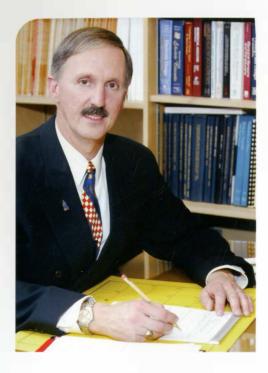




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South Dakota State University



# Dear ALUMNI AND FRIENDS,

We are finishing another outstanding year for SDSU and the College of Engineering! This issue includes many interesting articles and news stories that will show you why 2007-2008 has been another exceptional year for our students and institution.

By the time you receive this issue, we will have already formally celebrated the start of construction on our newest engineering building south of Harding Hall. Much progress has been made during the year, and in this issue you will learn how this project got its start from some very generous friends of the College of Engineering.

You will also read about our record year for research funding from the Department of Defense in the areas of alternative energy and structural health (fatigue) monitoring.

We have a large number of feature articles on our students in this issue, including stories on our highly successful recruitment camps, growth and impact of scholarships, student-athletes, and standout student achievers.

One of our most significant accomplishments in 2007 was receiving the official word from ABET that three of our programs received their first program accreditations. We include an article that explains the significance of this accomplishment.

You surely remember the collapse of the I-35W bridge in Minnesota, but you may not have known that one of our Civil and Environmental Engineering professors, Arden Sigl, found himself in the spotlight as the result of that disaster. You'll have to read the rest of the article to see why.

Another historic event for the college this year was the official charter of our first sorority for College of Engineering majors, Alpha Omega Epsilon. Read how the exceptional leadership of a small group of women made this happen and why it is so significant for the college.

This is the annual issue in which we highlight our donors, as you can see from the impressive list. I want to thank all of you for your generosity and encourage your continued support. If you are not already a member of our Dean's Club, please consider becoming one and helping us continue to produce the best graduates in mathematics, engineering, science and technology. Your generous financial support is part of the lifeblood of the College of Engineering.

I hope you enjoy this latest issue and will drop us a line or stop in for a visit if you're in our area. Remember, Jackrabbits are always welcome!

> Lewis Brown, Ph.D. Dean of Engineering

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# Impuise Spring 2008



# Features

2

# Department of Defense research

An alternative power technology project is part of a \$7.8-million DoD grant awarded to the college.

## 4 Weapons wear and tear

A storage room has been renovated to do fatigue testing on military weapons.

# 6 Staying at State

An increasing number of alums are finding there is no place like their alma mater to get an advanced degree.

## 8 Record enrollment

Math, mechanical engineering, and construction management are among the programs helping to push the college to record enrollment.

# 10 A new home

Fund-raising has not finished, but the steel is in place for a new electrical engineering and computer science building.

#### 12 Veterans Club reactivated

Sophomore civil and environmental engineering major Claire Garry took the initiative to bring the SDSU Veterans Club back to life.

# College

- 14 Lohr Structures Lab: Word has gotten out on the strength testing being done in the Crothers Engineering Hall facility.
- **16 Online master's degree:** Three programs are now available via the Web and a fourth will be added in the fall.
- **18** Scholarship dollars: A scholarship program is being developed to target high-achieving students.
- **19 A milestone:** Three programs gain initial accreditation on their first attempt.
- 20 Doctorate in stats: Donations by Meta Payment Systems and Capital Card Services have created fellowships for students pursuing a doctorate in statistics.
- **21 Boomtown:** Engineering camps for eighth-graders and high school students continue to draw more participation.

## Students

- **22** Brawn AND brain: Nearly fifty students are pursuing excellence in athletics as well as engineering.
- **24 Alpha Omega Epsilon:** A new sorority is in the chartering process for women engineering students.
- **25 'I Built the Best':** Projects taken on by a grad student has caught the eye of *Farm Journal.*
- 26 Schultz-Werth honors: Three Math Department graduates won a total of \$3,000 in Schultz-Werth Awards.

## Alumni

28 Distinguished Engineers: Albert "Bill" Billman, Ed Cannon, Ron Mielke, Wanda Reder, John Kappenman, and Kenton Kaufman have all been honored in 2007 and 2008.

## 49 Alumni news

Faculty

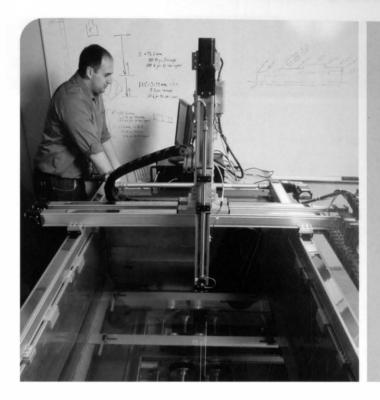
- 31 New faculty
- 33 Bridge collapse brings media to Arden Sigl.

## ABOUT THE COVER

Adam Goblish, a mechanical engineering graduate student, conducts a tensile test by using the 858 Flex Test Materials Testing system. The work tests fatigue on nine-millimeter handguns, fifty-caliber rifles, and other weapons as part of a Department of Defense grant. See story on page 4.

Cover photo by Eric Landwehr.

# U.S. DEPARTMENT OF DEFENSE



# SDSU awarded **\$7.68 MILLION** for defense work

A multimillion dollar Department of Defense grant has been awarded to the College of Engineering to fund defenserelated research that will keep soldiers safer in the field and save the military money.

Of the total \$7.68 million, which was part of the defense appropriations bill signed by President Bush in November 2007, \$2.64 million is designated for fatigue-odometer sensor research for military vehicles and weapons, \$1.84 million is to develop a fatigue testing system for lightweight cannon system parts, and \$3.2 million is for alternative power technology for missile defense.

# Research to power military with alternative energy

SDSU engineers will soon begin research to find a way to more safely provide energy to soldiers in the field.

Military equipment and personnel deployed in a remote location need power in order to deploy their equipment. The Army's typical power source is a diesel generator, which needs diesel fuel. But trucking it in from a source miles away makes troops highly vulnerable to the enemy.

"A logistical supply line is a huge liability for the military because the enemy could sever the line," says Dennis Helder, head of the Electrical Engineering and Computer Science Department and head of an alternative power technology project funded by a \$3.2-million Department of Defense grant, which is part of the \$7.8-million DoD grant awarded to the college.

"It would be a strategic advantage for the Army to have alternative power "Everyone wants to keep our soldiers safe, but if somewhere down the road I can be putting solar cells on my house and saving money on my electric bills, I'm all for that, too."

Dennis Helder, head of Electrical Engineering and Computer Science Department

capabilities or be able to generate its own power.

"The overall concept is to consider several forms of alternative energy—wind, hydro, or solar," Helder says. "It's a comprehensive approach, but the initial work will concentrate on our strengths, which are in photovoltaics, or the direct conversion of sunlight to energy. That has a lot of potential and is a very good fit for us.

"SDSU is always here to serve students," Helder says. "Now we're developing research capabilities and another opportunity to be of service to another part of our society that I feel is very important." The centerpiece of the project, Helder says, will be a power systems test bed.

"This will allow us to look at many different sources of power and energy storage, interface them together and into an electrical grid," he says.

Lead investigator for the project is Mike Ropp, associate professor of electrical engineering.

The first year of the project, Ropp says, will entail building the test bed, where researchers can test their ideas for alternative power in all kinds of variations and combinations.

"That's one of the things I'm most excited about," Ropp says, "to build hardware and test ideas out there." "Research is built on a body of knowledge. We're all standing on the shoulders of giants.

It's simply the way it is." Mike Ropp, lead investigator for the alternative energy project

The grant money is for one year, but follow-on research work and funding are anticipated.

"Both of these DoD projects target very significant research work that has great value to both the military and the general public," says Dean Lewis Brown. "I'm really pleased that our faculty and their students are contributing to needed breakthroughs in alternative energy and structural health monitoring."

As is true with all research, it involves what came before and what is yet to come. SDSU engineers will study any relevant research already on record, adding new ideas, strategies, and techniques. What they do will, in turn, serve as a catalyst for future research. "Research is built on a body of knowledge," says Mike Ropp, lead investigator for the alternative energy project. "We're all standing on the shoulders of giants. It's simply the way it is.

"The first thing researchers do is go to the library. All good research starts in a library so you can figure out where you can improve on what's been done or try an idea nobody's tried before. It's taking basic physics principles and finding ways to do things better."

Cindy Rickeman

LEFT: John Feldhacker, a mechanical engineering graduate student, works on the immersion ultrasonic nondestructive testing system for detecting flaws and cracks inside a gun barrel.

# Using what's there; supplying what isn't

SDSU researchers will work at the system level, Ropp says, using alternative energy sources not currently available in the field solar, wind, hydro, and perhaps even thermophotovoltaics, or TPV.

"TPV is not very efficient," Ropp says, "but it will burn anything at all. It would give soldiers in the field tremendous flexibility in fuel choices."

The goal is to develop a device that will run on whatever is available to keep the troops operational.

"The system will figure out how to run itself," Ropp says. "It will automatically reconfigure to a new system, depending on what energy sources are available and what loads are connected. It's very much the same as plug and play; a computer recognizes a USB device and knows what to do.

"The soldier won't have to do any field engineering of the power system. If there's not enough power, it won't turn on. It won't let a load crash the system, either; it will automatically shut off.

"The idea is to make the time between convoy trips as long as possible. It probably won't go to zero, but they won't have to be trucking fuel in every day."

The system will also be highly portable, so it can be moved quickly and easily during a relocation and then set up again as quickly and easily.

Ropp hopes the test bed will move SDSU squarely into the center of the power systems community.

"SDSU has a great reputation in ag and the Center for Power Systems Studies has a long history at SDSU," he says, "but we're still in the reputation-building mode for power systems research. It will take lots of work and time."

SDSU is working with Radiance Technologies in Huntsville, Alabama, which specializes in commercializing research for Army use.

"The military funds the project. SDSU is the awardee. Radiance is a subcontractor," Helder says. "They'll take our research ideas and turn them into actual products people can use—off the research drawing board and into the field so the Army can use it. It's a complete, end-to-end project."

Cindy Rickeman

RIGHT: SDSU researchers are working to make solar power systems like this one on top of Crothers Engineering Hall more useful to the U.S. military by developing intelligent power systems technologies for solar and other renewables.



# U.S. DEPARTMENT OF DEFENSE



# CEH 147 reborn as Materials Testing and Evaluation Lab

Room 147 in the new wing of Crothers Engineering Hall, once a materials lab and, most recently, a storage room, has new life as the Materials Testing and Evaluation Lab.

In this room, Fereidoon Delfanian and colleagues are busy learning to operate the new, custom-built equipment and doing research for the Department of Defense.

"There's nothing like this in eastern South Dakota," says Delfanian, project director and professor of mechanical engineering. "The department would never have gotten all this if it weren't for the support of Senator Tim Johnson and Representative Stephanie Herseth Sandlin. They were the ones who helped us get the funding. It has brought great academic and research opportunities to us." Of the \$7.68 million in DoD grant monies the College of Engineering received this year, \$2.6 million is for development of a fatigue-odometer sensor (FOS), a project that will enter its third and final year this fall and \$1.84 million will fund nondestructive testing of lightweight cannon systems, a new project and an outgrowth of the first, in addition to further work on FOS.

Both projects work toward the same end: to track wear and tear on military vehicles and weapons, so parts can be replaced before they fail, keeping soldiers safe and saving the military money.

The fatigue-odometer sensor, Delfanian says, "is really a healthmonitoring device. It helps predict when something will go wrong with a machine component so it can be replaced before failure occurs. It's for the health of the device and the safety of the operator."

# The lab

Lab equipment already in place includes a high-speed camera "that captures images and motions. It can stop a bullet right out of the barrel. We use it to monitor the sensor put on a gun barrel, something you can't see with the naked eye," Delfanian explains.

The lab also has an electronic hardness tester, which assesses the properties and strengths of a material, and an ultrasonic immersion tank, which can detect flaws and cracks inside a pipe or gun barrel while leaving the part intact

"This tests materials nondestructively," Delfanian says. "We can test things without taking them apart. It doesn't alter the material or affect its usefulness. Industries use this type of device to examine welds in



"It's a big attraction for students. They are very interested in nondestructive technology, and NDT specialists are in very high demand." Fereidoon Delfanian, project director

pipelines and aircraft, for example. There are abundant applications; it's very useful.

"We also have complete fatigue testing equipment," Delfanian says. "We have various samples we can insert into the equipment and run a test to see what happens to the specimen. We test torsion, bending, compression, tension. We can elevate the temperature of a specimen up to 1,500 degrees Celsius. When it fails, we know how strong the part is, and we can determine properties of the material."

Another device, built entirely by SDSU mechanical engineering students, will roughly simulate the behavior of a pressurized cylinder, such as gun barrel, during operation. It is used for testing sensors for the FOS.

"It was built here, in-house," Delfanian says. "The cost was only parts. It's one of a kind, built for specific applications."

Other than the hardness tester, all equipment was custom built for SDSU by MTS in Minneapolis, Instron in Massachusetts, and NDT Automation in New Jersey. And despite their heavy-duty purpose, the lab is not a noisy place even when every machine is running.

"All are very quiet," Delfanian says. "There's a little humming, but you can carry on a conversation with no problem at all."

This fall, when the grant money arrives, it will fund more equipment and training for students and faculty.

#### South Dakota center

The lab moves SDSU and the College of Engineering closer to becoming a regional center for materials testing and evaluation, which also means more research, more testing, and more educational work.

"We're looking for postdocs to work in this area," Delfanian says. "We need faculty in the nondestructive and fatigue areas to teach classes because the classes are getting bigger. You wouldn't believe the number of students who want to work with us."

The SDSU research team consists of four graduate students and two faculty members as well as several teams of undergraduate students who are involved in the research as part of their senior design projects. Last summer, the project also employed faculty from four departments in the College of Engineering.

"It's a big attraction for students," Delfanian says. "They are very interested in nondestructive technology, and NDT specialists are in very high demand."

And, as with much of the equipment that comes to campus for a specific research purpose, its uses will prove more far-reaching, from businesses that could use the equipment to analyze machine components, to faculty and students in a variety of disciplines.

"The benefits are so broad," Delfanian says. "We are just scratching the surface of this field, but we'll learn as time goes by. This will get more students interested in the field. South Dakota will benefit, as we hope more high-tech people stay in South Dakota. Just exposing faculty to this project and its possibilities creates good challenges for faculty and students—great challenges, really."

#### Cindy Rickeman

LEFT: Graduate student John Feldhacker analyzes data collected by a high-speed camera while Zhong Hu, an associate professor in mechanical engineering, looks on. The camera is capable of capturing a bullet coming out of a gun barrel as shown in the above photos of a fifty-caliber rifle being fired.

# DOD TIMELINE

- SEPTEMBER 30, 2006 First DoD grant awarded for fatigue-odometer research, a three-year project. SDSU and four partners (Batcheller Consulting Group, Army Benet Laboratories, Augusta Systems, and American Science and Technology Corporation) received \$1.65 million; SDSU's share was \$468,000.
- ▶ OCTOBER 1, 2007 The DoD awards SDSU \$342,000 for the second year of the three-year fatigue-odometer research.
- ▶ OCTOBER 1, 2008 SDSU will become the prime contractor and receive \$3.345 million for the final year of fatigueodometer research and the first year of nondestructive evaluation and testing of lightweight cannon systems. A portion of this will go to the other three partners—Batcheller Consulting, Augusta Systems, and American Science and Technology Corporation.

# Staying at State

Competitive, quality grad programs encourage students to earn advanced degrees at SDSU

Earning an engineering diploma puts graduates at a crossroads: take on a high-paying job or enroll in competitive graduate programs. An increasing number are choosing to remain at SDSU and pursue graduate degrees.

In fall 2007, for example, twenty-one out of twenty-nine graduate students in the civil and environmental engineering program received their bachelor's degrees at SDSU.

Other departments boasted similar numbers: seven out of the seventeen graduate students in mechanical engineering received their BS degrees at SDSU, as did five out of the seven graduate students in the agricultural and biosystems engineering program.

"There is increasing pressure to have education beyond the bachelor's degree," says Assistant Dean Rich Reid. "A graduate degree can lead to a higher salary and management potential."

In addition, observes Reid, many students are attracted to SDSU's graduate program because of "the growth of new research projects."

According to Dean Lew Brown, this growth in research programs has been a major goal for the college: "We've been

working very hard for the last six years to get the graduate programs we need to be competitive in research, and we've had success in bringing in more funding and opportunities for students."

# **Research opportunities**

For John Feldhacker, who received his bachelor's degree in mechanical engineering at SDSU in 2006, those research opportunities played a vital role in his decision to enter the graduate program at SDSU.

"I heard about the Department of Defense (DoD) research project that came up in the Mechanical Engineering Department and was interested in what the research involved," says Feldhacker. "I did some investigating into the project and the graduate program."

Feldhacker is now involved in the DoD project and expects to receive his master's degree in July 2008. In the future, he plans to pursue a doctorate degree and find a position in "solid mechanics with an established company."

# **Teaching opportunities**

In addition to research projects, some programs also give graduate students the opportunity to teach classes, an experience that industrial management major Doug Kopecky considers invaluable.

"I was given the opportunity to help instruct labs on campus in the EET (electronics engineering technology) program while I was taking classes," says Kopecky. "That was huge for me because eventually I want to get my doctorate and teach at the collegiate level."

Kopecky received his bachelor's degree in electronics engineering technology in 2004 and expects to receive his master's degree by next spring. He also works full time at VeraSun Energy.

#### Satisfactory experience

Though research and teaching opportunities are a major draw for potential graduate students, some are impressed with the general quality of the College's programs and faculty. Chad Stripling, who received his bachelor's degree in civil and environmental engineering in 2006, is one such student.

"I chose to attend graduate school at SDSU because I was pleased with the quality of my undergraduate education and enjoyed the friendly atmosphere," says Stripling. "My primary goals are to work as a structural engineer and become professionally licensed. My education here has provided a foundation for me to build on."

Stripling expects to receive his master's degree this summer.

# **Solid reputation**

Fellow civil and environmental engineering student Abby Drews, who received her BS from SDSU in August 2007, also chose SDSU's graduate program based, in part, on its reputation.

"I talked to other grad students here who said that SDSU's civil and environmental engineering program was very strong, and they recommended that I go to graduate school here," says Drews.

She expects to receive her master's degree in environmental and water resources engineering in December 2008 and eventually become a project manager with an environmental consulting firm.

Delvin DeBoer, director of the Water and Environmental Research Center, has mentored a number of graduate students and advised on more than fifty theses. "We tell the students to look around and make sure this is the right program for them," says DeBoer, "but we are certainly happy to have them in our program."

April Myrick

LEFT: Graduate student Bing Lu, far right, assists undergraduates Eric Bergquist, left, and Travis Mahnke in a manufacturing engineering technology lab. An increase in research projects at SDSU has lead more undergraduates to stay at State to pursue a graduate degree.



# COLLEGE AT ALL-TIME HIGH; RECORD GROWTH IN MANY AREAS



In the words of Pat Pannell, it's all about name recognition.

"A person can't just sit and wait for people to walk in," he says. "You have to let them know what you are doing. You will only grow if you get your name out there."

Pannell is an associate professor and coordinator of the construction management program, a curriculum that best typifies the positive growth in some of the College's engineering programs.

The 2007 fall semester showed a record 1,592 students (undergraduates and graduates) enrolled across the College's fifteen different majors. That compares to 1,359 in 2002, and 1,260 in 1997.

"We have seen dramatic growth during the last few years," says Dean Lewis Brown. "We like this trend better than the opposite one. There are institutions that have problems finding enough students for their faculty and resources. That's certainly not the case for us."

Construction management headlines the increase by experiencing a 21 percent growth from last year and the fourth consecutive year of double digit growth. In 2000, the program had ninety-nine students. When 2007 unfolded, 224 students were taking the major.

The Department of Mathematics has an all-time high of seventy-three students—a huge rise from only twelve in 2004. The College's largest program, mechanical engineering, has risen for seven consecutive years and now boasts 296 students.

## Spreading the word

Pannell credits a better marketing job for the rise in construction management and cites activities that were once foreign to students. "We do projects that we never used to do before," he says. "Faculty and students are motivated more than ever."

His students now partake in making a Hobo Day parade float, building homes for Habitat for Humanity, fund-raisers for Make-A-Wish, attending the Association of General Contractors' Convention, and participating in the National Association of Homebuilders competition in Orlando, Florida.

Their main fund-raiser has been the annual pheasant hunt that brings in contractors from around the state. In addition, student clubs have increased from one to three during the last few years.

"Five years ago the only people we had were students who changed majors," adds Pannell. "They didn't know we existed until they came to campus. We have nearly seventy freshmen this year, which is almost unheard of compared to past years."

Construction management's counterparts in the Department of Engineering Technology and Management housed in Solberg Hall also show record growth: electronics engineering technology, industrial management, safety management, and manufacturing engineering technology.

"All the programs in that department grew this year, which is rather

LEFT: Physics Professor Larry Browning conducts an experiment with the help of sophomore Brendan Smith. RIGHT: Browning lectures to a large group of students in the auditorium of Crothers Engineering Hall.



unprecedented," observes Brown. "Their whole team has promoted the program with our industry constituents and the construction industry, and that has brought a lot more visibility to it."

# Lots of the Big Mo

A newsletter continually touches base with industry leaders and the department hosts a job fair that attracts construction employers from across the country. LEFT: Professor Kurt Bassett, head of the Department of Mechanical Engineering, lectures to a packed room of students in Crothers Engineering Hall. The College of Engineering is at an all-time high for enrollment with 1,592 graduate and undergraduate students spread across the fifteen different majors at the start of the 2007 fall semester.

"There's a good deal of forward momentum in the Engineering Technology and Management Department these days," says Professor and Department Head Teresa Hall. "Enrollment is setting new records, recruitment and placement are strong and growing, and the positive energy can be felt in the offices and classrooms in Solberg Hall. "Faculty continue to find new and innovative ways to provide relevant and state-of-the-art course content for our growing population of students," she adds. "Validation comes from the positive feedback from employers, recruiters, and alumni. It all adds up to a significant positive impact on economic development for the state and region."

Kyle Johnson

# the figures undergraduate enrollments in the college of engineering

Year	ABE	CEE	СМ	CS	EE	EET	Math	EP	Phys	GE	IM	MNET	ME	SAFM	SE	TOTAL
2007	65	239	224	86	142	94	73	8	20	67	22	84	296	3	38	1,422
2006	71	257	187	98	147	80	64	10	15	74	18	72	293	1	31	1,375
2005	78	228	155	83	142	73	44	9	16	43	13	70	284	-	27	1,230
2004	74	259	124	138	187	69	12	8	28	47	41	74	288	-	9	1,365
2003	81	219	116	168	215	NA	-	9	23	70	42	57	276	-	-	1,359
2002	75	228	94	200	197	82	-	13	20	92	35	56	267	-	-	1,359
2001	65	193	104	205	205	83	-	15	12	124	-	59	259	-	-	1,324
2000	62	218	99	200	209	64	-	14	7	94	-	53	243	-	-	1,263
1999	65	249	94	180	184	57	-	19	5	76	-	49	257	-	-	1,235
1998	64	193	102	165	128	61	-	19	6	206	-	33	185	-	-	1,167
1997	53	240	87	136	177	64	—	13	8	52	—	20	247	—	—	1,105

ABE (agricultural biosystems engineering), CEE (civil and environment engineering), CM (construction management), EE (electrical engineering), EET (electronics engineering technology), EP (engineering physics), Phys (physics), GE (general engineering), IM (industrial management), MNET (manufacturing engineering technology), ME (mechanical engineering), SAFM (safety management), SE (software engineering)

Note: Prior to 2004, mathematics was part of the College of Arts and Sciences. Safety management, software engineering, and industrial management were first offered in 2006, 2004, and 2002 respectively.



New building for electrical engineering, computer science; expansion made possible with private funds

Having an office in what was once a dormitory isn't exactly cause for celebration.

That has been the scene for College faculty members who have worked through the years in Harding Hall, which houses the Department of Electrical Engineering and Computer Science along with the software engineering program. Harding Hall is also home to the Department of Mathematics and Statistics, and the Engineering Resource Center.

The situation will soon change when a new \$7.5-million engineering facility is completed. Currently being constructed immediately to the south of Harding Hall, the four-story, 40,000square-foot structure is funded entirely with private money.

A dedication of a building that is tentatively being called the Electrical Engineering and Computer Science Complex was April 25. With a February 2009 occupancy date, the official title will emerge once final fund-raising is completed. To date, \$5.3 million has been raised for the project.

"I anticipate the name of the building will change," says Dean Lewis Brown. "We have to raise the money from our constituents, and without their faithful and generous support, this building would not be possible.

"Our alums have such a heart for SDSU and the College of Engineering," he adds. "There will be a number of naming opportunities in the new facility so donors who give at a certain level can have an office, classroom, or a laboratory named in their honor."

#### A date with destiny

The College is experiencing record enrollments, going from 1,250 students in 2000 to nearly 1,600 for the 2007 fall semester.

# A PLACE TO GROW

The College doesn't have to be reminded of what new facilities can do when it comes to recruiting students and hiring faculty.

For example, when the third floor of Crothers Engineering Hall was refurbished in 2002 to house part of the electrical engineering program, the department experienced a 10 percent increase in enrollment. Likewise, as the walls go up on the new engineering building, its impact is already being felt.

"Can you imagine what it's going to be like to bring students in the front door of a building that actually looks like a modern engineering facility?" asks Professor Dennis Helder, who credits the facility for the hiring of five new faculty members in the doctoral program in electrical engineering.

"Every one of them came here because they knew we were making an investment in facilities, an investment in our graduate program, and they looked at this as an exciting place to continue their careers," he says.



BUILDING BRINGS TOGETHER PROGRAMS, LOTS OF RESEARCH The new engineering building will be rich in research laboratories along with muchneeded space for faculty offices and classrooms.

The basement level will be devoted to five research laboratories and offices for faculty working in the labs.

The largest is the micro/nanoelectronics clean room laboratory. It will have fresh air constantly filtering through the area to greatly reduce the amount of dust particles, which is vital since the lab will produce photovoltaic devices and sensors at the nano or extremely small scale.

The photovoltaic systems lab will study the integration of photovoltaic devices into large-scale electrical generation systems that can be attached to the nation's electric grid.

The two electro-chemistry labs will develop organic photovoltaic devices that merge the fields of electrical engineering and chemistry, while the device characterization lab will measure the performance of photovoltaic devices as well as other related devices and sensors with respect to their electrical and optical properties.

Software engineering and computer science will occupy the first floor along with classroom, office, and more laboratory space. The second floor will house electrical engineering faculty, classrooms, and labs, including Helder and the administrative support staff.

What the new building will do is bring together programs that are currently spread across four locations on campus.

Electrical engineering and computer science personnel also have space in Crothers Engineering Hall, Solberg Hall, and the Administration Building. Electrical engineering and computer science, which will completely vacate Solberg and the Administration Building, will still maintain laboratories and classrooms in Crothers.

That, coupled with a half-century old building out of touch with the times, prompted Brown and Professor Dennis Helder, head of the Department of Electrical Engineering and Computer Science, to push for a new building—an issue they have been aggressively pursuing for at least five years.

For Helder, he remembers quite vividly one summer day about three years ago when reality hit home.

"I came in early like I typically do, stood at the end of the hallway, flipped the lights on, and looked down the hall," he recalls. "I said to myself, 'This building looks exactly the same as it did the first day I saw it as a student in the mid-1970s, except the floor tile doesn't match anymore. This has got to change. I don't want to retire in a dormitory."

A few months later, Brown and Helder attended a meeting at the Enterprise Institute; when it was over, the building project was put in motion.

"We were extremely fortunate to have some very concerned people step up to the plate," says Helder. "When I walked out of the meeting, half the support for the building was laid on the table. I've been walking six inches off the ground ever since.

"We have a lot of friends in this program who have said we want your programs to be in a facility where you can show off the high-tech organization that you are," he adds.

# Instrumental backers

Some well-known figures closely tied to the college were instrumental in making the building spring to life with their financial contributions:

- Daktronics—a Brooking-based company recognized worldwide as the leading designer and manufacturer of electronic scoreboards, programmable display systems, and large screen video displays.
- Al Kurtenbach—cofounder and chairman of the board of directors at Daktronics; former electrical engineering professor and past dean of the College.

- Duane Sander—cofounder and member of the board of directors at Daktronics; former electrical engineering professor and past dean of the College.
- Jim Morgan—1969 electrical engineering graduate, who is president and chief executive officer at Daktronics.
- Jerry Lohr—1958 civil engineering graduate, who is president and owner of J. Lohr Vineyards and Wines in California.

The newest building on south campus reaffirms a longstanding bond between Daktronics and SDSU, according to Kurtenbach.

"We have a very close working relationship with the entire College of Engineering, especially the electrical engineering and computer science programs," he says. "We have hired many graduates and have employed many students from SDSU over the years. We consider SDSU to be the life-blood of the company, because SDSU is the magnet that attracts talented young people to Brookings.

"There's no question that Harding Hall is no longer conducive for faculty research and students' education needs," adds Kurtenbach.

## What about Harding Hall?

Constructed in 1954 as a men's dormitory and named after longtime history professor Albert Harding, Harding Hall will continue to serve the College.

The Mathematics and Statistics Department, which has been crunched for space in the lower level of Harding for years, will double its living quarters when electrical engineering personnel vacate the middle floor.

Graduate students in electrical engineering also will see their office space expanded by retaining space in the top floor of Harding as well as offices in the new building.

With five-foot-wide hallways and dim lighting, the master plan for Harding Hall, according to Brown, is to eventually tear it down and build a new home for the Department of Mathematics and Statistics and the Engineering Resource Center.

Kyle Johnson

Civil engineering major helps 'seedling' gain full-grown stature

# VETERANS CLUB



From a seed planted in the Financial Aid office in spring 2006, grew the restoration of the Veterans Club on campus, and engineering student Claire Garry played a key role in that reformation.

Garry, a sophomore civil and environmental engineering major, was working in the Veterans Services office on campus two years ago, when Jay Larsen, director of the Financial Aid office, which oversees Veterans Services, suggested restarting the Veterans Club.

"There are a number of students in the National Guard now, as well as those who have served active duty, and I thought this would be an opportunity for all of these students to get together," Larsen says. "The appropriate way is to have them become affiliated as an official club."

That means paperwork and Garry took the lead in getting the necessary documents filed for the Veterans Club to be recognized as an official student organization.

Cindy Swinson, assistant director of Financial Aid, was not only "very vocal in helping us re-up the club," Garry says, she stepped up as club advisor.

Swinson was a Veterans Club member when she was a student at State in the early '80s. Then, most Veterans Club members had completed active military duty. Swinson had served in the Army.

"Then, everyone [in the club] was nontraditional because we'd been active duty," Swinson says. "The National Guard was not called up for active duty then like it is now. We were older and we had different experiences, yet we were starting [college] the same as a high school senior coming in as a freshman. We seemed to be a different class of students. The club helped us not feel so alienated."

Today's club is more diverse from Swinson's day in that its members are of a wider range of ages.

"Now, the club membership is combined," Swinson says. "There are those who are National Guard, those who are National Guard and have been activated and returned, and those who are active duty."

# Camaraderie

But one thing remains a constant: the camaraderie enjoyed by people with like interests and like experiences. This may be especially true of active duty military personnel, who, unlike National Guard members who return with their unit, basically "come home alone," Garry says.

"When you leave your active duty station and come back to South Dakota, you don't necessarily come back with your buddies," says Garry, who served four years in the Navy aboard the USS Carl Vinson. "So when you come back to college, unless you have friends here from high school, you come back alone."

The club, which began meeting in fall 2006, gives veterans a place to connect. They meet at the VFW Club in Brookings twice a month. And, unlike Swinson's Veterans Club, which was mainly social, she says the current Veterans Club is more proactive.

They built a float for Hobo Day. They sent care packages to troops overseas at Christmas time. And they support anything the VFW is doing, like helping with the March pork feed, which raises money for the Vietnam Memorial Park.

Garry, the club's first president, is secretary this year. Jonathan Peschong is serving his second year as treasurer. Ashley Englemann, first year secretary, is the current president.

Of the 400 students collecting military benefits on campus, Garry says, a major portion are National Guard or prior active duty. She wants them to know there's a place where they'll belong.

"The military was definitely like a family for those four years, so it's nice to have that connection at college," says Garry, who hails from Pierre. "Adapting from military to civilian life is a challenge.

"Individuals need to belong again. You go from a place where you have authority, down to a place where you're just another number, another face on campus.

"There's so much more structure in the military than when you come to college, so if anyone has trouble or feels they don't belong or that they go unnoticed, this is the club to come to." *Cindy Rickeman* 



OPPOSITE PAGE: Aboard the Veterans Club Hobo Day float in the 2007 parade are, left to right, Josh Boomgarden, Ashley Engelmann, Mel Hill, Derek Douglas, Nick Peterson, and Coiin Simpson. ABOVE LEFT: Edward Hruska holds the Marine Corps flag. ABOVE, LEFT CENTER: Trick-or-treating at the HPER Center October 7 is Jonathan Peschong and his daughter Sophia Sailor Peschong. ABOVE, RIGHT CENTER: Jonathan Peschong and Claire Garry aboard the USS Carl Vinson CVN-70 in 2005. ABOVE RIGHT: At the Brookings Post Office ready to mail care packages to troops overseas are Claire Garry, left, and Ashley Engelmann.

# "I found that having the Veterans Club on campus gives new vets a chance to share what they experienced and to keep the bond held by vets intact."

Brice Meyer, Marine Corps, a junior wildlife and fisheries major from Wessington Springs

"Immediately, it was a group of people who helped get me settled in. We all have had the same or similar experiences, which is rare compared to most college kids. They also helped to ensure that I was awarded my benefits and helped with scholarship opportunities."

Edward Hruska, Marine Corps, a sophomore sociology major and criminal justice minor from Sioux Falls

"It's a chance to network and socialize with other veterans and get to know other veterans who have similar backgrounds and experiences, and who are in about the same year at school."

Derek Douglas, Navy, a freshman economics major from Fort Pierre

"It's a place where veterans with common values can meet."

Jason Knopik, Marine Corps, a junior electrical engineering major from Little Falls, Minnesota

"The Veterans Club gives veterans a way to talk about issues that concern us. It's also a way for people who are like-minded to have fun."

> Josh Boomgarden, Air Force, a sophomore broadcast journalism major from Algona, Iowa

The Veterans Club meets at 6:30 p.m. every second and fourth Wednesday at the VFW, 520 Main Avenue.

For more information:

- Stop by the Veterans Services office, first floor Administration Building
- E-mail: Veterans.Club@sdstate.edu



# Business good at Lohr Structures Lab

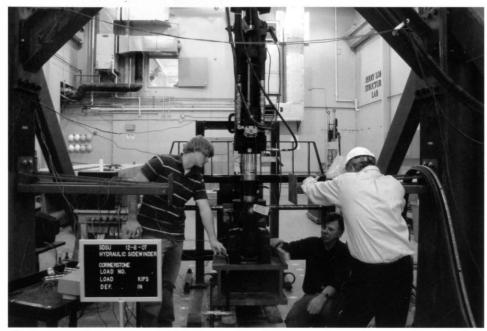
The prominence of the Jerome Lohr Structures Laboratory can easily be seen by the many well-known clients who have benefited by its services, including one that unfortunately wasn't able to fit into the lab's schedule.

"I received a call from a contractor who was looking to test some steel components for the Freedom Tower," says Nadim Wehbe, associate professor and coordinator of the structures lab, referring to the proposed plans for a complex to replace the Twin Towers destroyed on 9/11.

"We were unable to accommodate the request in the timeline they wanted because our lab was busy," he adds. "It tells us that word is spreading about the structures lab and its unique capabilities."

Indeed, life has been good for the only facility of its kind in South Dakota. Located on the southeast corner of Crothers Engineering Hall, the lab tests large structural components for strength and endurance.

Featuring a giant overhead crane and a twenty-four-foot door clearance, the facility is outfitted with a hydraulic structural testing system, a modular loading steel frame, a post-tensioning system, and load cells.



The Jerome Lohr Structures Laboratory has been carrying out numerous testing services for a variety of clients. Testing the load-carrying capacity of a forklift attachment are, from left, graduate student Mike Merron, Civil and Environmental Technician Jim Anderson, and Civil and Environmental Engineering Professor Arden Sigl.

Development in Norfolk, Nebraska, is more than pleased with the results and hopes to continue the relationship.

"For the size of the school, it's one of the best labs in the nation, and they have equipment that other places don't have,"

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"As we achieve new milestones, we set new goals for ourselves to keep up with increasing testing needs and technological advancements."

Associate Professor Nadim Wehbe, coordinator of the Lohr Structures Laboratory

"We have seen a lot of action in the structures lab," observes Wehbe. "In addition to the research projects, the Lohr Structures Lab is rapidly becoming an indispensable facility for meeting the needs of the South Dakota manufacturing industry."

Lionel Dayton, a structural research engineer at Nucor Research and

says Dayton, a 1995 SDSU engineering graduate. "We have a lot of research coming up, and so much is changing in the construction industry, that it's our intent to stay on the forefront of developing new ideas."

Dayton, who has worked as a consulting engineer and coordinated with Wehbe on many structural seminars, calls the structures lab "a good fit" for Nucor Research and Development.

"We can drive up and witness the tests and return all in one day," he adds. "It's good to have things done effectively and efficiently and get the turnaround we want without waiting. Plus, they are a great group to work with, and we hope to be able to hire additional qualified SDSU graduates as Nucor continues to grow."

Notes Wehbe, "We are pleased to hear about the success of the structures lab, but success is a dynamic goal," he says. "As we achieve new milestones, we set new goals for ourselves to keep up with increasing testing needs and technological advancements."

# Personnel duties increasing

However, success brings challenges, too. As lab traffic increases, the importance of properly scheduling testing events, managing lab space, assembling teams to perform testing, and maintaining and

# College

upgrading equipment become more paramount.

All those tasks are currently being accomplished without the services of a full-time lab manager, a fact Wehbe wants to change.

"So far I have been able to take care of running the activities with help from fellow faculty members and graduate students," he says. "But as the current trend of increasing testing needs continues, I see no option but to create and fill a lab manager position."

Wehbe, who doesn't specify when a manager will be hired, also points out that a busy lab doesn't necessarily equate into a big money venture for the College. On the contrary, lab fees are "moderate" and depend on the complexity and duration of the test.

"Fees cover wages for students and technicians, and they are used to update and maintain the equipment," he says. "The main goals are to meet research needs and to help with the economic development of the state by providing testing services to the local industry.

"Many manufacturing businesses are becoming aware of the opportunity that the structures lab provides, to either launch new products or improve existing ones," adds Wehbe. "This is a good thing for our local industry."

Kyle Johnson



# Structural Seminar focuses on bridge design

The Department of Civil and Environmental Engineering continued the tradition of hosting the Structural Seminar when the thirty-second annual event was held November 8, 2007, in Sioux Falls.

The one-day seminar, cosponsored by the Mountain Plains Consortium and the South Dakota Department of

Transportation, attracted more than seventy-five engineers and steel fabricators.

Under the theme "High Performance Steel," the seminar featured five renowned speakers from Boston, Massachusetts; Lincoln, Nebraska; Irvine, California; and SDSU. They made six presentations that focused mainly on recent developments in high performance steel applications in bridge design and accelerated bridge construction.

"The seminar went very well," says Associate Professor and Seminar Coordinator Nadim Wehbe. "The seminar is one of the continuing education activities we undertake in the Department of Civil and Environmental Engineering. It is a service to the local and regional engineering community."

Kyle Johnson

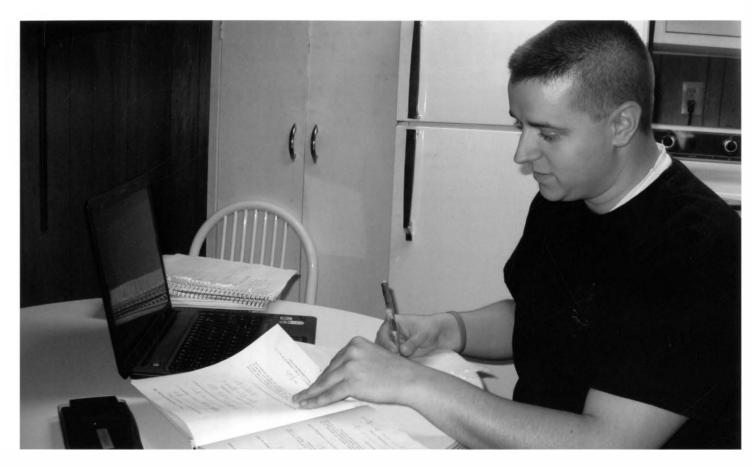
# **IMPRESSIVE "CLIENTS" LIST**

The Jerome Lohr Structures Laboratory marked its first full-scale testing when the first of three fullscale prestressed bridge girders were tested in October 2006.

Since then, testing has ranged from upstart entities to industry giants. The clients and their expertise include:

- ► DAKTRONICS, Brookings-the first business in the state to realize the benefits of the lab, the facility tests connections and metal structures for the company's display video scoreboards.
- ▶ GAGE BROTHERS, Sioux Fallstesting of bridge girders and other prestressed beams for the precast concrete company.
- ► ANDOR, Watertown-testing of heating and plumbing components for strength and fatique.
- ▶ COUNTERPART, Brookingstesting of products for the metal fabrication company.
- PREST RACK, Brookings testing strength of metal, joints, and welds for a company that produces metal racks.
- CORNERSTONE INDUSTRIES, Brandon-testing the load carrying capacity of a forklift attachment.
- ► CRETEX, Rapid City-testing of prestressed bridge girders.
- ▶ NUCOR RESEARCH AND **DEVELOPMENT** for downstream products based in Norfolk, Nebraska. It's part of the Nucor Corporation, a Fortune 500 company that is one of the largest manufacturers of structural steel in the world and the largest recycler of steel products in the world.





THREE-SOON FOUR-MASTER'S DEGREES OFFERED ONLINE

# Master's degrees take to the Web

Delivering courses to students who can't attend class on campus is a challenge the College has tried to meet in several ways.

From April to September one year, Dean Lewis Brown drove to Sioux Falls to teach a course at a business there, a method he describes as "exhausting and not very efficient."

A Watertown company sent a group of employees to campus three times a week for a year, but that is seldom a viable option.

The College explored offering courses one evening a week, but that didn't work well.

"We've tried for years to have a physical presence in Sioux Falls," Brown says. "We've done a number of marketing studies in the Sioux Falls area. Most employees are workplace-bound. Employers don't like releasing employees from productive work

time. Employees don't like giving up their evenings and weekends.

"We decided that what we needed, for the ultimate in convenience, was to do it online."

And they have. Beginning with the fall 2007 semester, three graduate programs are now available online, and a fourth, the new master of science degree in statistics, approved by the Regents in December 2007, will begin in fall 2008.

All courses are also available through traditional delivery on campus. The goal, Brown says, is to offer all master's degrees online; any new graduate program requests from now on will include an online delivery component.

Developing a course for online delivery takes work and training of faculty with widely diverse computer skills.

ABOVE: Adam Sullivan, a graduate math student originally from the Buffalo, New York, area, does homework in his Brookings apartment. A master's degree in mathematics is one of four graduate programs that will be available online this fall.

# College

## Technology, training, teachers

"It's an effort," Brown says. "It's an investment of time to learn the software and the hardware and to redevelop course materials. Ultimately, it comes down to training and experience for faculty who traditionally use a chalkboard or white board, going to all electronic.

"It takes the right technology, the right training, and selecting faculty members with a genuine interest in taking the next step. We're still new at it. We have a number of faculty who have used these tools for a number of years and some who haven't used them at all.

"When we applied [to the Regents] last summer, we put together a matrix of courses that would be offered online. We identified the courses, and the instructors, and set up a twoyear training program of distance delivery academies."

The training is done by Shouhong Zhang, manager of Instructional Design Services on campus, with assistance from John Howard, coordinator of distance education and, Brown says, "a real expert in distance delivery of courses.

"We'll train again this summer," Brown says. "We'll likely train faculty every year. Technology changes so rapidly, we'll always be teaching.

"There are a number of models we're using, from streaming video to voice annotated PowerPoint presentations. We haven't set a lot of rules other than that the courses reflect a high-quality presentation from SDSU. Whatever we do, we want to do it right."

#### A real boon

That they're doing it at all is a boon to employers who want more highly skilled employees but can't afford to lose productivity, and to employees who desire more knowledge and earning power, but who cannot abandon the workplace to sit in a classroom.

"More than 100 companies are represented on the advisory boards for the college," Brown says, "and, for some time, they have expressed interest in continuing education for their employees.

"Quite a number of employees, when they go out and interview for a job, will ask about continuing education benefits. Because of the computer nature of the job market, continuing education benefits are continuing to be at the top of the discussion between new graduates and employers.

"This is part of our strategic initiative," Brown says, "to meet the needs of our employers and employees in the region."

Daktronics in Brookings not only recruits most of its engineering professionals from SDSU, the company encourages its employees toward a higher degree.

"We have a tuition reimbursement program where we reimburse 100 percent of tuition if they earn an A or a B," says Carla Gatzke, vice president for human resources at Daktronics. "What we found was many of our professionals would not be able to pursue a master's because they travel for their work and the classroom schedule, even a once-a-week schedule, was difficult for them. So we noticed some were pursing online degrees before SDSU offered them.

"Now we believe our employees will see SDSU as an alternative and consider SDSU's programs when they're deciding how to further their education. It's not so much the degree itself, it's the practice of continuing individual development."

#### Flexibility

Lance Weatherly of Sioux Falls earned his bachelor's degree in civil engineering from State in fall 2004. Now he's pursuing his master's in civil and environmental engineering while working as a staff engineer at Banner Associates—something he could not do, he says, were it not for the online option.

"Online is the best option for me because of the flexibility," Weatherly says, "being able to work full time and keeping my full-time benefits while pursuing my degree."

Weatherly had been accepted to grad school but then started working and moved to Sioux Falls. Now he's one of three Banner employees enrolled in the online course.

"I was excited when I found out about it," he says, "and I've been happy with it."

Though online poses its own set of challenges, Weatherly has managed to stay on course, doing most of his work evenings and weekends.

"You're not face to face with your instructor, so you have to be proactive about asking professors questions and allowing them time to respond," he says.

"It's easier to procrastinate. As a traditional student, you have class three times a week that you show up at. Online, you don't have to be there at class time, you can view it at your own leisure, so you have to take the initiative to keep up with that."

And though they're not physically in the classroom, online students bring an element to "class" that enhances the educational experience for all.

"The professors like having input from people who are currently working in the field," Weatherly says. "It's an addition to the classroom. Most prior grad students were just coming out of their undergrad and didn't have any work experience.

"Now that they've opened the field to allow practitioners to interject in the classroom, it brings more experience and a better learning experience for everyone involved."

Cindy Rickeman

For more information about the master of science degrees offered online:

## M.S. IN ENGINEERING

- Agricultural and Biosystems Engineering Van.Kelley@sdstate.edu
- Civil and Environmental Engineering Richard.Reid@sdstate.edu
- Computer Science Dennis.Helder@sdstate.edu
- Electrical Engineering Dennis.Helder@sdstate.edu
- Mechanical Engineering Kurt.Bassett@sdstate.edu
- Physics Oren.Quist@sdstate.edu

M.S. IN INDUSTRIAL MANAGEMENT Teresa.Hall@sdstate.edu

M.S. IN MATHEMATICS Kurt.Cogswell@sdstate.edu

M.S. IN STATISTICS Kurt.Cogswell@sdstate.edu

Or call the College of Engineering, (605) 688-4161.



# College seeks high-end money for high-end students



Professor Kurt Bassett, head of the Department of Mechanical Engineering, lectures to a packed room of students in Crothers Engineering Hall. Many students like these are benefiting by various scholarship opportunities that are growing every year, and the College is looking to create even larger scholarships.

Recruitment and retention: an age-old process that colleges and universities must meet in order to survive.

And when it comes to attracting and keeping the best minds possible, SDSU's College of Engineering is on a mission to raise scholarship funding to meet their high aspirations.

"We have a particular challenge in not having enough scholarships for the highest performing academic students," says Dean Lewis Brown, who points out the College is seeking more high-end scholarships like the prestigious Briggs Scholarship.

Incoming engineering freshmen currently benefit from the Jackrabbit Guarantee Scholarship and the South Dakota Opportunity Scholarship.

Both scholarships require a minimum ACT score of twenty-four. The Jackrabbit Guarantee awards students \$1,000 per year if they maintain at least a 2.5 grade point average.

Meanwhile, the Opportunity Scholarship, which is for South Dakota high school graduating seniors, is worth \$5,000, awarding \$1,000 per year for the first three years and \$2,000 the fourth year.

Students also need a minimum ACT score of twenty-four; must have taken certain high school courses; and they need to maintain a 3.0 grade point average to keep the Opportunity Scholarship.

However, according to Brown, "Our scholarship efforts are aimed at developing

new and larger scholarships," he says. "The Briggs Scholarship helps us land some, but not all of these high-performing graduating seniors."

## Keeping students here

A recipient of the Briggs Scholarship receives \$6,500 per year. The number of Briggs awards is annually limited to twelve students with six going to the College and six to nonengineering students.

The scholarship is named after Stephen Briggs, a 1907 electrical engineering grad who later teamed with Harold Stratton to form Briggs & Stratton and become the world's largest builder of air-cooled gasoline engines.

In previous years, the average number of engineering freshmen boasting an ACT score of thirty or more was twenty-three. There were forty-nine students this year, which meant that forty-three students were not offered a Briggs Scholarship, according to Assistant Dean Richard Reid.

"It would be nice to offer them a large scholarship and hold them here," observes Reid, "because they will certainly be offered those scholarships at competing institutions."

Indeed, many students, particularly national merit high school scholars, turn to out-of-state schools like Nebraska, Minnesota, and Iowa State for full-ride scholarships. "Unfortunately, that's where many of these students go year after year," Reid notes.

No higher education institution in the state currently offers a full-ride scholarship. Being a national merit scholar is an automatic full ride at many universities in the country.

Having high performing high school students obtain sizeable financial packages at other competing institutions is a trend SDSU is trying to reverse, according to Steve Erpenbach, president and chief executive officer of the SDSU Foundation.

"Part of the president's strategic plan is to address that so we have more scholarships at the \$3,000 to \$5,000 level," he points out. "Schools are getting highly competitive and looking to capture these bright students. Our challenge is to create larger scholarships to keep them here."

## Jackrabbit Guarantee increase

According to Erpenbach, the good news is there is a growth in companies sponsoring their own named-scholarships, and the Jackrabbit Guarantee Scholarships are on the rise, too, because of their affordability and popularity.

In 2004, there were thirty-three engineering specific named Jackrabbit Guarantee Scholarships issued to engineering majors. The number of engineering specific named Jackrabbit Guarantees has steadily climbed with fortyone in 2005, forty-nine in 2006, and fiftythree for the 2007 fall semester.

"That's where many people want to have named scholarships," cites Erpenbach. "Alumni understand that is a great way for them to give back. They like that connection between a student and getting to know them.

"They also understand the cost of higher education goes up," he adds. "Alumni are becoming more aware of the need for more scholarships and they are responding well."

Kyle Johnson

To help in creating scholarships, contact the SDSU Foundation, (605) 697-7475 or 1-747-7378; tim.reed@sdsufoundation.org.

# College |

# Reaching a **milestone**

THREE PROGRAMS GAIN INITIAL ACCREDITATION ON FIRST ATTEMPT

Rarely does ABET (the Accreditation Board for Engineering and Technology) award new accreditation to three new programs within the same institution in the same year.

SDSU's College of Engineering accomplished this feat, however, with the accreditation of the Electronics Engineering Technology, Computer Science, and Manufacturing Engineering Technology programs in November 2007.

"This was a significant milestone for the College," says Dean Lew Brown. "It's the highest stamp of approval we can have placed on our programs, and to get successful accreditation for all three programs on the first visit is a noteworthy accomplishment."

Preparing for the accreditation process was no easy task, however. "It takes two to three years of hard work, planning, and detailed assessment," notes Brown. "It's a tribute to the leadership of our department heads and the teamwork of their faculty."

The departments submitted their applications in fall 2005, a full year before a review team from ABET came to view the facilities, conduct interviews, and examine detailed self-studies of each program.

"What you have to do is document each aspect of the program," said Dennis Helder, department head for electrical engineering and computer science. "We conducted a mock review and collected documentation on how we assess our program."



Students and department heads gather outside Solberg Hall after learning that six-year accreditations had been granted to three programs within the College. The Electronics Engineering Technology, Computer Science, and Manufacturing Engineering Technology Departments gained accreditation in September 2007.

Helder observed that the process was ultimately a "team effort" that involved not only department heads, but faculty and staff, a sentiment also expressed by Manufacturing Engineering Technology Coordinator Carrie Steinlicht: "Our staff did an unbelievable amount of work to help us coordinate meetings, create charts, and organize folders and binders."

This process proved especially tricky for Steinlicht's department, as she was quarantined during the mumps outbreak in spring 2006 and unable to meet with other faculty on campus.

Despite the hard work and unique challenges faced by each department, they are proud of their accomplishments and excited about the opportunities the accreditation offers both students and faculty.

According to Brown, many employers "won't consider hiring a student who doesn't graduate from an ABET-accredited program." In addition, students seeking a professional engineering license are required to be graduates of an ABETaccredited program. Teresa Hall, department head for Engineering Technology and Management, believes that the accreditation will not only draw the attention of employers and potential students, but also create more awareness among the faculty in the College. "But the best part of it is that the people of South Dakota benefit," says Hall. "We have programs preparing graduates who are ready to contribute to our regional economy."

Although all three programs received the full six-year accreditation, the faculty is not content to rest on their laurels. "We continually look to the future," says program coordinator of electronics engineering technology, Byron Garry. "We want to make sure that we're meeting all our goals, and setting new goals."

April Myrick



# Doctorate in stats adds up to big opportunities

PRIVATELY CREATED FELLOWSHIPS EQUAL JOBS, BUSINESS-BENEFITTING RESEARCH



Associate Professor Din Chen meets in his office with, from left, Alfred Furth, Tom Brandenburger, and Matt Biesecker. Chen is the advisor to Furth and Brandenburger, who are working toward a doctorate in statistics.

The addition of a doctorate of philosophy program in computational sciences and statistics, has advanced the Math Department to a new level and brought big improvements to new graduates, South Dakota, and the Midwest.

With a boost in the form of two graduate fellowships established by Capital Card Services and Meta Payment Systems, SDSU grads now can earn a Ph.D. while addressing real-world problems with local significance.

According to Kurt Cogswell, Math and Statistics Department head, "a graduate degree in statistics is a tremendous credential for anyone working in business, industry, government, or research."

Until summer 2005, the Math and Statistics Department, had focused nearly entirely on preparing students to become teachers. But with financial awards from the state and private companies, the Ph.D. program expands that focus to include solving substantial research problems of local and regional economic significance. When Governor Mike Rounds sent out a call for proposals to fund new doctoral programs that would promote economic growth, the computational science and statistics Ph.D. program was among three winners selected from twenty-two proposals by the South Dakota Board of Regents in December 2004.

The state provided SDSU with \$170,000 in funding for fiscal year 2006.

In addition, two South Dakota businesses—Meta Payment Systems and Capital Card Services—created graduate fellowships in March and July 2007, respectively. Their donations of \$100,000 provide students with real-world experience and companies with solutions to actual business problems.

Each donation is sufficient to credit one fellowship that provides a three-year stipend for the student.

# Fueled by growing volume of data

"The need for this program is driven by the increasingly large amount of data accumulated by businesses, government, and researchers today," Cogswell says. He explains that students, supported by SDSU mathematics and statistics faculty members, analyze that data and work on problems that help businesses make good business decisions.

Students work directly with the companies.

The current Meta Payment Systems fellow Erin Nichols and Capital Card Services fellow Tom Brandenburger work with their respective companies in analyzing data in ways that can serve their companies in the future.

The collaboration between this program and local corporations will have a far-reaching impact for graduates and corporations throughout the region.

# Times have changed

Cogswell notes that when he graduated from college, graduates of math and statistics programs not planning on teaching would have needed to look to California or the East Coast for employment. Now programs like this one are working to create opportunities for graduates locally.

Not only will this program advance SDSU graduates, but it will also advance South Dakota and Midwestern companies and economies, Cogswell says.

"The more South Dakota students working in the field, the better," he adds.

There are certainly more being trained to work in this field. Currently six students are in the doctorate program and another nineteen are part of a master's program.

Brandenburger, who earned bachelor's and master's degrees from State in 1992 and 1995, respectively, says, "The lack of a graduate degree in statistics in South Dakota has been discussed for as long as I have been associated with SDSU.

"Now that it is there, the aim is to build the program in such a fashion as to be an economic benefit to the state." *Nicole Biever* 





Brittany Bullis, standing, and Natalie Kephart perform a water softening experiment in the environmental lab at the November 2007 Ready-SET-Go! workshop. They performed experiments to examine hardness removal as a function of lime.

With 120 eighth-grade girls attending GEMS camp in March and attendance at the Ready-SET-Go! camp for high school girls doubling in size to fifty-four last November, it's safe to say young women no longer look at engineering as a man's field.

"It's starting to explode on us, so it's a good thing," says Assistant Dean Rich Reid.

Both camps follow a similar theme, with opening remarks, interactive activities, tours, speakers, lunch, and an afternoon SDSU ice cream break.

Throughout the day, the girls take part in various activities that emphasize female engineering role models.

"It's a fun day," Reid says. "Female college students and faculty are involved, representatives come from IBM in Rochester, Minnesota, and female alumni come from as far as Sioux City to help out."

GEMS (Girls Engineering, Math, and Science) participants learn about famous women engineers. They design, build, and test bridges. They solve a crime using forensic science, dusting for fingerprints, analyzing mystery powders, studying teeth imprints, and measuring footprints.

Ready-SET (Science, Engineering, and Technology)-You Go Girl! participants learn about geospatial technologies and computer programming, and tour Daktronics in Brookings.

# Boomtown Engineering camp population on the rise

# Connections

The computer programming session caught the interest of Jordan Ericson, a Brookings High School junior who attended Ready-SET last November.

"I learned that science can be connected to a lot more things than I previously thought," Ericson says. "I didn't realize how much science and math were involved in software engineering.

"I was impressed by the lady who was in charge of it. She seemed really successful and knew what she was talking about. She showed us a lot of the electronic devices they were showcasing and how to work them."

The lady in charge is Becky Schmieding, a 1978 mathematics and commercial economics grad and an executive certified project manager for IBM Rochester. IBM, Daktronics, Banner Associates, Sencore, Mid-America Power, East River Electric, 3M, and the SDSU Women's Giving Circle sponsor the oneday workshops.

"I learned that science can be connected to a lot more things than I previously thought."

.....

Jordan Ericson

## Hidden treasures

Programming a robot was "my favorite station of all time," says Natalie Kephart, a Brookings High School senior who attended the Youth Engineering Adventure and Ready-SET-Go camps. "That really got us involved. My number two favorite was the GPS tracking station," where, using Global Positioning Systems, they navigated to find hidden "treasures" on campus.

Kephart also found a few treasures in the people involved in Ready-SET-Go!

"[U.S. Representative] Stephanie Herseth spoke at the opening ceremony. She talked about being an independent woman," Kephart says. "I love Stephanie. Dr. Rich Reid really impressed me. He's such a great man. I really respect him."

Kephart, whose college plans are geared toward engineering or secondary math education, gives rave reviews for Ready-SET-Go!

Cindy Rickeman

#### GIRLS ENGINEERING, MATH, AND SCIENCE (GEMS) WORKSHOP

One-day workshop for eighth-grade girls to explore interests in engineering, science, and technology. Includes interaction with professional women engineers and hands-on activities. Held in March (TBA for 2009) Info: Engineering Dean's Office, (605) 688-4161 http://www.engineering.sdstate.edu/gems/

# READY-SET (SCIENCE, ENGINEERING, AND TECHNOLOGY)-GO!

One-day workshop for high school girls interested in a college major and career in the engineering field. Includes interaction with professional women engineers and hands-on activities. *Saturday, Nov. 1 Info: Engineering Dean's Office, (605) 688-4161* 

http://www.engineering.sdstate.edu/ReadySETGo/

#### YOUTH ENGINEERING ADVENTURE (YEA) CAMP

Five-day summer camp for high school students to learn how engineering and technology relate to the world. Students work closely with engineering professionals and participate in panel discussions, demonstrations, engineering design, and hands-on projects. *June 8-12* 

Info: Mylo.Hellickson@sdstate.edu, (605) 688-5610

http://www.engineering.sdstate.edu/~yea/

#### ACE (AEROSPACE, CAREER, AND EDUCATION) CAMP

Five-day camp for high school students interested in college and career options in the aerospace field. Students fly a private plane, visit the Air National Guard and fly the F-16 simulator, visit and tour a wind farm, and learn about satellite imagery and astronomy. *June 15-19* 

Info: Ryan.Phillips@sdstate.edu, (605) 688-6291 www3.sdstate.edu/Academics/CollgeOfEnginereing /redirect/EngineeringResourceCenter/ACECamp/ Index.cfm



# Athletic Competition

Based on student-athlete representation, the College can hit, throw, run, ride, and grapple with the best of them.

That's because the College exhibits a good showing in intercollegiate athletics with forty-eight of its students competing in eleven different sports programs during the 2007-08 school year.

Tim Hanigan and Jessica Heine are worthwhile examples.

A sophomore from Sioux Falls, Heine is a defense specialist who started all of SDSU's seventeen soccer matches during the 2007 fall season that saw the Jacks post a record of 9-4 with four ties.

She is also pursuing a career in civil engineering. Although not sure about employment at this young juncture, she is confident of her path.

"I had an awesome physics teacher in high school, and she got me excited about how things work," recalls Heine. "I have always been fascinated by how things were built. I remember driving past a bridge that was under construction with my dad and asking to go by it again."

# Math, science whiz

Hanigan graduated in May with a mechanical engineering degree. He accepted an internship with Osbourne Construction Company in Fairbanks, Alaska, with future plans of attending graduate school.

The Lincoln, Nebraska, product sported a .356 batting average for a Jacks team that finished 34-19 in 2007. He indicates the influence of family and high school success spurred his engineering interest.

"I always excelled in math and science and was told it would be a good fit for me," he says. "I was also told it had a strong job market.

"My uncle is an electrical engineer and based on what I've seen from him I wanted to do something in a sciencebased field," adds Hanigan. "Also, my older brother entered college in mechanical engineering and that helped my decision to go into mechanical."

# The quality of time

Heine and Hanigan, like all studentathletes, are majoring in another subject: time management—something they have mastered quite effectively.

"If I have a half hour of free time between classes, I sit down and get some homework done," says Heine. "I am lucky because the soccer team is pretty good about studying on the road. This makes it easier to get my homework done."

She has discovered that a daily planner is a must. "Without it I would









"I haven't had a professor yet who wouldn't work with me because I've let them know of upcoming games as early as possible."

Tim Hanigan (pictured), baseball senior, mechanical engineering major

have a hard time remembering what is due when and where I have to be," she admits.

"In the fall during soccer season I have to look ahead a week or two in advance," she adds. "I have to know when I am going to be gone so I can make up the classes. We have morning practices in the spring with weekends off, so weekends are makeup days."

Hanigan observes, "Good time management means being efficient with your time and getting the most out of it," he says. "No matter how hard it seems, you just have to do it for yourself, teammates, the university, family, and whatever else that motivates you."

# Working with faculty

The future engineers appreciate the understanding of professors when meeting the demands of academics and sports.

"I haven't had a professor yet who wouldn't work with me because I've let them know of upcoming games as early as possible," points out Hanigan. "It's completely up to the student-athlete to let the professor know well in advance so proper arrangements can be made."

Adds Heine, "Professors generally don't have a problem giving assignments or tests early and they are always willing to help if there are questions. Most of the teachers are easy to get a hold of to schedule an appointment."

Kyle Johnson

OPPOSITE PAGE, ABOVE: Senior outfielder Tim Hanigan makes a catch in a 2007 game at Sioux Falls. The mechanical engineering major has an internship lined up in Fairbanks, Alaska.

OPPOSITE PAGE, BELOW: Sophomore defensive specialist Jessica Heine fights for possession of the ball with a North Dakota State University player at a 2006 match in Brookings. The civil engineering major says she relies on her daily planner.

# STUDENT-ATHLETES IN ENGINEERING

# BASEBALL

- Timothy Hanigan: mechanical, Lincoln, Nebraska
- Samuel Pieczynski: construction management, Des Moines, Iowa Michael Robinson: mechanical, Rapid City

# FOOTBALL

J. Preston Crumly: civil, Hartington, Nebraska

Tyler Duffy: electrical, Brookings

Jesse Ekeren: construction management, Volin

- Mitchell Erickson: mechanical, Hutchinson, Minnesota
- Nicholas Flesner: construction management, Pierce, Nebraska
- Adam Fritz: mechanical, Colman
- Scott Gillen: electrical, White Lake

Luke Greving: industrial management, Alton, Iowa

- Justin Horn: mechanical, Tripp
- Casey Knips: construction management, Adrian, Minnesota
- Jason Nobiling: construction management, Huxley, Iowa

Mitchell Pontrelli: construction management, St. Paul, Minnesota

Dean Priddy: math, Eden Prairie, Minnesota Nicholas VanWyhe: civil, Luverne,

- Minnesota
- Anthony Wise: electrical, The Colony, Texas Luke Witte: construction management, Long Pine, Nebraska

# SWIMMING

Andrew Arens: construction management, Littleton, Colorado

Jason Garder: electrical, Omaha, Nebraska Andrew Martin: mechanical, Kingwood, Texas Cade Roberts: manufacturing engineering

technology, Richland, Washington Hadleigh Tyler: civil, Des Moines, Iowa Ryan Willett: manufacturing engineering technology, Cedar Falls, Iowa

#### TENNIS Matthew Cills math

# Matthew Gill: math, Pierre

# TRACK/CROSS-COUNTRY

Heidi Quail: math, Volga

Anthony Bongard: math, Redwood Falls, Minnesota

Kelly Hall: general engineering, Sioux Falls Jacob Brinkmann: electrical, Plato,

Minnesota

Benjamin Jasinski: general engineering, Rapid City

- Tyler Schiferl: agricultural/biosystems engineering, Fordyce, Nebraska
- Clinton Schroeder: construction management, Irene
- Joshua Sundall: mechanical, Spirit Lake, lowa
- D.J. Thompson: computer science, Spearfish Bradley Tomschin: manufacturing engineering technology, Alden, Minnesota

Zachary Wirth: civil, Sioux Falls

# WRESTLING

Jared Aesoph: mechanical, Watertown Jeffrey Cooley: civil, Westbrook, Minnesota Travis Gottschalk: mechanical, Kimball, Minnesota

Bradley Gregory: manufacturing engineering technology, Glenwood, Iowa Jason Stripling: civil, Wabasso, Minnesota

# **EQUESTRIAN**

BrittaRae Barta: math, Glyndon, Minnesota

# SOCCER

Jessica Heine: civil, Sioux Falls

# SOFTBALL

Stephanie Peters: civil, Nerstrand, Minnesota

Brooke Postma: civil, Madison Brittany Postma: math, Madison

# VOLLEYBALL

Melia Iwamoto: civil, Honolulu, Hawaii



# Alpha Omega Epsilon

NEW SORORITY GIVES WOMEN ENGINEERING STUDENTS A PLACE TO CONNECT

It was more than a ceremony Saturday, February 23, 2008. It was a new chapter in the history of the college, when Alpha Omega Epsilon, a new women's engineering sorority, was initiated.

National officers provided official pomp to the proceedings. Speeches of congratulation and future success were offered up by SDSU Engineering Dean Lewis Brown and Assistant Dean Rich Reid, who staunchly encouraged all efforts by the three founding students:

- Audrey Bloemendaal, president, a junior mechanical engineering and music major from Zionsville, Indiana;
- Christine Keierleber, vice president, a sophomore ag and biosystems engineering major from Colome; and
- Natasha Buckle, secretary-treasurer, a sophomore electrical engineering major from Albany, Oregon.

## Colonization

Alpha Omega Epsilon will be called a colony until its members have met certain requirements. Within the next year and a half, they need to hold a "rush" recruitment event, create a banner, and conduct or be a working part of three events: one



Charter members of Alpha Omega Epsilon fraternity are, front row, from left, Audrey Bloemendaal, Natasha Buckle, Whitney Karpen, Kayla Nelson, and Christine Keierleber. Back row, advisor Norma Nusz-Chandler, Brittni Stephens, Michelle McKenzie, and Jennifer Kalbaugh.

"It's a way to get to know each other outside of class," Keierleber says. "There are 100-plus girls in engineering [at SDSU], but I can honestly say I might see twenty during the week. It's hard to make social

# "It's a big deal. If you're struggling being a woman in the field, you have a support group."

Natasha Buckle, secretary-treasurer

philanthropic, one social, and one professional. Only then will they be a chapter.

"We're all so motivated, fulfilling that in eighteen months won't be that hard," says Buckle, demonstrating the attitude that brought Alpha Omega Epsilon to the starting point to begin with.

What the organization will bring to SDSU women engineering students is a gathering place where they can become comrades on both a professional and social level. contact. As an ag engineering major, it's even harder. Last year, there were two of us; this year, five."

Bloemendaal, in her third year at State, says, "This is the first year I had a class with other females. We sat together and thought, 'This is monumental!"

## **Common hurdles**

The small pool of women in engineering is not unique to the Brookings campus. Nationwide, Keierleber says, only fifteen to twenty percent of all engineering students are female.

Because they're few and far between, women engineering students need each other.

"Alpha Omega Epsilon will help us connect," Bloemendaal says.

That connection may very well stretch beyond female students and reach other engineering majors—period. That could happen through Alpha Omega Epsilon's link to Sigma Phi Delta, the men's engineering fraternity that's been on campus for nearly seventeen years, since its initiation May 4, 1991.

It was Sigma Phi Delta members attending their national convention who first heard about Alpha Omega Epsilon. They returned to campus and broached the subject of a State chapter with Assistant Dean Reid, who ran the idea by several women engineering students.

Bloemendaal, Keierleber, and Buckle set to work in January 2007.





Adam Goblish's dreams have him earning a master's degree, then a doctorate, and working in research.

The thoughts that are in his head could fill a magazine, and lately they've been doing just that. His mechanical work has been featured in the January and February issues of *Farm Journal*, the largest national U.S. farm magazine with a national circulation of 430,000.

In the January issue, *Farm Journal* writer Darrell Smith told of Goblish's work to renovate a gooseneck trailer. In the February issue, Smith wrote about the creation of a quick-fill bean planter.

The trailer project won Goblish \$100 from *Farm Journal* and the planter project won a \$500 prize in the magazine's "I Built the Best" contest.

"Everybody's saying they saw" the articles in the monthly Missouri-based publication, the 23-year-old graduate student from western Minnesota says with a sheepish grin.

# Two for one

Goblish was interviewed in May 2007, about the time he earned his bachelor's degree from State in mechanical engineering.

The writer drove out to his hometown of Milroy, Minnesota, to interview Goblish about the soybean planter, and the Marshall (Minnesota) High School

# 'I Built the Best'

# FARM JOURNAL HONORS WORK OF ME GRAD STUDENT

graduate took advantage of a rainy day to also show Smith the trailer.

He built the planter about four years ago and the trailer three years ago.

"I applied engineering concepts to make them the best I could," says Goblish, who plans to earn his master's degree in mechanical engineering in December and continue in research.

# After-school project

He put about fifty hours into the planter and thirty-five hours into the trailer.

The work was done in the winter while he was going to school full time at State, about seventy-five miles from his home. "There were nights when I came home from painting my trailer and it was 11:30," he recalls.

Goblish did the work at the farm of Lloyd Welu and his sons, who are Goblish's contemporaries.

## A time-saving idea

The planter project was motivated by a desire to reduce the amount of time spent planting.

Goblish says that seed tanks from a John Deere 60 seed cart were added to a sixteen-row John Deere 1170 front-fold planter.

Now the planter holds enough seed to plant ninety-five acres. Before adding the seed tanks, the planter had to be refilled every forty-five acres, Goblish says. The Welus own the planter.

By purchasing used units, the planter was built for \$55,000. A centralcommodity planter that could have also done the job would have cost \$85,000.

## Not your grandfather's trailer

Goblish owns the 19 1/2-foot-long flatbed trailer, but it is stored at the Welu Farm, which also paid for part of the steel used in the reconstruction effort of the original trailer Goblish bought from his grandfather for \$400. Since finishing the trailer, "I've had people offer over \$4,000 for it. I've looked at trading, but I can't find anything as suited to my needs," he says.

Those needs include hauling a 1953 John Deere Model 60 show tractor to parades and informal plowing bees, towing combines to combine derbies, and hauling scrap metal.

## Ag machinery makeover

The 1979 trailer needed a lot of work when he purchased it.

"Four tires were flat, the brakes were shot and the bed was rotten. The paint was faded or gone and only one light worked," Goblish told *Farm Journal*. New wiring, lights, bearings, brake pads, and other items added up to \$2,300.

Even if he had bought a new trailer, Goblish says he would have wanted to customize it. Goblish's work included:

- Gaining additional parking space by shortening the beavertail from five to 2 1/2 feet;
- Gaining space by removing the flip-over ramps and creating a space to store them underneath.
- Cutting off the gooseneck hitch and raising it six inches.
- Filling in the space on the gooseneck hitch with wood to create a storage area and added safety chains.
- Moving the fold-down siderails outward away from the bed so he can have access to the tie-downs when the sideboards are up.

# Three little words

His other restoration projects include a two-bottom John Deere 44 plow and a sickle mower. A small, four-row corn planter is on his to-do list.

That work may not generate an article in the *Farm Journal*. But that's OK. Goblish says, "The most rewarding part is you can say 'I did that."

Dave Graves

**Students** 

# Bringing home the Schultz-Werth gold

GRADUATES' ACHIEVEMENTS REFLECT MATH & STATISTICS DEPARTMENT'S JOB WELL DONE

The prestigious Schultz-Werth Award is sought after by many an undergraduate, and usually they don't find their way into very many mathematical hands.

This year that was not the case. Three of the eleven winners of the 2007 awards went to students from the Math and Statistics Department.

"It's unusual for any department to win three in one year. The awards are highly competitive and tend to spread around across departments pretty well. A Schultz-Werth Award requires a student to choose a substantial topic, research it thoroughly, and present a well-written paper describing the results of the research," explains Department Head Kurt Cogswell.

"As might be expected, mathematics majors as a group are extremely intelligent and have excellent analytical skills, but they also have excellent personal and communication skills and are not afraid of a challenge," boasts Cogswell.

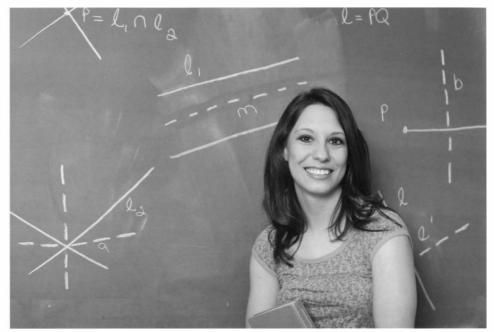
These characteristics, he explains, are what led to the success of Megan Haffner, Carla Roth, and Michael Loney. Between them, these mathematical superstars were awarded a combined total of \$3,000.

# Examining the geometry of origami

Advised by Associate Professor Donna Flint, Haffner won \$1,500 for her report on the relationship of *Euclidean Geometry and Origami*. In her research, Haffner presented mathematical properties of origami and their usability in solving Euclidean problems, correlating their procedures, and then establishing a distinction between them.

Haffner, of Sioux Falls, participated in other facets of SDSU life, including cheerleading, theater, the dance team, and the SDSU GEMS (Girls: Engineering, Math and Science) workshop.

Upon graduating, her plans included attending graduate school to study



Megan Haffner poses by a chalkboard with Euclidean geometry problems. The May 2007 graduate earned a \$1,500 Schultz-Werth Award for her paper on *Euclidean Geometry and Origami*.

epidemiology. She will pursue those plans this fall.

As far as her future is concerned, her career aspirations involve "working in a public health office, studying the effects of infectious disease on a population," writes Haffner.

# Shooting some hoops with Newton

Loney, advised by Professor Robert Schmidt, discussed ways to use Newton's Laws to find the best angle to shoot a swish from the free-throw line. He won \$750 for his report that reflects research giving suggestions to struggling freethrow shooters from a mathematical perspective.

The best shooting angle for a swish, Loney's research concluded, comes from shooting at a 50.6 degree angle. "This model suggests that aiming closer towards the back of the rim gives the player a greater chance of swishing the free throw," he states. Loney had plenty of opportunity to test the results of his research. He has been a member of the South Dakota State men's basketball team since 2003 and was captain of the team in 2006. For his career, he was a 72 percent free-throw shooter.

On campus, Loney was active in Campus Crusade for Christ, Student Athletic Advisory Committee, and SDSU Council of Teachers of Mathematics. He has also been on the dean's list for six semesters.

Following graduation, Loney enrolled in the graduate program of the College of Education while finishing his basketball eligibility. He plans to complete his master's in education administration.

Looking forward, Loney's career goals include teaching math and coaching sports in a high school setting, and perhaps even becoming an athletic director or youth pastor.

**Students** 



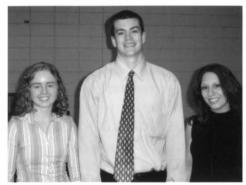
# Integrating genetics, bacteria and immunity

Carla Roth, advised by Assistant Professor Matt Biesecker, wrote her paper, *Modeling Immune Response to Bacterial Infection* in an attempt to combine "mathematics into the field of biology and continue the development of both fields." Judges awarded her \$750.

"Mathematical models have become integrated into numerous areas of biology," her paper claimed, "including cell kinetics, population ecology, epidemiology, and population genetics."

Nowadays, Roth is fulfilling one of her career goals and teaching mathematics at Tri-Valley High School in Colton.

Department Head Cogswell says, "This accomplishment tells us that our mathematics majors are graduating with the full range of skills they need to have productive, meaningful, enjoyable careers. The employers who hire our graduates repeatedly stress the need for strong personal and communication skills in addition to strong analytical skills.



The Math and Statistics Department's Schultz-Werth Award winners gather at the May 2007 spring commencement. Pictured, from left, are seniors Carla Roth, Michael Loney, and Megan Haffner.

"Whether the career be in financial engineering, business analytics, education, statistics, or any of the other excellent options open to mathematics majors, the days when analytical skills alone would suffice are rapidly disappearing."

For these three, that doesn't seem to be a problem.

Catherine Grandorff

# SHULTZ-WERTH

- Schultz-Werth Awards are given at the end of each academic year to SDSU seniors who submit superior research papers.
- The papers are judged on originality, scholarship, and creativity.
- The awards are open to all undergraduate majors.
- The awards are funded by South Dakota natives and South Dakota State College graduates Theodore Schultz, a Nobel Laureate in economics, and his wife, Esther F. Werth.
- They established the award in 1964 based on their belief in the importance of investing in people through education.
- Since its establishment, 313 students have received \$273,900 in awards.

# [Student NEWS]

# CHI EPSILON SCHOLARSHIP AWARD

Chad Stripling, a graduate teaching assistant in civil and environmental engineering, received a \$1,500 North Central District Chi Epsilon Scholarship for 2007-08.

Each year, there is one \$1,500 scholarship awarded for each of nine Chi Epsilon districts and six \$3,000 national scholarships.

Stripling's honor follows a 2006-07 award to him for the John A. Focht National Chi Epsilon Scholarship, but earning scholarships at that level isn't commonplace.

Stripling earned his bachelor's degree in civil and environmental engineering in 2006. This summer he plans to complete his master's degree in civil and environmental engineering with an emphasis on structural engineering.

# ASCE CHAPTER MAINTAINS TOP SPOT IN MID-AMERICA

Excellence continues its reign among members of the student chapter of the American Society of Civil Engineers at SDSU.

In spring 2007, the chapter was named the outstanding chapter in its zone, which spans the nation's heartland from North Dakota to Texas. It is the ninth year in a row that the chapter has won the zone or national title. In 1999 and 2004 the chapter won the Robert Ridgway Award for being the outstanding national chapter.

The club is looking for a tenth year from the report that was submitted in January 2008 for calendar year 2007.

One of the criteria is community service, and the club continues to

excel in that area. The chapter received honorable mention honors in community service in the Board of Regents Awards for student organizations at SDSU. The board will honor the SDSU winners when it meets on the SDSU campus June 27.

Jennifer Nelson, a senior civil engineering major, was selected for a \$2,000 scholarship for 2007-08. A dozen Samuel Fletcher Tapman Scholarships are given nationwide to members of ASCE.



# Distinguished Engineers

The classes of 2007 and 2008 added six names to the 112 persons already honored by the College of Engineering as Distinguished Engineers. Albert Billman, Ed Cannon, Ronald Mielke, and Wanda Reder were added at ceremonies April 20, 2007. Joining at the April 11, 2008, banquet were John Kappenman and Kenton Kaufman. Their abbreviated stories follow:

# BILLMAN BUILT AMERICA'S COLD WAR DEFENSE SYSTEMS



ALBERT "BILL" BILLMAN '27 received his

Distinguished Engineer award posthumously in April 2007.

Billman worked at the college plant when he enrolled at South Dakota State College in 1923 and continued in the power industry after he graduated. Billman worked for Texas Power and Light in Dallas from 1927 to 1941. He then began a distinguished

twenty-nine-year career with the U.S. Army Corps of Engineers. He worked on several sophisticated and secret military facilities, including Army training bases, a prisoner of war camp, and Cold War defense systems.

He was supervisory construction engineer for the top-secret U.S. Air Force SAGE (Semi-Automated Ground Environment) air defense projects in the 1950s and '60s. SAGE was a computerbased command and control system to thwart potential bombing attacks by the former Soviet Union.

Between 1959 and 1963, twenty-three SAGE Direction Centers and three SAGE Combat Centers were spread throughout the U.S. The centers were hardened concrete blocks or bricks with no decoration or distinctive architectural features and 130,000 square feet of floor space spread among three or four floors at strategic air command bases.

Each was linked by long-distance telephone lines to more than 100 air defense elements. The centers were built around a huge computer with 49,000 vacuum tubes. Within each center, about 100 operators could track as many as 400 airplanes, and differentiate the enemy from friendly planes by keeping track of flight plans, according to former SAGE programmer Jim Ray, a retired Boeing staffer living in Bellevue, Washington.

Billman also oversaw the construction of Minuteman intercontinental ballistic missile sites in Wyoming, where underground concrete silos were built to launch the fifty-threefoot high missiles at ranges of 3,000 to 8,000 feet.

He died in 1994 in Madison.



# CANNON CREATES SOLUTIONS FOR UTILITY COMPANIES

**CANNON '74** cofounded Cannon Technologies in 1988 in Minneapolis with his brother Joel, and it has become a multimillion-dollar corporation, which was purchased by Cooper Power Systems in 2006.

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Cannon started the business to deliver load management and automated distribution solutions to electric utilities. Cannon has branch offices in nine states,

including South Dakota, and works with more than 400 electric utilities across North America.

Utilities of all sizes apply Cannon solutions to manage peak load, improve system power factor, read meters remotely, and improve substation reliability.

Cannon has more than 150 employees, fifteen of whom are SDSU graduates. "Since the day we founded Cannon Technologies twenty years ago, our passion has been to help utilities better manage assets and improve system reliability," Cannon said in a message posted on the company Web site. In 1995, Mike Cannon '67, opened up the Sioux City, Iowa, substation-automation division of Cannon.

"We have had a lot of fun building the company and growing at an average rate in excess of 25 percent per year. We owe that to having tremendous employees and a great customer base," Ed said. "Our mentality has been 'check your ego at the door and whoever is the closest one to the broom closet sweeps.'

"People enjoy coming to work here as witnessed by our retention rate being close to 100 percent over the years. I was never the greatest student, but somehow I learned how to hire great people and then get out of the way and let them run."

Cannon's experience prior to becoming an electrical entrepreneur was with Westinghouse Electric in Pittsburgh.

Following graduation from SDSU, the electrical engineering graduate started as a trainee in the graduate student program and in fourteen years with the firm worked on projects involving power generation, transmission, and distribution systems.

Cannon was manager of distribution automation when he left to form his own business.

The Sioux Falls native had four siblings—Mike, Pat, Anne (Hajek), and Joel—who all graduated from SDSU. During Cannon's stay at State, he was president of Young Hall and served as finance director for the Students' Association.





# MIELKE MATCHES BUSINESS, MILITARY, COMMUNITY SUCCESS

**RON MIELKE '65** built a career as a Distinguished Engineer through nearly forty years with TSP, a 170-person architectural, engineering, and construction organization headquartered in Sioux Falls with offices in seven other Midwest cities. But he also has distinguished himself through service to the U.S. military and the Sioux Falls community.

In January 1965, Mielke received his bachelor's degree in mechanical engineering and also was commissioned as a second lieutenant in the United States Army. He served three years in the U.S. Army Corps of Engineers, including a one-year tour in Vietnam.

Mielke then went to the University of South Dakota to pursue a master's degree in business administration.

Upon graduation in 1969 he became a mechanical engineer at TSP (then The Spitznagel Partners, Architects & Engineers). In 1972 he joined the South Dakota Air National Guard as a captain in the Civil Engineering Squadron. He continued in the Guard for thirty years.

He attained the rank of brigadier general and for the last seven years of his military career was Assistant Adjutant General for Air for the State of South Dakota.

In the community, Mielke served numerous roles with the Sioux Empire United Way, including a two-year term as chairman. He also served six years on the Sioux Falls Chamber of Commerce board and was chairman for one year. He currently serves as chair of the Business Leadership Council and cochairs the recently formed Sioux Falls Area Military Task Force.

Mielke also has been a member of the Sioux Falls Downtown Rotary Club for more than twenty years and was president in 1997-98.

At TSP, an architectural, engineering and construction firm with vast experience in the design and construction of senior housing, schools, government buildings, and health-care and recreational facilities, Mielke became a principal in 1977 and assumed the role of president in 1981.

He held that role for twenty-one years, when he yielded the reins to Dick Gustaf and now serves as senior leader for TSP's construction services.



# **REDER SURGES TO TOP POSTS IN ELECTRICAL FIELD**

As an ag engineering major, WANDA REDER '86 thought she would be working for a rural electric cooperative: little did she

know this degree would distinguish herself in the field of electrical engineering.

The daughter of a West River rancher, Reder has become vice president for the Power Systems Services division of S&C Electric of Chicago, a privately held, global

provider of equipment and services for electric power systems. In a field of electrical engineering majors, Reder also has

become president of the Institute of Electric and Electronic Engineers' Power Engineering Society.

Of her academic background, Reder said, "Ag engineering gave me a solid understanding of the of the multiple engineering disciplines. Decisions made regularly are comprised of electrical, mechanical, civil, industrial, and economic factors.

"The ag engineering curriculum provided a good balance of those elements."

It was a summer 1985 internship with the National Rural Electric Cooperative Association in Washington, D.C., that sparked an interest in electrical distribution, where most of her twentytwo-year career has been devoted. From 1986 to 2001, she worked with Minneapolis-based Northern States Power Company (now Xcel Energy).

Her last four years at NSP were spent directing the firm's unregulated subsidiary—Ultra Power Technologies. The company performed diagnostic testing on distribution cable and generated \$3.6 million in revenues in its first two years.

That was followed by a short stint as vice president of energy at Davies Consulting in Chevy Chase, Maryland.

In August 2001, Reder became vice president of engineering and planning at ComEd Energy Delivery, a subsidiary of Exelon Company, which provides electric service delivery for more than 3.4 million customers in northern Illinois.

Her duties expanded and she became vice president of transmission and distribution with the parent company, overseeing operations in both Chicago and Philadelphia. Her duties included planning and maintaining ComEd's power distribution operations.

In 2004, Reder joined S&C Electric, where her responsibilities include overseeing analytical studies in the area of electric power switching and protection, directing the electrical and physical design of substations, and guiding project management for wind farms.

Reder has served on the governing board of the IEEE Power Engineering Society since 2002.





# **KAPPENMAN HITCHED CAREER TO A SOLAR FLARE**

Most of us check the weather report to see if in the morning we should pack an umbrella, snow boots, or sunscreen.

JOHN KAPPENMAN '76 is interested in a more distant forecast; a lot more distant. His interest is in space weather things like solar winds, geomagnetic storms, and solar flares.

His penchant for tracking

solar cycles and interplanetary magnetic fields stem from his position as a manager of the Applied Power Solutions Division with Metatech Corporation, a small California company. The Applied Power Solutions Division focuses on space weather impacts on electric power grids and other related technology systems.

The electrical engineering graduate joined Metatech in 1998 after spending twenty-one years with Minnesota Power, holding a number of senior management and technical positions.

In his current position, he directs the development of products, services, and consulting to clients worldwide, focusing on lightning and space weather impacts on electric utilities. Kappenman has been an active researcher in power delivery technologies. His primary engineering contribution has been research on lightning and magnetic storms and their disruptive effects on electric power systems.

He led a utility industry effort to deploy a monitoring satellite that now provides advanced warnings of geomagnetic storms (launched by NASA in August 1997).

Kappenman is a senior member of the Institute of Electrical and Electronics Engineers and the Power Engineering Society, and chaired its Transmission and Distribution Committee in 1994–1996.

In February 1997, Kappenman provided presentations to the U.S. Presidents' Commission on Critical Infrastructure Protection on the Potential Impact of Geomagnetic Storms on Electric Power System Reliability.

In June 2000, he lectured at the NATO Advanced Science Institute on Space Storms and Space Weather Hazards. In July 2000, Kappenman served on the Science Advisors Panel for the NOAA Space Environment Center.

He was a member of the Scientific Organizing Committee for the NATO Advanced Research Workshop on "Effects of Space Weather on Technology Infrastructure" in March 2003.

Kappenman presented testimony before the U.S. House Science Committee in October 2003 on the importance of geomagnetic storm forecasting for the electric power industry.



# MAYO RESEARCHER KAUFMAN EARNS DOUBLE HONOR

For KENTON KAUFMAN '74/'76, to paraphrase that 1960s Broadway title, "A funny thing happened on the way to a career."

Kaufman is a world-class researcher at a world-class facility — Mayo Clinic in Rochester, Minn.

His background is in ag engineering. While a graduate research assistant at SDSU in

1975-76, the Mitchell native established a human thermal comfort basis in air-conditioned tractor cabs. Kaufman taught in the Ag Engineering Department at North Dakota State University in Fargo from 1976 to 1986.

In 1983, he spent a year as a United Nations consultant evaluating the technical and economic feasibility of using coconut oil for diesel fuel in Fiji.

Today, Kaufman provides patient care in the Department of Orthopedic Surgery at Mayo Clinic and directs the Motion Analysis Laboratory in addition to teaching in the Mayo Clinic College of Medicine and conducting research in the Biomechanics Laboratory. In addition to being named a 2008 Distinguished Engineer, he was selected by the SDSU Alumni Association as a 2007 Distinguished Alumni.

While it may seem odd for an ag engineer to be a leading researcher at one of the world's foremost medical research labs, Kaufman notes that it is not as incongruous as it may appear.

He points out that his training was in power and machinery. "The principals that I learned in my training were in machine design and analysis of systems design. I apply those same principals to the body. I analyze the body as if it was a machine. That's why it is called biomechanics."

He cites the redesigning of the Marine boot as one of the highlights of his career.

"The Marines were using boots that were designed in the 1960s or '70s. You could buy work boots on the market and they were better than what the Marines were using. In boot camp, they were actually using tennis shoes for running because they were having so many injuries. Now they are using the 'sneaker' boot for all of their activities including running."

Kaufman says another career highlight is the opportunity to testify to the medical directors of a major insurance company and see medical policy be changed as a result of his testimony.

In May 2007, Kaufman reached a career pinnacle when the 1974 ag engineering graduate became a named professor at Mayo. Named professorships at Mayo Clinic represent the highest academic distinction for a faculty member.

# new Faculty







Mahdi Farrokh Baroughi

# Steven Christianson

CONSTRUCTION MANAGEMENT Instructor Steven Christianson joined the SDSU faculty August 15, 2007, after working as a project engineer with Myrl & Roy's Paving, Sioux Falls, from 1988 to 2007.

He also was a staff engineer with the City of Sioux Falls from 1985 to 1988 and a project engineer with the North Dakota State Highway Department in Valley City from 1978 to 1985.

The Estelline native received an associate's degree in math from Anoka Ramsay Junior College in Coon Rapids, Minnesota, in 1969, a bachelor's degree in history from the University of Minnesota in 1973, and a bachelor's degree from SDSU in civil engineering in 1978.

# Mahdi Farrokh Baroughi

ELECTRICAL ENGINEERING & COMPUTER SCIENCE

Mahdi Farrokh Baroughi, an assistant professor in electrical engineering's doctoral program, joined the SDSU faculty in February 2007 after serving as a research associate at the University of Waterloo in Canada from November 2006 to January 2007. He earned his doctorate in electrical and computer engineering there in October 2006.

Baroughi earned his bachelor's degree from Iran University of Science and Technology, Tehran, Iran, in 1997, and his master's degree from Sharif University of Technology, Tehran, Iran, in 2000.

He does research in photovoltaics, large area electronics, and microelectronic materials and devices.



Onyeka Ezenwoye



Hongshan He

# Onyeka Ezenwoye

ELECTRICAL ENGINEERING & COMPUTER SCIENCE Onyeka Ezenwoye, an assistant professor in the software engineering program, joined the SDSU faculty in August 2007 after completing his doctorate in computer science at Florida International University.

He earned a bachelor's degree in software engineering from the University of Manchester (United Kingdom) in 2000.

# Hongshan He

ELECTRICAL ENGINEERING & COMPUTER SCIENCE Hongshan He, a research assistant professor in electrical engineering, joined the SDSU faculty March 16, 2007, after two years as a staff scientist at North Dakota State University.

He earned his degrees in chemistry while living in his native China. He received his bachelor's and master's degrees from Lauzhou University in 1990 and 1993, respectively, and his doctorate in Zhongshan University in 1996.

He does research in photoconversion materials, luminescent materials, magnetic materials, molecular modelling, and crystallography.

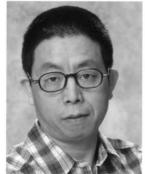
# Qiquan Qiao

ELECTRICAL ENGINEERING & COMPUTER SCIENCE

Qiquan Qiao, an assistant professor in the electrical engineering's doctoral program, joined the SDSU faculty May 1, 2007, after completing a postdoctoral fellowship at the University of Florida.



Qiquan Qiao



Xingzhong Yan

He received his bachelor's degree from Hefei (China) University of Technology in 1999 followed by a master's degree from Shanghai Institute of Optics and Fine Mechanics from the Chinese Academy of Science in 2003. His doctorate was earned at Virginia Commonwealth University in 2006.

He does research in organic photovoltaics, organic light emitting diodes, organic transistors, semiconducting polymers and dyes, and nanomaterials.

# Xingzhong Yan

ELECTRICAL ENGINEERING & COMPUTER SCIENCE

Xingzhong Yan, a research assistant professor in electrical engineering, joined the SDSU faculty December 1, 2006, after several years in Michigan.

He was born in Hunan, China, and received his bachelor's degree in chemistry from Hunan Normal University in 1986. That was followed by a master's degree in physical chemistry from the Chinese Academy of Sciences in 1991 and a doctorate in polymer chemistry physics from Zhongshan University in 1994.

He worked as a research scientist at the University of Miami (Florida) in 2001-02. He then worked as a research associate: seven months at North Dakota State University and fourteen months at Wayne State University in Detroit. He was a lab specialist at the University of Michigan for two years and research director at Michigan State University from July through November 2006.



# new Faculty







He does research in photovoltaic materials and devices, conjugated polymers, and near-infrared florescence dyes.

# **Gemechis Djira**

MATHEMATICS & STATISTICS

Gemechis Djira, an assistant professor, joined the SDSU faculty August 15, 2007, after working in Germany for the previous five years.

He taught courses at the Institute of Biostatistics at Leibniz University in Hannover from 2002 to 2007. From 1994 to 2000, Djira taught in the Department of Statistics at Addis Ababa University in Ethiopia.

His higher education began at Addis Ababa University, where he earned bachelor's and master's degrees in statistics in 1990 and 1994, respectively. That was followed by a master's degree from Limburgs Universitaire in Centrum, Belgium, in applied statistics (2001) and biostatistics (2002). His doctorate came in biostatistics from the University of Hannover in July 2005.

His research areas include simultaneous inference, bioassay, and bioinformatics.

# Xi Ge

MATHEMATICS & STATISTICS Xi Ge, an assistant professor in bioinformatics, joined the SDSU faculty August 15, 2007, arriving from Northwestern University in Evanston, Illinois.

He did a postdoctoral fellowship there from 2004 to 2006 in the Feinberg School of Medicine and in 2006-07 worked as a research scientist in the Center for Medical Genetics.

Jung-Han Kimn

Ge earned his doctorate in engineering at the University of Tokyo in 2000. He earned his bachelor's degree in applied physics (1994) and his master's degree (1997) in solid state physics, both from the University of Science and Technology, Beijing, China.

At SDSU he teaches upper level statistics and bioinformation as well as conducting research in bioinformatics.

He notes, "Modern biotechnologies often produce thousands or even millions of data points in a single experiment. Proper interpretation of such data is a big challenge. While this might be the source of headache for traditional bench scientists, it means opportunity for computational scientists."

# Jung-Han Kimn

MATHEMATICS & STATISTICS Jung-Han Kimn, an assistant professor, joined the SDSU faculty August 15, 2007, after working as a postdoctoral researcher at Louisiana State University from 2003 to 2007.

Previous to that, Kimn was at Worcester (Massachusetts) Polytechnic Institute as a postdoctoral fellow (2001-02) and a visiting assistant professor (2002-03).

He earned degrees in mathematics from Courant Institute (New York University), in 2001 (doctorate); Seoul National University, Korea, 1994, (master's); and Yonsei University, Korea, 1992, (bachelor's).



Kurt Bassett

# Kurt Bassett

MECHANICAL ENGINEERING

Professor Kurt Bassett has been on the SDSU faculty for most of the past twentyfive years, but he had a change of duties when Don Froehlich retired as department head June 30, 2007.

He was named acting department head and in late April 2008 it was announced that he will become the permanent replacement. Bassett had been serving as a professor in the department before gaining the promotion.

Bassett graduated from Wilmot High School in 1977 and began his SDSU career that fall. He earned a bachelor's degree in ag engineering in 1981 and followed that with a master's degree in ag engineering in 1983. His doctorate came from North Dakota State University in 1995.

Bassett served as a graduate research assistant in 1982-83 in the Ag Engineering Department and began teaching in the Mechanical Engineering Department in August 1983. From 1985 to 1987 he was a graduate assistant in North Dakota State University's mechanical engineering Ph.D. program.

Bassett was project development engineer for Johnson Controls from 2001 to 2005, when he returned to the SDSU Mechanical Engineering Department.

His research areas include heating, ventilating, and air conditioning system design, energy engineering, thermal systems, and indoor environmental quality.

# **Faculty**

# À

# [Faculty NEWS]

Assistant Dean RICH REID

was named teacher of the year in the College of Engineering in balloting by students February 27-28. In addition to his duties as assistant dean, Reid is a professor of civil and environmental engineering and teaches a number of classes.

This is the third time students have voted this honor upon Reid since he joined the faculty in 1995. He also was named educator of the year in 2000 by the Brookings Area Chamber of Commerce.

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Instructor HARVEY SVEC represented SDSU when State

received the Outstanding Adult Program award from the South Dakota Workforce Development Council at the council's banquet in Mitchell September 26, 2007.

SDSU was honored for an introductory welding course taught by Svec during the summer.

The eighty-hour welding class was coordinated by the Brookings Area Career Learning Center and the South Dakota Career Center in Brookings on behalf of Twin City Fan, which needed production welders.

Through the class, seven new \$30,000-per-year jobs were created.

## NADIM WEHBE, associate

professor of civil and environmental engineering, has been appointed by the American Concrete Institute (ACI) to chair ACI-ASCE Joint Committee 441: Reinforced Concrete Columns. Starting April 4, 2008, Wehbe will serve a two-year term, renewable for two additional terms.



Structural engineer Arden Sigl was glued to the TV when network news channels began to report on the collapse of the Interstate 35W bridge in Minneapolis August 1, 2007.

The next day he was helping the media explain what could have happened in the 6:05 p.m. terrifying sudden failure of the 1,907-foot bridge over the Mississippi River in the heart of metro Minneapolis that killed thirteen people and left 100 injured.

Sigl spoke on a noon, Aug. 2, broadcast of South Dakota Public Radio. That was followed by interviews with reporters from the *Boston Globe* and the *Argus Leader* in Sioux Falls.

The associate head of the Civil and Environmental Engineering Department found himself in the media mix quite by accident. A nine-month employee, Sigl stopped in the dean's office for other business August 2 and was asked if he was officially in to work.

He responded, "No, but . . ." With that hesitation, office manager Barb Dyer told him that public radio needed to talk with a structural engineer during its noon program. Sigl has been a registered professional engineer since 1973, and to his own surprise found himself consenting to the interview.

## In general terms

He says he normally shies away from such interviews because of the lack of first-hand evidence to address matters.

Sigl says he had to be cautious in his responses on *Dakota Midday* because he only had a living-room view of what happened. But he was able to talk in general about the truss-arch bridge and its catastrophic failure. Such a sudden collapse is indicative of tension failure, he explained.

The challenge for engineers is to pinpoint when that failure will occur.

# Bridge collapse brings media to Sigl

"You never know when that next load is going to break the bridge (will come). You can't say with certainty this" particular load will cause a collapse, he says.

Sigl also fielded some calls from listeners during the half-hour show that included a reporter from the Twin Cities.

Subsequent interviews with the newspapers were briefer.

## A solid source

It didn't surprise Carey Bretsch, owner of Civil Design Inc. of Brookings, and a 1981 civil engineering graduate, that the media would seek out Sigl.

"He's done a lot of research for the Department of Transportation and other agencies on bridge materials. He's well known throughout the local industry, the universities, steel fabricators, and steel manufacturers. He's trained the steel engineers that have come out of SDSU for the last thirty years," Bretsch says.

"I think he conveyed the message quite clearly. I heard him on public radio. He was good," Bretsch adds.

Assistant Dean Rich Reid, who also is a civil engineering professor, says Sigl is "a very precise person. I think his response was very measured and appropriate. It's always good to get that regional and national exposure" that comes when the media recognizes experts within the University.

Sigl agrees there is a sense in which his passage through the media spotlight has a benefit for the College.

The collapse did provide a good teaching opportunity as well as reminding Sigl to be careful when people ask, "Are you officially in?"

Dave Graves

# Phonathon pledges second highest in history

Callers in the twenty-fifth annual College of Engineering Phonathon came within one good donor of hitting its 2008 goal. The eight-day event brought in pledges of \$173,900, according to Phonathon cochairman Tyler Dutton. The goal was \$175,000. "With the economy kind of in question this year, it was a really impressive total," Dutton says of the January 26-February 2 event.

The tally wasn't far off the Phonathon record of \$178,145 in 2007 and well above what had been the second-best showing—\$165,060 in 2006.

Using the calling center at the SDSU Foundation Building, the College had a total of 150 students volunteer to cover forty-eight hours worth of calling. "A lot of people came more than once," says Dutton, a freshman whose first Phonathon experience came as the event's top dog.

# "If you have empty phones, money's not being made."

Tyler Dutton, Phonathon cochairman

He shared the duties with Brian Mattson, a senior and fellow electronics engineering technology major.

Dutton says, "The opportunity was offered [to be cochair] and I took it up. I got to know people in the other fields in the College of Engineering and get involved. It's been one of the favorite things I've done at college."

He hopes to be chairman again next year.

"It was a really good leadership experience teaching all the callers the process and getting to know the faculty," Dutton says.



Darin Waldner, a junior mechanical engineering major from Webster, gets some phone system advice from SDSU PhoneJack Kirsten Heitz during the third day of the twenty-fifth annual College of Engineering Phonathon January 28. The eight-day fund-raiser brought in \$173,900.

# A fast start

The Phonathon began with a blast— \$61,000 the first day and \$96,000 after two days. "We make sure we call our high donors right away. Having good

# **DEAN'S** CLUB

The Dean's Club is comprised of graduates and friends who gave \$250 or more to the College of Engineering from January 1 through December 31, 2007.

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

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LEFT: Michael Imholte, a senior mechanical engineering major from St. Cloud, Minnesota, talks with an alumnus. RIGHT: Heath Petersen, a junior electronics engineering and technology major from Sisseton, takes a breather during the twenty-fifth annual College of Engineering Phonathon.

relationships with the alumni really shows in this total," Dutton says.

The near record total wasn't simply an influx of old money.

"Surprisingly, we [also] had a good outcome with newer donors," Dutton says.

Unless otherwise directed, Phonathon dollars go to the department of the caller's major. "Our highest major was electrical engineering. It raised \$55,000-plus" and funds will be used to purchase supplies and equipment for labs and student projects as well as funding student and faculty travel to conferences, Dutton says.

Callers have individual incentives to participate in Phonathon as well.

During each shift, students have a chance to win movie tickets, sweatshirts, t-shirts, and \$10 in Brookings Bucks. Departments offer prizes on top of that. "If you have empty phones, money's not being made," Dutton explains.

#### Getting to know you

Another benefit is the "chance for engineering students to talk to people in their field," he says. "A couple people did get job leads."

There is a half-hour training session before each shift, but that doesn't keep some callers from being uncomfortable about asking strangers for money. "It's really hard at first for some callers, but the people they're calling are really nice. We send postcards out a week in advance so they know they're going to get called. A lot of callers came back for a second session, and they were really comfortable," Dutton says.

A committee of twenty worked under Dutton and Mattson in the following areas: training, marketing, job leads, food, office help, and materials.

"Everyone was really great in their duties and jobs, and we really had a good time," Dutton says.

Dave Graves

### **DEAN'S** CLUB

The Dean's Club is comprised of graduates and friends who gave \$250 or more to the College of Engineering from January 1 through December 31, 2007.

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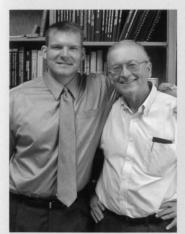
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Patrick Sigl '92, left, buddies up with his dad, Arden, during a fall 2007 visit to campus. Patrick Sigl also is a University of South Dakota law school graduate and works in the Arizona Attorney General's office as the lead attorney in water law. Arden is interim associate head of the Civil and Environmental Engineering Department. The younger Sigl spoke on water law to three different classes September 21 and 24.

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38 Impulse | SPRING 2008

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# Scholarships multiply like Jackrabbits

#### A DOZEN JACKRABBIT GRADS AT DGR PROVE TO BE PROLIFIC

"Once a Jackrabbit, always a Jackrabbit," or so seems the motto for SDSU graduates employed at DeWild Grant Reckert and Associates (DGR).

With the support of their company and the encouragement of the SDSU Foundation, a dozen SDSU graduates employed by the engineering firm have come together to establish three scholarships for students in the College of Engineering.

During 2006, the SDSU Foundation issued a challenge that proposed to match donations of \$500 every year for three years for the Jackrabbit Guarantee. Donors would then take on the full \$1,000 scholarship in the fourth year.

The employees of DGR, a consulting engineering and land surveying firm with locations in Rock Rapids, Iowa; Sioux City, Iowa; and Sioux Falls, decided to accept the challenge.

According to Lucy Forman of the SDSU Foundation, "DGR had supported the College of Engineering in different facets; this was an additional way in which to do it." Bruce Jennings, DGR president, and Blair Metzger, DGR Electrical Power Department head, agreed that the availability of matching funds was the final catalyst to get them motivated.

Metzger explains, "Our group came together pretty quickly, as there was a lot of enthusiasm for the effort. All of us felt that a group effort was a way to make a little more of a statement without breaking our individual budgets. Many of us also contribute to SDSU on an individual basis, so we had to find some balance with our efforts.

"We organized our effort on company time, but it really was more of a Jackrabbit initiative than a company plan. We have a great core of SDSU alumni in our company, and this was a good way to come together on an important initiative."

#### Supporting ag, civil, electrical

These Jackrabbits at DGR could have stopped at just one scholarship, but the employees at DGR felt strongly about helping SDSU students and took on three scholarships for three fields of

#### The JACKRABBIT GUARANTEE

The Jackrabbit Guarantee is available to any new firsttime freshman who scored a twenty-four or higher on the ACT or 1110 on the SAT. Eligible students will receive \$1,000 a year for four years if they take at least thirty credits each year and maintain a 2.5 or higher GPA.

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DRG engineers who contributed to Jackrabbit Guarantee scholarships are, front row, from left: John Madden, Bruce Jennings, Trent Bruce, Sara Smith, and Dan McMahon. Back row: Troy Metzger, Myron Adam, Blair Metzger, Curt Dieren, Chad Rasmussen, and Andy Koob. Not pictured: Bryan Wells.

engineering: agricultural, civil, and electrical.

According to Metzger, "The best way to insure the success of the engineering program at State is to be sure that the best students are encouraged to learn there. The Jackrabbit Guarantee, with an emphasis on scholarship and academic achievement, is a good way to encourage those students."

Forman notes the advantages of donating as a group: "It made it so that individuals do not have to commit at as great a level, but they still can represent their company and show their enthusiasm for SDSU. It also allows them to support students who might potentially work for them."

The SDSU students who receive these scholarships can only benefit from these scholarships. As Forman states, "DGR makes a substantial difference with these scholarships."

#### A benefit to DGR

But the employees at DGR benefit too. According to Jennings, "This opportunity gives us an immediate reward of team spirit in helping students, our profession, and SDSU. It gives us a chance to emphasize that the future of our company and our region is held by those who are now thinking about where to learn engineering.

"And, it gives us a closer connection to those students who may want to stay in the region and help to design the infrastructure of the future."

Forman notes, "DGR really appreciates their employees and SDSU." Their efforts to aid students and the College of Engineering are proof of that.

According to Metzger, "Our expectation is that the faculty and staff at SDSU will seek out the best and brightest of our area youth and use our funding, and that of our fellow contributors, to encourage those students to stick around to maintain this as the best area in the world to live and learn."

The scholarships are in their first year, and Eric Lenz of Brandon, Joshua Cahill of Sioux Falls, and Jesse DeCoteau of Sisseton, are benefiting from the help of their fellow Jackrabbits at DGR.

Says Forman, "Sometimes it just takes one person or company to make a difference."

Nicole Biever

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#### [Alumni NEWS]

**DENNIS CHRISTENSEN** '69 of Sun City West, Arizona, died October 13, 2007, at Sun City West. The 1960 math graduate spent his career as a math teacher to junior high and high school students, retiring in 1995. He also was a golf coach, leading the Rapid City Stevens girls' team to two state championships. He and his wife, Diane, moved to Arizona in 2000 to be closer to their grandchildren.

**DANIEL COOMES** '07 and Ashley Erickson were married June 15, 2007, at St. Patrick's Catholic Church in Montrose. He is an electrical engineering graduate who works for Interstate Engineering in Sioux Center, Iowa.

THOMAS DURLAND '84 of Twin Falls, Idaho, died November 23, 2007, in Boise, Idaho. The 1948 ag engineering graduate began his career with International Harvester in Sioux Falls and ran the family farm near Brookings from 1952 to 1966. He then became a district sales manager for Ford Tractor and Implement and moved his family to Twin Falls.

JARED HASKINS '05 married Kristin Korstjens September 8, 2007, at St. Lawrence Catholic Church in Milbank. The civil engineering graduate is a geotechnical and materials project manager with GeoTek Engineering and Testing Services in Sioux Falls.

**B.J. KEPPEN** '03/'07 and Katie Hoffman were married September 22, 2007, at Trinity Lutheran Church in Tea. He is math major who teaches math and coaches basketball at O'Gorman High School in Sioux Falls.

ALAN LOHR '60 of rural Raymond, was named in fall 2007 to the board of directors of the Children's Care Hospital and School Foundation. The retired civil engineering graduate now operates a pheasant-hunting operation and encourages donations to the South Dakota organization from his hunters.

NEIL R. PATTERSON '55 of Loveland, Ohio, died June 9, 2007, in Cincinnati at age 77. Patterson, a mechanical engineering graduate, served three years in the United States Air Force. After his discharge in 1954, he joined the Trane Company in La Crosse, Wisconsin, where he worked the next forty years. His positions included corporate director of market development and product planning. Patterson also participated in the American Society of Heating, Refrigeration and Air Conditioning Engineers. He retired in 1994 and moved to Loveland to be closer to family. **RODNEY PAULSON** '81 was promoted from senior mechanical engineer to managing director of Unified Theory of Sioux Falls in summer 2007. He spent seventeen years as a project engineer with the Veterans Affairs Hospital in Sioux Falls before joining Unified Theory in June 2006.

JIM SHOEMAKER '81 of Bettendorf, Iowa, staff engineer at John Deere, was awarded another patent in fall 2007. The electrical engineering graduate now holds nine U.S. and fifteen European patents for innovations in equipment for agricultural, construction, and professional turf care. He also has worked with off-road hybrid vehicles that use a combustion engine to drive a generator that powers electric motor-driven loads on the vehicle.

MATT SMOLIK '98 married Amy Bennett May 12, 2007, at St. Michael Catholic Church in Sioux Falls. He is a construction management major who is a project manager/estimator and farms south of Beresford.

**CALEB TEIGEN** '06 is a project engineer with GE Johnson Construction Company in Colorado Springs. The construction management major took the position after interning with the firm in summer 2006.

**CAPT. MARTIN WENNBLOM** '01 received the Bronze Star in fall 2007 for his work during a fourteen-month deployment in Iraq. He is commander of a company whose mission was to operate an ammunition storage area. The company moved more than 41,000 tons of explosives, valued at \$1.7 billion, to support all of the coalition forces in Iraq. Wennblom and his company returned to their U.S. Army base in Fort Carson, Colorado, October 22, 2007.

JORDAN WILLIAMS '05 married Rebel Dede August 10, 2007, at the Lutheran Church of Dell Rapids. Williams earned degrees in electrical engineering and engineering physics before enrolling at Washington University in St. Louis. He has completed his first two years of the M.D./Ph.D. program and has begun the research phase of a biomedical engineering program.

HEATH VONEYE '02 began work November 26, 2007, as the public works director in Madison. He began his career as a design engineer for the Washington Department of Transportation and then spent a year as a project engineer with the South Dakota DOT in Watertown. VonEye became an assistant city engineer in Brookings in January 2006. He is completing his master's degree at State in civil engineering.

# In Memoriam

#### BRUCE L. MILLER



Professor Emeritus Bruce L. Miller, 83, of Brookings, died June 1, 2007, at the Brookings Hospital.

He taught physics at SDSU from 1958 to 1988 and then tutored

university and high school students. He received the College's Distinguished Engineer Award in 1999.

Department Head and former colleague Orin Quist called Miller, "the ultimate servant. He was willing to help always in any way he could with a helpful and cheerful attitude."

Miller was born September 8, 1923, in Grove City, Pennsylvania, but graduated from Brookings High School and enrolled at what was then South Dakota State College.

He interrupted his studies to pursue work as a junior researcher on a government war project at the University of Iowa, which was followed by two years of military service. During that time he completed an advanced course in electrical engineering at Rutgers University.

Miller returned to State and earned a bachelor's degree in physics and mathematics in 1947. He received his master's degree and doctorate in physics from the University of Kansas. Miller then joined the Sandia Corporation in New Mexico and did research on damage assessments from nuclear detonations.

At SDSU, Miller was "an extremely competent and tough teacher that students liked and appreciated. But he will probably be remembered most for all his help to students that were struggling in physics. He never charged a fee for his tutoring.

"I've had students tell me he was solely responsible for getting them through physics," Quist reports.

He is survived by a son, a daughter, and ten grandchildren.

He was preceded in death by his wife, Marian, in 1990.

# Dependable income

#### NEW ENDOWMENT FUND AIDS MECHANICAL ENGINEERING DEPARTMENT

The name is unimaginative and the donor is anonymous, but the benefits that will be produced by the Mechanical Engineering Support Fund promise a colorful story.

In summer 2007, the department received a \$14,905 gift from a publicity-shy benefactor.

Even Department Head Kurt Bassett doesn't know the name of the donor, but he does know how the gift has helped the department. He said \$10,000 was set aside to endow the Mechanical Engineering Support Fund while the remainder was used to purchase a laptop computer, a tabletop projector for classroom use, and for data acquisition equipment for labs.

The support fund provides money for student travel, lab needs, and other needs not provided by state sources.

"One of our biggest needs is to maintain new equipment and new software," Bassett says. Phonathon dollars have helped with that need, but "the nice thing with an endowed fund, we know what we're going to have available each year."

#### **Programmable logic controllers**

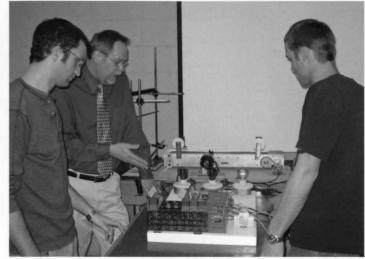
In the fall semester, the department began using a programmable logic controller in the dynamic system lab.

"Programmable logic controllers are widely used in all aspects of industry," Bassett says. "A lot of our alumni expressed that it would be nice if they had exposure to programmable logic controllers. That's one of the things we wanted to get for our lab from the donation."

The industrial-quality device is controlling simple versions of what would be found in a manufacturing setting, he says.

#### **Financing students travel**

In the fall, the department will have \$500 available from the endowment. Bassett foresees some of that going to fund trips to



Kurt Bassett, center, head of the Mechanical Engineering Department, explains the working of a programmable logic controller to seniors Chris Jerred, left, and Micky Oldenkamp. The mechanical engineering majors were in the first class to do a lab activity on the new device in the dynamic systems lab.

regional and national professional meetings, where students are recognized for their leadership skills.

"Previously people have contributed for specific projects and huge purchases, but this is the first time we've established an endowment," Bassett said.

Of course, \$500 won't cover too many motel rooms.

Ideally, mechanical engineering graduates will want to beef up the endowment so more money would be available, Bassett says.

Dean Lew Brown said he would like for donors to other departments to also create an endowment fund.

Dave Graves



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#### THEATER

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LEFT: Collin Boots was awarded first place at the fourth annual SDSU Program Design Competition held March 28. He stands with his parents Karen and Jim Boots of Redwood Falls, Minnesota. A total of thirteen schools were represented at the competition where high school students were challenged to design a software program to solve a graphic theory problem. RIGHT: Computer Science Professor Sung Shin (right), who created the Program Design Competition four years ago, stands with Sunho Lim, a software engineering professor, who developed the software design problem for students to solve for the competition.

### **Program Design Competition** gives students 'real world' practice

When it comes to acquiring an edge in computer skills that will greatly prepare students for future careers, the Program Design Competition is front and center.

For this year's competition, high school seniors were challenged to design a software program to solve a graph-theory problem.

Hosted by the Department of Electrical Engineering and Computer Science, a total of thirteen high school teams entered the March 28 contest. Their task was to develop a software tool that could illustrate the concept of a graph. Graph theory is considered one of the most important areas of study in computer science and software engineering.

First place went to Redwood Valley High School senior Collin Boots of Redwood Falls, Minnesota. Second place went to Chris Dilley, of William Kelley High School in Silver Bay, Minnesota. Tying for third were the Sioux Falls Lincoln High School team of Brandon Nesiba, Blake Neff, Nathaniel Nesiba; and the Western Christian (Hull, Iowa) High School team of Shaina Kollis, Rebekah Van Maanen, and Xi Sen Hou.

"We give the opportunity for high school seniors to be exposed to the real world, to real-life projects as early as possible," says Computer Science Professor Sung Shin, who came up with the idea for the competition four years ago.

"This event has been very successful and is attracting more teams every year," he adds. "This year's problem was a little more difficult than previous years. Graphic theory can be very complicated, but the students handled it very well."

Students can participate with little or no programming experience. They are directed to design a software application based on logical thinking, problem-solving skills, and math and science knowledge.

The teams must choose their own software and present their project on competition day. Entries are evaluated based on originality, creativity, completeness, and technical skills. Points are also awarded on clarity and organization of their presentation.

Software Engineering Professor Sunho Lim took the lead in developing the software problem seven months ago and was amazed how the students performed. Once the competition problem was issued to the schools, students had three months to come up with a solution.

"You all did a wonderful job," he tells the students before the awards were handed out. "I thought it might be too hard, but you proved me wrong. Congratulations on a job well done."

The contest provides a platform for industry and academia to encourage and focus public attention on the next generation of computing professionals.

"The main idea for this event is to give students a real good edge because the computer science job market is highly competitive," says Shin. "Students realize early on that this is good for them in the future."

For taking first, Boots will receive a \$1,000 scholarship for two years if he enrolls at SDSU and remains in the Department of Electrical Engineering and Computer Science.

For second, Dilley will receive a \$500 scholarship for two years if he enrolls at SDSU and stays in the department.

Each member of the third place team will get a \$250 scholarship for two years if they enroll at SDSU and remain in the department.

Plaques went to the coach of the top three teams, the team members received iPods, and their schools received Microsoft or Adobe software.

Kyle Johnson

### Your gifts support the College's vision



The College of Engineering strives to be nationally recognized, regionally relevant and student-centered. In 2007, more than 2,900 alumni and friends gave generously to support the College's mission.

From a \$100 gift for scholarships to a \$1 million gift to help build the new Electrical Engineering and Computer Science Complex, the financial support is critical to enable the College to realize the vision developed by Dean Lew Brown and faculty.

Private gifts make a difference. They support students and laboratories that are investigating alternative power and improving the structural integrity of bridges. Fellowships have been established by corporate friends to help with doctoral research. Scholarships help the college attract more bright students who will be our next leaders in the fields of research and engineering.

One of the main challenges facing the college is the need for new and improved facilities for classroom and research space. Five supporters stepped forward last year to provide \$3 million in lead gifts to move ahead with the new electrical engineering building. Other corporate and individual commitments have raised an additional \$2.4 million. Another \$2.1 million is needed to finish the project—the first of a two-phase project.

You can be proud of the College as it continues to advance its reputation as a leader in research and in producing the nation's top engineers.

#### Tim Reed

DIRECTOR OF DEVELOPMENT

#### CURRENT GIVING OPPORTUNITIES IN THE COLLEGE OF ENGINEERING

- Electrical Engineering and Computer Science Complex
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View of manufacturing floor in Brookings facility.

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Example of Lean Manufacturing implemented in the Brookings facility.

Chris Moller
Lean Manufacturing Manager
'98 SDSU Graduate
Mechanical Engineering



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BRIDGE INSPECTION – Balsa wood truss bridges are examined before testing their ability to withstand a minimum load of twenty-five pounds in the Bridge Builder contest at the College's Engineering Expo April 25. In addition to high school contests, the annual expo included the display of senior engineering projects and Larry Browning's "Wonders of Science" show.