



Impulse

**College of Engineering
South Dakota State University**

Spring 2005, Vol. 3, No. 1



FROM THE DEAN



Dear alumni and friends:

As this issue reaches you, we have just completed another historic year for SDSU and the College of Engineering!

As you read this issue you will see that there are many positive reasons for long remembering 2004, but I think history will show the year as a turning point for our graduate education programming with the approval of two new Ph.D. programs.

You will read about the recent approval of doctoral programs in Geospatial Science & Engineering, and Computational Science & Statistics. These two programs are good news for both SDSU and South Dakota as they will help support doctoral research of both great scientific value and economic benefit to the state.

Another piece of exciting news from 2004 was official notice from ABET, our engineering accreditation agency, that our four engineering programs were approved for another six years of accreditation. In our article, you will learn more about how important that news is for us, and of our plans for accreditation of other programs in the College.

This issue also features some articles that relate to our many outreach activities: from award-winning training and workshops to our successful student camps. Outreach activities are a special part of our land-grant university mission to South Dakota. The student outreach activities are aimed at our very future: one day, majors enrolled in programs in mathematics, engineering, science or technology.

Of course, we always include special features on award-winning students and faculty and this issue is no exception. Just look at the photo on the back cover and imagine how happy those students were to fly to Washington, D.C., and receive the nation's top award for a student chapter of the American Society of Civil Engineers! Then stop and realize that our ASCE student chapter won that same award just six years ago! We couldn't be more proud of them.

This is the annual issue where 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. As someone has so accurately stated, we have gone from a "state-funded" university to a "state-assisted" university, depending more and more on the private funding from our friends and the external funding from our research and outreach activities. Your 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



About the cover

Steve Tate, left, and Brennan Grant, researchers with Stennis Space Center in Mississippi, tie up loose ends before a weather balloon launch. The scientists were in Brookings in August 2004 as part of a research project with local members of the Joint Agency Commercial Imagery Evaluation Program, which received the Group Achievement Award from NASA August 12. NASA has contracted with SDSU for satellite imagery research since 1993.

Also in 2004, Department Head Dennis Helder received an award from the United States Geological Survey in recognition of his many years of education and research in the field of remote sensing. (See story page 12)

His expertise will be a major asset for one of the College's two new doctoral programs that will begin in the fall. (See story page 10)

Cover photo by Eric Landwehr.

Impulse

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The SDSU campus as imaged by the IKONOS satellite on June 30, 2000, from an altitude of 400 miles. The raw image was processed by Dennis Helder and the staff of the SDSU Image Processing Laboratory. See story page 10.

Impulse

College of Engineering, South Dakota State University

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Institute

looks to bring Enterprise to South Dakota

An important economic development arm in the state has its first home.

Located on the northwest corner of Medary Avenue and Eighth Street is the new Enterprise Center, a three-level brick building that houses the Enterprise Institute, the Avera Research Institute, and the SDSU Foundation.

Built with private funds through the Foundation, the 18,000-square foot facility was completed in fall 2004 at a cost of \$2.3 million and dedicated November 5.

While the Avera Research Institute focuses on clinical research, the Enterprise Institute is designed to serve the needs of budding entrepreneurs in South Dakota.

A project of the SDSU Foundation to grow new business in the state through education and research, the Institute acts as a pre-incubator or the first stage in helping an entrepreneur get started, much like a parent nurturing a child.

The Institute had been operating behind the scenes since May 2001, working with more than 400 entrepreneurs and projects. Previously located in the former SDSU Foundation

building and an office in Sioux Falls, the Center puts a public face on the mission of the Institute.

"To this point we've never marketed ourselves," says Assistant Director of the Enterprise Institute Tim Weelborg, who points out that the Institute is not about duplicating the services of other small business development centers.

"We don't try and compete with anyone," he adds. "We're a non-profit organization that's separate from the University. That's often a misconception. We are here to serve the whole state."

Minds who made it happen

The idea for the Institute came from Duane Sander, dean of the College from 1990 to 1999. A co-founder of Daktronics, Sander bounced the concept off Daktronics' other co-founder, Al Kurtenbach, now chairman of the board.

"I felt it would be very useful if we could have an entity close to the University with the ability to utilize University expertise as well as business expertise," says Sander. "I didn't see an entity like that in South Dakota and felt it was something that would be really useful."

It didn't take Kurtenbach long to jump on board, and with the financial assistance of others, the Institute was born.

"In South Dakota we have not benefited as much from the entrepreneurship of our University graduates since they tend to leave the state," says Kurtenbach, who knows a little something about being an entrepreneur. "The idea is to have more systems here so people could actually start more companies in South Dakota."

Sander is particularly excited about what the Institute means to students as they delve into the entrepreneurial world.

"We're looking forward to working with students who might form a team or do a project in one of their courses that develops into a commercial salable idea," he says. "They could apply for space and we would support them for a certain period to get them up and running."

Sander is also pleased that the Institute has a home in the Enterprise Center. "The initial dream was the Enterprise Institute, but this [Center] is an expansion and really is a tremendous opportunity for people in the state to

*"It's great to have a place like the Institute to help an inventor bring their product to market."
—Dan Houg, 1994 graduate*

Left: It was the dream of former engineering dean Duane Sander to have a facility that would assist entrepreneurs in developing a product and starting a business. The idea became reality when the Enterprise Institute found a home in the new Enterprise Center, just a block west of Crothers Engineering Hall.



Top: Dan Houg of Sioux Falls displays ColdSnap during the November 3, 2004, Innovation Expo at the Swiftel Center. Houg and his cousin, Mark Houg, invented ColdSnap to cover the blades of ice augers. The Enterprise Institute was instrumental in providing Houg the help he needed in developing and marketing the product.

help develop an economic mission for the state."

The drive for the building to house the Institute came from Foundation board members, with perhaps the hardest push coming from Jerry Lohr, a 1958 civil engineering graduate.

"The whole idea is to bind people together with an idea and be able to help them in whatever way they need, especially with any collaboration they might do with the University," says Lohr, citing assistance with patents, financing, and marketing.

"We have the incubator space on the lower level, which gives them their own office space," he adds. "Wherever they come from in the region, they can sit down and seek help with their ideas, because everything in this day and age is a collaboration."

Lohr had his own engineering idea that was incorporated into the building in the form of false floors, an architectural move that will come in mighty handy, according to Weelborg.

"All the heating, cooling, computer, and phone lines are down below," he says. "All the wiring that is traditionally in the ceiling is under the floors. We can move all the heating and cooling floor

vents ourselves, instead of calling an electrician, so the design offers flexible office space."

Proof of success

From ideas to implementation, the Enterprise Institute does make things happen.

Just ask Dan Houg of Sioux Falls. A 1994 SDSU agriculture business major with a marketing minor, Houg teamed with his cousin, Mark, in developing *ColdSnap*, a protective blade cover for ice augers.

Designed to cover all augers with eight to ten-inch blades, the covers are easily attached and provides protection to the auger tips, especially in harsh weather and during transportation.

"*ColdSnap* is quick attaching," Houg explains. "With the old covers, you have to set the auger down and take off your gloves to attach them with a cord that breaks easily and falls off all the time. This is a more convenient cover that snaps into place. It not only protects the operator, but it also cuts down on the expense of replacing costly blades."

Houg credits the Institute for assisting with early market research and pointing him in the right direction.

"It's great to have a place like the Institute to help an inventor bring their product to market," he says. "The whole process from start to finish is somewhat complicated. Without guidance, it's just too daunting for most people.

"The people at the Institute give you the confidence to go forward and take the mystery out of the process," adds Houg. "The Institute will create new businesses that eventually will increase the labor force and tax base. This is a long-term investment in the state of South Dakota."

According to Weelborg, the Institute works on between forty and fifty active projects every month. However, he says not every client is going to experience success like Houg.

"The process is like a spectrum," he notes. "It takes a number of steps to get to the end. There's not a great success rate, even with a group like us. Stats tell us that a majority of people don't make it, but we do our best to improve the odds so more are successful."

Weelborg points to success stories like *Glucoboy*, which is the first glucose

meter developed specifically for children. *Glucoboy* is inserted into a Nintendo GAMEBOY and the product downloads video game programs to reward children for maintaining good blood sugar.

For ice fishermen who don't want to handle two rods at the same time, *ICELAR* was created. It's a rod holder that can be placed at a convenient location, and when tapped, allows for a hands-free jigging motion.

To give consumers a healthy way to enjoy soda, *M.O.O.M.* was invented. Made out of milk, the product has the nutrition of milk, with the flavor, fun, and fizz kids like. Likewise, *PEANOTZ* is a roasted soy snack that tastes good with the nutritional benefits of soy.

It's those examples and more that makes for an exciting time, according to Kurtenbach, who senses a sea change in the state.

"I think there's a change taking place in South Dakota," he says. "People are thinking more positive with a can-do attitude. We don't have to look to somebody else to come here and do it for us. We can, in fact, improve our own state of life and generate jobs to employ our young people."

Kyle Johnson



Duane Sander, right, visits with Scott and Jeanne Chleborad, owners of Bludogg Communication Arts of Sioux Falls, during the November 3, 2004, Innovation Expo. The new event drew several entrepreneurs to show off their product at the Swiftel Center, attend breakout sessions, and listen to a keynote speaker.

Institute's strategy:

Help entrepreneurs hatch businesses

Perhaps it is appropriate that a fledgling business would start out on the bottom floor.

On the lower level of the new Enterprise Center on Medary Avenue there are twenty offices of different sizes intended for clients of the Enterprise Institute during their pre-incubation phase.

Institute staff members, who have their offices on the main level, then act as entrepreneur coaches, guiding their clients in a building-block fashion.

"We meet with the people who have ideas, whether they are young companies, student teams, or whatever stage they are in to help incubate their ideas," says Weelborg. "We hand-hold them through the business development process, plugging in our business services, and connecting them to business mentors. We want to keep their idea moving forward so they don't drop off the map as a lot of entrepreneurs do."

The Institute, which is led by director Marcia Hendrickson, has offices in Brookings, Yankton, Sioux Falls, and Lead.

An array of strategic services—from business assessment, capital sourcing, and financial analysis, to marketing analysis—is offered by seven full-time members and seven students, including six students from SDSU and one from South Dakota School of Mines & Technology.

While the Institute is open to anyone interested in starting a business or marketing a product, the College, by its very nature, figures to benefit since engineers are trained to design products.

An important resource for the Institute is the Product Development Center, formerly known as the Great Plains Rapid Prototyping Consortium. The relationship gives engineering students hands-on experience in developing actual prototypes for a potential business product.

"The Product Development Center is an integral piece in the business development process for entrepreneurs," Weelborg notes.

The Enterprise Institute, Avera Research Institute, and the SDSU Foundation each pay rent to occupy the Center. Private donors also contribute and the money is matched by the governor's office up to \$150,000 per year. In addition, clients either rent office space or are subsidized by the Institute.

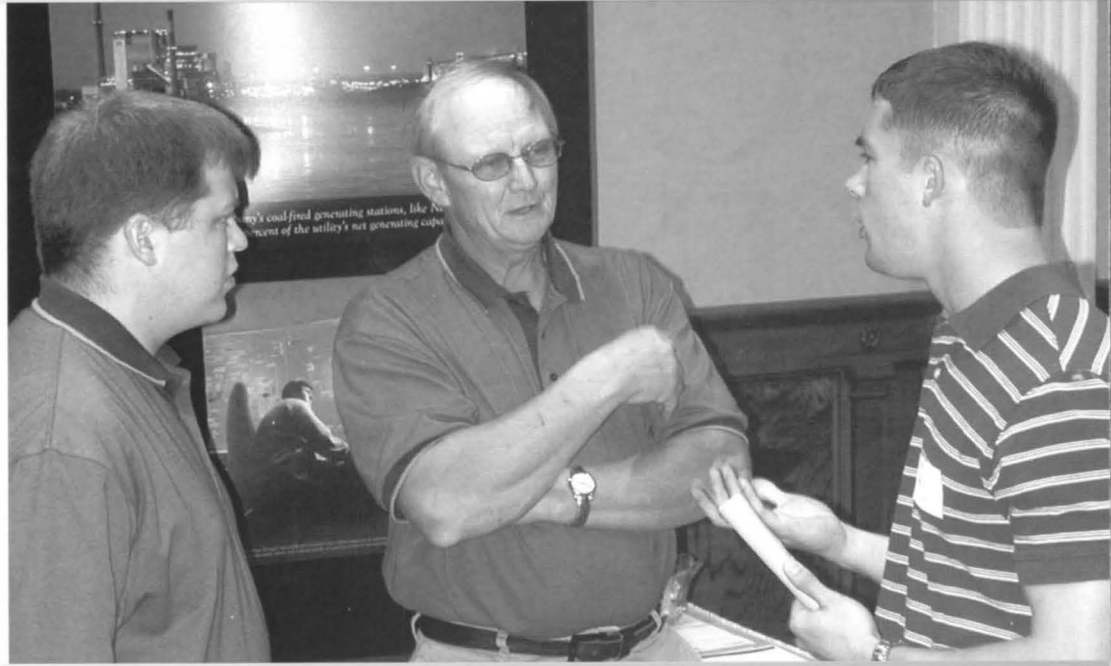
The Institute took the first step in marketing itself with its first Innovation Expo November 3 at the Brookings Swiftel Center. The event featured a distinguished entrepreneur lecture, informational breakout sessions, and industry/entrepreneur exhibits. The expo will be an annual affair, taking place the first Wednesday before Hobo Day.

"We're excited about the Expo," Weelborg says. "This is a great opportunity for South Dakota entrepreneurs to network with a variety of individuals and businesses who can help grow their idea or business."

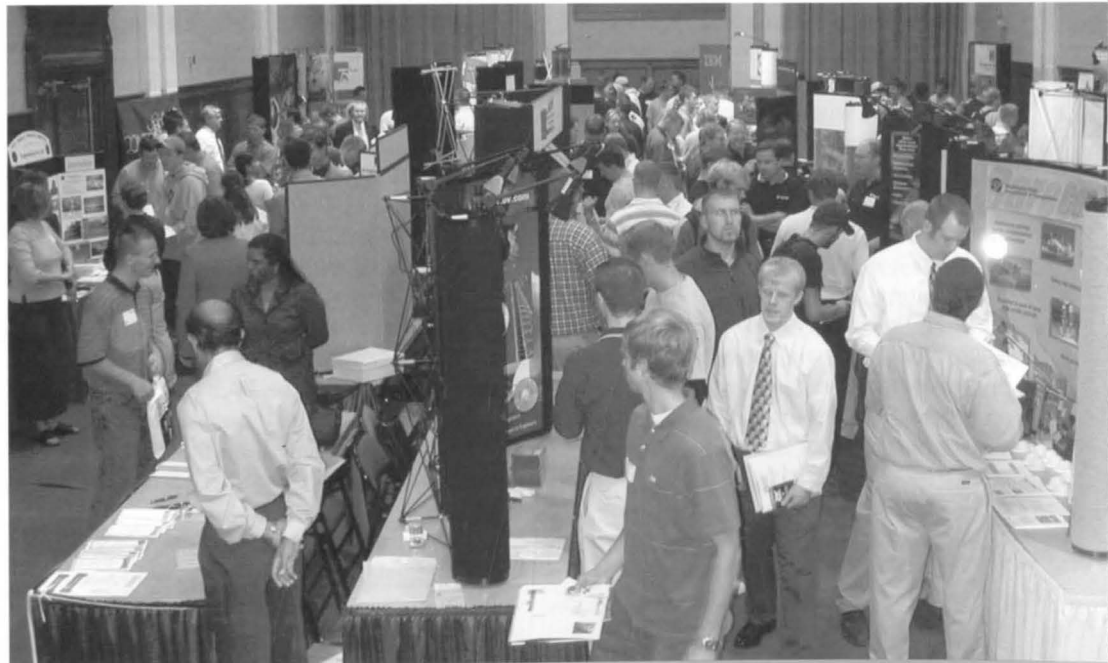
Kyle Johnson

ENGINEERING Job Fair

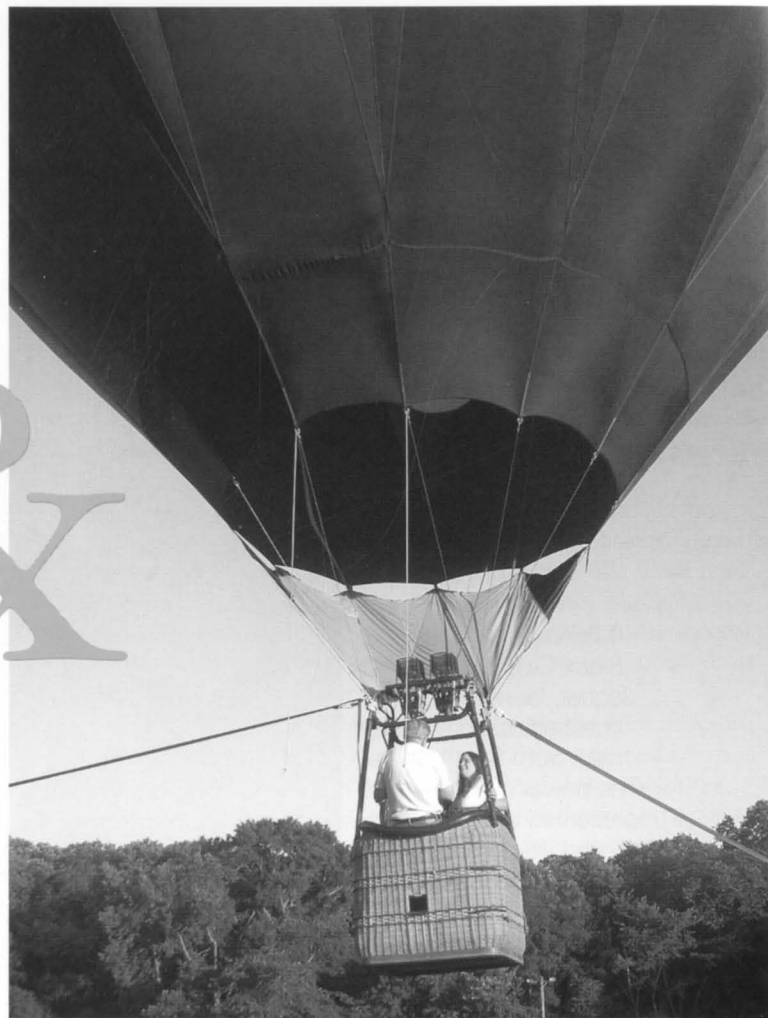
Checking the job opportunities at MidAmerican Energy of Sioux City, Iowa, is Matt Jaquet, far right, a senior mechanical engineering major from South Shore. The power company was represented by Chad Orris, left, and Dave Healy at the September 29, 2004, Engineering Job Fair at Peterson Recital Hall in the Lincoln Music Center.



Displays from forty-two companies and waves of students fill Peterson Recital Hall in the Lincoln Music Center at the September 29, 2004, Engineering Job Fair. The annual event was moved to the former library because an expansion project has the Student Union closed this school year.



ACE & YEA Camps



When SDSU's ACE camp sends a high school student slicing through the air at the controls of a Cessna 172 or floating up above the South Dakota prairie in a hot air balloon, it makes an impression.

Similarly, when Whitney Karpen, now a freshman mechanical engineering major, toured Daktronics at Youth Engineering Adventure camp, it did more than teach her how scoreboards are built; it made engineering real.

"Getting to see all of the things that go on at the factory was very interesting. It was also interesting to see all of the processes that must occur to put a scoreboard on the market," Karpen says. "It taught me about the many different parts that engineering plays in the real world."

Ultimately, Karpen's experience at YEA camp determined where she would go to college and why.

"YEA was the real reason that I decided to become an engineer," she

says. "I had thought about pursuing a career in engineering before I attended YEA, but the things that I learned at camp really cemented my plans."

Camp also cemented her college selection. "I had visited other schools in the region, but the time that I spent on campus during YEA influenced my decision to attend SDSU," says Karpen, a Jefferson, South Dakota, native. "I am very glad that I attended YEA because it helped me to make one of the most important decisions of my life."

"YEA was one of the best experiences that I have ever had because it was very exciting to realize that I had found something that I liked enough to want to spend the rest of my life doing," Karpen adds.

YEA camp's official objective is to build understanding and enthusiasm for engineering as a career among high school students between their sophomore and junior years.

"At this point in their lives, students are beginning to make college decisions, and YEA camp may help them decide if they want to go into engineering. Also, students may learn about careers they didn't know existed," Richard Reid, assistant dean of engineering, says. "YEA camp exposes students to hands-on projects, on-site tours of local engineering firms, panel discussions, demonstrations, and social functions."

Numbers show camp's impact

In addition to being good for students, YEA camp may also shore up SDSU's enrollment among prospective engineering students. "Since YEA campers stay on campus for the duration of the camp, they get familiar with our

Above: The Sioux Falls Hot Air Ballooning Club shows students how to inflate and deflate a hot air balloon at Tuthill Park in Sioux Falls at ACE camp in 2004. The wind died down enough for the students to receive a tethered ride.



Left: Youth Engineering Adventure participants complete an air motor in a lab at the week-long camp at SDSU June 13-17, 2004. That was the third year for SDSU to host the adventure, designed for high school sophomores and juniors. It attracted twenty-seven students, who undertook projects, learned engineering principles, and toured regional industries.

Right: Jon Goeden, Dustin Nelson, and Alex Nielsen, members of ACE camp 2004, gather around a Big Sioux Aviation plane while on a tour of the Brookings flight school.

"I am very glad that I attended YEA because it helped me to make one of the most important decisions of my life." — Whitney Karpen, past YEA camp participant



"You learn so much, and even if you do not go to school for anything remotely related, you become a more well-rounded individual and learn interesting things." — Jacob Ness, past ACE camp participant and counselor



campus and their experience may influence them to come here," says Reid.

Statistics collected by Reid have proven this. "For the summer 2002 YEA camp session, we had thirty-four campers. Twenty of them were accepted at SDSU, which is a fifty-nine percent payback, a very strong payback for a camp," says Reid.

"Of those twenty, fourteen are engineering majors. Eight other students were accepted at other South Dakota state schools, and of those eight, five are engineering students at the South Dakota School of Mines & Technology," Reid adds.

A flying testimonial

Aerospace Career and Education camp doesn't have the hard statistics, but former ACE camp attendee Jacob Ness, a sophomore history and geography major, testifies to the sway it holds over campers.

"ACE camp gave me many ideas about what I could do and how to achieve it," Ness says. "I joined the Civil Air Patrol, which helped me with my decision to join the Air Force. I am in Air Force ROTC and plan to be an officer when I graduate.

"I highly recommend that high schoolers who are interested in aerospace and aviation attend ACE camp," says Ness, who is pursuing a minor in aerospace studies.

"You learn so much, and even if you do not go to school for anything remotely related, you become a more well-rounded individual and learn interesting things. It's something students should take advantage of if they are given the opportunity," Ness adds.

Just the right size

Lori Sullivan, ACE camp coordinator, says, "ACE camp gives high school students a chance to experience and learn first hand about aerospace, aviation, and related careers. Students experience actual flying time, hot air ballooning, tours of scientific facilities, and discussions with professionals and experts in the diverse fields."

Activities like these impacted Ness so deeply that his excitement for ACE camp still flies high long after he has passed the eligible age to attend. Ness first attended ACE camp during his senior year at Grand Forks Central High School. Wanting to stay involved with the camp, he decided to serve a tour of duty as an ACE camp counselor, something he hopes to do as long as he is a student here.

For the past fifteen years, ACE camp's out-of-this-world educational opportunities have attracted a steady stream of campers, but recently, ACE camp's enrollment ballooned. ACE camp officials, pleased at the climb, discovered that the camp had also reached its ideal

enrollment. Now that ACE camp has found its enrollment sweet spot, they want to keep it there.

"In past years, we averaged about seventeen students, but for the past two summers, we have had twenty-six students, and we actually want to keep the camp enrollment right around there," Sullivan says. "With a smaller group, it is easier to take tours and gain hands-on experience that might not otherwise be possible."

YEA goes for corporate boosters

YEA camp, on the other hand, hopes to engineer ways to increase its enrollment through the implementation of corporate sponsorship scholarships.

The camp currently receives corporate sponsorship from area engineering firms and industries. These businesses offer financial support, donate supplies for the camp's activities, and allow campers to go on tours of their companies. Some area engineers devote their time to attend the camp and mentor the students.

YEA camp generally attracts about thirty students per session, but Reid hopes to boost that number to at least fifty. The new scholarships and continued corporate sponsorships will allow the College to do more advertising and attract more students.

Participants in ACE camp 2004 wait for their Styrofoam plane to be towed into the atmosphere at Watertown Model Air Plane Club's airfield northwest of Watertown. The students went to Lake Area Technical Institute in Watertown and worked in groups of four or five to build airplanes under the guidance of LATI's Professor Greg Klein and camp counselors.

After the planes were built and given a test flight to balance them, participants went to the Watertown club's airfield. A remote control model airplane towed the Styrofoam planes into the sky and then released them to glide. Pictured, from left, are students Andy Engelmann, Harold Morse, and John Lillevold; camp counselor Chris Swier, Klein, and camp counselor Lynette More.



John Lillevold, left, and Fielding Russell IV, members of ACE camp 2004, stand in the engine compartment of an F16 D fighter during a tour of the South Dakota Air National Guard at Joe Foss Field in Sioux Falls.



Al Kurtenbach, chairman of Daktronics, came up with the idea for companies, organizations, and individuals to contribute scholarships to YEA. Students are responsible for a \$100 registration fee, but the actual cost for each student to attend the camp is \$400 to \$500 or more, and the College, with the help of corporate sponsorship, pays the remaining cost.

"My idea was to raise scholarships that would pay the amount it costs for each student to attend camp, minus the registration fee," Kurtenbach says. "In the past, companies like Daktronics provided funding to YEA, but with the scholarships, an individual could give a scholarship for one student, and maybe a company like Daktronics could fund ten scholarships."

"Instead of asking companies to be corporate sponsors, we would be asking companies and individuals to sponsor a certain number of students'

scholarships," says Kurtenbach. "It brings it down to a more personal level."

Scholarship donors and paying parents might consider the camps' benefits from a student's slant.

At ACE camp and YEA camp, students like Karpen and Ness have discovered new ideas, experienced new things, gotten a head on their future careers, and chosen colleges. Because students' experiences at these camps have been invaluable, donors and parents should feel confident that their money is well-spent.

Nicole Schaffer

Today a camper, tomorrow a major

Of the thirty-four campers that took part in the summer 2002 Youth Engineering Adventure camp: twenty (59 percent) chose to attend SDSU and fourteen of those became engineering majors. Another eight went to school elsewhere in South Dakota with five of those becoming engineering majors at South Dakota School of Mines.

That means 82 percent of the campers stayed in state to go to school and of those that did, 68 percent majored in engineering.

Source: Rich Reid, assistant dean of the College.

YEA/ACE Camp

ACE Camp

July 10-14, 2005

\$25 application fee

\$225 camp attendance fee

\$250 total, with many scholarship opportunities

Contact: Lori Sullivan

ACE Camp Coordinator

Engineering Resource Center

Box 2220

Brookings, SD 57007-0199

Phone: (605) 688-4184

Fax: (605) 688-5880

YEA Camp

June 12-16, 2005

\$100 application fee

Contact: Mylo A. Hellickson

Department of Agricultural &

Biosystems Engineering

Brookings, SD 57007

Phone: (605) 688-5610

Fax: (605) 688-6764

A stamp of quality

Four programs reaccredited for maximum term

With dedications of renovated buildings in 2002 and 2003, what milestone would mark 2004 for the College?

Dean Lew Brown got that answer in July, when notice was received from the Accreditation Board of Engineering and Technology that all four of the College's programs had been reaccredited for the maximum of six years.

The Electrical, Mechanical, and Civil Engineering programs have been accredited since 1936. The Agricultural and Biosystems Engineering program has been accredited since 1961.

"ABET accreditation of a program indicates a standard of quality that is recognized universally in higher education, and it is an absolute must for our programs to compete with others," Brown says.

A laborious self-review was compiled in advance of a September 21-23, 2003, visit by a seven-member ABET team.

This was the first time the programs had been up for accreditation since new standards took effect in 2000. A greater emphasis is placed on measuring goals and student assessment. "Program outcomes and educational objectives all must be documented. It's gotten to be quite complex," Brown says.

"We owe our successful ABET review to the students, faculty, and staff of our four programs that were reviewed, and I couldn't be more proud of their performance.

"I am particularly proud of the comments made by the ABET reviewers to our president and provost: 'The students at

SDSU are strengths of the institution. They are well-grounded, are diligent workers, and appreciate the educational opportunities that are being provided,' and 'The collegiality of the faculty within the College of Engineering is an institutional strength. Their willingness to be engaged with each other to benefit students is admirable.'"

The accreditation covers the programs through 2010. The temptation might be to think about the next review in 2009, but the new accreditation requirements simply don't allow that.

Now an accredited program must continually measure its progress in achieving its objectives and outcomes, and use the results for continuous improvement.

"When ABET returns to campus in 2010, we will have to show them documented evidence of the improvements in our programs and students. It is a way to ensure that our engineering graduates remain best prepared for their profession," Brown says.

The college is also working toward program accreditation for Computer Science, Construction Management (to be visited for accreditation this spring), Electronics Engineering Technology, Engineering Physics, Manufacturing Engineering Technology, and Software Engineering.

"It is our hope that all of these programs will be accredited within the next two to three years," Brown says.

Dave Graves

NEW FACULTY

Electrical Engineering & Computer Science

Steve Hietpas, professor of EE/Csc, was named coordinator of the Electrical Engineering Program. He has taught at SDSU since August 1994.

Scott Overmyer, associate professor, is teaching software engineering. He holds a doctorate from George Mason University in Fairfax, Virginia, and comes to SDSU from Massey University, Albany, Auckland, New Zealand, where he was teaching in the Institute of Information & Mathematical Sciences

Songxin (Zongshin) Tan, assistant professor, came January 1, 2004, to teach electrical engineering. He earned a doctorate from the University of Nebraska-Lincoln, where he was a research assistant in the Department of Electrical Engineering.

Engineering Technology & Management

David Wahlstrom, associate professor, is teaching construction management. He holds a juris doctorate degree from Indiana University

and received bachelor's and master's degrees in civil engineering from SDSU in 1964 and 1970, respectively.

Wahlstrom comes from University of Houston, where he taught engineering technology.

Li Qian (Le Tcheon), assistant professor, is teaching manufacturing engineering technology. He holds a doctorate industrial engineering from Kansas State University and earned his bachelor's and master's degrees in mechanical engineering from Harbin Institute, China.

Qian comes from L.H. Thomson Company, Macon, Georgia, where he was a manufacturing engineer.

Math & Statistics

Solomon Harrar, assistant professor, is teaching statistics. He comes from Bowling Green State University in Ohio, where he received his doctorate in August 2004.

Rebecca Hunter, instructor, began teaching in mathematics after receiving her master's degree from SDSU in May 2004.

Dan Springman, instructor, is teaching in Math & Statistics Department as well as working at SDSU as a computer support specialist. He holds his bachelor's and master's degree from SDSU (1994, 1998 respectively).

Mechanical Engineering

Shanzhong Duan (Shawnjong Duwhan), assistant professor, comes from Novi, Michigan, where he was a software quality assurance engineer for Autodesk, Inc. Duan earned his doctorate from Rensselaer Polytechnic Institute in Troy, New York.

Physics

Robert McTaggart, assistant professor, came January 1, 2004, from Eastern New Mexico University, where he was an assistant professor. He holds a doctorate from Penn State.

Judy Vondruska, who has taught at the University since August 2001, was named a permanent instructor in physics. She holds a master's degree in astronomy from University of Arizona in Tucson.

New doctorates

Classes begin in fall for degrees in statistics, geospatial science

Action by the South Dakota Board of Regents at its December 2004 meeting left Dean Lew Brown feeling like both a winning coach and a new father.

"This will be remembered as a historic day for SDSU and the College of Engineering that came as the result of our teamwork and I couldn't be prouder," Brown wrote in a December 17 e-mail to faculty members.

His excitement was prompted by the Regents' approval of doctorate programs in geospatial science and engineering, and computational science and statistics engineering, the first doctorates to be offered by the College. Both programs will begin in the fall.

David Hilderbrand, interim dean of the University's Graduate School, says, "These additions will make us much more competitive for research grants. With a lot of funding agencies, your competitiveness is based on the reputation of the faculty and your doctoral programs."

A doctorate in nursing at SDSU and three doctoral programs outside SDSU also were approved by the Regents.

The focus on doctoral programs is being driven by Governor Mike Rounds' 2010 Initiatives—one of which is that South Dakota would become a recognized leader in research and technology development by 2010.

Doctoral programs impact economy

The concept is simple: Doctoral programs create research; research and development produces spin-off companies; and new tech companies mean good paying jobs and a stimulated economy.

The new doctoral programs in the College are designed to support that initiative, Hilderbrand says.

"In order to create opportunities to commercialize new ideas, you need strong, viable Ph.D. programs,"

Regents President Harvey Jewett says. "South Dakota must establish for itself a broaderbase of doctoral programs that generate new research, as well as additional education and employment prospects for our youth."

Funding for the geospatial science program will come from "internally redirecting some resources, and perhaps seek outside funding," Jewett says.

Statistics to have biological focus

The computational science and statistics program, which is being undertaken in collaboration with the University of South Dakota, is one of three statewide that will require legislative funding.

Governor Mike Rounds is recommending \$1.7 million in FY2006 for that program as well as a nanoscience program at Mines and a combined MD/PhD program at the USD medical school. The SDSU share of the computational science and statistics program would be \$170,000, Hilderbrand says.

Brown says between SDSU and USD there will be four or five faculty researchers hired. "Computational science and statistics is the development and implementation of sophisticated mathematical and statistical models into computer software for scientific applications. In our case, those applications will primarily be in the biological sciences. This will involve researchers who develop models to study living systems, whether it's populations of some species or interactions of molecules, and they want to use the models on very high performance computers. They will study and predict what happens in living systems," Brown explains.

Biostatistics will support other Colleges

The students will be directed by world-class biostatisticians who will teach classes in Brookings, Vermillion (USD),

and USDSU or the USD Medical School facilities in Sioux Falls, Brown says. Distance education technology will connect classrooms at each location.

"Ultimately, we will offer a significant number of classes in Sioux Falls, which both campuses view as a major focal point for medical research," Brown adds.

The new program "will have great applications in the College of Nursing, the College of Agriculture and Biological Sciences, and even Family and Consumer Sciences. Bonnie Specker [head of the Ethel Austin Martin Human Nutrition program] is very excited about this year. Her work is dependent on having high-level biological statisticians," Brown says.

He notes, "Computational science and statistics is a foundation to support areas for research in any of the sciences. I expect the principal researchers in this area to be in large demand in other areas of campus."

Geospatial science to work with EROS

The geospatial science program will offer specializations in remote sensing geography, which will interest geography majors, and remote sensing engineering, which will be attractive to those in engineering, Brown says.

The program also will support the research efforts of the new SDSU-EROS Data Center Geographic Information Science Center of Excellence at SDSU.

Geospatial science involves remote sensing, geographic information systems, geography, cartography, aerial photo interpretation, computer science, engineering and land surveying, environmental sciences, landscape architecture, and related aspects of statistics and public policy.

Brown says that it appears to be the only program in the nation that formally brings together geography and engineering programs for a doctoral program.

The concept is simple: Doctoral programs create research; research and development produces spin-off companies; and new tech companies mean good paying jobs and a stimulated economy.

Keeps EROS workers on the job

"Students will come from EROS Data Center [north of Sioux Falls], our campus and from around the world as the program becomes better known. We have already had outside students inquire about the new program.

"Data Center employees now take a leave of absence to go out of state and get their degree. Now they can continue to work and get their degree.

"This will be a highly respected program with more than fifteen scientists from SDSU and EROS involved in the program," Brown says.

He expects eight new students per year, building up to an on-going enrollment of twenty-four students.

"Typically, the program requires three to four years of study beyond the master of science degree," depending on where the master's degree was earned and how well prepared the student is, Brown says.

Dennis Helder, a department head and national expert in satellite imaging, will play an important role on the engineering side of the program.

"Dennis has been sending his master's degree graduates away from South Dakota for years. He has a waiting list for this program, some who are graduating this year, who will now stay in South Dakota because of this new degree," Brown says.

"Typically, our grad students go to neighboring states to pursue a doctorate and don't come back," he adds.

Dave Graves

Geospatial Science and Engineering

What: A multi-disciplinary program that focuses on geographic information science.

Faculty size: 20

Department heads: Dennis Helder (electrical engineering & computer science) and Roger Sandness (geography).

Expected first-year enrollment: 8

Program description: A three- to four-year course of study in which students can specialize in either remote sensing geography or remote sensing engineering.

Classes begin: Fall 2005

Computational Science and Statistics Engineering

What: Applies mathematical and statistical models to biological sciences.

Faculty size: 5-7

Department head: Kurt Cogswell

Expected first-year enrollment: 5

Program description: Curriculum will be research based with students studying and predicting occurrences within living systems through the use of high performance computers.

Classes begin: Fall 2005



The SDSU campus as imaged by the IKONOS satellite on June 30, 2000, from an altitude of 400 miles. The raw image was processed by Dennis Helder and the staff of the SDSU Image Processing Laboratory. Helder's research students now will be able to continue their education at SDSU while working on the new doctorate degree in Geospatial Science and Engineering.

Helder

From ham radios to satellites, Helder tops the field



When the United States Geological Survey gives out its highest civilian honor, people take notice.

When the 2004 John Wesley Powell Award winner was Dennis Helder, tributes abounded. However, in typical low-key fashion, the recipient was humble and quick to cite the sender.

"When I was notified, I was glad that I was sitting down," Helder says.

"It is so overwhelming that the people who initially supported me as a doctoral student, and have funded me for years to work for them, now are giving me an award.

"It should be me who is giving them an award for all that they've done for my career!" he adds.

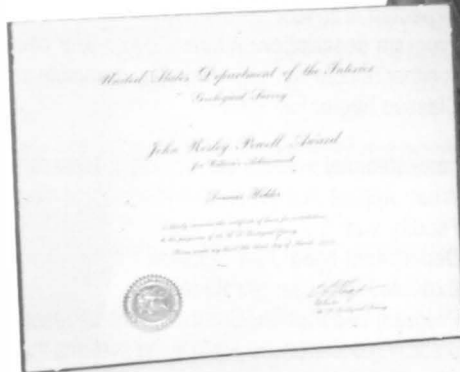
The award recognizes an individual or group not employed by the USGS whose contributions to the agency's objectives and mission are noteworthy.

For Helder, head of the electrical engineering and computer science department, the recognition stems for his many years of education and research in the field of remote sensing.

And, when it comes to satellite knowledge and advancing the mission of the EROS Data Center and the United States Geological Survey, Helder stands alone.

"Dr. Helder's selection for the John Wesley Powell Award brings tremendous distinction on himself, SDSU and the EROS Data Center," says Dean Lewis Brown.

"It is a tribute to his outstanding work as a scientist, educator, and the long fruitful relationship he has fostered with the EROS Data Center," he says.



The United States Geological Survey's highest civilian honor, the John Wesley Powell Award, was presented to Dennis Helder, head of the electrical engineering and computer science department, on October 19, 2004, at a ceremony in Reston, Virginia. The recognition is for his many years of education and research in the field of remote sensing.

Hello destiny

Born in Sioux City, Iowa, and raised near Canton, Helder developed a passion for science as a young boy, especially electronics and ham radios.

Enrolling at SDSU, Helder took courses in animal science and electrical engineering, earning degrees in both in 1979 and 1980, respectively. During that time, he worked as an undergraduate research assistant.

During a two-year period after graduation, Helder farmed while delving into the electronics business. He worked on the development of the handheld cellular radiotelephone receiver. He also operated a two-way radio sales and service business, where he developed radio systems for rural South Dakota farms, businesses, and government agencies.

Graduate school beckoned for Helder, who gained a master's degree in electrical engineering from State in 1985. He was hired as an instructor and became interested in signal processing,

"I looked at that book and thought this has got to be cool. I read it and thought, my goodness, you can look at pictures as signals and process them as signals. That's what I got excited about. It tripped my trigger."

— Dennis Helder

because, "that's what they asked me to teach," he says.

Helder and destiny came face-to-face one particular day when he walked into a colleague's office and spotted a book on digital image processing. It was love at first sight and the two have never parted.

"I looked at that book and thought this has got to be cool," he says. "I read it and thought, my goodness, you can look at pictures as signals and process them as signals. That's what I got excited about. It tripped my trigger."

Dennis Helder stands between R.J. Thompson, chief of the EROS Data Center, left, and Dean Lewis Brown as Helder is recognized at SDSU for receiving the 2004 John Wesley Powell Award. It is the highest civilian honor given by the United State Geological Survey to an individual or group not employed by the federal agency.



The EROS connection

Helder went to North Dakota State University to earn a doctorate in electrical engineering, which he received in 1988. He returned to SDSU as an assistant professor, but still needed a dissertation project.

When told about the USGS EROS Data Center, Helder was all ears and immediately made a phone call. "I said, 'Hi, my name is Dennis Helder and I'm interested in image processing, are you?'" he recalls. "They said 'Come on down.' That was my first contact with them."

Helder was given an image processing problem that NASA was having with Landsat 5 since launching the satellite in 1984. Dark and light stripes were appearing in certain images of the earth's surface that scientists from around the country were unable to solve, that is until Helder came along.

"Nobody had been able to remove those stripes without destroying the rest of the image," he says. "I was able to fix it by creating an algorithm for a de-banding filter that restored the image."

A sense of accomplishment went running through Helder's veins. However, as he quickly points out, "Just when you develop some pride in what you do, you get humbled real fast."

Reality struck hard on Thanksgiving Eve 1990. The U.S. military asked the EROS Data Center for a large mosaic map of Saudi Arabia, which called for the "stitching together" of images from Landsat 5. Since Helder's new algorithm was working well, having been correctly used on three test cases, EROS installed it on their system. However, the result was not what EROS, and certainly Helder, was looking for.

"They used it without telling me," he says. "When they got that huge product,

the map of Saudi Arabia, my algorithm to get rid of the striping ruined the entire data set! It caused little problems that were unacceptable to their system. It hadn't been proof-tested enough."

And, to make matters worse, Helder was preparing defense of his dissertation. He drove to EROS to get the test images to put in his thesis, but upon arriving, he wasn't exactly greeted with open arms.

"They told me, 'By the way, your algorithm ruined a whole week's worth of work down here.' On the day before Thanksgiving, I went from an emotional high to feeling pretty worthless."

Not willing to accept defeat, Helder lay awake that night going over in his mind what went wrong, and suddenly it came to him.

"I got up at three in the morning and re-coded the algorithm and at six in the morning I knew I had fixed it," he says grinning. "It was eventually implemented at EROS and has worked ever since. So, my reputation went from this guy is pretty good, to oh, he messed up our data, but he fixed it, so I was good again!"

A valuable connection

Helder's relationship with the EROS Data Center has not only benefited him personally and professionally, but it has meant a great deal to SDSU.

The College annually receives between \$250,000 to \$350,000 from EROS and NASA for research projects, which "is a significant amount for this University," he says.

Not only have faculty members partnered with EROS and NASA scientists, but a new doctorate program in geo-spatial science and engineering was created with a specialization in remote sensing.

"Dr. Helder has done conducting cutting-edge image processing work with EROS, involving many students at both the undergraduate and graduate levels," says Brown. "Through his work, he has also mentored students who went on to become outstanding scientists in the field. He has long been recognized as one of SDSU's top researchers and classroom teachers."

Helder is the founder and leader of the Image Processing Laboratory within the electrical engineering and computer science department. It was established in 1988 to conduct satellite imaging research and has worked extensively with the EROS Data Center, and NASA's Goddard and Stennis Space Centers.

In addition, Helder established a radiometric, spatial and geometric calibration test site in Brookings to perform in-flight calibration of a variety of satellites, including Landsat, Earth Observing 1, IKONOS, and Quickbird 2.

Because of its accurate and consistent calibrations, the lab is a reliable source for the calibration team at the EROS Data Center, according to Bruce Quirk, chief scientist of remote sensing systems at EROS.

"Dennis is one of the country's leaders in the calibration of remote sensing data, particularly Landsat data," Quirk says. "He has built his reputation from years of hard work and is recognized as one of the world's leading experts in the calibration of Landsat data."

"The team at the USGS EROS Data Center was very excited to hear that Dennis had been selected for this very prestigious award."

Kyle Johnson

Hassan Ghazi

Retiring mechanical engineering professor

"I thought teaching was the thing for me. . . . It just came natural. I think it's a very honorable and rewarding profession."

Hassan Ghazi knows the key to good teaching. It's an approach that he has put into practice for more than twenty years.

"I think one of the secrets of good teaching . . . you've got to be at [the students'] level," he says. "You pass information at their level and you sequence it in a way they understand. An example problem then ties it all together."

In August, Ghazi celebrated twenty years with SDSU. "My whole life is around my job, my teaching job," says the mechanical engineering professor.

Even though he officially retired this December, Ghazi plans to continue his work with students by maintaining a campus office for students to visit and receive help. He names "contact with the students" as his favorite part of teaching. "I enjoy working with students very much."

Ghazi remembers his first experience teaching first- and second-year mathematics courses as a graduate student at Ohio State University. He earned his bachelor's degree in mechanical engineering at Purdue University in 1954 and both his master's and doctorate degrees at Ohio State in 1956 and 1962, respectively.

After teaching at the University of Akron and at Youngstown State University (both in Ohio), Ghazi went to work in industry for thirteen years.

He joined the BF Goodrich Company in Akron as a scientist, progressing through the ranks, and eventually supervising twenty-nine scientists, serving as corporate

consultants in engineering, management science, and computer science.

"We did all the advanced technical work," Ghazi says of his position with the company that manufactured a range of industrial and aerospace-related products.

Following his work for BF Goodrich, Ghazi, who has authored several papers and developed two patents, started a professional engineering consulting business. But soon he decided to return to teaching.

"I thought teaching was the thing for me. I enjoy it very much," he says. "It just came natural. I think it's a very honorable and rewarding profession."

In 1984, Ghazi, whose major areas of interest are fluid mechanics, thermodynamics, and heat transfer, accepted a teaching position at SDSU.

The father of three says that Brookings was "a nice place to raise kids. That's one thing that was a big plus for my coming here."

All three of his children graduated from SDSU—his daughter Najla in journalism; another daughter, Yasmine, in mechanical engineering; and his son Tarek in computer science.

His wife Mayla has a pharmacy degree from the American University of Beirut. She received a doctorate in plant science at SDSU.

From 1985 to 1990, Ghazi served as mechanical engineering department head. In addition, he served as advisor of Pi Tau Sigma, an international mechanical engineering honor society. Ghazi says he enjoys taking students to the society's national convention



Professor Hassan Ghazi reviews a student presentation on aerodynamics design during his final week of instruction in December with, from left, Scott Christianson, Steven Menning, Jessica Weber, Benjamin Taecker, Joseph Spee, and Kevin Meier.

because SDSU students learn how they compare to students from other schools.

"South Dakota State . . . can stand up to any other school," he says. "They [the students] find that they are just as good as they [students from other schools] are."

While Ghazi says he has no specific plans for his retirement, he hopes to study as well as travel. Europe remains a place of interest for the Syrian-born professor.

"When I was growing up, we had a lot of contact with the French and British," says Ghazi, who initially studied under the French system in his native country. He has visited both countries in the past, and now hopes to travel to Spain and Germany and "see more of Europe."

Denise Watt

Structures Seminar



Nadim Wehbe

Seminars extend College's role

When the College's majors walk off the Frost Arena stage with their diploma and then receive their Order of the Engineer ring, the University's commitment to these students is not ending.

That is especially true for graduates whose profession requires continuing education.

For going on thirty years, the Civil and Environmental Engineering Department has provided off-campus education to practicing engineers. In addition to the structural seminar, which was first organized in 1975, the department offers outreach with geotechnical, transportation, and surveying seminars.

These one-day events provide engineers in the Upper Midwest with a chance to gain required professional development hours.

The seminars are an attraction for government agencies, city and county engineers, the state Department of Transportation, and private sector engineers, according to Associate Professor Nadim Wehbe, who has coordinated the structures seminar since coming to SDSU in 1998.

Information and networking

Troy Borchard, a project engineer with the Department of Transportation, says the seminars allow participants to become "exposed to what different people in the industry are doing. . . . You get a knowledge base of contacts, who you can call about what."

Marcy Halstenson, a structural engineer with Rise, a Sioux Falls consulting firm, agrees.

"The seminars have been very useful and you get to exercise your networking skills. It's good to visit with others in the industry and to keep up on the latest trends. The seminars also keep you updated on codes.

"What I like about Nadim's seminars is they're local. Different parts of the

country have varying design requirements. He has quality, local speakers that are familiar with our design requirements. This is very beneficial from a practical standpoint."

Some of the speakers, such as Borchard '00, are alums. Another alum, Lionel Dayton '95, has helped Wehbe put the seminar together for the last three years.

That work includes selecting seminar topics, lining up speakers, promoting the conference, and lining up co-sponsors, which have provided free publications, offset the cost of coffee breaks, and funded registration for students.

Practical for students

Each year six to ten of Wehbe's students voluntarily attend the conference.

"It was good to get the perspective of those who practice in the field rather than just the academics," says Caleb Jobs, a graduate student from Stewartville, Minnesota, who attended the fall 2004 seminar with classmate Tom Hamlin of Madison.

"We had adequate class background to understand what they talked about," Jobs adds.

Rather than design theory, the seminar presenters were "more interested in the practical aspect of getting it built," he says. Jobs compared it to getting the CliffsNotes on a subject, which this year was steel-framed and composite structures.

Past topics have included reinforced and prestressed concrete structures, masonry structures, light-gauge steel structures, and timber structures.

Participant interest helps drive topic selection. "People who are out in the trenches and deal with every day design issues help us get an idea of what is being used in the field," Wehbe says. "That also sheds some light in discussing practical problems when I'm in the classroom."

Economical learning

Halstenson adds that the structure seminar offers another practical benefit: "It's very economical." At the 2004 seminar, early registrants paid \$90 and received credit for seven professional development hours. "I just received information on a seminar in New York City for fourteen professional development hours for \$900," notes Halstenson.

Borchard said his office took thirteen engineers to the Sioux Falls seminar, something it couldn't do for an expensive conference.

The opinions of Halstenson and Borchard apparently are held by others in the field. Each year the event attracts about seventy engineers from South Dakota and neighboring states.

As the outreach events heads for its thirtieth year, Wehbe is considering a two-day event or possibly holding a spring and fall seminar.

Dave Graves

Structures Seminar

Structures Seminar

Who to contact: Nadim Wehbe,
605-688-4291

Geotechnical seminar

Who to contact: Allen Jones,
605-688-6467

Transportation seminar

Who to contact: Ali Selim,
605-688-6355

Surveying seminar

Who to contact: Charles Tiltrum,
605-688-6627

Water

Class drenched with praise, award

Even for old pros, there is no substitute for reviewing the fundamentals occasionally.

When a pair of Brookings water plant operators attended a day-long training session at SDSU in October 2004, they found themselves measuring pH and alkalinity, testing for chlorine, and conducting jar tests for turbidity removal.

Gary Englund and Mike Lund were among a dozen East River operators who were enrolled in the award-winning training program.

Organized and presented by Civil and Environmental Engineering Professor Delvin DeBoer, the program is sponsored by the South Dakota section of the American Water Works Association and the Northern Great Plains Water Resources Research Center, which DeBoer directs at SDSU.

Earlier this year, the state group was honored by the parent American Water Works Association with a national education award for the program.

Its popularity helps explain why national drinking water officials took note of the effort. This is the third year

for the program, which now is offered twice a year—once on campus and once at a treatment plant. “Classes fill with relatively little advertising,” DeBoer says.

That is because the classes offer hands-on training with a limited enrollment so operators can feel like they’re learning one on one, Greg Merrigan, manager of Clay Rural Water System, says.

Merrigan sent an operator to the campus session the first year it was offered and will send more in the future. The operator thought the training was “excellent. It gave him an opportunity to ask questions about our particular treatment plant and how we operated it,” Merrigan says.

DeBoer says operators come from municipal utilities and rural water systems. Some are just learning the trade. Others, like Englund and Lund, have been testing water since the glaciers melted.

“It was a good refresher course on some lab procedures for water analysis. I had taken Delvin DeBoer’s class for credit a couple years ago, a test and measurements class. I went back to this

more as a refresher because as a foreman I don’t perform those tests on a regular basis,” says Englund, Brookings water/wastewater plant operations foreman.

The one-day class focuses on the fundamentals of water chemistry and water quality analysis typically conducted by water treatment workers.

DeBoer says, “This whole thing wouldn’t have been possible without the renovation of Crothers Engineering Hall because we didn’t have the lab facilities for the class. It provided an appropriate environment for this type of course.”

The 2002 expansion and renovation of Crothers Hall included a quadrupling of the water lab’s space, improving seating capacity, and bringing it into compliance with health and safety codes.

Englund remarked, “I am really impressed with their remodeling and their lab facilities.” The previous course he took from DeBoer was taught when the Northern Great Plains Water Resources Research Center and the Civil Engineering Department had



environmental lab facilities in a building north of the current Swiftel Center.

"Their current facility is modern and well lit with a conference area up front for a class, and lab equipment in back," Englund says.

In the summer, \$10,000 worth of lab equipment was purchased to allow seminar participants to work in groups of two or three. "It takes it from being a demonstration to letting each group be hands on and have their own experiment, DeBoer says.

The funding for equipment was split by the Northern Great Plains Water Resources Research Center and the state section of the American Water Works Association. When not used for lab training class, the equipment is available for SDSU environmental engineering students in courses and research.

"The laboratory training takes the operators through the theory and procedures of chemistry. It also improves their ability for quality control in the laboratory," DeBoer says. The bottom line is that operators are more efficiently able to gauge the quality of our drinking water.

That helps explain why Merrigan calls the class a "good, first-hand experience from someone who is well trained."

Dave Graves

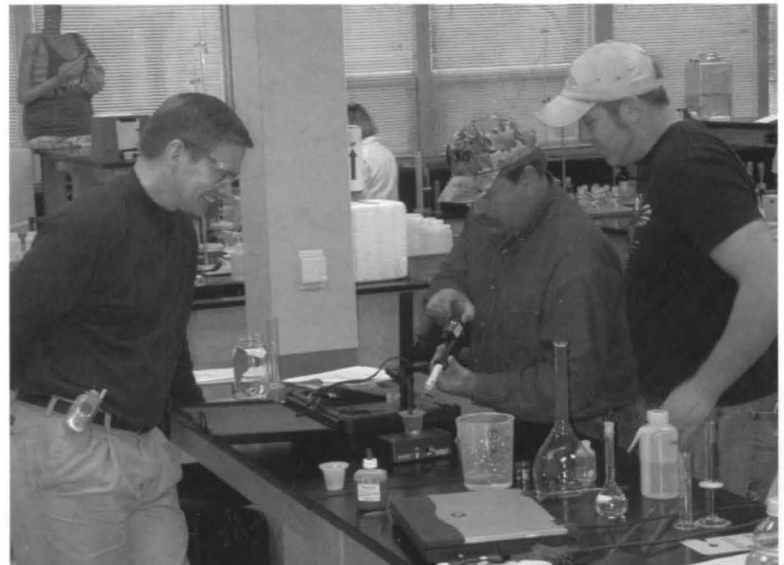
Left - right

Del DeBoer, far left, reviews standard methods with participants at the October 28 training session for water plant operators in the environmental laboratory at Crothers Engineering Hall. Among the dozen East River participants in the one-day workshop are, from left, Gary Spencer of Sisseton, Justin Patek of Watertown, and Gary England of Brookings.

Del DeBoer, left, reviews standard methods with participants at the October 28 training session for water plant operators in the environmental laboratory at Crothers Engineering Hall. Performing alkalinity tests are, from left, Gary Spencer of Sisseton, Justin Patek of Watertown, Bob Dubro of Watertown, and Gary England of Brookings.

Gary England, operations foreman, at the Brookings water and wastewater plants, calibrates a pH meter while Del DeBoer and others enjoy a laugh an October 28 training session in the environmental laboratory at Crothers Engineering Hall. This was the second year that DeBoer offered the training through the South Dakota section of the American Water Works Association and the Northern Great Plains Water Resources Research Center at SDSU.

Del DeBoer, left, observes water plant operators Gary Spencer of Sisseton, center, and Justin Patek of Watertown performing an alkalinity test during an October 28 training session in the environmental laboratory at Crothers Engineering Hall. This was the second year that DeBoer offered the training through the South Dakota section of the American Water Works Association and the Northern Great Plains Water Resources Research Center at SDSU.



With the goal of enhancing economic development, a pair of College professors are hoping Korean-made might translate into South Dakota-made.

That's what came from a fact-finding mission by Sung Shin, professor of computer science and Dennis Helder, professor and head of the electrical engineering and computer science department, to Seoul, South Korea, October 8-17, 2004.

Their mission was to identify venture companies with products that could be developed in the United States; specifically, companies that would partner with SDSU and the new Enterprise Institute, which serves as a pre-incubator for small start-up companies.

There was a recruiting side of the trip, too, informing students and faculty at Korean universities about SDSU. They gave presentations to large and receptive crowds concerning the College's

electrical engineering, computer science, and software engineering programs, Shin says. Their main emphasis, though, was touring small Korean companies for ideas, ideas that will benefit South Dakota. "Many Korean companies are very interested in developing their products in the U.S.," says Shin, who visits his homeland every year. "These may serve as a springboard for the development of new businesses in South Dakota, particularly in Brookings."

Timing is right

According to Shin, who is a member the College's research advisory committee, products already made in Korea will only require a small amount of research and development to make them successful in the U.S.

"In theory, this should result in a more rapid development of a salable product," he says. "I've found in Korea there are a lot of products that we don't have here or we may have a very similar

one, but price-wise is much cheaper than in the U.S. That means it's marketable.

"The key factor will be to locate a person or persons here who would want to develop such a product," adds Shin. "They may be faculty, students, people outside the University or a combination of both."

As the director of research for the College, Helder says the timing is perfect for developing new businesses in South Dakota.

"Governor Rounds realizes that faculty and students at a university can really be catalysts for economic development. At our Enterprise Institute, we have a place that can give us support in terms of business plans, market analysis, and financial support.

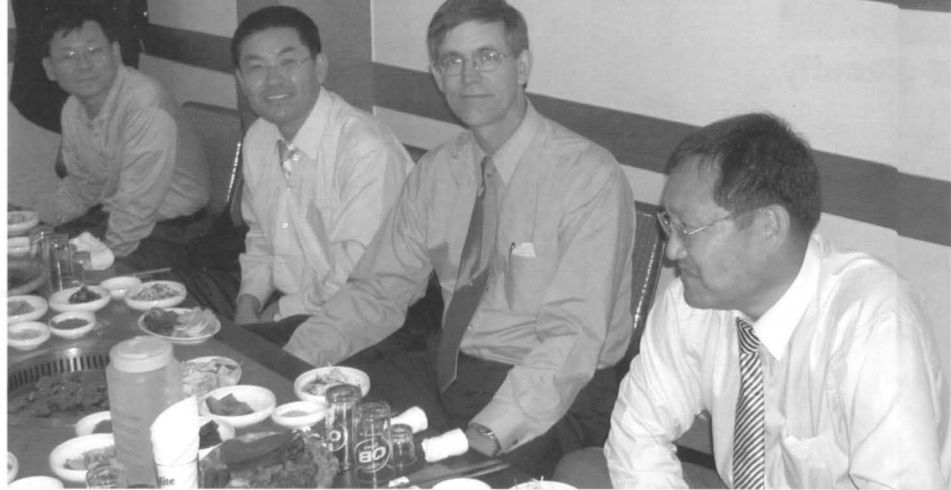
"In Korea there are these new venture companies that the universities and government are supporting," Helder adds. "We not only wanted to better understand how they do it, but to also

Korean

Korean products in South Dakota makes for good sale



"Koreans would like to work with anyone over here to get their products started, and why not SDSU?" – Dennis Helder



see their start-up companies and the products that we could Americanize. Koreans would like to work with anyone over here to get their products started and why not SDSU?"

The trip was also helpful in better understanding the Korean model that links universities with venture companies, much like the Enterprise Institute will be doing in Brookings.

Shin and Helder found the Korean system for developing venture companies in conjunction with universities comparable to what SDSU is doing, although they indicate Korean companies seem to be more closely linked to their universities.

"Incubation centers are right on campus and are funded through the university and not other entities," notes Shin. "In one case, university laboratory space was used to house offices of a venture company. We wanted to learn from this so we can get a good model for us here."

Potential companies cited

Three companies were singled out as most suitable for possible moves to South Dakota: BIT Computer, GIT [Geospatial Information Technology], and Xcurenent.

BIT Computer is the largest and perhaps the most successful venture company in South Korea. It provides medical telemedicine products like picture archiving and plastic surgery systems.

However, the main focus was on the company's electronic medical record system called "Dreamcare," which, according to Shin, would convert fairly easy in the U.S. since much of medical record keeping worldwide is based on the American approach.

In a demonstration of the system, a high-resolution video monitor of a patient was taken at a remote site fifty miles away, while a second monitor recorded data at a different site. Blood pressure, pulse, and EKG were taken remotely. In addition, an instrument

allowed for video of the patient's throat with tonsils clearly visible.

"This system has obvious applications for rural medicine," says Shin. "A nurse could do this at a remote location without the need for a doctor to be present. There is significant potential here for a new start-up company for our Enterprise Institute."

Helder agrees, pointing out that the system would be a perfect fit for a rural state like South Dakota.

"There is the potential for keeping the doctor, say in Brookings, let the nurse set it up, and the doctor gets all the information he or she needs remotely through a computer," he says.

"There are smaller scale systems that can be used in your own home, too, for example if you need to send an EKG to the doctor once a week," he adds. "Since the product is based on the American system, it would only mean changing the documentation and the software from Korean to English."

GIT specializes in two software products. One allows a user to create digital graphic products from aerial imagery in three dimensions to make a map for a geospatial information system. Similar products exist in the U.S., but the price tag is much higher compared to the same products made in Korea.

A second GIT product takes the output from other software and prepares the data for a database program. A significant feature of the software is that it checks for errors in the data. For example, if contour lines cross the user is able to solve the error.

Better e-mail protection

Xcurenent deals with network security and Shin and Helder were shown two major products: EMASS and VENUS/VirusWall.

EMASS is an e-mail security product that scans outgoing and incoming e-mail

for security breaches. It particularly focuses on detecting sensitive information outflow from a company. It scans text and attachments to determine if they contain sensitive information and alerts a security manager of a breach.

The VENUS product detects and filters inbound and outbound packets to prevent virus, worm attacks, and denial of service so e-mails are not lost. It can also detect unknown viruses.

"Xcurenent's products have the potential for being developed in Brookings at our Enterprise Institute," predicts Shin. "It's very doable, and if the right person or persons could be found, I think this is a viable opportunity to expand business in South Dakota."

What's ahead?

The next step, according to Shin and Helder, is to find the right people to work with through the Enterprise Institute and explore the potential of expanding Korean products here.

Helder says, "We came back with a lot of opportunities and concepts after being in South Korea for just a few days. The key is to identify entrepreneurs who could say this is something I would like to take a shot at."

Shin adds, "Dennis and I keep saying this is like going fishing. If we sit down and think and think and nothing happens, we have to move on. The same thing applies here."

Kyle Johnson

Left: Dennis Helder, left, and Sung Shin pose under a South Korean flag on Teheran Street in the section of Seoul where high-tech companies are located. A deep curb gave the "Mutt and Jeff" pair a chance to see eyeball to eyeball.

Above: Sung Shin, second from left, and Dennis Helder are flanked by faculty members of Computer Science Department at SuWon University at a Seoul, South Korea, restaurant during the trip that the SDSU professors took there October 8-17. Their mission was to identify companies that would partner with SDSU and the new Enterprise Institute.



Orie Leisure

Leisure time

Engineering professor emeritus retires after nearly forty years at SDSU

Orie Leisure knows about whoppers. His last walleye catch weighed in at nine pounds and measured twenty-eight inches. However, this fisherman can claim a whopper of another kind—a career spanning almost four decades in the classroom.

The engineering professor emeritus retired May 2004 after a long relationship with the university he called home as both student and physics professor. A Watertown native, Leisure came to State in 1956 to play football. Despite an injury during his sophomore year, he returned his junior year as quarterback of the '58 Jacks.

Off the field, Leisure dreamed not of teaching; but of working in an engineering business.

"When I first graduated from high school, I was pretty convinced that I was going to go into industry," he says.

After graduating from SDSU in 1960 with a degree in engineering physics, the young engineer went to work in Connecticut for Hamilton Standard, a division of United Aircraft Corporation, now United Technologies. The company manufactures propellers, jet fuel controls, and jet engine starters, according to Leisure. "When I originally went out there, I thought I was going into [the] missiles and space division," he says. Instead, in his two years with Hamilton Standard, Leisure worked with a group

"Students really educate themselves. You can either encourage them or discourage them. I like to think that I encouraged them." — Orie Leisure

of twenty-two people on electron beam technology.

"We became the advanced people," he says of the team, which solved engineering problems for the company. He still remembers his first project, which entailed fixing an electron creator made of tungsten.

Unfamiliar waters

Leisure remembers that he and his wife (Jody) experienced culture shock after leaving the Midwest. He estimates that Hamilton Standard alone employed 50,000 people. His five-mile commute took half an hour to drive, and he walked past guards stationed at the door of his workplace. The guards periodically searched the employees, he recalls.

"We weren't really, being naive kids, prepared for East Coast living," he says. "It was quite a change for us."

Hooked on teaching

In 1962, the Leisures decided to return to the Midwest, where Orie went to work at 3M in St. Paul. In 1963, Leisure returned to SDSU. While he says he

enjoyed the jobs within the engineering industry, he became hooked on a job he enjoyed even more—teaching.

"Both my wife and I were close to our families. It was not unusual for me to find a job closer to home," says Leisure, who had spent his junior and senior years of college tutoring. "Even though I could've been successful in industry, I wouldn't have been happy."

In 1965, he earned his master's degree in physics with emphases in nuclear and gamma ray spectrometry from State. That same year, he became a physics instructor at his alma mater.

Working across the country and at home

Teaching a summer course in nuclear engineering piqued Leisure's interest in nuclear science and its applications.

"By the time I graduated [from college], nuclear energy was one of the major developments going on in the engineering world," says Leisure, whose expertise led to a National Science Foundation faculty fellowship.

"I spent virtually every summer until 1985 traveling around," says the professor, who spent time working with the Nuclear Radiation Center at Washington State University to solve environmental problems.

Throughout his fellowship and career, Leisure worked closely with fellow professor and former physics department head Hans Graetzer to detect trace elements like selenium in soil, plants and metals in sewage sludge and chocolate. The duo's research encompassed local interests as well, including the Big Stone Power Plant in Big Stone City and sewage sludge from Brookings and Sioux Falls.

"We were trying to find something that fit with the agricultural thrust of South Dakota," he says.

'A pretty reasonable career'

Throughout his nearly forty years of teaching, Leisure taught all of the introductory engineering courses, nuclear engineering, introduction to modern physics, and electricity and magnetism. He says he enjoyed teaching the electricity and magnetism class because of the "mathematical vigor" it required. However, he names the modern physics course, which introduces students to concepts in Newtonian and quantum physics, as his favorite course.

"You learn so much [writing lectures]," says Leisure, who received the title of professor emeritus on June 25, 2004.

He speaks highly of his students at SDSU. "I always thought the average student was a little bit better than average," he says. "I think at times you wonder if you're doing anybody any good," Leisure says of teaching. "Students really educate themselves. You can either encourage them or discourage them. I like to think that I encouraged them.

"I found it to be a pretty rewarding lifestyle. I thought it was a pretty reasonable career."

At home on the lake

Throughout his retirement, Leisure hopes to continue his family's tradition of spending time at the lake with his four children and six grandchildren. The Leisures first began spending time at the lakes of northeastern South Dakota when they returned to the state in the early 1960s.

"We began our love affair with Buffalo Lake," located about ten miles west of Sisseton, he says. "This summer, we lived virtually at the lake full-time."

The Leisures may continue another family tradition—traveling. "I threatened to get to California before I die," says Leisure with a laugh.

And with his newly found 'leisure' time, Orie has time to focus on his other passion—fishing.

"I guess I was thinking it would be nice to go fishing anytime I wanted," he says of his retirement. "I try to catch lots of walleyes." Orie Leisure looks ready for retirement with his polo fishing shirt and a framed copy of the Board of Regents' resolution declaring the physics instructor to be a professor

emeritus. He retired in May after thirty-nine years at the College.

Denise Watt

"A Life of Leisure"

- Played quarterback for the 1958 Jackrabbits.
- Worked for three years in electron beam technology for Hamilton Standard Division, a United Technologies Corporation company in Connecticut, and for 3M Company in St Paul, Minnesota.
- Earned his master's degree at State in 1965, the same year he became a SDSU physics instructor.
- Received a National Science Foundation faculty fellowship in 1974. One of ninety-one recipients, he was selected from a pool of 683 applicants.
- Measured his largest walleye catch at 9.3 pounds and 29 inches.

FACULTY NEWS

Correction:

The College's list of Distinguished Engineers currently stands at 107. That number will grow when another group is added at the Distinguished Engineers' banquet on April 22. The summer 2004 issue of *Impulse* listed the names of 107 engineers, however, the editors lost count and listed the wrong total in the article and the headline.

Honored with a star quilt

MaryJo Benton Lee, the College's diversity coordinator, received a star quilt at an end-of-the-school year pow wow at the Flandreau Indian School in 2004.



The quilt was a gift from the FIS graduating seniors, recognizing Lee's work with them during the past four years of the SDSU-FIS Success Academy program. Lee is co-founder and coordinator of the Success Academy, an early and intensive college preparatory program for FIS students.

"The gift of the quilt and the playing of the honor songs are treasures that I will cherish my entire life. I accept them on behalf of the 150 faculty and staff members from throughout SDSU who have worked so hard to make Success Academy a true success," Lee says.

The fifth year of the program, which features visits to various colleges on campus, began in January.

MaryJo Benton Lee, the College's diversity coordinator, attended the Bureau of Indian Affairs—Office of Indian Education Programs' national meeting in August 2004 in Denver. She and Sandra Koester of the Flandreau Indian School presented the workshop "Success Academy: Transition from 8th Grade to College."

Lee is the coordinator of the SDSU-FIS Success Academy program, an early and intensive college preparatory program for Flandreau Indian School students.

Making the grade with townships

Ken Skorseth, right, field services manager with South Dakota Local Transportation Assistance Program, receives the Friend of Local Government Award from the South Dakota Association of Towns and Townships at its annual convention in Huron December 3, 2004, from association President Dan Thyen of Waverly.

Skorseth was honored for his work with Professor Ali Selim in authoring a gravel road manual that has gained worldwide acclaim and for the gravel road maintenance seminars that he annually conducts for the association.



Structures test

First tests performed in structures lab

June 28, 2004, marked a milestone for the College's Civil and Environmental Engineering Department.

That Monday, instrumentation sensors were fastened to a Daktronics' scoreboard and the first tests were performed in the Jerry Lohr Structures Lab.

The lab is the most visible component of the 24,000-square-foot addition built onto the southeast corner of Crothers Engineering Hall in 2002. Measuring twenty-eight feet high, forty feet wide, and ninety feet long, the lab features an overhead crane (funded by Lohr) and a twenty-four foot clearance for the testing of large-scale structural systems and components.

The facility was shown off during the rededication of Crothers in October

2002, but the room was a little bare.

However, in 2003 a \$280,200 grant was received from the National Science Foundation to leverage the purchase of \$400,300 worth of equipment.

By this summer, the equipment had been purchased and installed, says lab coordinator Nadim Wehbe, who pursued the grant with Arden Sigl, also of the Department of Civil and Environmental Engineering.



An outdoor scoreboard is connected to instruments and is ready for wind-load testing in the Jerry Lohr Structures Lab in Crothers Engineering Hall on June 28, 2004. These were the first tests performed in the 24,000-square-foot addition built in 2002.

Dak products tested by summer interns

A total of seven tests were performed on specimens of aluminum scoreboards and advertising panels built by Daktronics of Brookings. Each test took about two days to set up and perform, says Wehbe, an associate professor.

He supervised the work of Daktronics' summer interns Jennifer Briggs, a graduate student, and Christopher Cressy, an undergraduate, both in the Department of Civil and Environmental Engineering.

Jennifer Briggs, a graduate student, adjusts instruments to test the load capacity of a mounting connection for a Daktronics scoreboard this summer in the Jerry Lohr Structures Lab in Crothers Engineering Hall. This was part of the first tests performed in the 24,000-square-foot addition built in 2002.

The instrumentation on the twenty-five- by five-foot panels measured the strains and deflections caused by the loading. This allowed Daktronics to learn the wind-load capacity of six different panels, Wehbe says.

One test measured the load-carrying capacity of a connection used to mount display panels onto steel posts.

"The test results will be used by Daktronics' engineers to verify the adequacy of their existing design details or to improve their details, if necessary," Wehbe says. "The results also will be used by Daktronics as a reference for potential clients. Test results can be used to confirm the load-carrying capacity of the display panel assembly.

"Different states have different structural standards and the tests can show the panels meet those standards."

The ability to withstand wind is determined by applying a distributed load that is equivalent to a code-prescribed pressure at a certain wind velocity, Wehbe explains. Daktronics won't be the only firm to pay to use the Lohr lab for testing, Wehbe says.

Lab serves trio of purposes

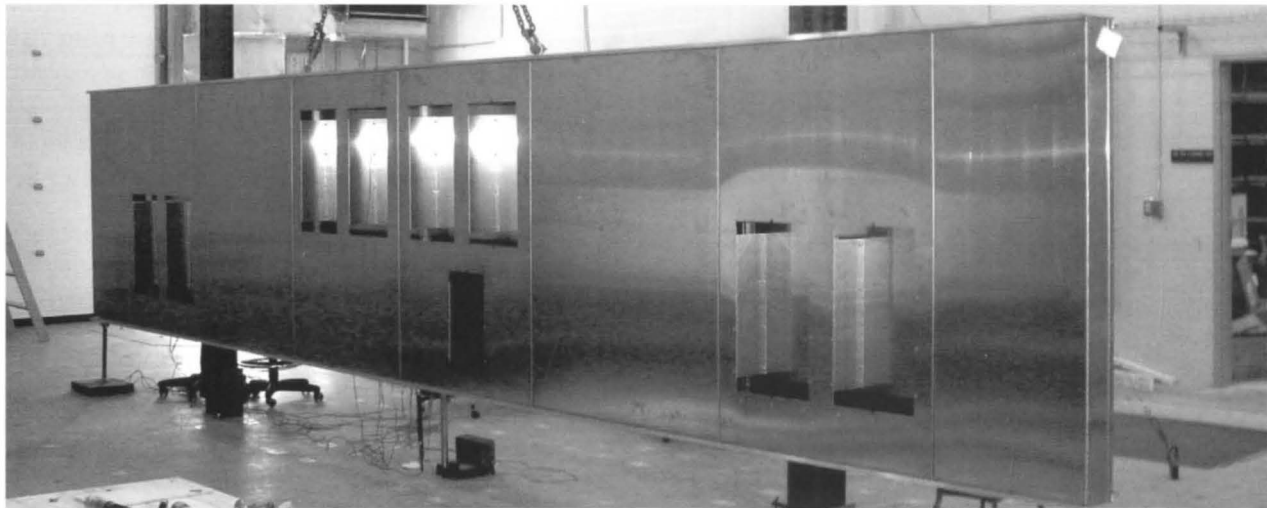
The lab's threefold purpose is for faculty research, classroom demonstrations, and commercial testing.



“Without the facility, we couldn’t have accommodated the scale of testing we did. Before we didn’t have the facilities to perform the tests for commercial applications,” says Wehbe, who adds that the lab also is an attraction for prospective students.

Wehbe is planning an open house, where a large-scale test will be demonstrated. A date has not been set.

Dave Graves



A Daktronics scoreboard is being mounted on steel posts in preparation for testing this summer in the Jerry Lohr Structures Lab in Crothers Engineering Hall. This was part of the first tests performed in the 24,000-square-foot addition built in 2002.

IMAPS convention

Students detail SDSU micro-electronics at convention

Four students in the micro-electronics program at SDSU did a little recruiting for the College at an international symposium in Long Beach, California, this past fall.

The students from the SDSU chapter of the International Micro-Electronics and Packaging Society gave a booth presentation demonstrating its activities to the micro-electronics industry at the society’s thirty-seventh annual international symposium, which drew university and industry representatives from around the world.

Roby Behanan, an electrical engineering graduate, organized the November 14-18 trip, which was funded by donations from the Viking chapter of the International Micro-Electronics and Packaging Society, the SDSU Department of Electrical Engineering, and the College of Engineering.

Behanan was joined by undergraduate James Galipeau, and graduate students Sandeep Kottam and Lakhwinder Klar.

Five other universities gave booth presentations on their school’s programs. SDSU placed third in the judging,



Gathering at their booth at the International Micro-Electronics and Packaging Society Symposium in Long Beach, California, are SDSU students, from left, Lakhwinder Klar, James Galipeau, Roby Behanan, and Sandeep Kottam.

In addition to the presentation, the SDSU quartet viewed new industry products, listened to paper presentations, and attended the Student Industry Panel, where professionals from the electronics and optical networking equipment industries, industry recruiters, and engineering educators discussed how their education, interests and career experiences led to their current positions. Students also learned current

industry expectations and what they should be doing now for their long-term career development.

“It was a good experience because we could talk to so many people in the industry and learn what the job opportunities are,” Behanan says.

Chapter advisor David Galipeau, who chaired several sessions, left in advance of the students to help organize the symposium.

Robotics

Not ready to be finished with FIRST, freshman ME major returns to high school to help robotics team

Many college students spend their Christmas breaks visiting family, sleeping in, and enjoying a much-needed break from classes. Matthew Hein, a freshman mechanical engineering student, spent his break working at his old high school. And he wouldn't have it any other way.

The Browns Valley, Minnesota, native serves as a mentor for the FIRST robotics team at Sisseton High School. An alumnus of the robotics competition himself, Hein's reasons for staying involved in the program are simple.

"I've gotten so much out of the program I feel like I have to give something back," he says. "Me and a couple other graduates help the students at the high school keep up to date with what they need to be working on," he says. Hein says he will assist the team throughout the building process by giving them information he has collected, as well as answer any questions that the team might have.

Building robots, skills

Hein began participating in FIRST robotics, an international robot-building competition for high-school students, during his sophomore year. He credits his high school shop teacher, Dayle

Haaland, with beginning the program at Sisseton High. He still remembers the day that the announcement for the program came over the afternoon intercom at school.

"Like many people in the tri-state area, it was completely new to us," Hein says. "None of us really knew what we were getting into."

Hein, along with seven teammates representing freshman through senior levels, learned quickly. After paying the registration fee, the team received a kit by mail. The kit included a rulebook (now found online) along with items such as pneumatic parts, electric motors, sensors, aluminum, plastic materials, and a list to order more parts, Hein says.

"That's all you are given," he says. "None of us had any idea of what any of this stuff was."

The team had six weeks to build a robot. They began designing by hooking up different parts to a battery to see how they worked.

"It became a full-time job," he recalls. "You work in eight-hour shifts," of going to school, working on the robot, and sleeping. "They [students] do all this on their free time," he says. "They learn it for fun. Not only learn it, but master it."

'Gracious professionalism'

Part of Hein's Christmas break was spent convincing administration to install \$30,000 worth of donated software on the school's drafting computers. The

software, which arrives prior to the kit, can be used to design robots electronically.

"This is the industry standard engineering equipment," says Hein of the software used to create the movie *Toy Story*.

He says FIRST often sends students sophisticated, often cutting-edge software and parts to use. This year the teams will be given full access to the latest version of programming software before it is released to industry. Along with the software comes a manual of thousands of pages, according to Hein. "You start at page one and try to learn it," he says.

Along with a competition to actually build a robot, FIRST holds a 3D robot competition, a video competition, and a website competition, according to Hein.

He adds that all students can use their skills in FIRST. Teams need to raise money, and often do so by electing officers, working on publicity, performing demonstrations, and visiting with community members and possible sponsors. Hein recalls that his team at Sisseton partnered with the journalism classes in order to document their trip to regional competition. "No kid's really left out within FIRST," Hein says. "Every kid that gets involved absolutely loves it."

In 2004, Sisseton's team placed second at the regional competition in St. Charles, Missouri. Other South Dakota teams have placed at competitions as well. Sioux Falls O'Gorman was one of three winning teams at a 2004 regional



"It's just unreal how promising students can become through the program," says Hein. "They can do more math and physics than most high school teachers can now because of this program." — Matthew Hein

competition in Denver, Colorado. Woonsocket won second place at the 2004 national competition.

However, Hein says that the competition isn't about winning, which he says differs from other typical sporting events.

For example, teams share plans and parts with other teams, he says. Several teams often staff support desks during competitions. If a part is needed, "within five minutes, you have other teams willing to help you even if there your opponent in the next round," he says. "Everyone wants to help everyone else because it benefits the whole."

According to Hein, the teams demonstrate the competition's theme—gracious professionalism. "Everyone wants to share everything," he says.

Hein remembers meeting Dean Kamen, FIRST founder, and having the chance to ride on his invention, the Segway Human Transporter. He also had the opportunity to shake hands with Woodie Flowers, a well-known mechanical engineering professor at the Massachusetts Institute of Technology.

"The games they [Kamen and Flowers] develop are also cooperative," he says. "You can't do well without your opponents doing well."

"The atmosphere is so great. You get such a rush from it," he adds.

Endless Opportunities

Through FIRST, students learn skills to carry with them into the future.

Photos L-R

From left, Sisseton High School students John Medbery, Ross Vig, and Matt Hein pose by their 2004 robot "Anomaly" at the regional competition in St. Charles, Missouri. This year, Medbery and Hein are SDSU freshmen while Vig is a senior at Sisseton.

A side profile of the robot built by Matt Hein and fellow students at Sisseton High School last year. They selected Hiphoponymy for a team name. The robot is pictured at an SDSU test competition one week prior to being shipped to the regional contest in St. Charles, Missouri.

Matt Hein of Sisseton High School makes last-minute adjustments on programming for the robot at the 2004 regional contest in St. Charles, Missouri. This year Hein, a freshman mechanical engineering major, is returning to help the school with its 2005 entry.

"It's just unreal how promising students can become through the program," says Hein. "They can do more math and physics than most high school teachers can now because of this program."

He remembers one instance in particular. "We called up NASA one year and stumped them on a problem," he says. According to Hein, engineering companies have used several FIRST designs. "It's such a great opportunity. There's always half a dozen NASA engineers [scouting talent] at every competition."

In addition, FIRST gives students a different type of learning experience that often can't be gained in the traditional classroom setting.

"Kids around here work with machines, work with their hands," Hein says. "This takes the classroom and applies it. They're given the bare bones and told 'Do what you want with it.' There are no limits. It's just all opportunity."

At Sisseton, Hein says a troubled student joined the team and now works on automatic transmissions with a talent unusual for a high-school student. "These kids can do such amazing things. They have goals now," he says. "I just think without this type of program . . . they wouldn't have this opportunity."

In addition to learning physics and programming at a collegiate level, students gain time-management skills and discipline, according to Hein.

"I got my homework done faster and got better grades when I was on the build team," he says. "A lot of our teachers are just absolutely loving it. It's really self-motivated, group-motivated, mentor-motivated."

Hein's own hard work has paid off.

"Last year, I had two NASA scientists compliment me on my electronics," he says. "Getting a compliment from a NASA scientist feels pretty good, especially when you're in high school."

'A tremendous edge'

Hein's own career choice has been influenced by his participation in FIRST. "So many kids change what they want to do because of the program," he says. "I began to realize that the work I put in didn't feel like work anymore. I was

originally looking at the medical field. Now, I can't think of doing anything else besides engineering."

The advantages continue now that Hein is at college. "It gives me such a tremendous edge over everyone else," he says.

While Hein doesn't have any specific plans for the future, he says he "wouldn't mind working for NASA." He does know one thing for certain—wherever he works in the future, he hopes to find—or start—a FIRST team nearby. "I want to become more of a mentor to the program," he says.

Denise Watt

FIRST Facts:

Since its beginnings in 1989, FIRST (For Inspiration and Recognition of Science and Technology) Robotics Competition has given high school students across the world the chance to excel.

The 2004 competition featured 929 teams from forty-six states and six countries, and offered more than 250 merit-based scholarships.

Four South Dakota high schools—Sisseton, Faulkton, Sturgis, and Flandreau Indian School—will participate in the 2005 contest.

For more information about the competition or how to become involved, visit www.usfirst.org.

Financing FIRST

Funding proves a challenge for any team involved in FIRST robotics. The kit and registration for one regional event costs \$6,000, according to the organization's website www.usfirst.org.

Participating in another regional event costs an additional \$4,000, and another \$5,000 is required for the national championship. Costs of travel and additional parts add up to as much as \$30,000.

A three-year grant from NASA through the South Dakota Space Consortium has provided funding for the program in South Dakota schools in recent years, according to Kevin Dalsted, director of the engineering resource center.

With the termination of the grant, however, schools have had to find funding elsewhere, including sponsors.

Swedish engineers

Swedish engineering students switch courses at State



Andrea Tengbrand, left, Karin Stake, center, and Annie Carlsson, from Jonkoping University in southern Sweden, pose at the campus entrance in December, shortly before finishing their semester of study at State. All of them have engineering degrees, but for reasons of language and measurement systems decided to take non-engineering courses at SDSU.

Some changes are easier to adapt to than others. Three engineering students from Sweden liked having a four-class schedule, but struggled with English measurements.

Annie Carlsson, Karin Stake, and Andrea Tengbrand, from Jonkoping University in southern Sweden, studied at State last semester.

"It is easier here because you have small tests," says Stake, who is used to having only one test for every course.

"After ten weeks we have a final," says Carlsson, explaining that students take two classes during the first half of the semester and then at mid-term they have finals for those two classes. The second half of the semester they take two more courses.

"I think it's better here [at State], because we learn more here," says Tengbrand, noting that having many smaller tests and quizzes motivates them to keep up on studying.

Carlsson took a mix of classes including business and computer science, while Tengbrand and Stake studied art and interior design.

"Everything is so different here from in Sweden," says Stake, referring to the engineering principles. That's why they didn't take engineering classes this past semester. "Everything here is in feet and inches. We

can't use that in Sweden."

The difficulty of engineering courses in general coupled with learning it in a second language would have made it a challenge as well.

"At first I had two engineering classes. I felt I couldn't keep up," says Carlsson, who already holds an engineering degree from Sweden, as do her counterparts.

It only takes three years to get an engineering degree in Sweden, and the three students say they came here to help them decide what career path to pursue. "I would like to work at an architectural firm," says Stake, noting that the job market in Sweden for engineers isn't that good right now. "There will be openings in a couple of years," she says, looking ahead to the retirement of many current engineers. The trio is hopeful that their international experience will help them secure a job.

"Everybody is so helpful here if you're lost. People are not like that in Sweden if you're in a big city."

—Andrea Tengbrand

"When applying for a job, it looks good [to have studied abroad]. It's better to have done some real, important stuff," Stake says.

"I came to do something else and have the experience to be in another country. I've been here before, just as a tourist," says Tengbrand, who wants to go into the building processes side of engineering.

"I wanted to go to an English-speaking country," says Carlsson, who plans to start her master's degree this spring.

The Swedes were surprised by some of the students they met here.

"People here know what they want to do. People who go to school in Sweden, they do it to have fun, too," says Tengbrand.

"Here you really want to do good and get good grades," says Stake, explaining that not as many people care about their academic performance in Sweden because it is free to them. Their taxes are high enough to provide everyone with free higher level education.

There were some other very noticeable differences. "In Sweden nobody has cars when they go to school. It's expensive to have a car," says Tengbrand. They were used to walking, but were also used to having trains and buses to take them places.

"The most thing that is different here is that we had to live with somebody," Stake says. All three lived in Berg Hall, but were used to living in their own apartments in Sweden.

"You can't live on campus there," says Carlsson, who was glad to live so close. Finding housing in Jonkoping, a city of 130,000 people, can be difficult.

Stake and Tengberg visited Minneapolis and Chicago during their stay. "We're used to both big and small

towns," says Stake, whose hometown is around 500 people.

Although the climates are very similar between South Dakota and southern Sweden, the landscape is drastically different. "You can see the road way ahead of you here. You don't have any curves," says Stake, comparing South Dakota to the rolling hills they're used to. They have more trees in their region and their campus and city is less spread out.

Carlsson, Stake, and Tengbrand returned to Sweden this December, after spending four months here.

"I'm very happy that I went and took the opportunity. I have met many other international students. I think I also learned more about Sweden," says Carlsson, who had to answer many questions about her native country when meeting people.

"Everything was really good here, and I want to come back," says Stake.

Miranda Malo

Growing on great relationships

Greetings from the top floor of the new Enterprise Center, the new home of the SDSU Foundation and the Enterprise Institute.

SDSU, the College, and the Foundation are experiencing tremendous growth thanks to our alumni and friends' generous support. The enrollment growth has led to the expansion of the Student Union and the construction of a new dormitory. Your support of scholarships and the Jackrabbit Guarantee has been a big part of the enrollment growth. The College continues to add and expand programs such as software engineering and the newly approved doctoral degrees in computational science and statistics, and geospatial science and engineering. Your contributions to the Greater State Fund, specific projects, and scholarships help support these programs. The Enterprise Center would not be possible without the support of SDSU alumni and friends.

I thank for being a part of these exciting times through your support of the College of Engineering Greater State Fund during the Phonathon and when the PhoneJacks called for the Jackrabbit Guarantee. For more information on how you can help in specific areas and projects, give me a call at 888-747-7378 or e-mail me at tim.reed@sdsufoundation.org.

The success of the College depends on the great relationship we have with our alumni and friends. Thank you for your continuing support.

Tim Reed

Director of Development, College of Engineering



Outstanding

First-grade project helps make chapter a first-rate club

The SDSU chapter of the Society of Physics Students has again been named an outstanding chapter by its parent organization.

The current award, for the 2003-04 school year, was announced December 14 by the Society of Physics Students national director. Less than 10 percent of chapters nationwide receive the award, but the SDSU chapter has been able to receive the award about every other year for the many years that Department Head Oren Quist and Larry Browning have served as advisors.

Selection is based on the depth and breadth of chapter activities in areas such as physics research, public science research, tutoring programs, hosting and representation at physics meetings, and providing social interaction for chapter members.

Highlighting the accomplishments of last year's chapter was an elementary education outreach program.

Through "Phundmentally Physics," students in the chapter worked with first-graders from Medary Elementary School in Brookings throughout the school year, using hands-on lessons to teach about physics concepts.

One of the lessons used objects such as marshmallows to explain the concepts of atoms and density. Demonstrations also covered mass, length, heat, the seasons, the Mars Rover, gravity, kinetic energy, motion, electricity, and optics.

The project was financed by a \$300 Marsh W. White Award, a prestigious award given to very few chapters, Quist says.

The activity was organized by Ryan Siebrasse, a senior physics,

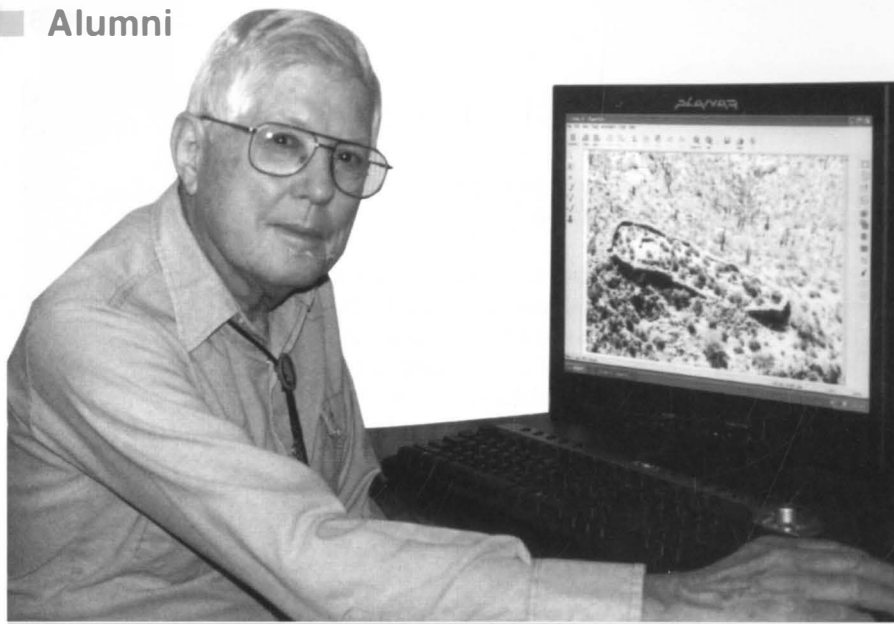
communications studies and theatre, and secondary education major from Aberdeen, and Sara Landau, a physics and electrical engineering major from Brookings.

The presentations benefited Siebrasse's aspirations as a physics educator, were good for other students to get a chance to show physics rather than just taking it in, and it helped the overall morale of the chapter, Quist says.

Other chapter activities included constructing a Hobo Day float and putting together a video, *Physics Phor Eve*, that showed club activities and was shown at the spring banquet.

Officers in 2003-04 were: Siebrasse, president; Landau, vice president; Katherine Brandtjen, secretary; Brandon Breitling, treasurer.

Dave Graves



Vogel

Computer-minded Joe Vogel funds first software engineering scholarship

It would not be too far-fetched to imply that Joe Vogel was born with a computer in his crib.

When it comes to computer knowledge and what the electronic marvel has meant to society and its future offerings, there's no better person to understand that than Mr. Vogel.

Indeed, since earning his electrical engineering degree from SDSU in 1958, the world has certainly benefited from his expertise when it comes to the inner workings of computers.

And, when learning that his alma mater had created a major in software engineering in fall 2003, he was the first to jump on board, creating the program's first scholarship.

"Hearing that SDSU had a software program, it was just natural for me to select this area," says Vogel of Prescott, Arizona. "It's the computer software that makes the computer such an important tool. With new technology just around the corner, computers will play an even more important role in our lives.

"I want to encourage people to step into the computer arena and hopefully they will come from SDSU," he adds. "As it was for me, it will be a challenging, gratifying, and rewarding career. It's quite an experience to walk into a department and see people working at a computer terminal using the program you designed, developed, and helped write."

Vogel, who retired in 1986 after twenty-one years at Eastman Kodak, set up an initial \$10,000 endowment, which will be administered by the electrical engineering and computer science

department. His plans are to continue adding to the fund.

The endowment also satisfies the advice of Junis Storry, late dean of the College and Dean Seltzer, former graduate professor at the University of Minnesota.

"They told me, 'Joe, remember, you owe something back.' I have not forgotten this. Most of my college expenses were paid for under the GI bill. I well remember fellow students who had to struggle to pay those expenses. If I can help someone a little, I want to do that."

Dennis Helder, head of the electrical engineering and computer science department, calls the endowment "a shot in the arm" for a new program. "An absolutely critical part of a program that's just beginning is to obtain these kinds of resources to get strong students in the program and keep them."

Computer interest grows

Born and raised in Springfield, Minnesota, Vogel joined the U.S. Navy in 1950 and was discharged in 1954.

He first became fascinated with computers as an electronics technician in the military. "Occasionally, I worked on this rudimentary computer that counted the time it took electronic pulses to arrive at the ship. My interest grew at SDSU as the computer became more and more prominent."

One week after graduation, Vogel went to Remington Rand Univac in St. Paul as an electrical engineer. A major highlight was working on one of the first transistorized computers.

"Although I was involved with the hardware side, it was the software that interested me the most," he says. "The software makes the computer do something useful, like calculate a phone bill or print out the statement."

When learning that Remington wanted its software personnel to have a master's degree in math, Vogel opted to leave in 1959. He moved to Washington, D.C., and took a job with the U.S. Patent Office. He also pursued a patent law degree, taking night classes at George Washington University.

Realizing that "patent law was not for me," Vogel moved to Minneapolis, where he worked as a patent agent at Honeywell.

A year later, he enrolled at the University of Minnesota, and in 1963 he completed his residency requirements for a master's degree in business administration.

The degree took him to San Diego as an administrative assistant for General Dynamics/Astronautics, where he worked on projects to keep man alive in space and a project planning a Mars trip.

"In both of these projects I saw how computer technology was used in planning and controlling projects," relates Vogel.

A Kodak moment

Vogel said goodbye to General Dynamics in 1965 and began his career with Eastman Kodak in Rochester, New York. While there, he finished his MBA and was awarded the degree in 1968.

His first job was as an administrative assistant on the Lunar Orbiter program.

He worked on a camera that circled the moon, took photos, digitized the images, and sent them back to earth.

"This might have been the first digital camera," he notes. "The purpose of the orbiter was to locate a landing site for putting a man on the moon in 1969."

In 1966, Vogel worked with others on developing software for an integrated computerized production control system for the Kodak factory, which manufactured everything from low cost cameras to expensive film processing and printing equipment.

The software system greatly improved the manual system, says Vogel.

"Under the manual system, it took twenty people three weeks to calculate the production figures. With the computer system, it took three days. With today's technology, those same production figures would be ready in three seconds."

From 1969 to 1976, Vogel was on a team that made an integrated computerized business system. Eventually used by Kodak's international distribution centers in thirty foreign countries, the system controlled the inventory, ordering, billing, accounting, and sales reporting.

"One interesting aspect of this system was that each country was able to use its own language on invoices, statements, and reports," observes Vogel, who helped install the first of the systems in Portugal in 1971. "It was a tremendous satisfaction to see people use and rely on a system that you helped develop, build, and install."

Computers in retirement

Vogel worked on various specialized systems in Kodak's corporate office until he retired. Six years later, computers took him in a different direction, this time to a second passion: flying.

ALUMNI NEWS

Gary Hartmann '66 received Honeywell's Lifetime Achievement Honor from Bob Johnson, chief operating officer and executive vice president of Honeywell Aerospace, at a presentation in Phoenix on April 14, 2004.

The award was in recognition of Hartmann's technology contributions, dedication, and innovation in Honeywell's aerospace business.

Hartmann started his career with Honeywell as a co-op student in 1963 while he

Having flown for the first time in 1947, Vogel bought his first airplane in 1972 and purchased his second 1998. "I have always loved airplanes and flying," he says. "If I had good vision, I would have been an airline pilot, but I had to settle on being a private pilot instead."

In 1992 Vogel volunteered to monitor Indian ruins from the air. It's up to volunteers like myself and others to protect and document these Indian ruins," he points out. "Most of these ruins are 500 to 1,000 years old."

Using a camera with an image stabilized lens and fast speed film, he has photographed more than 400 ruins. He gives the photos to the Museum of Northern Arizona, the Forest Service, and the Bureau of Land Management. It's not uncommon for him to have three computers sitting on his desk, each running a different program to help him map and document the ruins.

For his volunteer work, he received the State of Arizona's "Award in Public Archaeology" in March 2004.

Kyle Johnson

Vogel profile

Hometown: Springfield, Minnesota.

Education: electrical engineering, SDSU, 1958; master's degree, business administration, University of Minnesota, 1968.

Military service: U.S. Navy, 1950-54.

Employment: Remington Rand Univac, 1958-59; U.S. Patent Office, 1959-60; Honeywell, 1960-63; General Dynamics/Astronautics, 1963-65; Eastman Kodak, 1965-86.

Present: documenting Indian ruins by air for state of Arizona.

Awards: Arizona's "Award in Public Archaeology," 2004.

Schaefer gains endowed professorship at Iowa State

Former department head Vernon R. Schaefer '78 was honored as the first recipient of the James M. Hoover Chair in Geotechnical Engineering at Iowa State University in Ames.

He was honored at an October 2, 2004, ceremony at the ISU's president's house.

The endowed professorship was set up in honor of a former Iowa State geotechnical engineering professor by Craig and Terry Denny of Lenexa, Kansas.

The endowment provides Schaefer with discretionary funds to use in teaching and research efforts. Initially, Schaefer said he will use interest from the endowment for the purchase of lab equipment and to assist in his

research on the analysis of slopes.

"Getting a chaired professorship is certainly a key distinction in one's career. I was very honored to get it," Schaefer says.

He joined the Iowa State faculty in January 2003 after a fifteen-year career at SDSU. His final years were spent as head of the Civil and Environmental Engineering Department and director of the Northern Great Plains Water Resources Research Center, a University organization.

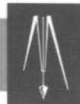
At Iowa State, Schaefer splits his time between teaching and research.



was an electrical engineering undergraduate at SDSU. He held a series of engineering positions at Honeywell and is currently a corporate fellow at Honeywell's Aerospace Electronic Systems Research and Development Center in Minneapolis.

He and his wife, Laurel, have two grown daughters and live in Fridley, a suburb of Minneapolis.

Angela Stotesbery '93/'95 moved to Tokyo, Japan, on May 13, 2004, to continue her career with Hartford Life as the assistant director of application services in the information technology department. The Ortonville, Minnesota, native has 140 people in her organization with three managers reporting to her, but misses Vikings football.



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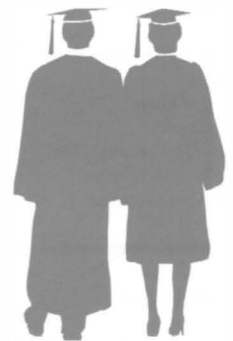
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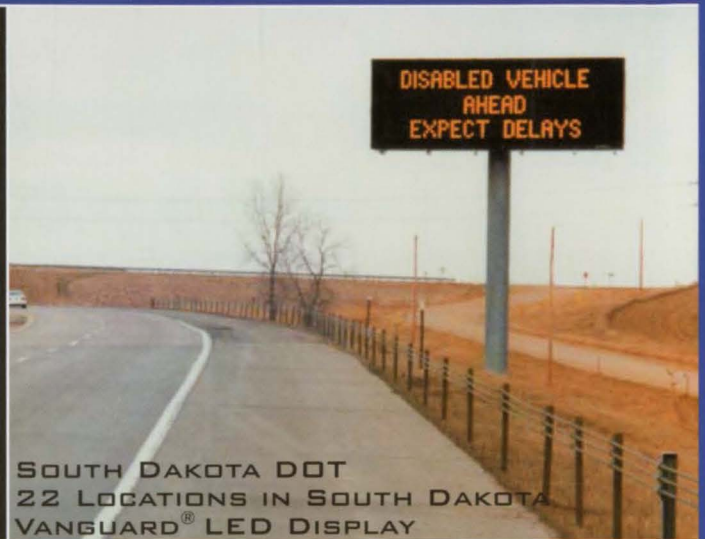
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MAKING A LEARNING CONNECTION

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ASCE President Carrie Buthe, left, and Kristina Bennett hold the resolution declaring SDSU to be the 2004 winner of the Ridgway Award. Buthe's husband and chapter vice president, D.J., holds the plaque that the SDSU chapter received at the October 23 awards ceremony at the Baltimore Convention Center during the American Society of Civil Engineers convention. A total of eighteen students were able to make the trip with funding provided by the Students' Association, the College, the Department of Civil and Environmental Engineering, a scholarship fund, and the eastern branch of the American Society of Civil Engineers. The Ridgway is the highest award given to student ASCE chapters and this is the second time in five years that the SDSU chapter has won the award.