A DYNAMIC FORCE THAT INITIATES MOTION TO A BODY OR SYSTEM

IMPULSE

WINTER 1989

COLLEGE OF ENGINEERING / SOUTH DAKOTA STATE UNIVERSITY / BROOKINGS

Education and industry

Opportunities to get together serve both students and businesses

Cover: Student leaders in the College of Engineering at SDSU know that dressing for success is part of being a professional engineer. Turned out for dress-up day, left to right; Michelle Neyers, sophomore from Redwood Falls, Minn., assistant for engineering orientation; Michelle Clauson, senior from Brookings, promotions consultant and JEC representative for physics; Kate Mensch, senior from Avon, EED co-chair; Troy Erickson, sophomore from Summit, phonathon co-chair; Doug Fick, senior from Luverne, Minn., EED promotions co-chair; Leland Day, senior from Onida, JEC secretary; and Susan Quam, senior from Burnsville, Minn., JEC president. See story, page 10.

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BARBARA SUHR HARTINGER / editing, design and layout

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

BRYON BOHLENDER / student photographer

WINTER 1989

Dear Alumnus:

After the holidays, we in South Dakota usually weather the cold, hope we don't have to get our snowblowers out, and start looking toward the spring and summer. In the College of Engineering our students are beginning another semester's work and looking either for permanent employment or summer work related to their interests in engineering. If you have those kinds of opportunities available in your company or business, please consider our students. It's becoming more and more important for our students to have this experience and for you as employers to have the opportunity to observe and train these excellent employee prospects. If you have positions or would like to visit with us, please contact my office, the individual department heads or SDSU's Career and Academic Planning Center.

The Engineering and Environmental Research Center was successful in obtaining a grant from the Economic Development Administration for a technology transfer center. The University/Industry Technology Service (UITS) has been operating for two months. Associated with the UITS, we are proposing a computer facility to train industry people and provide computer time for engineering/design requirements from industry. LaDell Swiden, EERC director, and I are visiting a number of businesses to determine if we can serve industry better with a computer center of this nature.

This spring, March 30-31, we will be holding Engineering Exploraton Days. The students in our fall 1988 promotions class have been busy developing promotion material and you will be seeing information soon about EED. The Engineering Dean's Advisory Council, composed of executives and engineers from throughout the country, will be meeting in conjunction with EED. And, the finale is the Distinguished Engineer Awards banquet at which we honor distinguished alumni from the College of Engineering. EED is a highlight of our year and we'd like you to come share the excitement.

Dean Buckley's duties as acting executive director of the South Dakota Board of Regents have kept him in Pierre. We are assured, however, that he will be back on campus sometime this spring. Buckley has been an effective spokesman for higher education in South Dakota and they will miss him in the regents' office when he returns to SDSU.

We like to hear from our graduates. Please tell us what you are doing, and give us suggestions for improving the College of Engineering.

Sincerely yours,
Duane E. Sander, acting dean

South Dakota industries will benefit from $100,000 grant

by Dan Merritt

A $100,000 federal grant awarded to SDSU last fall will help the College of Engineering better solve problems of South Dakota industries by means of a new service that is the first of its kind in the state, according to one university official.

The new service is being called the University/Industry Technology Service (UITS). It will make available to South Dakota industries more than two million abstracts of scientific papers, designs and research from NASA, as well as expertise and research from SDSU's College of Engineering, says LaDell Swiden, director of the service and acting director of the College of Engineering's Engineering and Environmental Research Center (EERC). The new UITS is part of the EERC.

"UITS allows us to develop linkages between industry and university research and federal government researchers. It's a great opportunity for industry and the university to get together," notes Swiden. That's something that is not being done to any great extent now, he says.

"Five years down the road we'd like to see more industry-university consortiums. We need to start building these now. It's a beginning," Swiden says.

The new service will help solve manufacturing, processing and product design problems. "These are engineering problems," notes Swiden.

To a limited extent that help has been offered all along, but industry has had to come to the College of Engineering and ask for it. The new service reverses that.

Mary DeVries is associate project manager for UITS and Erick Lewis, a graduate research assistant in mechanical engineering, is handling daily contacts with industry and doing records keeping and data base maintenance and development, says Swiden.

"The purpose of the grant is for us to go out and work with industry. It's so the university can go out to industry and say 'Can we help you?'," explains Swiden.

The $100,000 from the federal Economic Development Administration was matched by $33,000 from SDSU in the first year of the new service. The federal money is part of $600,000 that has been allocated over the next seven years.

"This dovetails nicely with a recent grant from Northwestern Bell, now U.S. West Communications, which provided funding for implementing a Faculty Profile System for the College of Engineering. This now allows us to quickly identify faculty with expertise in a given technical area," Swiden says.

Federal expert help is available through NASA's Central Industrial Applications Center, of which the Engineering and Environmental Research Center is the South Dakota affiliate member.

"What this means is access to NASA's RECON database of over two million abstracts of scientific papers, designs and research and access to over 200 databases for a wide range of technical topics and market research.

"EERC can serve as an initial point of contact for South Dakota industries and institutes of higher education to NASA's research laboratories and the Federal Laboratory Consortium," adds Swiden.

The new University Industry Technology Service "complements the other services available from EERC" including the Transportation Technology Transfer Service, the Office of Remote Sensing and the Water Resources Institute.

Swiden says the $100,000 grant was announced last fall by both Senator Tom Daschle and Senator Larry Pressler. It was obtained through their efforts as well as the efforts of Warren Albertson with the federal Economic Development Administration office in Pierre.

LaDell Swiden, left, with Erick Lewis

Street, road and highway officials are now in touch with the latest maintenance technology

by Dan Merritt

South Dakota towns, large and small, have begun slowly to make use of the newly established Transportation Technology Transfer Service Center (TTTSC), says director Dr. Ali Selim. The center is part of the Engineering and Environment Research Center in the College of Engineering at SDSU. It has satellite centers at the South Dakota Department of Transportation, Pierre, and at the South Dakota School of Mines and Technology, Rapid City.

TTTSC was started this past summer to help towns, cities, counties, townships and the state keep up with the latest technological advances in street and highway maintenance. As the center becomes more well known it will get used more, Selim asserts.

"I know we are providing a service that there is a desperate need for. I hope within a year or two . . . everybody in the state will rely on us heavily," says Selim.

The center has a full-time coordinator, M. R. "Dutch" Cheeseman, who spent more than 20 years as the Brookings County highway superintendent. "I wish we could get more use. But it will come, it's just going to take a little time," says Cheeseman of TTTSC.

Ali Selim

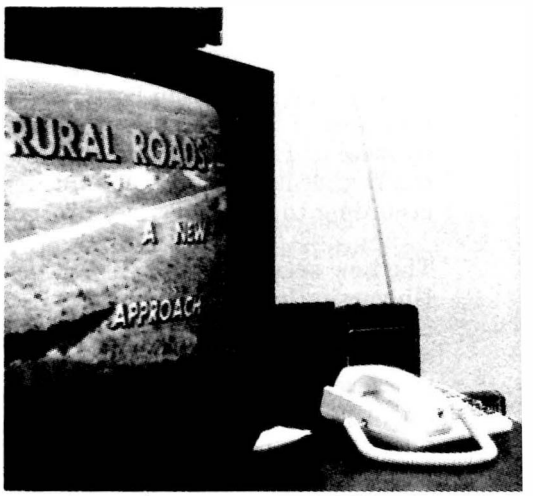
So far, TTTSC has provided service through workshops or by means of over-the-phone consultations with street maintenance officials in Aberdeen, Brookings, Custer, Ft. Pierre, Huron, Lake Preston, Miller, Mitchell, Rapid City, Sioux Falls, Spearfish and Watertown. Bureau of Indian Affairs officials at Eagle Butte, Pine Ridge and Ft. Thompson also have been in contact with TTTSC. The center also has had calls from Deuel and Brookings counties and from state officials in Pierre.

Potentially, the center stands ready to help all 330 cities and towns in South Dakota, as well as its 66 counties and 700 townships, Selim says.

TTTSC began holding workshops last October and had 65 officials at its first three sessions on snow and ice removal. "That's not too bad considering we just started operating this office. It was the most popular topic, too," Selim says.

As of mid-December, 16 workshops had been held at three locations — Rapid City, Pierre and Brookings — on topics including bridge inspection, tort liability, and principles of surveying and map making, in addition to snow and ice removal. Workshops for other topics are planned for March through November.

In December, TTTSC published its first newsletter *The Connection*. "It has a lot of information of help to local government. They don't have any other access to this technology. We have about 1,000 people on the mailing list. All the little towns, highway superintendents, engineers . . .," says Selim. The next newsletter will include an article by Cheeseman on the procedure for road and street abandonment.



Center officials also have published an "Inspector's Job Guide for Highway and Street Construction," and mailed it free to street maintenance officials around the state.

Selim and Cheeseman also have been putting together a library of transporation technology publications and videos available for use by street maintenance officials. "I hope with six months we can increase our videos library to 150 tapes," says Selim. Cheeseman thinks videos on safety will be the most requested. That's because insurance companies are offering breaks in rates if such videos are shown to highway and street crews.

TTTSC also is involved in research on bridge abutments. "The School of Mines and Technology is conducting the research. This one will benefit local governments a great deal," Selim says.

The transportation center was funded last year at $120,000—half of that coming from the federal government. The rest came from

M.R. "Dutch" Cheeseman reviews a video from the TTTSC library.

the state. This year, the center's budget is $180,000—again with half coming from the federal government and the other half coming from the state.

There are now 44 such centers throughout the U.S., all of which receive funding through the Federal Highway Administration. Selim says federal Department of Transporation officials have told him they feel sure these centers will continue to get important federal aid. "They feel these centers will continue to survive and progress forever," he says.

A particular strong point is the type of workshops and speakers TTTSC can get. Various transporation, engineering or street maintenance groups can put on workshops, but they are limited by finances. "We can do things they can't do, bring in additional presenters. This is our business," Selim says. Some workshop speakers cost $1,000 a day. "No one county association can afford to hire a consultant to come in for six days, but we can," he adds.

Engineering Extension trains schools to handle asbestos

A total of 800 people — many of whom will be back this spring for re-certification — were trained and certified to deal with asbestos in buildings this past summer, during six weeks of classes put on by SDSU's Engineering Extension office and the Black Hills Special Services Cooperative. The classes were held at SDSU in Brookings and in Rapid City.

"Practically every school or school district in South Dakota participated. We had a real cross section of titles and occupations. It was a pretty good effort on both our parts," says SDSU Engineering Extension Director Jim Ceglian.

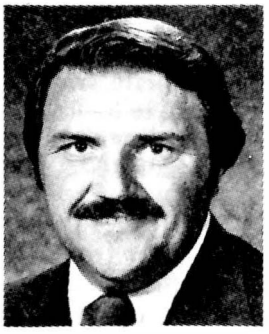
It was mostly public school officials who took part in the classes, including teachers, custodians, business managers and school board members. Some employees of private businesses also participated as did a few state and local government employees. Some participants came from other states including Wyoming, North Dakota, Nebraska and Iowa, Ceglian says.

Federal law directed that by last October school districts were to have people in place who could identify and plan how to handle asbestos in school buildings. "It's something that's a hazard and it has to be dealt with. We've done some good, sound training," says Ceglian. Beginning July 1, 1989, federal law says school districts must begin implementing the asbestos plans they've developed.

Those who were trained last summer must be re-certified within a year and SDSU Engineering Extension and the Black Hills Special Services Cooperative plan to hold re-certification classes in March and April 1989, Ceglian says.

Beginning last fall, Engineering Extension took the asbestos training seminars on the road to Sioux Falls and Pierre. More seminars are planned for January through April and will be taught by Engineering Extension safety consultants Keith Corbett and Jim Manning.

Last summer's asbestos classes were taught by Terry Forest, assistant professor of civil engineering and acting head of the Department of General Engineering; Robert Broschat, associate professor of mathematics and computer science; Kurt Bassett, instructor in mechanical engineering; and Dr. Oren Quist, associate professor of physics.



James Ceglian

Engineering faculty update classroom skills in new teaching methods course

by Lois Hatton

Lois Widvey

"She is the teachers' teacher," says Duane Sander, acting dean of the College of Engineering, about Lois Widvey, professor of education at SDSU. Widvey taught a teaching methods course for engineering faculty members and graduate teaching assistants last fall semester. The class was funded by Harvey Owren, a 1941 SDSU electrical engineering graduate who now lives in California. The course is being called the Harvey Owren Principles of College Teaching for Engineers Seminar.

According to Sander, "teaching effectiveness is one of the strong points of the College of Engineering. This course gave our teachers and graduate students a chance to further develop their teaching skills," he says. "Alternative teaching methods can help students learn more effectively. We are here to teach as effectively as possible and we want to be current with the latest research in teaching methods," explains Sander.

Widvey taught the non-required, non-credit class on six Saturday mornings last fall. Each session was four hours long. She designed the couse for new graduate teaching assistants, new faculty, and current faculty members interested in learning some of the new methods and techniques in teaching.

"New findings in educational research on learning styles have surfaced in the last five to ten years. We try to keep abreast of the new theories in learning so that our students can receive the best instruction," Sander says.

According to Widvey, engineers think in a left-brain style. "We need to be aware of tactile kinesthesis, a sense of touch, when engineers work with materials. So other teaching methods, in addition to lectures, are important in getting across some of these concepts," Widvey says.

"Teachers must know their students' names and treat them as fellow human beings. They must create a comfortable working environment for their students in the classroom, and teachers must be available when their students need help. Sometimes that may mean giving out a home phone number," Widvey adds.

According to Widvey, teaching is a complex process, both a science and an art. It requires mutual exchanges between the world of theoretical research and actual teaching practices.

Widvey was impressed with the dedication and enthusiasm the engineering faculty brought to the class. "They were eager to learn. I was impressed because they gave up six Saturdays to take this no-credit, non-required course," she says.

Widvey's course included developing a class syllabus, developing lesson plans, and creating student hand-out material. The second part of the course dealt with techniques of instruction, which included learning skills, effective lecture techniques, audio visual materials and evaluation techniques.

Testing and evaluation methods explained by Widvey included writing effective test questions, deciding when to use take home tests, and formating of test questions. She says teachers should test for course objectives, with a fair and effective grading system.

"Tests should be fair. They should not be designed to trip students up. They should be designed to test for understanding," she explains. And, she adds, "teachers should let their students know how they will be graded at the beginning of the course." She says she covers the master learning approach in which teachers do not test students until they master the material.

Harvey Owren

Dr. Don Moore, associate professor of electrical engineering, participated in the teaching seminar. He appreciated Widvey's appraisal of new research on group projects. "She reinforced the idea that using cooperative learning — having three students work together, for example — gets better results than competitive learning," says Moore.

"We appreciate Owren's understanding and foresight in providing the support for this course," says Sander.
There are many outstanding teachers in the College of Engineering. "We are encouraging them to make some of their most successful teaching methods available to other members of the faculty," Sander adds.

Faculty participating in the Harvey Owren seminar included, left to right: Don Moore, associate professor of electrical engineering; James Helertz, graduate teaching assistant in math; Bridget Moore, lecturer in computer science; Jeri Kurtz, graduate teaching assistant in math; Wayne Knabach, professor of electrical engineering; and Ritchie Mikesell, associate professor of mechanical engineering.

Funding approved for SORD and Capstone projects

Engineering design projects at SDSU have received $82,500 from the South Dakota Futures Fund. The College of Engineering had submitted a proposal for funds to support Capstone design projects and multidisciplinary design projects. "We will be implementing it spring semester 1989," says Dr. Duane Sander, acting dean.

The purposes of the Futures Fund are to develop and support the capabilities to train engineers and technologists for South Dakota industries, and to assist in job development. The projects being funded at SDSU are geared to train engineers and technologists, as well as help South Dakota industries with engineering problems, says Sander.

Of the total, $27,500 will be used to pay a half-time, 12-month design coordinator, and $14,000 will be used to pay student coordinators, designers, and assemblers. Student Originated Research and Design (SORD) projects will receive $16,000 to cover costs of materials for an airplane, robotics, a fuel efficient vehicle, a hazardous waste processing system, and other projects. Fifteen thousand dollars will cover costs of materials for Capstone Design Course projects, and $10,000 will cover costs of speakers and consultants.

Sander says the funds for SORD and Capstone materials, consultants and speakers would be used for more than one year. Initial funding for the projects coordinator position would last one year.

"This would be money to get us started and prove the concept. Then we would seek additional funding from other sources that might benefit from student designs in coming years," says Sander.

General Engineering comes into its own with focus on technology

by Carrie Sword

The Department of General Engineering has added three courses, changed five classroom locations, installed a satellite disk, and begun work to expand its programs. The changes reflect growing enrollment and growing interest in engineering technology.

The department, for many years, was comprised of basic engineering courses required by other departments, but after the University of South Dakota at Springfield closed in 1984, the department started a four-year electronics engineering technology program. "Since the EET program came, there's been a change of emphasis," says Terry Forest, assistant professor of civil engineering and acting head of the General Engineering Department.

Now the focus is on technology, as well as computer and graphic support for the College of Engineering. Department administrators would like some day to offer programs in construction, industrial, and architectural technology, engineering shops, and drafting. "The letter of intent has been approved and we're in the process of preparing Class III documentation for both the construction technology and the industrial technology four-year programs," says Forest.

Terry Forest

The existing program in electronics engineering technology trains students to fill the void between design engineers and the technicians who assemble or repair electronic devices. An electronics engineering technologist acts as a liaison to assure that a design is workable and that the technicians assemble it correctly. They also help engineers design aesthetically pleasing machines. "You can have the best component, but if the package looks unappealing or just dumb, nobody will buy it," Forest says.

The three areas of focus in SDSU's EET program are communications systems, video devices, and computers. Graduates can qualify to work on electronics product development teams or in sophisticated electronics maintenance.

New courses in the department this year include Prototype Techniques, Advanced CAD (Computer Aided Design), and Microcomputer CAD. Prototype Techniques introduces concepts of the manufacturing assembly process. Students complete several projects during the semester, including design/layout of the project, component procurement, printed circuit board design and etching, and enclosure of the finished product.

The new microcomputer-based CAD courses give engineering students the opportunity to broaden their skills using the current industry standard software—CADKEY and AutoCAD.

The mini-computer CAD software used by the department helps engineers plan manufacturing processes or design mechanical parts. If an object, like a bicycle wheel, is produced on a computer

screen, then factors like its perimeter and center of gravity can quickly be calculated. Objects can also be viewed from different angles. Information used to design the object can then be transferred to other programs so machine tools can manufacture it.

While new courses are springing up, three existing courses in the department offer an interesting new twist, says Forest. Three professional architects taught Architectural Systems during the fall semester, and they are teaching Architectural Design Drafting and Technical Sketching during the spring semester. The temporary instructors are Dick Dempster, Architects Inc., Sioux Falls; Steve Randall, Spitznagel Inc., Sioux Falls; and David Noyes, Banner Associates, Inc., Brookings. Forest says the department is searching for a full-time professor with a degree in architecture to teach the courses.

Another recent development is increased interest in the Master's of Science in Industrial Management degree offered through the department. Steve Wynia became the first graduate of the program this fall, and six students are currently enrolled. The program emphasizes technical management, economic analysis, and technical proficiency.

In other developments, students taking the Communication Circuits Lab and the Resonating Systems course have been building and

Steve Wynia

installing a satellite receiving station, including an 11-foot disk, on the roof of Solberg Hall. The station belongs to the General Engineering Department and will serve as a signal source for the Video Lab, as well as a hands-on project for studying cable television systems. It also has long-range potential for enabling faculty members and administrators to conduct tele-conferences on campus, says Forest.

The department also recently implemented a temporary solution to overcrowding in Solberg Hall by changing several classroom locations prior to spring 1989. The moves created more space for several EET labs.

The department continues an ambitious cooperative education program, striving to give students as much hands-on experience as possible. Twenty-five students earned credit for working at Daktronics during the fall semester. Forest says the department is trying to locate other companies to provide "co-op" opportunities throughout the United States.

A strong satellite program also continues at Ellsworth Air Force Base near Rapid City. Twenty-seven students were enrolled in the four-year EET program there this fall. The program, offered through the Division of Lifelong Learning and Outreach at SDSU, is open to both civilians and enlisted persons. It attracts people of all ranks in the Air Force, Forest says.

First industrial management graduate degree awarded

Steve Wynia earned the first Master's of Science in Industrial Management (MSIM) degree from SDSU during graduation exercises Dec. 17.

"Overall I think the program has a very strong and very useable potential for the state of South Dakota. I think it's going to grow," Wynia says.

The degree enables people with technical skills to learn about management and economic analysis for application in business and industry. People with business backgrounds can also use the program to gain technical proficiency and advance their managerial and economics skills. The program started as a joint venture between SDSU and the University of South Dakota, but it was later restructured so that all required courses are offered through SDSU's Economics Department and College of Engineering. Appropriate business courses can still be transferred from USD.

"It's a much more viable program," says Dr. Duane Sander, acting dean. "The restructuring made it easier for our students to take the program. What we did was consolidate it on the SDSU campus."

Dr. Christopher Sword, dean of the Graduate School at SDSU, says that businesses and industries are increasingly requiring employees who wish to enter management positions to complete a master's degree in management or administration. "In fact, many will pay the cost of this training," he says. "The MSIM degree at SDSU offers comparative advantages over other degrees for many students because it is adaptable to specific work situations and can be tailored to maximize the potential of the individual student," says Sword.

Wynia started work on his master's in 1986, after earning a bachelor's degree in electronics engineering technology. "I wanted to eventually move into a management position, and this degree was geared for the area of industrial management," he says. For his research project and thesis, he compiled a procedural manual, a quality assurance manual, and a cost analysis report for Star Circuits, Inc., a Brookings company that manufactures printed circuit boards.

The industrial management program includes courses in quality control, inventory management, materials handling, reliability, testing, production equipment design, product planning and design, safety, liability, and product promotion.

Students in the program come from a variety of backgrounds. Some are recent graduates with degrees in technical or business-related fields. Others are professionals who want to sharpen their managerial or technical skills.

"The industrial management degree allows people from our undergraduate schools and from industry to pursue a master's level program that provides instruction and research directly related to production level management," says Sanders. Six students are currently working toward MSIM's at SDSU.

'Engineering students stand out . . .'

by Lois Hatton

"Engineering students stand out on this campus by the way they act and by the way they dress. In a general class of students from different colleges within the university, the engineering students usually are found at the top of the class academically," says Teresa Hein, instructor in physics.

"Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties . . . and engineers shall be guided in all their profesional relations by the highest standards of integrity."

This statement paraphrased from the Engineers Code of Ethics is a fundamental canon that SDSU engineering students live with from the moment they enter the College of Engineering as freshmen. They are identified by a committment to professionalism, Hein says.

Engineering students at SDSU distinguish themselves. Students in the college, from freshmen to seniors, dress up at least once a week as if they were going to work in the professional world. "Some of the students carry attache cases. This adds to their professional image," says Hein.

"A suit or sport coat with a tie, dress pants and a sweater, or any dress clothing suitable for a professional situation, can be worn on dress-up day, says Duane Sander, acting dean of the College of Engineering. Sander credits Ernest Buckley, dean-on-leave, with the idea for dress-up day.

Being well groomed and well dressed is a way to show pride in one's self and in one's profession. "It helps convey an attitude of seriousness about one's work," Sander says. "Our students are serious about their studies and their education. Dressing for success is only one of the many ways our students show their committment to professionalism," he adds.

Our students realize that engineering is an important and learned profession, says Sander. Professional engineers recognize that their work has a direct and vital impact on the quality of life for all people.

"The engineer works within the public trust. The principles of ethics are so important that we as faculty members can't afford to act as if the students will develop an understanding and make a commitment to these principles purely by chance," Sander says.

Engineering students at SDSU are encouraged to join and participate in student chapter professional and honorary societies. Attending professional meetings and national conferences helps develop leadership skills and a professional attitude, says Hein.

Senior engineering students observing Wednesday dress-up day recently included James Kahler, on the steps, mechanical engineer from Dell Rapids; Doug Fick, electrical engineer from Luverne, Minn.; and Mary Knudson, mechanical engineer from LaCrosse, Wis.

Ethics conference with

by Dan Merritt

Roger M. Boisjoly adamantly opposed the launch of the doomed space shuttle Challenger in January 1986. Morton-Thiokol, which built the Challenger's rockets, overruled Boisjoly's recommendations that the shuttle not be launched.

Senior scientist Boisjoly had serious concerns about the vulnerability of the space shuttle's O-ring seals to cold temperatures, which eventually was determined as the cause of the explosion that killed the seven astronaut crew members.

Seven SDSU engineering students heard the "whistle blower" Boisjoly speak at the "Ethical Dilemmas in Engineering Practice" conference at Iowa State University, Ames, in November. They also sat in on a talk about the Kansas City Hyatt-

SDSU students attend national NSPE meeting

by Richard Heitkamp

Two senior engineering students, Susan Quam and Richard Heitkamp, represented SDSU at the National Society of Professional Engineers (NSPE) student conference in Atlanta, Ga., in January. According to Heitkamp, the three-day conference, held in conjunction with the NSPE winter meeting, offered excellent seminars on technical communication, professional liability and engineering ethics.

Susan Quam, Dr. Alvin Meyer, director of NSPE student programs, and Richard Heitkamp

Dr. Alvin Meyer, director of NSPE student programs, cited SDSU as outstanding for its high school program, Engineering Exploration Day and Engineers' Week phonathon fundraiser.

Quam says more than 100 engineering students from some 60 chapters across the U.S. compared projects during an idea exchange. She and Heitkamp picked up information on new programs they hope to test and implement at SDSU.

Quam, NSPE student chapter president at SDSU, is an electrical engineering major from Burnsville, Minn. Heitkamp, the immediate past president of the NSPE student chapter, is a civil engineering major from Adrian, Minn.

impresses SDSU students responsibility of professional engineers

Regency Walkways collapse. In that accident in 1981, 111 people were killed and nearly 200 injured. Some of the students who attended the conference will make public presentations this semester about what they learned, including at Engineering Exploration Days in March.

Boisjoly received the 1988 Freedom and Responsibility Award from the American Association for the Advancement of Science for his concerns and efforts. He is no longer with Morton-Thiokol and now speaks publicly on engineering ethics. Boisjoly also has sued his former employer.

Troy Erickson, a junior mechanical engineering major from Summit, was most impressed by Boisjoly's presentation. "It really gets you to thinking about a lot of the problems we could face as engineers. I think it's an important subject students have to get a little more interested in," says Erickson.

Teresa Hein, instructor in physics and coordinator of instruction for the College of Engineering, organized the trip to the ethics conference. "I felt it would be good for the students — student leaders — to bring back what they learned and share it with other groups and other students. We need to teach about ethical behavior. The sooner, the better," she says. Hein includes ethics in the courses she teaches, Introduction to Engineering I and II. Hein says ethics demands that engineers speak up.

Erickson says professional engineers in attendance at the conference expressed a strong belief in the need for early acquaintance with ethics in engineering. "They said ethics should be a class required for all engineers."

Other SDSU students attending the conference were Susan Quam, senior in electrical engineering, Burnsville, Minn.; Stacy Helmann, junior in electrical engineering, Brookings; Eric Moser, junior in engineering-physics, Lake Preston; Michelle Neyers, sophomore in mechanical engineering, Redwood Falls, Minn.; Brent Carey, freshman in electrical engineering, Windom, Minn.; and Damon Pistulka, senior in mechanical engineering, Fairfax.

Hands-on experience gives engineering graduates an edge on the job market

by Carrie Sword

Young college and university graduates often experience the frustration of applying for jobs with employers who won't hire inexperienced people. But some students are solving the "catch 22" problem while they are still in school.

Several departments in SDSU's College of Engineering participate in either cooperative education programs or internship programs. Both options give students opportunities to gain hands-on experience. The internship programs also offer college credit.

Carmen Fink, a senior in civil engineering from Delmont, recently returned from a seven-month cooperative education experience near Delta, Colo., where she worked for the U.S. Forest Service in Grand Mesa National Forest, Uncompahgre National Forest and Gunnison National Forest.

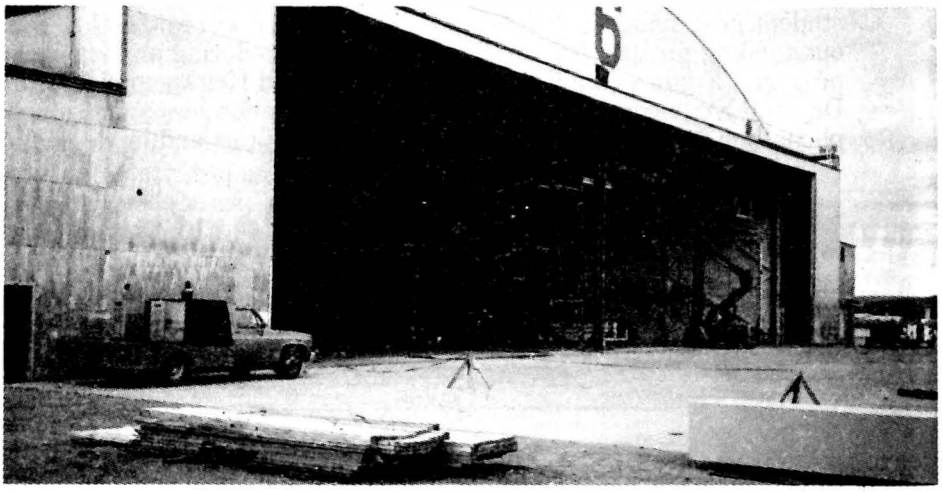
"I was in charge of a four-person survey crew for five months. We surveyed 23 miles of roads for logging. We also surveyed four campgrounds that will be improved," she says.

During the final two months, Fink put her design skills to work. "I designed a road with the help of a computer. Then I put together the estimate and final drawings and the complete contract package. I was helped by a civil engineering technician," she says.

Fink had worked previously for the Forest Service in the summer of 1987 and has an invitation to return. She received one college credit for the seven-month experience and earned more than $7 per hour.

Many students in the College of Engineering develop similar connections through internships and cooperative education. About twenty-three electrical engineering majors at SDSU were involved in cooperative education programs this year. Participating companies included 3M in the Twin Cities and Brookings; Rockwell International in Cedar Rapids, Iowa; Honeywell in the Twin Cities; Daktronics in Brookings; IBM in Rochester, Minn., and others.

Richard Heitkamp gained construction site inspection experience while working with the U.S. Army Corps of Engineers at Ft. Wainwright, Alaska, last summer.



Carmen Fink ran a survey crew for the U.S. Forest Service in Colorado during her seven-month cooperative education internship.

Carmen Fink

Richard Heitkamp, a senior in civil engineering from Adrian, Minn., had an internship last summer with the U.S. Army Corps of Engineers, Alaska district, at Ft. Wainwright near Fairbanks, as a quality assurance representative. Heitkamp has been active in Army ROTC at SDSU, so his summer experience included both technical engineering and military training.

A major part of Heitkamp's work with the Corps was studying plans and specifications and applying his knowledge of specs and tests to the inspection process. He singles out the importance of a knowledge of construction safety as a necessity on any engineering project.

Heitkamp is spending spring semester 1989 as a research assistant/technical writer for the South Dakota Board of Regents in Pierre. He expects to receive his bachelor's degree in engineering with a minor in technical communications in 1990.

Several math majors also have been involved in cooperative education or internships. Howard Nielsen, coordinator of the internship program for the Math Department, says sometimes other departments on campus seek help from math students. Some of the SDSU departments and private companies that have been involved are the Animal Science Department; the Plant Science Department; EROS Data Center near Sioux Falls; Brookhaven National Laboratories at Long Island, N.Y.; and the Water Resources Institute at Brookings. Nielsen said he thinks more companies would hire SDSU math interns if students would set aside one summer plus one semester for an internship, rather than just one summer.

The electronics engineering technology program in the General Engineering Department has an ambitious cooperative education program, as does the Computer Science Department. Physics and mechanical engineering students at SDSU also are involved in internships and cooperative education, gaining experience before facing the challenges and demands of the professional world.

Testing policy shifts choice to students

This year's SDSU engineering graduates will make an important choice about the Engineer in Training exam (EIT). The test is no longer required for graduation, but it is still an integral step toward becoming a professional engineer, according to Dr. Duane Sander, acting dean of the College of Engineering.

"The change (in testing requirements) was due to the expense of the EIT exam. It cost the College of Engineering $35 per student," says Sander. The college continues to offer the test, and students are urged to take it at their own expense, because it's one in a series of steps leading to professional status, he says. The first step is earning a bachelor's degree in engineering from an accredited institution. The second step is passing the EIT exam, and the third involves working under a registered professional engineer for four years. Then, after passing a practical exam, one can be registered as a professional engineer, says Sander.

"It assures the public . . . that projects such as bridges, roads, buildings and power systems will be properly designed, provide safety and maximize economy," he says. SDSU engineering graduates enjoy a reputation for high marks on the EIT. "Our record has been very good. We've been in the top one-third of the nation in performance consistently," says Sander.

Although the college no longer requires the EIT exam, all graduating engineering students must now take the Watson-Glazer Critical Thinking Appraisal, a non-graded evaluation funded through student fees. It will be used on an interim basis until engineering departments develop their own assessment tests.

Capstone students tackle practical engineering problems

by Carrie Sword

SDSU engineering students in the fall semester Capstone Design Course invented a translator winch to ease the work of a disabled Sioux Falls resident and worked on a machine to package "yule logs" for the Campfire Memories Company.

Capstone is a mechanical engineering course which assists businesses and manufacturers with engineering problems while offering students opportunities to solve practical problems and to enlighten them about on-the-job responsibilities. The three-credit course is required for accreditation by the Accreditation Board for Engineering and Technology (ABET), and all senior engineering students must take it, according to Kurt Bassett, an assistant professor of engineering who teaches the course.

When ABET established the requirement, a few new features were added to SDSU's existing course, but the focus on practical design remained. "Now we've added lecture topics . . . for the subjects that haven't been covered in the more technical courses—things like general design procedures, safety, reliability in design, engineering economics, optimization of designs, legal considerations, and standards and patents," Bassett says.

"One thing students like is that it gives them an opportunity to apply their formal education to a practical project that will have some value when it's done," adds Bassett. The course is called a "Capstone" course because it tops off a student's education with practical application of theory.

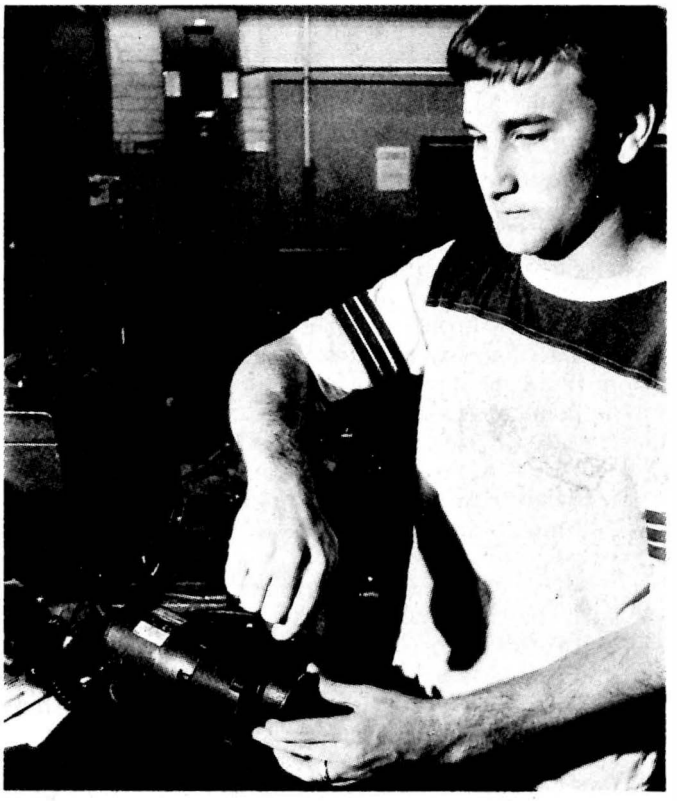
The 20-25 students in each class undertake several projects per semester, working in groups of three. The department seeks requests from South Dakota businesses, and business managers write to the department with problems.

The state Department of Vocational Rehabilitation recently called with a problem involving a disabled Sioux Falls resident who works at a dental laboratory. Nerve damage limits the employee's mobility, creating a problem lifting heavy denture molds from one bath of water to the next. A group of SDSU students visited the laboratory and designed a solution.

"They're developing a small electric winch for the lab bench that allows the employee to electrically lift these molds . . . The winch is attached to a track, so it can be moved from one location to another on the lab bench," explains Bassett.

Tom Froseth, senior in mechanical engineering from Garretson

Kurt Bassett



Tim Matus, Beaver Creek, Minn., was graduated in December with a degree in mechanical engineering.

Clete Sehr, district supervisor of the state Department of Vocational Rehabilitation at Sioux Falls, says the arrangement with SDSU's College of Engineering will help his office and give students exposure to an area of abundant employment potential—adaptive equipment for disabled people. "This is our first experience with the engineering school in this respect. We're quite excited about it," he says.

Students also worked to invent a machine to fill boxes with small pieces of incense called "yule logs," made by the Campfire Memories Company at Kalispell, Montana. The packaging work was previously done by hand.

The companies pay costs of materials and fabrication, but all design services are free. Prior to fabrication of any designs, the company receives a written proposal, three progress reports, and a final report with drawings, says Bassett.

One project completed in the past year was a pre-heating device to prevent thermal stress during welding of hydraulic cylinder rods. It was made for Telelect of Watertown. Another was an automatic packaging system for plastic wands produced by Falcon Plastics Inc. of Brookings. "Also, last semester I had a group that designed an instrument case for Sencore, a Sioux Falls company that makes electronic test instruments," Bassett says.

Dr. Hassan S. Ghazi, head of the Mechanical Engineering Department, says the capstone course helps students find employment after graduation because they get practical experience, make business contacts and develop business sense.

"The course is intended to bring together the engineering principles learned in the different courses and integrate them to solve one big systems design project . . . so, in effect, the course is an example of the type of work they will be doing after they graduate," says Ghazi.

Mark Dewitt, senior in mechanical engineering from Brandon

Senior mechanical engineering students Steve Kocourek, left, from Martin, and Mark DeWitt, from Brandon

Hassan S. Ghazi

'Son of Wild Hare' on the drawing board

SORD class continues work on aircraft, robotic arm and fuel-efficient vehicle

by Carrie Sword

The next prairie-hopper built by engineering students at SDSU may be able to herd cattle, spray crops, and venture unabashedly into dangerous territory.

Three senior engineers in the fall semester Student Originated Research and Design class set criteria and started designs for the next SORD aircraft. They were Rob Matthes, Mitchell; Troy Moller, Mount Vernon; and Lonnie Pederson, Sisseton. They recommended the aircraft be a drone of composite material, mounted with a video camera, and capable of spraying crops. They decided it should cruise at 55 mph and slow to 25 mph without stalling, and it should carry 50 pounds of chemicals and five pounds of fuel.

As a drone, the aircraft would be able to spray crops without exposing a pilot to chemicals and take video footage of dangerous or remote areas. The camera could help locate and herd livestock, aid in military missions, and make agricultural spraying possible. "You need a camera in there to have a bearing on where you've sprayed," says Pederson.

Operators of the aircraft won't be able to anticipate wind and pressure changes the way a pilot does. "The person flying (controlling) it is going to have to be trained," adds Pederson. To help compensate for lack of a pilot, the fall class emphasized aerodynamic stability in their plans.

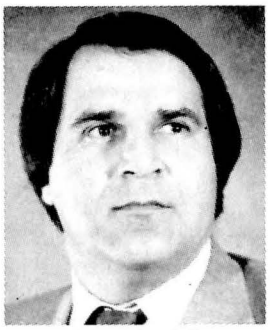
"We're just starting the project now. It will take two to three years to get the project done," Pederson says. His group determined requirements related to the wings, using information from the previous aircraft. "We've done all the calculations for the wing section and the required wing span," he says.

The next groups of students will determine the wing cross section. "When they get that, they can follow the calulations we've done, to a point," Pederson explains.

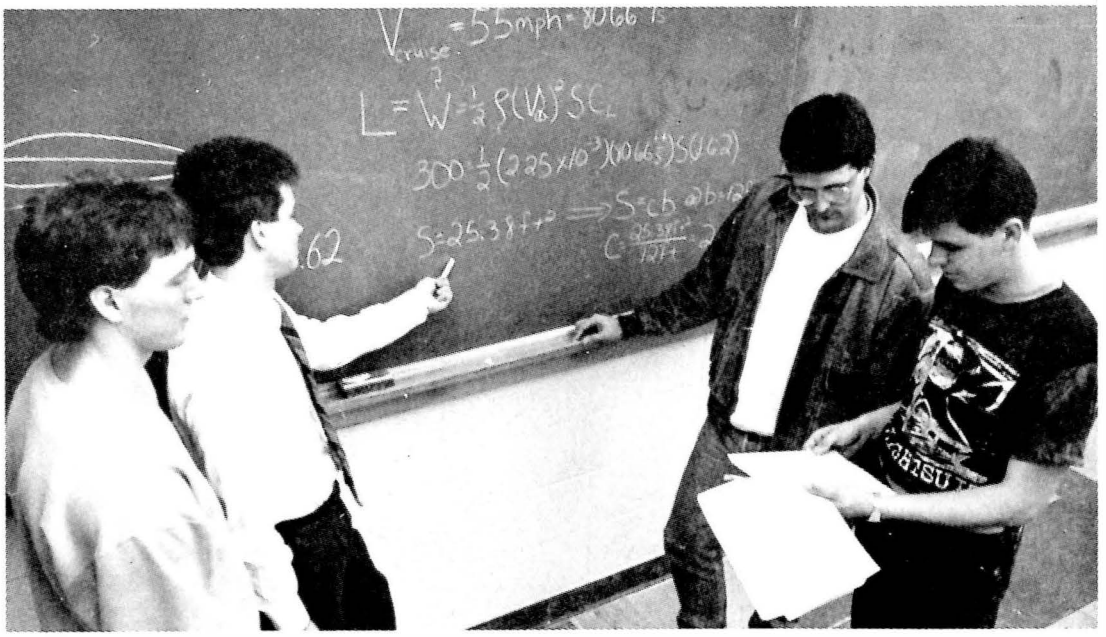
The class, advised by Dr. Hassan S. Ghazi, wrote a precise record of decisions and calculations, because they found past reports difficult to follow. "We made a report that's very precise and that they (future groups) will be able to follow," says Pederson.

Robotic arm moving smoother

In another SORD class this fall, students gave freedom of movement to a jerky robotic arm. The arm, designed to do repetitive assembly-line jobs, didn't function smoothly. "We redesigned parts of it . . . There was too much friction in the



Hamid Hamidzadeh



Students in Dr. Ghazi's class worked out calculations for the next SORD aircraft. Left to right, seniors Troy Moller, Lonnie Pederson and Rob Matthes with sophomore Reese Kor, from White.

Clayton Knofczynski demonstrates the fuel efficient vehicle students in his SORD class started designing last fall.

Clayton Knofczynski

arm for the motor to drive it," Pederson says

Seniors Jon Ness, Kasson, Minn., and Brian Parliament, Hayti, worked with Pederson and Dr. Hamid Hamidzadeh, their advisor, to smooth out the problems.

Parliament and Pederson reduced friction by installing bearing mounts, bearings and motor mounts. They replaced a two-foot long screw with a long ball bearing screw to reduce even more friction. The ordinary screw, which controlled the folding and reaching of the arm, had been attached directly to the motor. Friction in the motor area and on the screw itself caused the arm to stick in mid-motion, explains Pederson. Now, two plates in the motor mount area hold bearings which support the ball bearing screw. The new system increases power available to move the arm and decreases the amount of input power needed.

Jon Ness designed and installed a rack at the base of the arm that can hold as many as six, two-pound weights. The weights counter-balance the weight of different "gripper" attachments at the end of the arm. Ness redesigned the arm supports to make them more rigid and installed new brackets to hold the arm in place. He secured the brackets to the arm using bolts with bearings instead of the previous welding method.

Pederson was graduated from SDSU in December 1988, but Parliament and Ness plan to continue work on the robotic arm. One of their goals is to connect the arm to a computer.

Third FEV taking shape

Students in Clayton Knofczynski's SORD class started designing a new fuel efficient vehicle (FEV) this semester, using the completed FEV as "a model of the no-nos," according to Knofczynski, who is a professor in the Mechanical Engineering Department.

He explains that building a practical, fuel efficient, safe vehicle involves an incredible number of choices. Although the completed vehicle meets some of the needed criteria, it lacks acceleration power and doesn't maintain speed in headwinds or on hills. "An automobile is a very complex machine when you consider all the parts that interact," he says.

Dennis Jones, a student in the fall class, says they decided to change the type of engine, steering suspension and engine-transmission-differential for the new vehicle. The 15 horsepower snowmobile engine in the other vehicle was installed as an experiment by a summer school student. "The engine chosen (for the new vehicle) will be a water-cooled, four-stroke with approximately 45 horsepower," says Knofczynski.

The students decided the FEV should run on gasoline and have a manual transmission with multiple gear range. Because they want a lightweight vehicle, they recommended the body be made of a composite (two lightweight materials which are strong when bonded together).

"The vehicle is intended to be a small commuting type, with high economy, to be safe and have aesthetic appeal," Knofczynski explains.

In this class, as in all other SORD classes, the instructor serves as an advisor. "I let the students have the prerogatives. The only thing is to play 'the devil's advocate' and say 'Why?' If they make mistakes, hopefully they learn from it," says the professor.

The new vehicle will be the third attempted FEV. The first was a three-wheeler with a motorcycle engine. It was determined unstable and then scrapped so parts and materials could be used on other vehicles and in labs.

Students in the fall class were Jones, Bruce Boerner, Hoo Kooi Ooi, Gary Thune and Bruce Hanen, all of Brookings; Myron Chicoine, Elk Point; Robert Chrismer, Easley, S.C.; Mark Matson, Arlington; Tim Matus, Beaver Creek, Minn.; and Cory Meier, Miller.

Susan Quam

Learning to be professional . . .

Learning to be professional is an important part of an engineering education, aside from the technical aspect. Developing good comunication skills; participating in technical societies, campus engineering activities, professional meetings and conferences; and "dressing for success" (in the words of Dean Sander), are all encouraged by the JEC as ways for students to acquire a professional attitude.

In the hopes of increasing student participation in engineering organizations at SDSU, a brochure titled *Experience, Professionalism and Connections* was designed and promoted by the Joint Engineering Council with the assistance of Mary Jo Benton Lee, publicity techniques instructor. We had an incredible response from this year's freshman engineerng class and plan to distribute the pamphlet to upper classmen next fall. We hope other engineering students will realize the personal satisfaction and growth that can result from group participation.

To increase the JEC's visibility in the College of Engineering and on the entire campus, a bulletin board displaying photos of all council members was displayed in the Briggs Library during finals week. Spring semester the display will be in a permanent case in Crothers Engineering Hall.

In November, several JEC members attended an ethics conference at Iowa State University, Ames. The conference theme was "Ethical Dilemmas in Engineering Practice." The focus was on ethical decisions in engineering and discussion of possible solutions. Roger Boisjoly, former project engineer for Morton-Thiokol, presented a detailed explanation of the events that lead up to the space shuttle disaster.

Richard Heitkamp joined me to represent JEC and SDSU at the National Society of Professional Engineers (NSPE) student conference in Atlanta, Ga., in January. We were really proud of the repeated references by Dr. Alvin Meyer, director of NSPE student programs, to the professionalism of South Dakota State University's engineering students.

Susan E. Quam, president
JEC/NSPE student chapter

Engineering stude for donations, job

Engineering students at SDSU are making plans to reach out and touch alumni in the annual College of Engineering phonathon fundraiser, Feb. 20-24. Committees have spent countless hours arranging and handling publicity and promotions. Correspondence for the event is being designed and mailed to alumni. Training sessions for callers and data-base-workers are being conducted. Facilities to house the phonathon and the phone net-work are being booked. There is a committee to set up and take down the phone apparatus. And, there is even a food committee.

Carmen Fink, a civil engineering senior from Delmont, is the student chairperson and Troy Erickson, a mechanical engineering sophomore from Summit, is the student co-chair. Teresa Hein, instructor in physics, is the faculty chairperson.

"The phonathon serves several purposes for the college," says Hein. "We raise money for scholarships and equipment, the students have a chance to talk to alumni about job leads and career goals, and alumni get a chance to talk to students to see what is taking place within the college. But, a very important benefit to the students," Hein says, "is having an opportunity to plan, organize and conduct a major event. They get some hands-on experience in putting together an event like this and they learn a lot in the process."

About 350 students are expected to make calls during the four-night phonathon. About 70 students will work in two and a half hour shifts starting at 6 p.m. each evening.

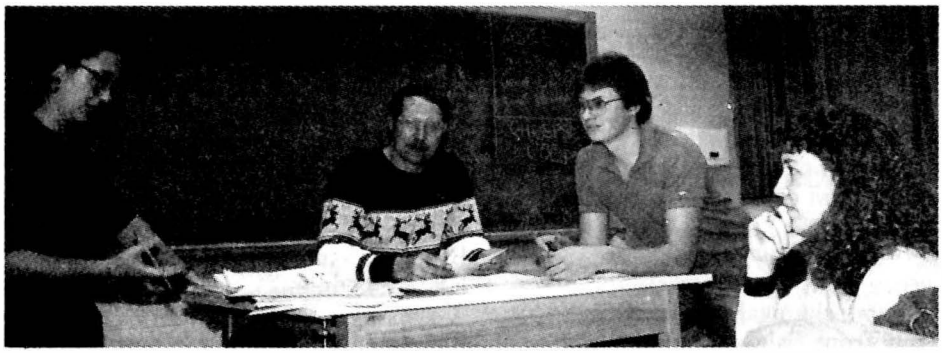
"Each student is learning proper communication skills in order to handle their calls effectively," Hein says.

ıts will be calling alumni eads in Feb. 20-24 phonathon

Carmen Fink

According to Erickson, another feature of the 1989 phonathon is the computerized job bank, which will be tried for the first time this year, to give engineering students job leads within their majors. "In the past, when a caller got a lead about a job during the phonathon, we didn't have an organized way of recording the information. With the computerized system the job information will be readily available for anyone looking for employment. We will have the jobs listed according to majors, electrical, mechanical and so on," Erickson explains.

Erickson says the major goal of the phonothon is to motivate faculty and students to achieve 100 percent success in the fund raising and job search and to encourage alumni to seek matching gifts from their employers. The students plan to top the approximately $50,000 raised last year. "We don't mind working hard to reach our goals," says Erickson.



A phonathon committee planning session: left to right, Teresa Hein, faculty advisor; Gary Anderson, assistant professor of ag engineering; Troy Erickson, phonathon student co-chair; and Kim Johnson, junior math major from Hosmer.

Fink says the communication skills gained from working on the phonathon will help students later in the work place. "All funds raised from the phonathon will be appreciated by students and faculty members, but another plus . . . is the opportunity it gives us to learn additional organizational, communications and human relations skills," she says.

Companies can provide career experience

Students and professionals both benefit when they get together on the job in the SDSU College of Engineering's externship program, during spring break, says this year's chairperson, Stacy Helmann, a junior electrical engineering major from Rapid City. She's now looking for companies and students who want to participate in this year's "EXPERIENCE '89" externship, March 6-10.

"EXPERIENCE '89 involves cooperation from alumni and other friends of SDSU to achieve its goal of providing students with valuable career experience," says Helmann. She urges sponsors and students interested in the EXPERIENCE to contact the College of Engineering at SDSU.

"The program gives students the opportunity to work directly with professionals whose careers parallel their own interests," continues Helmann. "For the student, EXPERIENCE '89 provides insight into job opportunities, an essential aspect of career planning. The program gives professionals a chance to work with, guide and advise students," she says.

Last year, engineering, computer science and math majors spent a week observing professionals on the job at companies like Sencore, Daktronics, Northwestern Public Service, Litton and in state government offices in Pierre.

"This year letters and brochures are being mailed to companies in the SDSU area. Companies responding will be matched with students of similar interests," says Helmann.

The EXPERIENCE externships program is in its third year and is sponsored by the College of Engineering's Joint Engineering Council.

Stacy Helmann

Engineering Exploration Days introduces high schools students to the engineering profession and SDSU

by Troy Erickson and Chris Neuzil

The sixth annual Engineering Exploration Days (EED), March 30-31 at SDSU, will introduce high school students to the engineering profession and feature industrial seminars for college students and professional engineers from a three-state region.

According to Damon Pistulka, a senior mechanical engineering major from Fairfax and general chairperson, the purpose of EED is three-fold. High school students are invited to explore the engineering field through hands-on workshops on High School Day, Friday, March 31. College students can attend industry programs to up-date their knowledge about what's really happening in engineering, and professionals will be introduced to newly developed ideas and information. Those programs are organized as College and Industrial Day on Thurs., March 30. Pistulka says both high school and college students can participate in design and demonstration contests with awards for the winners. Tours of Brookings industries also are on the EED schedule.

Damon Pistulka

Kate Mensch

Kate Mensch, a senior in mechanical engineering from Avon, is EED co-chair. She says a big part of EED is the Distinguished Engineer Awards banquet, Friday, March 31, at 7 p.m., at the Staurolite Inn in Brookings. The program honors two outstanding alumni from the College of Engineering and recognizes the Dean's Advisory Council, a group of engineering executives and professionals who meet annually with the dean "to bridge the gap between engineerng education and practice." Mensch says scholarship recipients and students outstanding for their extracurricular activities also will be honored at the awards banquet.

Students involved in organizing High School Day programs and activities include: Jim Kahler, senior in mechanical engineering from Dell Rapids, high school coordinator; Kelly Harty, sophomore in electrical engineering from Lesterville, program chair; and Eric Moser, junior in engineering physics from Lake Preston, contest chair. Last year 270 high school students participated in EED programs and contests, says Kahler.

This year is the first time the college and professional programs will be held together, says Michelle Clauson, senior in engineering physics from Brookings, who is the college coordinator. Roxane Alley, senior math major from Timber Lake, is the college programs chair. They are working with senior mechanical engineering students, Chuck Runge, Hartford, and Robb Schrunk, Marshall, Minn., who are on the industrial relations committee. The four are arranging the College and Industrial Day programs.

Jenny DeYoung, junior math major from Sioux Falls, is organizing the design and demonstration contest for college students. Electrical engineering majors Susan Quam, a senior from Burnsville, Minn., and Riaz Ali Ahmed, a junior from Brookings, are working on the awards banquet program.

Three students are sharing responsibility for the EED promotions committee. They are Doug Fick, senior electrical engineer from Luverne, Minn.; Forrest Weston, sophomore engineering physics/electrical engineering major from Sioux Falls; and Leland Day, senior electrical engineering major from Onida.

For more information about EED, contact Troy Erickson, promotions committee, at (605) 688-4161.

Troy Erickson, a sophomore engineer from Summit, and Chris Neuzil, a freshman engineer from Papillion, Neb., are both members of the EED promotions committee.

Fick is president of Etta Kappa Nu

Etta Kappa Nu electrical engineering honor society officers for the 1988-89 school are all seniors and include Douglas Fick, Luverne, Minn., president; Leland Day, Onida, vice president; and Susan Quam, Burnsville, Minn., corresponding secretary.

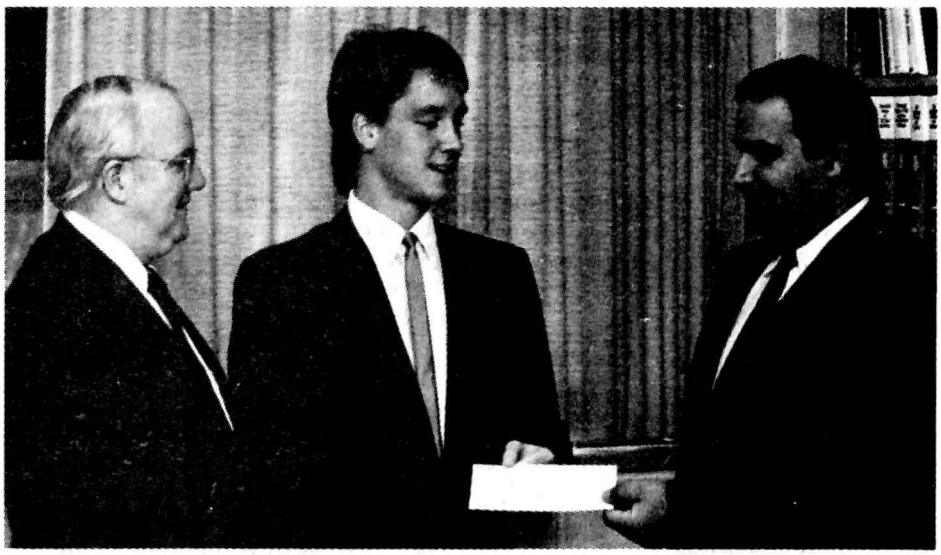
Fick has been been active in University Program Council film committee, Institute of Electrical and Electronics Engineering, and the promotion committee for engineering. Day is secretary of the Joint Engineering Council, a member of Tau Beta Pi, Institute of Electrical and Electronics Engineering and the International Society of Hybrid Microelectronics. Quam is a member of the Chi Omega sorority, president of the Joint Engineering Council, a member of the International Society of Hybrid Microelectronics, and a member of the National Society of Professional Engineers.

ASCE chapters to meet at SDSU

The American Society of Civil Engineers (ASCE) will hold its Midwest Regional Conference at SDSU, March 31 and April 1. According to Charles Tiltrum, associate professor of civil engineering and advisor to the SDSU chapter of ASCE, the annual spring meeting will draw 60 to 80 students from six other universities in Iowa, Minnesota, North Dakota and Wisconsin, in addition to SDSU.

Kristin Yahnke, a junior civil engineering major from Sherburn, Minn., and chairperson of the SDSU chapter, is in charge of organizing the two-day meeting. Friday's activities will include talks by practicing engineers, as well as a presentation by an attorney on liability. Tiltrum says Saturday's featured activity will be a model bridge contest for students, sponsored by the American Institute of Steel Contractors (AISC), with $400 prize money.

Bruce Lear, center, a senior in mechanical engineering from Slayton, Minn., received the first-ever $1,000 scholarship at SDSU from the International Gas Turbine Institute. The presentation was made by Dr. Hamid Hamidzadeh, right, advisor to the SDSU atudent chapter of the American Society of Mechanical Engineers. Dr. Duane Sander, acting dean of the College of Engineering, is at left.



Mary Knudson

Knudson honored as outstanding mechanical engineering senior

Mary Knudson, a senior from La Crosse, Wis., recently received the Outstanding Senior Award from SDSU's Mechanical Engineering Department. The award is presented annually, with selection determined by a vote of the students in the department.

Knudson is a member of the SDSU Student Association Senate and president of SDSU's chapter of Pi Tau Sigma. She served last year as general chairperson of SDSU Engineering Exploration Days. She will be graduated in May.

Three seniors hold mechanical engineering society offices

Pi Tau Sigma mechanical engineering honor society officers for the 1988-89 school year are Mary Knudson, La Crosse, Wis., president; Brian Parliament, Hayti, vice president; and Robert Schrunk, Marshall, Minn., secretary treasurer.

Knudson is a senior mechanical engineering major at SDSU, a member of the American Society of Mechanical Engineers and a Student Association senator. Parliament, also a senior, is president of Tau Beta Phi and a member of the American Society of Mechanical Engineers. Schrunk is a senior, vice president of Tau Beta Pi and a member of the American Society of Mechanical Engineers, Phi Kappa Phi and the Joint Engineering Council.

Bergum helps organize international conference in Italy

by Dan Merritt

Gerald Bergum

Dr. Gerald Bergum, head of the Computer Science Department at SDSU, gave advice to the minister of education of Cyprus and helped put on an international Fibonacci numbers conference in Pisa, Italy—all while on vacation this past summer. Bergum and his wife Shirley spent 42 days in Eastern and Western Europe riding trains, seeing the Alps and visiting Athens, Budapest, Venice, Rome and Paris.

Historic Pisa, Italy—home of the famous Leaning Tower of Pisa—also is the birthplace of Fibonacci, one of the most prominent mathematicians of the 13th century. He was one of the first to bring the Arabic number system to Western Europe at a time when Roman numerals were still in use. He also gave the world Fibonacci numbers—a string of numbers that begins 1, 1, 2, 3, 5, 8, 13, 21, 34, 55 . . .

Beginning at 2, each number is the sum of the two previous numbers. This is called a linear recurrence and it can be found throughout mathematics and in nature, says Bergum. "Fibonacci numbers are related to the outgrowth of branches on trees; they are related to the number of petals on a sunflower. The configuration of stars on a pineapple is normally a Fibonacci number," explains Bergum who has written two books on the numbers and edits an international journal, the *Fibonacci Quarterly.*

Bergum says Fibonacci numbers were harnessed by a speculator named Elliot who used them to predict the stock market. It's called the Elliot Wave Principal. Fibonacci numbers also have been used in the study of the structure of cells and to study population dynamics. A whole drainage system in California was designed using the numbers.

At the international conference, Bergum handled arrangements for scholarly papers, 45 in all, presented on new and significant uses for the Fibonacci numbers. "It went very, very well. It was a very interesting conference," Bergum says.

The Bergums' trip began in Athens, Greece. Bergum flew from there to the nearby island nation of Cyprus to advise new Minister of Education, Andreas Philippou, on how to go about building a university. The country has none. Bergum was quizzed about possibly being a visiting professor on Cyprus for a year. "I said I wouldn't be against or opposed to it, if it would be possible to get away." Bergum co-authored his two books on Fibonacci numbers with Philippou.

After Greece and Cyprus, the Bergums visited several large cities in Yugoslavia including Skopje, Nis, and Eger. Bergum lectured at the University of Nis on American computer science. In the other cities he visited associates with whom he has worked in his capacity as editor of the *Fibonacci Quarterly.*

DeBoer looks at water management in China

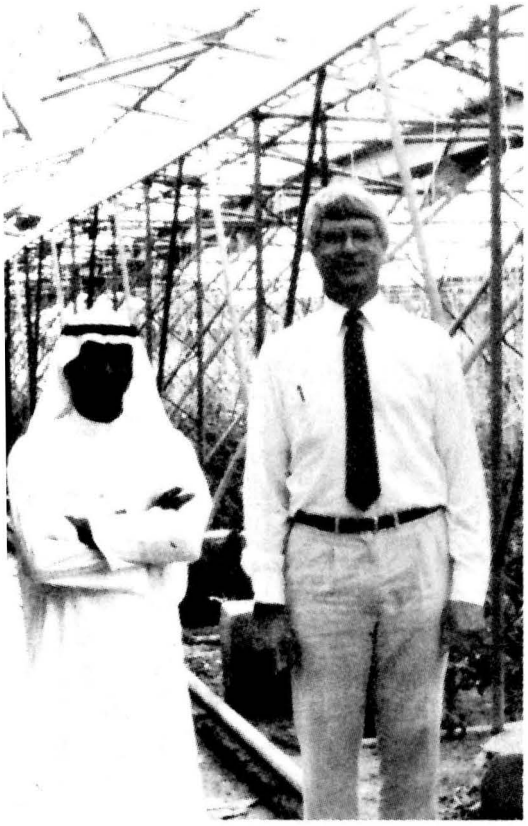
by Carrie Sword

Crowded Chinese city streets, Egyptian deserts, Kuwaiti greenhouses, and flood-ridden farms in Pakistan were all part of Dr. Darrell DeBoer's experiences during a professional development trip to Asia and Europe, Sept. 7 to Oct. 17, 1988.

DeBoer, a professor of ag engineering at SDSU, also toured farms and public works in China and attended the International Conference on Irrigation System Evaluation and Water Management at Wuhan, China. He met with SDSU alumni in Malaysia and Kuwait, visited engineers in Egypt and Pakistan, and made a side-trip to the Agriculture University at Wageningen, Netherlands.

One of DeBoer's first stops was at Wuhan University of Hydraulic and Electric Engineering. He gave a paper titled "Evaluation of Low Pressure Spray Sprinklers," the result of eight years research at SDSU. It showed that energy-efficient, low-pressure sprinklers create water runoff and lower crop yields, but those problems can be eliminated by using modified tillage methods. DeBoer worked on the project with Dwayne Beck, associate professor of plant science; Alan Bender, assistant professor of agricultural engineering; Kenneth Stange, assistant professor of agricultural engineering; Robert Kohl, professor of plant science; and several undergraduate and graduate students.

DeBoer heard presentations of about 75 papers during four days. On the fifth day, conference participants went on a field trip. "We basically got a review of some of the things the Chinese were trying to do as far as . . . irrigation and drainage. Their irrigation technique is quite basic and primitive. They use gravity or surface irrigation extensively. There's a lot of hand labor, with



Dr. Darrell DeBoer toured a "glass house" with Khalid Al-Masbahi, head of the Soil and Water Division of the Kuwait Agricultural Affairs and Fish Resources Authority. Research at the greenhouse focuses on hydroponics, says DeBoer.

nd the Middle East

shovels used to control and guide water flow. They also use water buffalo as a power source," he says.

A former president of Wuhan University expressed interest in starting a faculty exchange with SDSU for those involved in soil and water engineering. DeBoer also met with a coordinator of university faculty exchanges at Shanghai Cultural Information Office. "The Chinese are very interested in exchanges and getting their people to other countries . . . They're hungry to find out what the West is doing," he says.

During a brief stop in Kuwait, DeBoer talked with top officials in agriculture and natural resources departments and visited greenhouse research facilities. He also met with two SDSU alumni, Mohamad Barakat and Husam Al-Dibaki.

DeBoer consulted with agricultural engineering faculty at the University of Pertanian in Malaysia and had dinner with ten SDSU alumni there, including Fabillah Ibrahim, M. Ghazali Kassim, Ahmad Zamhuri, Siti Hajar, Dzulkifli Bin Abu Bakar, Abdul Halim A. Sharif, Wahid bin Mohamad, Mohamad and Roslina Shaber, and Rajasegaran Ponniah.

A sojourn in Egypt led DeBoer to the Nile delta region north of Cairo, where the U.S. Bureau of Reclamation is using conservative design criteria for subsurface drains in irrigated agriculture.

"We visited a research area which could have a significant impact on the design of subsurface drainage systems in the world . . . Researchers in the USA have produced results which indicate that the conservative position of the Bureau is not always justified. The results from the Egyptian field study could challenge the conservative design approach," DeBoer states in a report on the trip.

During his stay in Pakistan, record flooding of the Ravi River prevented travel to research stations and drainage system construction sites. Nevertheless, DeBoer says, it was valuable to visit Pakistan because it has the largest concentration of irrigated lands of any region in in the world. He met with several American engineers who work there, including Eugene Doering, a 1958 SDSU graduate.

At the Agriculture University in Wageningen, Netherlands, DeBoer exchanged ideas with faculty whose research projects are similar to projects at SDSU. They gave him a copy of a computer model that simulates movement of water to and from underground drain lines. "I plan to evaluate this model with field data which we collected at the Redfield Research Farm. I also received copies of professional papers which should be of value to me in my teaching and research program," says his report. DeBoer views Wageningen as a possible location for his next sabbatical leave.

Throughout his trip, DeBoer distributed literature about the SDSU Office of Remote Sensing's "Visiting International Scientist Program" and talked with interested persons about graduate school opportunities at SDSU. He plans to forward graduate school literature to several people and pursue the possibility of faculty exchanges with Chinese and Dutch universities.

At a government office in Zagzig, in the Nile Delta region of Eygpt, DeBoer conferred with civil engineers who work for the Drainage Research Institute based in Cairo. Zagzig is at the heart of an agricultural development area north of Cairo.

Faculty development program producing doctoral degrees

by Carrie Sword

The College of Engineering is enjoying the fruits of its investments as participants in the faculty development program return with doctorates and start new projects. Administrators have been trying to assure a strong future for the college by encouraging young faculty members to pursue doctoral degrees and then return to SDSU.

Delvin DeBoer took on new leadership when he returned this fall with doctoral work in civil engineering at Iowa State University almost complete. "He's been responsible for upgrading the sanitary engineering laboratory, and he's done an excellent job of pushing to get it remodeled. The lab really is in excellent shape right now," says Dr. Dwayne Rollag, head of the Civil Engineering Department.

"He has also become the faculty coordinator for our cooperative (graduate) program with the city of Brookings in operating the (wastewater) treatment plant on nights, weekends and holidays," adds Rollag. In addition, DeBoer started a research project involving a Brookings industry, in which he'll try to reduce problems with waste production by recovering materials that can be recycled from waste streams. "He's been a very dynamic individual since he returned to campus," says Rollag. DeBoer earned a master's in civil engineering in 1980.

After Charles Remund returned from the University of Nebraska with a doctorate in engineering, he began developing a special library. "I put him in charge of building up our computer-aided facilities," says Dr. Hassan S. Ghazi, head of the Mechanical Engineering Department. Remund has been studying what kinds of hardware and software are available as teaching tools.

"I want to have a library of software built, put it next to the PCs and assign homework to the students, saying 'Solve this problem using this software'," says Ghazi.

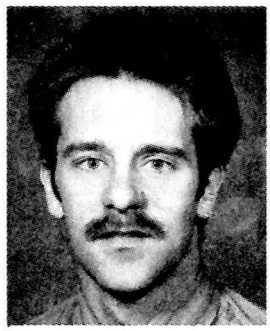
Remund teaches computer-aided design, thermodynamics and design of thermal systems. He earned a master's in agricultural engineering from SDSU in 1983.

Frank Kornbaum returned to SDSU this fall with a doctorate in electrical engineering, including a bio-engineering option. "He's now involved in (teaching) bio-engineering elective courses, which he was not involved in before . . . Of course we expect research to develop out of his bio-engineering interest also," says Dr. Virgil Ellerbruch, head of the Electrical Engineering Department. Kornbaum earned a master's in electrical engineering from SDSU in 1984.

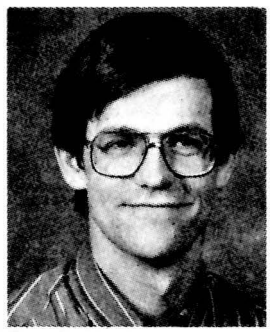
Dennis Helder returned to SDSU this fall and has been working half-time until he finishes a doctorate in communication systems at North Dakota State University, Fargo. Ellerbruch says Helder is working to develop a research relationship with EROS Data Center. He earned a master's in electrical engineering from SDSU in 1985.

Kurt Bassett came back this fall and resumed his former position at SDSU while working to complete a doctorate in engineering at NDSU. "Since Kurt returned, he has been heavily involved in organizing the programs for the ASEE (American Society of Engineering Educators) regional meeting, which is being hosted by SDSU in the fall of 1989," says Dr. Duane Sander, acting dean. "He's been very dedicated to developing coursework for his assigned courses, and he's well liked by the students. We're going to try to reduce his load so that he can try to complete his thesis work as soon as possible," Sander says. Bassett earned a master's in agricultural engineering at SDSU in 1983.

Delvin DeBoer



Charles Remund



Dennis Helder

Kurt Bassett

Hamidzadeh . . .
'The students think very highly of him'

by Dan Merritt

He received his doctorate from the University of London in England and has done research on underwater weapons for the British Ministry of Defense. In the United States, he's been nominated for two prestigious American Society of Engineering Education (ASEE) regional awards. He's Dr. Hamid R. Hamidzadeh, who, since 1986, has been an associate professor of mechanical engineering in SDSU's College of Engineering.

"We feel he is a good addition to the department. He's an excellent instructor. The students think very highly of him; he's very helpful, he's knowledgable," says Mechanical Engineering Department Head Dr. Hassan Ghazi. "He's involved in research and in consulting for South Dakota businesses and manufacturers," Ghazi adds.

Hamidzadeh is also the faculty member who advises students involved with the robotic arm project, one of the more complex projects of the Student Originated Research and Design (SORD) program. "They are now redesigning it, improving the performance," under Dr. Hamidzadeh's guidance, says Ghazi. As of late last year, it was hoped the arm could be linked to a computer and run by a computer program for the first time ever.

Hamidzadeh graduated with a bachelors of science degree from Arya Meher University in Tehran, Iran, in 1974. He then left his homeland and has only been back once to visit. In 1987, he gave up his Iranian citizenship and became a naturalized American citizen. With Iran under the rule of the Ayatollah Khomeni, he says he has no plans to go back. He received his masters in 1975 and his doctorate in 1978 from the Imperial College of Science and Technology, University of London. The doctorate came after three years of research on soil-foundation interaction. From 1978 to 1982, he taught and conducted post doctoral research for the Admiralty Underwater Weapons Establishment of the British Ministry of Defense.

Hamidzadeh joined the Department of Mechanical Engineering at the University of Maryland, College Park, Md., in 1982, as a lecturer and associate member of the graduate school. He also was lecturer for the Department of Engineering, University of Maryland, Baltimore. In 1983, he joined the faculty of the Department of Mechanical Engineering, University of Southern Colorado, Pueblo, Colo., as an assistant professor. While there, he was nominated for two ASEE regional awards including Outstanding Engineering Teacher and the Dow Young Outstanding Faculty Award.

Hamidzadeh has had two papers published since his doctorate. One, on "Surface Vibration of an Elastic Half-Space," was presented in 1986 at the Southeastern Conference on Theoretical and Applied Methods, at the University of South Carolina, Columbia. The other, "Dynamics of Foundation on a Simulated Elastic Half-Space," was part of the International Symposium on Geotechnical Engineering of Soft Soil, in Mexico City, Mexico, in 1987.

At SDSU, Hamidzadeh is the advisor for graduate mechanical engineering students and is currently involved in preparations of three thesis papers: "Coupled Vibration of Foundations," "Effect of Blast on Buildings," and "Vibration of Cylindrical Structures." Hamidzadeh is also in his first year as faculty advisor to the SDSU student chapter of the American Society of Mechanical Engineers. He teaches Kinematics and Dynamics of Machinery, Advance Mechanics of Materials, Machine Designs, and Automatic Controls.

Dr. Hamid Hamidzadeh, at right, advises students involved with the robotic arm, one of the more complex projects of the Student Originated Research and Design (SORD) program. From left to right, senior mechanical engineers Jon Ness, Kasson, Minn., and Brian Parliament, Hayti.

Prasuhn active in engineering societies

He's starting work on a national ASCE committee . . .

Dr. Alan Prasuhn recently started work on COSOPO, a national committee of the American Society of Civil Engineering. At the same time, his term as director of District 16 and as a member of the national board of directors drew to a close.

"In spite of the privilege of attending board meetings and involvement in the decision-making process at the top, the most pleasant part was visiting around the district and making friends with a large number of civil engineers and students," he says.

Prasuhn oversaw activities of the district for three years, taking time to periodically visit every section, branch and student chapter in Iowa, Missouri, Kansas, Nebraska, South Dakota, Colorado and Wyoming. "I was gone about 40 percent of the time," he says.

He represented the district on the national board of directors, served on several national committees, and attended workshops, conventions and other events.

His two-year term on the Committee on Society Objectives, Programs and Organization (COSOPO) will involve an overall review of the structure and functioning of ASCE.

The ASCE has about 107,000 members nationwide, and it's the largest publisher in the world of technical civil engineering materials. The society has one section in South Dakota, including a Black Hills branch and an eastern branch.

A professor of civil engineering, Prasuhn has been involved with the ASCE since 1962. He currently teaches hydraulic engineering, advanced hydraulics, and fluid mechanics at SDSU.

Dr. Alan Prasuhn, professor of civil engineering, is actively involved in the American Society of Civil Engineering at the national level and in the American Society of Engineering Educators at the sectional level.

. . . and organizing an engineering educators meeting

The North Midwest Section of the American Society of Engineering Educators will hold its next annual meeting at the Holiday Inn Convention Center in Brookings, Oct. 15-17, 1989. A planning committee has made an initial call for papers and selected the theme, "Service, Design, Solutions, Understanding."

Dr. Alan Prasuhn, professor of engineering at SDSU, who recently was chosen North Midwest Section Chairman for the coming year, is in charge of organizing the convention. His planning committee includes Dr. Duane Sander, Kurt Bassett, Louis Skubic, and Rod Devine. Bassett is also chairman of a program committee organizing presentations and events. Prasuhn anticipates the convention will include an effective teaching institute, an executive committee meeting, and a forum for speakers to address current topics, as well as banquets, business meetings, and special breakfasts. As many as 120 people will attend, including about 70 out-of-town visitors.

Prasuhn says the North Midwest Section of the society includes members in South Dakota, North Dakota, Wisconsin, Iowa, Northern Michigan, Minnesota, and Manitoba, Canada.

Faculty notes . . .

Dr. Jan Vandever, associate professor of mathematics, was one of five SDSU faculty members to receive the F.O. Butler Award for exceptional individual achievements, Dec. 17, during winter graduation exercises at SDSU. Vandever was recognized for service to students. The five, $500 cash awards are given annually.

Charles Tiltrum, associate professor of civil engineering, was one of three South Dakota land surveyors who joined 50 other surveyors from across the nation in a "minimum passing score" workshop at Clemson, S.C., last June. The surveyors worked the April 1988 examinations and then participated in a procedure to determine the passing point for each item on the exam. The final report of this workshop will determine the cut-off score for future exams.

Tiltrum also held a one-day land surveying seminar in Sioux Falls, Dec. 9, attended by about 45 to 50 private surveyors, government employees, technical school students and students from SDSU.

Dr. Alexandros Moutsoglou, associate professor of mechanical engineering, will publish two papers in 1989 issues of the *Journal of Thermophysics and Heat Transfer*. One is "An Inverse Convection Problem," and the other, co-authored with Y.H. Wong, is "Convection-Radiational Interaction in Buoyancy Induced Channel Flow."

Dr. Kampur Nikpur, visiting professor of mechanical engineering, has published two papers, "Local Compliance of Composite Cracked Bodies" and "Dynamic Mechanical Properties of Toughened Polystyrene," in recent issues of *Composite Science and Technology*.

Dr. Terry Forest, assistant professor of civil engineering, was appointed acting head of the Department of General Engineering, effective July 1, 1988. As part of his civil engineering responsibilities, Forest conducted a soils and foundations conference in Sioux Falls, Dec 8., for private consultants, contractors, state engineers and highway engineers on critical soil properties, soil testing, geotechnical computer applications, and the application of geographic information systems (GIS) to geotechnical engineering.

Dr. Dwayne Rollag, professor and head of the Department of Civil Engineering, attended a meeting of the board of directors of the National Society of Professional Engineers (NSPE) in Altanta, Ga., in January. He is serving a three-year term on the board. Rollag says NSPE is taking action on an international licensing system for engineers, and they now have a 25-minute ethics in engineering video available for use by engineering schools.

Jan Vandever

Dwayne Rollag

Virgil Ellerbruch

Ellerbruch named national president of Eta Kappa Nu

Virgil Ellerbruch, professor and head of the Electrical Engineering Department at SDSU, has been elected national president of Eta Kappa Nu electrical engineering honor society.

According to Ellerbruch, members are elected to Eta kappa Nu from among junior and senior undergraduate electrical engineering majors. Graduate students are eligible for membership and others may become members while engaged in their professional work. Eligibility depends on scholarship, personal character, voluntary services and distinguished accomplishments

According to Ellerbruch, Eta Kappa Nu has grown steadily since it was established at the University of Illinois in 1904. The organization has more than 125,000 members in more than 150 chapters. "Eta Kappa Nu continues to grow and to influence the progress of the electrical engineering profession through high ideals about scholarship, character and service to our fellow man," Ellerbruch says.

ALUMNI

J. Lohr

by Lois Hatton

One of California's top winemakers is a 1958 SDSU civil engineering graduate. Jerry Lohr, 51, who calls himself a former country boy from Clark, South Dakota, was recently back on campus as a newly elected member of the board of directors of the SDSU Foundation.

Lohr also made time during his SDSU visit to present a wine tasting seminar for restaurant management students on cost control of beverages and to lecture to an entrepreneurship class on starting and/or running a successful business. The entrepreneurship class was taught by Dr. Delores Kluckman, professor of home economics education, and the students represented all disciplines and age groups, including several majors from the College of Engineering. Some own businesses while others are merely thinking about it. Lohr told the students about his four-point success program which helped him to become one of California's top winemakers.

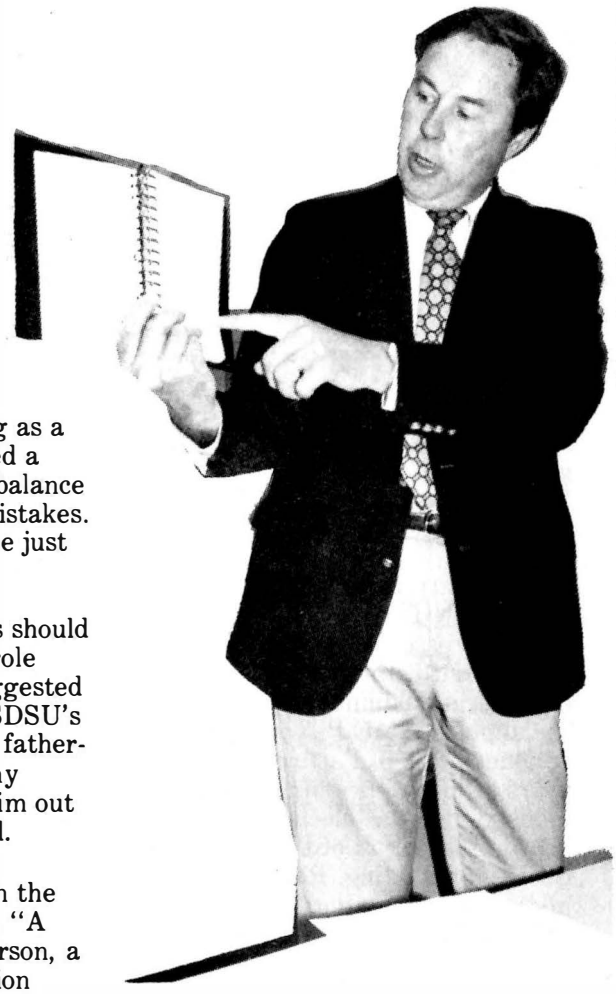
"I decided I would do my thing in life without ever having to work for somebody else," said Lohr. His four point success program was based on getting a good education, learning about investments, learning about running a business and starting a business of his own.

After earning his B.S. degree in engineering from SDSU, Lohr did graduate work at Stanford University in California and served as a research scientist in the Air Force where he earned the rank of captain. Then, after achieving success with his partner, Bernie Turgeon, as one of the largest builders of custom homes in Santa Clara, California, Lohr started his winemaking business in 1972 by planting a 280-acre vineyard. Two years later he and his partner bought an old brewery and converted it into a winery.

According to Lohr, his winery is one of the largest in California, selling its wines in 44 states, Japan and several of the Scandinavian countries, under the company label J. Lohr. The winery produces three million bottles a year and is supplied by his five vineyards from the coastal and interior areas of California. Lohr prefers to grow his own grapes because he is able to apply some of the knowledge gained while helping his father on the family farm in Clark County.

The J. Lohr winery is producing 2,500 cases of wine for South Dakota's 1988-89 centennial celebration. Because labels sport the centennial logo, the state centennial commission will receive a royalty for each bottle sold. It isn't the first time Lohr's wine has helped South Dakota. Sales of other special bottlings have benefited SDSU and the South Dakota Pheasant Congress. Jeff Nelson, director of development for SDSU, says Lohr and his business have been extremely generous in their support of South Dakota State University.

Robert Wagner, president of SDSU, and Walt Conahan, director of the SDSU Foundation, participated in Lohr's wine tasting seminar.



Jerry Lohr, 1958 civil engineering graduate

Lohr chose winemaking because it offered him the chance to have a vertically integrated business. "We grow the grapes, make the wine and market the product," said Lohr. And, he decided a partnership with Bernie Turgeon would be better than a one-owner business.

"Bernie complements me. If you are going to get a partner," Lohr advised SDSU students, "choose someone with skills and experiences in areas you lack. You don't need someone exactly like yourself who will always agree with you. You need someone who questions your decisions and makes you think of other options," Lohr said.

He advised against operating as a lone entrepreneur. "You need a partner to act as check and balance so you won't make foolish mistakes. Sometimes you need someone just to say 'no'."

A person going into business should find a mentor to serve as a role model and as an advisor, suggested Lohr in his presentation to SDSU's entrepreneurship class. "My father-in-law was my mentor and my financial partner. I bought him out a few years later," Lohr said.

Lohr operates his business on the Stanford University formula. "A business needs a financial person, a marketing person, a production person, a research and development person and an administrative person. I have developed as the marketing person and the financial person in our business," he said.

"When I started out I wasn't a good salesman, but I developed human relations skills and the ability to speak and present information as I went along," Lohr told the class. He also gave the students some pointers on financing a business.

Jerry Lohr compared low-, medium-, and high-priced wines during a presentation at the Brookings Holiday Inn.

Make as careful an analysis as you can of what it will take to start a business, then double or triple that figure. It always takes more to start up a business because of the unexpected things a person doesn't have control over," Lohr said.

And, Lohr stressed, "people are more important than markets. If you are thinking about expanding a business, get good people to help you. The quality of the people who work for you is more important than any other factor in your success," said Lohr.

Kluckman invited Lohr to speak to her students because he is a South Dakotan who has achieved success. "He will serve as our role model," she told the class at the end of Lohr's lecture.

Listening to Lohr's presentation to the SDSU entrepreneurship class were, left to right, Beverley Lundberg, associate professor of computer science; Delores Kluckman, professor of home economics education; LaDell Swiden, director of the Engineering and Environmental Research Center in the College of Engineering; Duane Sander, acting dean; and Mrs. Jerry Lohr.

Alumni notes . . .

Clarence Peterson, AE '49, is the general manager of the Lake Region Cooperative Electrical Assoc. in Pelican Rapids, Minn.

Neil R. Patterson, ME '51, director of integrated systems at the Trane Co., LaCrosse, Wis., was recognized as the first distinguished mechanical engineering alumnus of SDSU at the annual ASME/Pi Tau Sigma banquet, Nov. 5. Patterson has 33 years of experience in the HVAC industry. He was elected to the board of directors of the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) in 1985 and received the ASHRAE distinguished service award in 1988.

Neil R. Patterson

John Neuberger, AE '58 and '59, is the state executive director of the Nebraska Agriculture Stabilization and Conservation Service (ASCS).

Rollie Jensen, ME '60, is senior vice president for power supply for Northern States Power Co., in Minneapolis, Minn.

Vance Alsaker, AE '70 and '72, is a project engineer wth CASE IH in Fargo, N.D.

Doug Mertz, EE '71, is director of corporate strategy for Northern States Power Co., in Minneapolis, Minn.

Bob Schulte, EE '75, is general manager for South Dakota for Northern States Power Co., in Sioux Falls.

Kenton Kaufman, AE '74 and '76, is a research fellow with the Mayo Clinic in Rochester, Minn.

David Yexley, AE '77, is a product manager with Butler Manufacturing in Kansas City, Mo.

Philip Bogner, AE '78, is a design engineer with Melroe Co., in Gwinner, N.D.

Robert (Arlen) Heathman, AE '78, is a structural engineer with SJS Engineering in Oronoco, Minn.

Terry Uhl, CE '78, is a sales representative for Master Builders, Inc., a Sandoz Ltd. company, Cleveland, Ohio. His territory is the Plains Region which includes greater Kansas City and parts of Kansas and Missouri. He works with ready-mix concrete producers, engineers, architects and contractors in developing specialized concrete applications. Uhl has a master's degree in civil engineering from the University of Kansas and an MBA degree from Rockhurst College in Kansas City.

Dr. Robert C. Schmidt, MATH '79, assistant professor of mathematics at SDSU, and **Jim Coyle**, PHY '80, were members of a team at Iowa State University which, among other things, investigated the conversion of existing FORTRAN software into a form useable on today's supercomputers. They are co-authors of a paper published in *Supercomputer*, November 1988. The work was supported by a grant from National Advanced Systems and Computer Sciences Corporation. Schmidt is continuing his research at SDSU. Coyle is completing his doctoral dissertation at ISU.

Dr. Gerald Blazey, PHY '80, returned to SDSU this past year to lecture concerning his work in atomic physics. He is on the faculty of the University of Rochester, Rochester, N.Y., and is stationed at the Fermi Laboratory in Batavia, Ill., where he is experimenting on high energy physics.

Glen Vortherms, AE '83, and **Ron DeGroot**, AE '85, are hydrologists with the Maricopa Co. Flood Control District in Phoenix, Ariz.

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 June 1-Nov. 30, 1988

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)

Harvey Owren, BSEE 1941, has been interested in improving instructional methods in engineering and has provided the funds to conduct a course called the Harvey Owren Principles of College Teaching for Engineers Seminar.

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

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

1939
Larson, Lorys

1941
Wytock, Florence & Harry

1944
Brandt, Roy G.

1947
Olson, Gordon & Dorothy

1958
LaVallee, Ronald

1959
Blaze, Francis & Beverly

1965
Schrag, Robert

1966
Roitsch, Franklyn & Carolyn

1983
Bocklund, Lori

Friends
Graetzer, Hans & Miriam
Singer, Charles
Yocum, Kenneth

ENGINEERING CENTURIONS (Gifts from $100 to $199)

1923
Anderson, Marion

1928
Sundstrom, Raymond & Helen

1938
Frick, Gerald & Nanette

1939
Christoffersen, Lee & Lucille

1947
Lubinus, Irene
Waltz, Wayne & Ruth

1948
Roberts, Leslie & Wanda
Trapp, Lansford

1949
Mann, James
Minehart, Donald
Severtson, Donald

1950
Bertram, August
Christianson, Kenneth
Gillen, Lawrence

1953
Hanson, John
Miner, Harlow & Carol

1955
Schreurs, Raphael

1960
Halverson, Gladys
Harden, James

1962
Schulte, Richard & Rejean

1965
Kurtz, David & LaVonne

1966
Mentele, James

1969
King, Francis

1972
Moshier, Clarence & Ida

1975
Mortimeyer, Barry & Wanda

1976
Strandell, William

1977
Tvinnereim, Curtis

1980
Nuese, Gerald

1983
Clemen, William
Ulrich, Scott

1984
Wahlstrom, Stuart

Friends
Erickson, Lewayne & Nancy

ALTRUISTIC ALUMNI (Gifts up to $99)

1925
Berggren, Thelma

1927
Manning, Melvin

1929
Gastler, George & Mildred

1934
Grothem, Frederick

1936
Kulish, Leonard
Sauder, Harlow
Svec, Harry & Lillian

1937
Bentson, Robert

1939
Lintvedt, Maynard
McPhee, George
Pearson, David & Janet
Roda, Vern

1940
Aho, Alvar & Marvel
Emmerich, James
Rude, Vernon & Marian
Shubeck, Fred
Sivers, Cora
Williams, Perry & Dora Mae

1941
Barthle, Robert C.
Dirksen, Robert

1942
Arms, Milo
Bonzer, Boyd & Irene
Sanderson, Elmer & Ruth
Sharpe, Douglas
Storry, Junis & Laurel

1943
Edwards, Eulys
Wiersma, John & Leona

1944
Miller, Clyde
Nelson, Frances & Lawrence
Randall, Bruce & Lucille
Sahs, Robert

1947
Ardery, James
Clefisch, Glen
Williamson, Edward & Cathy

1948
Anderson, Marilyn & Joe
Hunt, Eugene
Moe, Dennis & Hazel
Persinger, Dale & Della

1949
Dornbush, James & Maxine
Housiaux, Glenn
Johnson, Elliott
Knabach, Wayne
Moldenhauer, William & Catherine
Paynter, Wilford

1950
Graham, Robert & Joyce
Johnson, Donald
Miller, Glenn
Mills, Harvey & Midge
Whitaker, Emilie A.

1951
Peterson, William & Carol
Wyman, Kenneth

1952
Conahan, Walter & Marjorie

1953
Hauge,Ted & Janice
Jarrett, Ronald
Tolstedt, Vern & Leona

1955
Hamann, Donald
Marshman, John
Tobias, Thomas

1956
Brotsky, Robert & Eleda
Denholm, Frank
Johnson, Stewart & Mary Anis
Jones, Harry & Helen
Nelson, Clarence & Kay
Severson, Wayne

1957
Sears, Ralph
Waby, Conrad

1958
Davies, James
Franzen, Kermit
Pearson, Kenneth
Peterson, Darcy
Rittershaus, Fred & Ardyne
Stribley, Gary

1959
Blesi, William
Houlihan, James
Rowe, Larry
Sjogren, Arden

1960
Creel, Roger
Eidem, Joseph
Kuhns, Richard
Prew, Duane
Tufty, Lyle & LaVonne
Wimsatt, James

1961
Buseman, Jerald
Isom, Arthur
Nagelhout, Maynard & Sharon
Nereim, Allan
Odland, Gary
Peterson, Wayne
Schlenker, Richard & Marlene
Swiden, LaDell & Phyllis
Tande, Paul

1962
Carlson, James
Patrick, Donald
Wolles, Walter

1963
Anderson, Daryl & Gwen
DeBlonk, Donald
DeRoos, Roger
Green, Roger
Nordstrom, Dennis
Shank, D. Boyd & Clarice
Trimble, Vernon

1964
Kelly, Donald & Lynn
Leitheiser, Paul
Packard, Douglas

1965
Danielsen, Richard & Sherry
Gannon, Thomas & Marilyn
Haffield, Norman
Parrish, Paul
Woods, Thomas

1966
Buri, Lynn
Hartmann, Gary
Hegg, James & Suzanne
Keen, David
Radtke, Gary
Rollag, Dwayne & Helen
Weddle, Laurence

1967
Bartels, Keith & Glynn
Hegg, Richard
Kelton, Keith & Beverly
Pedersen, Richard
Sigl, Arden & Lavonne
Sumner, John

1968
Haug, Wayne
Heeren, Jerome
Hesla, J. Peter & Mary Ann

1969
Aamold, Carrol
Larson, Merwyn
Roth, Thomas & Lynn
Schweitzer, Steven & Mary
Tschakert, Carol

1970
Bender, Gayland
Boice, Duane
Fergen, Joseph
Morgan, James & Dorothy
Skubic, Louis & Mary Ann
Snapp, Robert
Sundet, John & Rebecca
Tulson, Burton

1971
Boettcher, Robert & Crystal
Hegge, Ronald & Margaret

1972
Andersen, Thomas & Susan
Crawford, Robert
Forest, Terry & Debara Sue
Hellickson, Martin & Beverley
Holzbauer, Owen & Edith
Roe, Thomas
Tiltrum, Charles & Karon
Voelzke, Vernon & Cathrene

1973
Johnson, Judith

1974
Dreesen, Charles
Feind, Rand
Renner, Robert

1975
Dokken, Ronald & Peggy
Granquist, Lee
Jans, Dale
Larsen, Floyd
Melstad, James & Vida
Weinsmantel, Cecil

1976
Cramer, Jay
Ewy, Keith
Peters, Lyle

1977
Limberg, Edward
Schultz, Bradley & Laurie
Sutera, Steven

1978
Bartels, Daniel
Baumberger, Patrick
DeBoer, Delvin
Lee, James
Leifernan, Peter
Pierson, Daniel
Smith, Michael

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1985
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Thompson, Keith
White, John

1986
Doll, Timothy & Michele
Skogstad, Keith
Swartout, Douglas
Wingert, Ann

1987
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Friends
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Wyar, Donald & Mary Elaine
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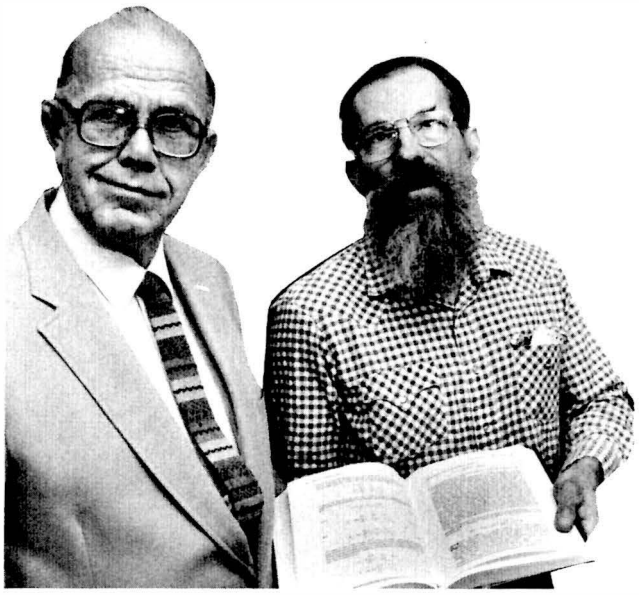
Miron's textbook to be sold at SDSU bookstore

by Lois Hatton



Dr. Don Moore, associate professor of engineering, left, and Dr. Doug Miron, Amdahl Distinguished Professor of Engineering, look over Miron's newly published textbook. Moore will be using the book to teach a senior-level SDSU course in lines systems control.

The Student Association Book Store at SDSU will soon have a textbook from a major book publisher written by one of the university's own, Dr. Douglas Miron, professor of electrical engineering.

Miron's book, *Design of Feedback Control Systems* published by Harcourt, Brace, Jovanovich, Technology Division, will be used on campus for EE 415, a senior-level electrical engineering course in lines systems control. The class will be taught by Dr. Don Moore, associate professor.

According to Miron, his book "supports a first course in control systems for senior students in engineering. It concentrates on feedback control systems describable by linear, continuous, time-invariant differential equations."

He says a student using his book should have access to a software package, either on a mainframe or micro computer, which will do the various calculations and plots discussed and presented in the text. "The presence of personal computers, terminals to mainframe, and 'workstations' in school and industry makes it necessary to emphasize ways to test the results of computation even more than in the past," says Miron.

"I not only expect the student to use computing systems for plots and calculations, I take many opportunities to point the way to checking results," he adds.

The textbook has received good pre-publication reviews from several engineering professors who reviewed it in the manuscript. Robert Egbert, Wichita State University, said a major strength of the text is the emphasis on design. "I find that the author has done an outstanding job of stripping away much of the extraneous material that seems to be present in many other introductory texts, especially in the early chapters, and giving a straightforward, well-focused, exposition of the basics of feedback control systems," Egbert wrote in his review.

Robert Van Nerys, Grove City College, also reviewed the book. "As I read this manuscript, I continually found myself thinking or saying, 'Good! How apt! Wish I'd thought of that!' . . . I could go on and on. This is not my usual reaction to textbooks, believe me; I am usually very critical," wrote Van Nerys.

Miron says his book, which has an estimated retail price of $40, will be sold at many colleges where the course is offered. It probably will sell for about $36 at the SDSU bookstore because they have a low mark-up.

Others who are interested in purchasing the book can call a toll free number, 1-800-237-2665, and ask for the sales division. The first 5,000 copies of the book were to be available in mid-January, according to the publisher.

Miron, a graduate of Yale University, New Haven, Conn., earned his bachelor and master's degrees in 1962 and 1963, respectively. He received his Ph.D. degree in engineering from the University of Connecticut in 1977.

Miron has taught at SDSU for 10 years and currently is completing his second year as the Amdahl Distinguished Professor of Engineering. This gave him one quarter release time from his university responsibilities to complete his book. The Amdahl Professorship is funded through an endowment to the SDSU Foundation by Gene and Marian Amdahl. Amdahl, a 1948 graduate of SDSU, is a leader in computer development world-wide.

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