Glazier, Craig Alan
 Loosbrock, Denise & Richard
 Haffield, Jerry Vernon
 Nunez, Douglas
 Becker, Jonathan Ray
 Genzlinger, Craig Lee
 Larson, Gary A.
 Anderson, Christine A.
 Brandner, Theresa E.
 Ginsbach, Mark J.
 Hassibi, Mohammad
 Hogue, Tony Lee
 Pool, Mark
 Friends
 Wade, Brenda L.
 Brage, Burton & Dolores
 Lubinus, Irene
 Lyde, William & Margaret
 Reismour, Patrick
 Sheka, Glenn Jr.
 Combs, Wesley
 Jones, Hank
 Briggs, H. M. & Lillian
 Grey, Donald E.
 Hartman, Alvin
 Franks, J. Robert & Maureen
 Schrader, Lloyd
 Chu, Shu Tung & Alice
 Hassoun, Nadim
 Kessler, William & Marjorie
 Sippel, Waldemar
 McCarville, James & Karen
 Sander, Duane & Phyllis

SCULPTURE

reflects classic symbols of engineering



People entering Crothers Engineering Hall this fall may reflect on the wisdom of ancient equations when they see a new aluminum and brass wall sculpture at the northwest entrance.

The College of Engineering used a \$1,000 grant from the Koerper College Professional Development Award to commission Michael Warrick, assistant professor of visual arts at SDSU, to design the sculpture.

The award honors superiority in collegiate professional development and promotes art appreciation among engineering students.

After the award was received Dr. Ernest Buckley, dean of the college, asked Dr. Norman Gambill, head of the Department

of Visual Arts, to help decide how the money could best be spent. Gambill asked for proposals from artists, and Warrick had an idea.

"I thought, 'Why not create a work of art and involve them (engineering students and faculty) in what it could mean, using the grant as seed money.'" Warrick said. Additional funds would be needed, but the result would be a quality work of art.

Buckley and Dr. Duane Sander liked Warrick's idea, and they met with him to discuss symbols that would be meaningful to engineers.

Warrick also wanted the design to reflect the purpose of the Koerper award--to foster growth and creativity.

The result is a design that integrates five Golden Rectangles. The Golden Section (from which one can draw a Golden Rectangle) was thought by Plato to be the key to the physics of the cosmos, and it's astounded scientists for centuries.

In the upper left corner of the design are a surveyor's target and a plumb bob, and within the largest square are a grid and a sine wave. Within the smallest rectangle is the Greek symbol for the Golden Section.

"The spiral symbol is a symbol of growth and creativity," Warrick said. "It has applications to architecture, astronomy, math, and other disciplines."

The five-by-eight-foot sculpture will be crafted by engineering students and staff, with technical assistance from Warrick.

The sculpture will not only represent connections between art and science, but between the past and present and between engineering disciplines. It will also reflect the purpose of the Koerper award and the college's achievement in promoting professional development.



COLLEGE OF ENGINEERING

Crothers Engineering Hall
South Dakota State University
Brookings, South Dakota 57007

NON-PROFIT ORG.
US POSTAGE
PAID
BROOKINGS, SD 57007
PERMIT 24