



GROWING SOUTH DAKOTA

A MAGAZINE BY SOUTH DAKOTA STATE UNIVERSITY
COLLEGE OF AGRICULTURE & BIOLOGICAL SCIENCES / SUMMER 2016



DEVELOPING THE NATION'S LEADING PRECISION AG INITIATIVE



Growing South Dakota

"Our dilemma is that we hate change and love it at the same time; what we really want is for things to remain the same but get better."

– Sydney J. Harris

SIX YEARS AGO JANE AND I MOVED BACK HOME, honored and humbled to have been chosen to be an endowed Dean of the College of Agriculture and Biological Sciences at our alma mater in the state which we loved. I came north with a pretty clear vision of where the College needed to go. I understood its recent trials, future challenges, and the expectations of its stakeholders. I believe the clarity of my vision came from my unique past. For you see, my perspective was framed by being both an outsider looking in, as well as an insider looking out.

My years ranching on the Rosebud Reservation had provided me the perspective of the outsider. For years I had benefited from the continuing education I received from the Cooperative Extension Service and from participating in field days and conferences where research from the Agricultural Experiment Station was presented. Perhaps my favorite memory is of participating in a series of pasture walks with Jim Johnson from SDSU's West River Ag Center along the banks of the White River. But Range Beef Cow Symposiums and enrolling calves in John Wagner's "Calf Value Discovery" program would be close behind. My six-plus years working in the Texas A&M system had also provided me an excellent opportunity to compare and contrast my SDSU experiences with those of a major land-grant power house.

I was, however, also an insider. Having received all three of my degrees from the College, I had certainly experienced the College as a student. From 2003 to 2007, I worked in the Department of Animal and Range Sciences, first as an Extension Associate and then as an Assistant Professor, teaching both range science and beef production. I was provided the perspective of a parent when our son Michael graduated with a degree in Biology/Microbiology.

As I prepared my application for the Dean of Agriculture and Biological Sciences position, interviewed, accepted the position, and began my journey north, I thought carefully about the College from those unique perspectives. I felt then, as I do today, that it was the primary responsibility of the College of Agriculture and Biological Sciences to help all of its stakeholders to **GROW**.

Using its three-pronged mission of teaching, research and outreach as a platform for learning and discovery, it just seemed natural to communicate the essence of the College's work using the word **GROW**. We needed to help 4-Hers and college students **GROW** and mature in their journey towards exciting futures that were changing at an accelerating rate. We needed to **GROW** our research output to help better understand the dynamic world of agriculture and the natural resources on which it is built. And in response to the information explosion, we needed to help

stakeholders **GROW** in their exploration of the world around them with unbiased science-based information in a way only the Cooperative Extension Service could. As a result of this thought and analysis, **GROW**, and its derivatives, became the theme of my vision for the College.

It followed then, that I would rename one of the College's main communication devices to report its activity and impact, this magazine, *Growing South Dakota*. And so for these last six years we have been publishing this quarterly magazine and I have been contributing this "From the Dean" column. My goal with the column has been two-fold. First, to help contextualize the content in the current issue; secondly, to provoke thought and reflection. I certainly appreciate and thank the guidance and patience of the magazine's editorial and design team for their dedication, outstanding creativity, and hard work.

This will be my last column as Dean, as I have been chosen to serve as the 20th President of SDSU, an honor I accept with even deeper humility. The College is in good hands as my friend and colleague, Daniel Scholl, will serve as Interim Dean of the College of Agriculture & Biological Sciences and Director of the South Dakota Agricultural Experiment Station. Don Marshall will continue his outstanding service as Associate Dean and Director of Academic Programs while Professor Bill Gibbons from the Biology & Microbiology Department will serve as the Interim Associate Dean of Research for the College of Agriculture & Biological Sciences and Interim Associate Director of the South Dakota Agricultural Experiment Station. Karla Trautman is well prepared to serve as the Interim Director of SDSU Extension and will do an excellent job. A search for a new Dean will begin shortly, and I have every confidence that we will find an excellent individual to serve in this position.

I believe strongly that the mission of the College has remained fundamentally the same during its 135 year history – to help South Dakota to continue its path of growth and renewal. I am sincerely grateful for your generous support of me and the College during the six years I have been privileged to serve as Dean as I have worked to fulfill that mission. You have my very best wishes for continued success and the fulfillment of your dreams.

BARRY H. DUNN, PH.D

In April, the South Dakota Board of Regents named Barry Dunn, Endowed Dean of the College of Agriculture and Biological Sciences and Director of SDSU Extension, as the 20th President of SDSU

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On the Cover:

The SDSU Agricultural and Biosystems Engineering Department recently purchased eight Kubota side-by-sides, and modified them to accept Raven Autosteering systems, for use teaching students about hands-on set-up, calibration, trouble-shooting and diagnostic training as part of the Precision Agriculture program. Photo by Lora Berg

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Breaking New Ground

SDSU Leads Nation With Precision Agriculture Initiative

WITH THE ADVENT OF TECHNOLOGY, all industries have seen a fast-paced evolution, among them – agriculture. Specifically, precision agriculture has emerged with an array of new and exciting – and increasingly high-tech – tools. The integration of computer technology with farm equipment, farm sensors, GPS navigation, satellite imagery and drone imagery are quickly revolutionizing agricultural production.

While this revolutionary evolution is creating new opportunities within the agricultural industry, it is also

generating a need for college graduates, pertinent research and Extension expertise related to precision agriculture.

SDSU is addressing this evolution by leading the effort to supply that need. Over the past several years, the Precision Agriculture Initiative at SDSU has been designed and developed to address the changing agricultural landscape.

As testament, the Fall 2014 semester marked the addition of a Precision Agriculture minor to SDSU's curriculum offering. As of Fall 2016, SDSU students will have the opportunity

PRECISION AG RESEARCH OPPORTUNITIES, TOO

As the precision ag field advances, new research will also be necessary to ensure the most viable management practices and equipment technology are being utilized. SDSU faculty is already exploring those opportunities. As one example, assistant professor in precision agriculture Aaron Franzen, who studied the use of sensors for crop

monitoring during his post-graduate work, is focusing on sensor technology.

Franzen is currently researching sensor devices that are becoming cheaper, smaller and more energy efficient due to the consumer and automobile markets driving down costs. His goal is to determine how to creatively use these devices in agriculture to improve efficiencies.

One branch of his research looks at inexpensive ways to detect plants that will become weeds, including late-emerging corn plants. Current technology that senses crop canopy while in operation in the field is very expensive because a low volume of products is sold. As a result, the cost of the technology is prohibitive for most farmers to adopt.



Above: SDSU students have a variety of opportunities to gain hands-on experience in precision agriculture – from the computer lab to equipment for the field. Upper left and lower right, instructor Nic Uilk provides students instruction with the tools of the precision ag trade.

Other sensor options that Franzen is considering include cameras and optical sensors, which are cameras with their own light sources. Combined with centimeter guidance from GPS, these sensors possibly could be used to make changes in a field on a per-plant basis. Research shows that corn plants take up most of their nutrients and water in a

one-foot diameter. A sensor that detects weeds in that diameter and applies herbicides and fertilizer accordingly will help achieve optimum yields in the crop.

Small cameras also could be used to identify insect problems in the field. Franzen used a small camera in his post-graduate work to identify insects

entering a trap. The camera took a picture of the insect and, based on its shape, an embedded computer in the trap identified it. The goal was to monitor for a particularly devastating insect, which would require spraying.

By Karen McMahon

to declare a major in Precision Agriculture. New precision ag equipment and travel opportunities for students to farm machinery shows and precision ag conferences have also been added to SDSU's program. (See related articles beginning on page 7). And, precision ag research efforts and Extension programs have been and continue to be pursued.

As SDSU continues to advance its precision agriculture initiative, plans are currently being developed for a new building dedicated to precision farming to be built on the campus.

Of SDSU's vision, Van Kelley, Head of the Agricultural and Biosystems Engineering Department at SDSU says, "We want to be the go-to place for any company in precision agriculture. We want them thinking of SDSU first."

Likewise, David Wright, Head of the Plant Science Department at SDSU, says, "SDSU believes strongly in the need to train the future workforce in precision agriculture." He adds, "The future of agriculture will require using technology to reduce input costs, increase yield per acre and sustain ecosystems while continuing to feed the increasing global population. South Dakota has a major role in producing the food that feeds the world, and therefore, we also believe it's important for SDSU to be a leader in precision agriculture."

That said, Wright also points out that the general public has much to gain from advancements in precision ag as well. He explains, "More and more people want to know how food is produced and that it is being done sustainably. Precision ag helps farmers by using technology to apply fertilizers or pesticides at the right time and right amount. Precision ag provides the tools to document that farmers are being environmentally sensitive, and I think consumers will come to appreciate that."

GROWING INTEREST

When the Precision Agriculture minor was approved by the Board of Regents and offered at SDSU two years ago, it quickly grew to more than 70 students declaring the minor in just three semesters. The curriculum includes a joint offering of courses between both the Plant Science and Agricultural and Biosystems Engineering Departments in the College of Agriculture and Biological Sciences.

"We added new classes in our department to support the minor, and we quickly had students coming out our ears who were signing up for these classes. We've had to add extra lab sections just to accommodate them," reports Kelley.

Even students who don't declare the minor will get some precision ag coursework during their time at SDSU, including approximately 150 students majoring in Agricultural Systems Technology and 300 Agronomy majors. Courses are designed to help them navigate the new electronics and data management technologies used in farming.

And, based on the overwhelming interest from students – and industry – in SDSU's precision ag program, SDSU has moved forward with designing a four-year degree in the precision ag curriculum. The South Dakota Board of Regents approved the new Precision Agriculture major in June, which allows students to declare such a major in Fall 2016. This means the SDSU

"To be the first in the nation to offer a Bachelor's degree in Precision Agriculture is a great opportunity."

Van Kelley, SDSU Agricultural and Biosystems Engineering Department Head



Bachelor's of Science degree in Precision Agriculture is the first in the US.

Coursework for the major would include a combination of existing agronomy and engineering technology courses along with rigorous math and statistics courses and several new precision ag-specific courses. Examples would include Use of Sensors and Chemical Application and Use of Technology to Reduce Inputs, according to Wright.

The goal of the program is to ensure precision ag graduates have a strong background in agronomy, ag machinery, electronics and data management – producing future employees who can troubleshoot electronics on machinery, or who understand agronomy when analyzing data.

Kelley explains, "Within the industry, traditional equipment dealers are adding agronomists and co-ops like Wheat Growers are adding people with machinery training. Agribusinesses want to be able to offer full-service and support so they are seeking employees who are cross-trained. Our Precision Agriculture major is designed to produce graduates with a solid foundation in all areas."

Both Wright and Kelley note that the interest and support SDSU has received from industry is very exciting. "We are hearing that there is an increasing need for graduates trained in precision agriculture, and our goal is to develop a program so our students will be the choice of employers," Wright states.

Kelley adds, "To be the first in the nation to offer a Bachelor's degree in Precision Agriculture is a great opportunity, and our goal is to offer a program that provides students the best hands-on experiential learning in the nation."

Potential employment for graduates may be at an equipment dealership as a precision ag specialist, with an agronomics service provider, or as an ag mapping specialist.

By Kindra Gordon



Building An "Innovation Ecosystem"

Plans For New Precision Agriculture Building Underway

SDSU leaders are taking a page from Silicon Valley and the tech world as they brainstorm about creating a collaborative space to house the future precision agriculture program at SDSU.

"We want to bring faculty from different disciplines together in a new facility and create an 'Innovation Ecosystem,'" explains SDSU Plant Science Department Head David Wright.

A facility that provides office space, research labs and classrooms for plant science and ag engineering faculty, researchers and students is being envisioned.

Of the collaborative space, Wright says, "By creating a facility where engineers and agronomists interact with one another on a daily basis we believe it will foster the innovative ideas and knowledge to advance precision agriculture and provide the solutions farmers will need in the next 20 years."

Wright notes that offering a degree in precision agriculture is only one step in the right direction for SDSU; he believes building a new facility will further secure SDSU's position as a leader in the precision ag field.

He acknowledges that the addition of a multi-million dollar facility is "not an easy task, but an important one." Additionally, while other land-grant universities are also adding precision agriculture coursework, dedicating a whole new building and putting engineering and agronomy faculty under one roof would be an additional step to make SDSU's program unique.

Architects are currently at work designing plans for the proposed Precision Agriculture Building on the SDSU campus. The tentative proposal calls for the new facility to be attached to the east end of the McFadden Biostress Laboratory, providing access to move equipment more easily on and off campus via North Campus Drive.

The facility would house agricultural engineers as well as plant and soil scientists and entomologists in one location. The new building would replace the current Agricultural Engineering Building.

Van Kelley, Head of the Agricultural and Biosystems Engineering Department at SDSU, says a new facility is needed that provides space for modern-day large equipment, enhances opportunities for students to work with equipment inside during winter weather, and allows easier access to move equipment in and out.

Kelley also notes that creating a facility that fosters daily interaction among engineers, plant pathologists, entomologists, soil scientists, weed scientists, bioinformaticists, and cropping systems agronomists will lead to more efficient problem solving for many crop production issues.

In The Driver's Seat

Utility Vehicles Provide Students Hands-On Precision Ag Experience

IN THE RAPIDLY EVOLVING realm of precision agriculture, hands-on experience is critical for students as they prepare for future careers in the industry. SDSU students are gaining that experience through eight Kubota utility vehicles outfitted with auto-steering systems – and other precision ag bells and whistles.

Nic Uilk, an instructor in the Department of Agricultural and Biosystems Engineering, notes that it is a major coup for SDSU to be able to offer these unique vehicles for students to work with. “No other university has eight,” says Uilk.

The Kubotas were added to the SDSU program in October 2015. SDSU faculty worked with Sioux Falls-based Raven Industries to install auto-steering systems on them to allow students to gain experience during labs. Uilk explains that previously an auto-steer tractor would be borrowed from a dealership and demonstrated during lab time. Now, with eight utility vehicles in the department, a lab with 16 students means two students share a vehicle and gain ample experience in the driver's seat.

Through support from other equipment and precision ag companies, the Agricultural and Biosystems Engineering Department has also acquired three two-row planters to pull behind the Kubota utility vehicles and continues to work with other farm equipment manufacturers to obtain additional North American planter brands. Plans are in the works to add more planting equipment and four sprayer units by the Fall 2016 semester.

Uilk notes, “Troubleshooting any precision ag equipment and systems really requires hands-on experience. Having this

equipment in our department is providing SDSU students that critical experience.”

With farm ground located just one mile from campus, Uilk says students are given opportunities during lab time to gain skills with auto-steering set-up, calibration and adjustment, as well as driving operation.

Austin Carlson, a 2016 SDSU graduate from Garretson, SD, with a degree in Agriculture Systems Technology, is excited for future students attending SDSU who will have the opportunity to work with the equipment. “These vehicles provide the necessary hands-on learning for precision agriculture, electronic controls, electronic communication and diagnostics, and proper machinery set-up and maintenance for planting and applicator portions of agriculture.”

Uilk notes that going forward, precision agriculture technology is continually changing, and SDSU will strive to evolve and adapt their equipment and systems as well. He says, “We plan for a continually developing platform to keep the technology current for students.”

Some of the classes the equipment is currently utilized in include Introduction to Precision Agriculture, Farm Machinery Systems Management, Electrical Diagnostics for Farm Machinery, and Emerging Technologies in Agriculture.

Below: SDSU has a fleet of eight Kubota utility vehicles outfitted with auto-steering systems and other precision ag bells and whistles. In addition to providing student instruction opportunities, the vehicles can also be used to display Jackrabbit pride, as shown during the 2015 Hobo Day parade.





Introduction To Industry

Travel To National Events Opens Opportunities For Students

ADMITTEDLY, THE CAMPUS AND CLASSROOMS at SDSU are just a microcosm of the larger industries where students will one day pursue their careers. But several SDSU College of Agriculture and Biological Sciences students involved in the precision ag-related curriculum had unique opportunities this winter to bridge that gap with industry.

In late January, six SDSU students attended the Precision Ag Innovation Series conference in St. Louis, MO. The program focused on how growers and their consultants make the best use of data collected from farm machinery about their crops. In mid-February, nine SDSU students attended the National Farm Machinery Show (NFMS) in Louisville, Kentucky. It is one of the largest indoor farm shows with exhibits from most major agricultural equipment and electronic companies.

Students who participated came away excited and inspired. SDSU faculty member Nic Uilk, who attended

the Precision Ag Innovation Series conference in St. Louis with students, says after the event there was a lot of discussion among students – and he adds, “Students were amazed at the new technology they saw. It really opened their eyes to the industry.”

STUDENTS’ PERSPECTIVES

Austin Carlson, an Agriculture Systems Technology major from Garretson, SD, – who graduated in May – attended the St. Louis conference and valued the opportunity to hear discussions regarding where precision agriculture is today, where it is going in the future, and the improvements that need to be implemented to make these technologies greater and more effective for the future.

Carlson says, “I found this conference very beneficial as it provided me with a much greater understanding of how producers, retailers, and equipment manufacturers rely on each other and need to work together in order for

a strong future. Technology drives data acquisition, interpretation, and implementation of different agronomic practices to improve agriculture production, and producer bottom lines. This conference provided me with a unique perspective on how early adapters of technologies (farmers), and early adapters of product development (companies) that modify their products to meet the demands of producers will generally be the successful leaders that the rest of the producers will look to and strive to become.”

Regarding his future career, Carlson says attending the conference helped him realize the team work that is mandatory among everyone in agriculture for success, and how important all three: data acquisition, interpretation, and implementation are to finding solutions to today’s current problems regarding all functions of agriculture. “Continued experimenting and changing instead of just doing things the way we always

Above: SDSU students from the Ag & Biosystems Engineering Department traveled to St. Louis, MO, to attend the Precision Ag Innovation Series conference. They are, from left, Andrew Gerdes, Clara City, MN, Austin Carlson, Garretson, SD, Brent Krause, Clear Lake, SD, Chandler Jansen, Emery, SD, Emma Larson, Rothsay, MN, Tia Muller, Pipestone, MN, and SDSU Ag Systems Technology Instructor Nic Uilk.



Left: Several students pursuing SDSU's Ag & Biosystems Engineering and Ag Systems Technology degrees were able to learn more about precision ag when they drove to Louisville, KY, to visit the National Farm Machinery Show. They are, from left, Miranda LeBrun (with white SDSU shirt), Reading, MN, Sam Amundson, Ivanhoe, MN, Jerome Schuhwerck, Farmington, MN, Sawyer Hansen, Redfield, SD, Tia Muller, Pipestone, MN, Landon Paulson, Clark, SD, Tom Logeais, Maple Lake, MN, Weston Carlisle, La Vista, NE, and Jae Trahms, Janesville, MN.

have will also drive a successful future in agriculture," he concludes.

Jerome Schuhwerck, a Farmington, MN, native majoring in Agricultural and Biosystems Engineering, says his first impression of attending the National Farm Machinery Show in Louisville was just the sheer size of the event. "It was difficult to see everything in the two days we were there."

But, the senior, who wants to pursue a career working for a large agricultural manufacturing company, says the event energized him and opened his eyes to the number of career opportunities available after graduation.

Similarly, Chandler Jansen, an Agricultural and Biosystems Engineering major from Emery, SD, says of the precision agriculture conference in St. Louis, "The sheer number, variety, and quality of the speakers was something that I had never before experienced in my life."

Jansen particularly enjoyed the producer panels that followed each speaker presentation, which allowed for hearing feedback from real producers. He was struck by producers' requests for industry to continue using consumer electronics like iPads, instead of companies coming up with their own monitors and displays.

Jansen also says, "Another take-away I had was that in this day and age of agriculture, we have already done the necessary things to accomplish big yield gains. Now, instead of accomplishing one task to make yields five or even ten percent better, we will need to do ten things to make yields ten percent better, such as nutrient management on a smaller scale, and accurately managing drainage."

Tia Muller, an Agricultural and Biosystems Engineering & Agricultural Business double major from Pipestone, MN, had the opportunity to attend both of the national events and gain perspective.

She says, "In Louisville, I was most surprised by the new technology and models that were displayed by numerous companies. The trip was an excellent way to keep up with where the agriculture industry is going, as well as learn what I should focus on in school to help me once I start my career."

She says she also enjoyed comparing how the various brands chose to market their products. She explains, "In engineering, one small design change can allow equipment to be used in a totally different marketing sector."

Of the St. Louis conference, Muller says she was surprised by the scope of

precision agriculture. She says, "Those two words – precision agriculture – are the hottest conversation topic in the industry right now although they cover so much more than just the crop fields. Irrigation companies, data consultants, even biomedical professionals all had their teams available to share information and ideas amongst other industry leaders."

Lastly, Muller reflects, "Both trips impacted how I plan to complete college and pursue a career because the one solidified my interest in machine design and the other inspired me to add a precision ag minor."

She concludes, "I would recommend students within the agricultural engineering department take advantage of the trips offered. They have been such an eye-opening experience and definitely inspired me to get the most out of my college education."

SDSU students will have an annual opportunity to attend the National Farm Machinery Show (NFMS) in Louisville, KY. Opportunities to attend other national industry conferences related to ag engineering and precision agriculture will be explored as those events are planned.

On The Ground

SDSU Extension Specialists Have Vital Role In Bringing Data To Producers

BRINGING MANAGEMENT INFORMATION, research applications and ready-to-use tools to producers is the goal of SDSU Extension, and as precision ag technology quickly advances, that role of providing current information and assistance to producers is increasingly important.

One way that SDSU Extension has focused on bridging the information gap to producers is via an annual Precision Ag conference held each winter in Aberdeen. The 2016 event was held on March 1, and marked the 17th year of SDSU hosting the conference.

“This is always a successful event designed to connect producers to a blend of the latest industry information along with research and management applications,” reports Laura Edwards, SDSU Extension Climate Field Specialist. She and SDSU Assistant Professor Aaron Franzen are among the planning team for the annual conference which includes a partnership with farmers and agribusiness companies and organizations from the north-central part of the state.

The 2016 conference attracted more than 200 attendees and numerous vendors to the trade show representing local co-ops, seed and chemical companies, equipment dealers, and ag organizations. Conference sponsors Climate Corp. and Encirca Services, representing Dupont Pioneer and Monsanto respectively, offered presentations highlighting climate and weather-driven decision-making tools. Breakout sessions related to specific topics, such as Nitrogen management, were also offered.

Edwards says another exciting aspect of the conference was student participation. She shares that 50 students from SDSU and 25 from Lake Area Technical Institute in Watertown had the opportunity to attend, learn from the presentations and network with others.

In preparation for future agricultural needs of producers, SDSU Extension is also actively involved in the newly established Northern Plains Regional Climate Hub. Edwards explains that this effort is focused on assisting Extension specialists to better deliver science-based knowledge, practical information, management and conservation strategies and decision tools to farmers, ranchers, and forest land owners and managers to help build resilience in management and production systems under changing climate conditions.



Established in June 2015, Edwards says the Northern Plains Regional Climate Hub involves the six surrounding states and is fostering synergy among states. Resources and education materials related to best management practices are available at www.climatehubs.ocs.usda.gov/northernplains

Additional climate information, useful to farmers and those who advise farmers, is available via the Useful to Usable, or U2U, website at www.agclimate4u.org. Under the “Decision Dashboard” tab, the site features online decision support tools – such as a Corn Growing Degree Days tool and a Climate Patterns Viewer, which allows farmers to track global climate patterns and impacts on farming in the Corn Belt. Content on the site was developed by a team of more than 50 researchers at nine land-grant institutions, including SDSU.

SDSU Extension Field Specialists with expertise in a variety of agricultural and consumer areas are stationed at the eight Extension Regional Centers across the state. Visit www.iGrow.org to contact them with questions.

Curricula Collaboration

SDSU Leaders Among Team Preparing Future Precision Ag Coursework

OVER THE PAST DECADE AS precision farming has come of age, higher education institutions have added classroom and distance on-line education programs to educate students and prepare them for precision farming career opportunities.

While the intentions have been good, SDSU Soil Biogeochemistry professor David Clay and several colleagues at SDSU recognized that a need existed to create precision ag curricula across the nation that was better coordinated, would better match employer needs, and ultimately increase student success.

To address this need, in 2014 Clay spearheaded the application for a USDA grant that would bring together precision agriculture leaders from industry, federal agencies, and universities who could use their expertise to develop cohesive experiential curricula that provides students top-notch preparation for precision agriculture. Clay also anticipated the project would link students from diverse backgrounds to potential employers, enhance teachers' and institutions' capacity, minimize

duplication, increase collaboration, and, ultimately, provide the nation and world with a more stable, sustainable food supply.

A nearly \$700,000 grant was awarded to South Dakota State University in September 2014, with Clay as Project Director. The grant proposal titled: "Precision farming workforce development: standards, working groups, and experimental learning curricula" is presently being pursued, and is projected to be completed by fall 2017.

The grant involves several SDSU faculty in addition to Clay, including Sharon Clay, Doug Malo, Cheryl Reese, Jiyul Chang, all from within the Plant Science Department; Scott Fausti, Department of Economics; and Gary Hatfield, Department of Mathematics and Statistics.

As well, scientists and staff with expertise ranging from economics to pest management are involved in the grant collaboration. Those include Richard Ferguson, University of Nebraska-Lincoln; Bruce Erickson,

Purdue University; Kent Shannon, University of Missouri; Newell Kitchen, USDA-ARS; Raj Khosla, Colorado State University; Ajay Sharda, Kansas State University; Brian Arnall, Oklahoma State University; Leon Schumacher, University of Missouri; John Shanahan, Pioneer Industries; Ken Sudduth, USDA-ARS; Shane Swedlund, Raven Industries; Matt Yost, University of Missouri.

Clay notes that this elite group includes individuals who have been involved in leadership roles with the International Society of Precision Agriculture and the American Society of Agronomy, as well as having served as editors and authors of many precision farming educational materials.

With the breadth of knowledge and skills represented, Clay says, "Team members will build on their collective strengths to provide proven regional leadership in the development of experiential state-of-the-art curricula that empower students to create more efficient ecological-based management practices through the use of 21st Century technologies."

And the precision ag materials developed will not be limited solely to agronomy. Clay notes that precision farming has the potential to also be linked to improving the management of locally produced foods and livestock, and improving pest management – thus, their curricula development efforts will also address those areas.

Left: Soil Biogeochemistry professor David Clay is leading an effort to develop precision ag coursework that provides a guideline for national standards and experiential learning.

Right: With the rapid advancements in technology, precision ag curriculum materials for the future must also evolve and keep students abreast of industry.





Project outcomes at the completion of the grant period include:

- 1) the identification of a range of precision farming employment opportunities;
- 2) student beta-tested classroom and distance on-line educational curricula;
- 3) creation of a precision farming video library;
- 4) improved institutional and instructor capacity by networking industry and academic experts;
- 5) graduates with enhanced occupational training in science, technology, engineering, and mathematics (STEM);
- 6) teachers more willing to integrate experiential learning approaches into classroom activities; and
- 7) a pipeline of students that are technology literate, creative, innovative, and fully trained in their discipline with the skills needed to develop creative locally based solutions that increase sustainable food production.

Over the past two years, the team of precision ag leaders has been meeting bi-monthly to address and discuss curricula ideas related to precision ag. To better identify the precision ag workforce needs of employers, a survey was developed and conducted by SDSU ag economist Scott Fausti and Purdue's Bruce Erickson.

Fausti reports that the survey data revealed that many of the candidates applying for precision-ag related positions were lacking in operational knowledge of current equipment, accounting principles, mathematics, general knowledge and ability to make effective recommendations. That feedback is being taken into consideration as the team develops future

precision ag curriculum materials. These materials will include two textbooks, tentatively titled *Precision Farming Basics* and *Practical Mathematics for Precision Farming*, and development of a precision agriculture video library

Of the textbooks, Clay explains, "These books are designed to provide an experiential learning experience to the students. This means as opposed to only providing factual information, such as corn yields, scenarios will be shared to provide an opportunity for students to determine – with data collected from farmers' fields – potential reasons why yields were reduced." The lessons will be augmented with short imbedded videos, adds Clay.

Clay also notes that the lessons being developed are designed to go from simple to complex, and they will be housed in the American Society of Agronomy Digital Library. With a library subscription, students would have the ability to download lessons free of charge.

Ultimately, Clay says the curricula being developed by the assembled team of experts will address two major concerns for the future of precision agriculture – developing an understanding of the new equipment, as well as improving students' ability to think, learn, problem solve, and modify.

Clay adds, "The materials developed from this project are intended to help create graduates who will be trained to help our farmers and ranchers overcome the yield gap between the crop's genetic capacity and the achieved yield. A secondary benefit of the curricula that is being developed is to improve teacher competency and enhance communication among diverse academic institutions. As a result, the agricultural industry will be better able to address global needs for the future."

2019
2018
2017
2016

FUTURE FOCUS

Ag 2020 Plan Prompts Important Reinvestments In State's Agricultural Experiment Station

WITH THE ICONIC YEAR 2020 just four years away, a new decade will begin, and with it new challenges and opportunities in the world. For many, the milestone year has also marked an opportunity for organizations to pose the question: *"What needs must we address before 2020 to prepare for a prosperous future?"*

That was the thought Daniel Scholl pondered in October 2011 as Director of the South Dakota Agricultural Experiment Station (SDAES). Scholl tells that it was a time when a significant decrease in federal funds and a decline in state funds was occurring, and he and other leaders recognized a plan was necessary to address future needs to rebuild – and reinvest – in SDAES.

After several conversations with College of Agriculture & Biological Sciences Dean Barry Dunn and SDSU President David Chicoine to explore development of a long-term vision for SDAES, Scholl says, "We recognized it was time to take a look forward for research in South Dakota because the state's economy depends on it."

Ultimately, an Ag 2020 plan was developed with a focus on reinvesting in three areas: human capital, infrastructure and research competitiveness. An initial effort to gain legislative approval to create a flow of tax revenue for ag research was explored, but didn't garner support.

In spite of that, Scholl says what did materialize was interest from the Governor's office and other commodity and ag organizations in the state who also recognized the important need to develop a future plan for SDAES. Long-term discussions occurred with many stakeholders over the next year, reports Scholl. "We brainstormed on where SDAES was weak and what it would take to resolve those weaknesses," he says.

From those discussions between SDAES leadership and various political and industry constituencies, a white paper, titled "South Dakota Ag 2020: Creating A Comparative Advantage Through Investments in Agriculture Research at the South Dakota Agricultural Experiment Station," was developed in November 2012 itemizing future

strategies for SDAES and serving South Dakota's needs well. "The white paper was a road map to help guide where SDAES is going."

Scholl explains that the white paper outlined needs to pursue funding to strengthen intellectual capacity through new FTE, salary supplements and training; to maintain, repair and modernize research laboratories, core facilities and field stations; and to leverage state research funds to enhance scientific endeavors and the overall competitiveness of SDAES.

He adds, "What was exciting about this process was that the governor's office became a part of it and recognized the need for reinvestment in SDAES as well."

As a result, during the past five state legislative sessions, state funds have been appropriated for many of the needs identified in the white paper. Examples include:

- \$1,098,000 of new recurring funds annually directed toward human capital to increase scientific capacity, salary competitiveness and faculty retention.
- \$2,000,000 appropriated toward infrastructure maintenance, repair and improvement, including funds for construction of the Swine Teaching and Research facility.
- \$450,000 recurring funds targeted to oilseed crop development.

"Many things have been accomplished," says Scholl as he reviews the funding to date. He adds, "We want the public to know we took stock several years ago of where SDAES was, and South Dakota leaders pulled together to develop a plan for the future. South Dakota will be better as a result."

But many projects still await funding. As one example related to infrastructure, Scholl points out that 70% of SDAES capital structures have not been renovated in more than 25 years.

That said, the quest for strengthening of capacity and impact will continue – as will the effort to assure that South Dakota's agricultural industry and economy remains vibrant and competitive for 2020 and beyond.



The Power Of Connections

Connected Approach Helps Solve “Real-Life” Problems To Benefit Animal And Public Health

By Jane Christopher-Hennings, Veterinary and Biomedical Sciences Department Head and Director of South Dakota Animal Disease Research & Diagnostic Laboratory

contributing to an FDA food safety database and organizing “One Health” workshops to discuss influenza and other infectious diseases that affect both people and animals.

In 1990, when I arrived at SDSU, a new disease called “Mystery Swine Disease” was causing abortions and respiratory disease in pigs. Connections between industry, university scientists, veterinarians in the field and swine producers contributed to finding the cause of this disease, a virus called “Porcine Reproductive and Respiratory Syndrome Virus (PRRSV). In our department, we did research to describe the virus, produced tests and reagents to diagnose it and contributed to the development of the first PRRSV vaccine. Since that time, the laboratory has continued with this testing and research.

My first research project at SDSU started with a problem presented by a producer who had pigs infected with PRRSV. However, there weren't any new pigs that had been introduced into the herd, so the answer to the question of where the virus came from was unknown. The only introduction of any swine-related material into the barn was boar semen that was used for artificial insemination, but it was not known whether the virus could be transmitted through this route. Our SDSU team developed a test to detect PRRSV in semen and since that time, significant measures have been taken in the US swine industry to prevent virus transmission through boars.

In the last three years, we have partnered with veterinarians in private practice to find out how other new diseases have entered the US. One such study modeled the possible transboundary risk of porcine epidemic diarrhea virus (PEDV) entering through contaminated swine feed ingredients. The study was able to simulate transboundary conditions for PEDV survival in feed, but it also was able

to show strategies that could prevent viable virus from being transmitted to pigs.

In another study, again showing the connections between veterinarians and animal owners, Russ Daly, our State Public Health Veterinarian in the department, partnered with a private veterinary clinic in South Dakota to test dogs for a disease that could be transmitted to people (*Brucella canis*). The prevalence of this disease was found to be similar to the incidence in other regions of the US, but the testing helped in finding homes for dogs needing adoption.

The Animal Disease Research & Diagnostic Laboratory (ADRDL) was established by South Dakota State Statute in 1967 to work “in conjunction with the South Dakota Animal Industry Board to provide for research and diagnosis in respect to animal diseases.” This statute helps in binding the departmental and laboratory goals for solving complex animal health issues. Since almost all faculty within the department have assignments within the diagnostic laboratory, this connection facilitates the relationships between research and diagnostics and in strengthening the resources put toward both functions. Last summer, the ADRDL also had good connections with state and federal veterinarians and poultry producers to test birds and make sure premises were cleared of the highly pathogenic avian influenza.

These examples point to the value in keeping close connections between research and diagnostics, departmental and laboratory goals, veterinarians and animal owners and human and animal health. They also demonstrate how a land-grant university and specifically, the Veterinary & Biomedical Sciences Department/SD Animal Disease Research and Diagnostic Laboratory uses research, teaching, outreach and diagnostics to solve “real-life” problems and promote animal and public health.

HISTORICALLY, THERE HAVE always been connections between veterinary medicine and the animal/human biomedical sciences. It is interesting that one of the first veterinary schools was established in the US in 1884 at the University of Pennsylvania and the first two deans were physicians. In the mid-1800s, a British surgeon named George Dadd authored two books of importance to veterinary medicine called, *The American Cattle Doctor* (1851) and *The Modern Horse Doctor* (1854).

Other connections between human and veterinary medicine were found to be important when Max Essex, a veterinarian, did research on feline leukemia, of which the Wall Street Journal (August 14, 1984) wrote, “Humans are repaying a debt to the world's cats. The debt was incurred when a lethal cat disease called feline leukemia helped pinpoint a human leukemia virus as a probable cause of human AIDS, or acquired immune deficiency syndrome.”

Another veterinarian, Tracey McNamara with the Bronx Zoo, alerted the medical communities when she observed the effects of West Nile Virus on birds in the zoo prior to people becoming sick with the disease in 1999.

In our department, we partner with the South Dakota Department of Health and physicians in the state on a number of projects such as testing for rabies,



First-Rate Facilities

Celebration Of Two New Education And Research Centers Planned

“WE ARE EXTREMELY EXCITED,” says SDSU Animal Science Department Head Joe Cassady as he talks about the completion of two new state-of-the-art facilities that will benefit the department and the livestock industry.

Multi-million dollar construction on both the Cow-Calf Education and Research Facility and the Swine Education and Research Facility will be completed over the summer, ushering in a new era of teaching and research opportunities for students and faculty beginning with the 2016-17 school year.

Of the modern technology featured in both facilities – from electronic feeding systems to animal handling equipment and an observation hallway in the swine facility, Cassady proudly says, “These livestock facilities rival those of any university in the country.”

SDSU Foundation Development Director Mike Barber is also proud of the tremendous funding support from the state and region for both projects. Barber says, “Both of these facilities required a grassroots fundraising effort. We saw many

people reach deep and give more than they’ve ever given before. They recognized they were not only supporting South Dakota State University, but also the industries that these facilities support – and we are grateful for all of the contributions.”

In honor of the donations and support, ribbon cutting celebrations are being planned for both facilities. A grand opening will be held at the new Cow-Calf Education and Research Facility on Friday, Sept. 16. This coincides with the annual Beef Bowl barbecue to be held Saturday, Sept. 17 followed by an SDSU football matchup vs. Cal Poly. The grand opening celebration at the new Swine Education and Research Facility is planned for Saturday, Oct. 1. Later that day, the SDSU Jackrabbit football team will face Western Illinois in a conference game.

Of the planned events, Barber says, “We genuinely thank those who helped make these facilities a reality, and we look forward to inviting the public to see these facilities during the grand opening and ribbon cutting celebrations.”



COW-CALF DETAILS

The Cow-Calf Education and Research Facility is located along Western Avenue, 2.5 miles northwest of the campus Animal Science Complex. Cassidy says the convenient location near campus is hugely important to allow hands-on student opportunities.

The facility, which replaces the old unit that was built in the 1950s, consists of three buildings and a dozen 10-acre paddocks.

The main building houses office space, a small laboratory and storage, and an 80-seat classroom, which will host student classes, as well as producer meetings and industry events. Additional features in the facility include indoor animal handling facilities with a double alley system, Silencer chute and Bud Box. The building also includes a multi-use barn space with a center concrete drive and area for portable pens on either side. This will primarily be set up for calving pens, but can also be modified to host A.I. schools, livestock judging events and a fitting chute area during Little International.

Adjacent to the building are six display pens, which will be utilized during events such as the university's annual bull sale.

A designated bio-secure space for four hospital pens is also included in the design.

A separate building will primarily be utilized for research. It features a monoslope barn with 12 pens and built-in Insentec feeders, which allow for collection of individual feed intake data, as well as applying different feeding treatments to different animals within a pen. Two Insentec waterers will also allow for tracking water intake of individual animals and other unique research projects.

The third building at the facility allows for covered feed storage in four bays.

Grazing access at the facility is in the form of 12 paddocks southwest of the monoslope barn. Each paddock is 10 acres. Six paddocks are seeded with cool-season grasses, and six are seeded to warm-season grasses. These replicated pastures will also facilitate various research projects.

Presently, the SDSU cow-calf herd includes 110 Angus and SimAngus spring calving cows. Bulls are developed and sold annually at the SDSU spring bull sale; replacement heifers are retained for the herd or utilized for other research projects.

Above: The new SDSU Cow-Calf Education and Research Facility will begin to be utilized by faculty and students in the fall semester. Modern technology within the facility includes a double alley system and Silencer Chute (above left), two Insentec waterers (above right) for tracking individual animal water intake, and 12 pens with Insentec feeders (lower left) to collect individual feed intake data. Lower right, the three-building facility includes a main building with office space, classroom (pictured lower right on next page) and indoor handling facility, a covered feed storage building, and a monoslope barn with 12 pens.



SWINE DETAILS

The Swine Education and Research Facility has a primary location at the existing Swine Unit site north of campus along Medary Avenue and a secondary location south of Brookings along Interstate 29 at Exit 121.

Two new buildings were constructed at the existing unit. One of the buildings is a gestation/farrowing barn featuring a gestation area, two farrowing rooms, a boar collection/A.I. room, surgery suite and a 45-seat classroom. The classroom has been constructed to allow live animals to be brought into the space for viewing.

Also unique to this building is an observation hallway with large windows to allow public viewing into the gestation and farrowing areas. Cassidy explains, "The observation hallway will allow us to bring in groups from elementary students to county boards or organizations without breaking biosecurity and allow them to look inside a modern swine facility to learn more about swine production and animal care."

The second building constructed is a 1,200 head wean-to-finish barn designed specifically for research. It features pens

for four to six head, a specialized electronic feeding system as well as a heating and cooling system in the floor. Nutrition, environmental and engineering research projects will be conducted using pigs farrowed from SDSU's sow herd.

South of Brookings at Exit 121 in Moody County, another 1,200 head wean-to-finish barn has also been constructed. It features pens more similar to a commercial set-up for 25-26 head per pen, allowing for different research missions in a larger setting.

Cassidy reports that the first research project to be conducted in SDSU's new swine facility has already received funding from the National Pork Board.

As both the cow-calf and swine facilities come to fruition, he anticipates that SDSU faculty will garner greater grant-funding support for research, as well as new interest and opportunities for students and stakeholders.

Contact Mike Barber at the SDSU Foundation for more information about the Sept. 16 and Oct. 1 celebration events. Call 1-888-747-7378 or email Mike.Barber@sdstate.foundation.org.

Above: The new SDSU Swine Education and Research facility adds two new buildings to the existing Swine Unit. One of the buildings is a gestation/farrowing barn (lower left). The second building features a 1,200 head wean-to-finish facility designed specifically for research. Lower right: The Cow-Calf Education and Research Unit includes a 45-seat classroom.

Seeding Success

SDSU Experience Fostered This Alum's Ag Career

JESS SONDGEROTH READILY admits, "I did not come from a production agriculture family." Rather, Sondgeroth's upbringing included his mom's interest in horses, along with his active involvement in 4-H and the Canton FFA Chapter, where he graduated from high school.

Those activities sparked Sondgeroth's interest in agriculture, and in August 1995 he began his college education at SDSU pursuing an ag business major and agronomy minor. With rigorous courses and summer internships in crop production, Sondgeroth knew by the time he graduated in December 1999 that agriculture was his future.

Initially after graduation, Sondgeroth worked as a district sales manager, but in 2004, joined two other business partners in establishing their own business – Seed Exchange located at Platte, SD. They buy and sell seed from local producers and sell through their wholesale channel of the business, which encompasses the western half of the United States. They also distribute many different kinds of seeds through their dealer network in the western two-thirds of South Dakota.

More than a decade later, Sondgeroth enjoys working actively in the business,

which employs as many as eight part-time employees during the busy seasons. Seed Exchange specializes in selling a variety of seed encompassing grass, forage and grain sorghums, alfalfa and small grains. Additionally, the business buys and processes alfalfa and grass seed from producers, which entails cleaning it, bagging it and selling it.

Recently, Sondgeroth has also been able to add the title of "producer" to his credentials. He explains that his mom grew up in the area and her family still owns land there. Sondgeroth now rents a portion of that land and grows Intermediate Wheatgrass and Pubescent Wheatgrass to help provide a more consistent supply of seed for the business.

Reflecting on his journey from a non-ag background to an ag business owner and producer, Sondgeroth, acknowledges that he has always proceeded cautiously in the industry because he didn't have inherent ag experience. "Both from the agronomy side and business side, I have always taken time to think things through. But that has also made me work to be more professional as well," he states.

Sondgeroth also credits his SDSU relationships for helping guide his path. He notes that even from his first

internship as a crop scout, the individuals who hired him were SDSU graduates. "As I've gotten older, I've recognized the value and importance of relationships that have been formed over the years," he states.

Looking ahead, Sondgeroth says his business goals aren't unlike any other ag-related entity – "to strive for steady growth, stay the course and stay profitable." On a personal note, he says his biggest goal is to raise two healthy daughters.

Sondgeroth's advice to other students who are on the path to a future ag career is this: "Keep your head in the books, but don't forget the social game as well. It's all about building relationships."

Jess Sondgeroth was recently elected to serve on the 12-member board of the South Dakota Crop Improvement Association (SDCIA). SDCIA was formed in 1925 through consolidation of the SD Corn Growers and Breeders Association, the SD Grain Growers Association, and the SD Experiment Association. SDCIA has headquarters in Brookings, where it is housed within the Plant Science Department in the College of Agriculture and Biological Sciences.



Photo by Kari O'Neill, SDSU Extension

SUMMER COLLEGE NEWS

College Achievements

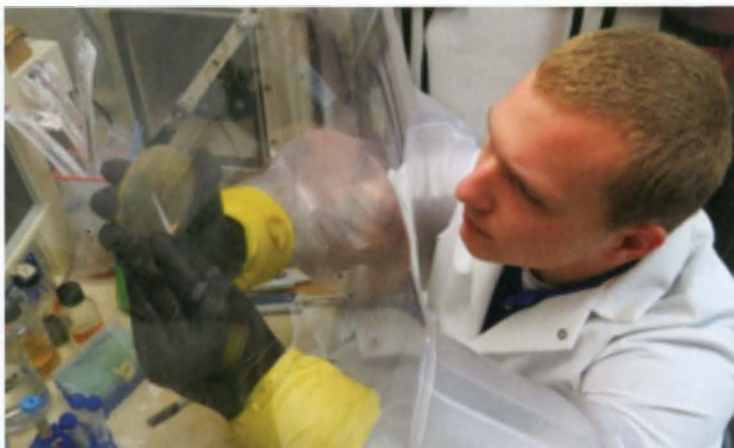
Andrew Foley (pictured), a junior biology major from De Smet, SD is the first SDSU student since 2011 to receive the Goldwater Foundation Scholarship for scientific research. Foley, who is enrolled in the Van D. and Barbara B. Fishback Honors College, works with assistant professor Joy Scaria of the Veterinary and Biomedical Sciences Department to identify species of gut bacteria that can help treat the intestinal infection caused by *Clostridium difficile*.

The Goldwater scholarship is extremely competitive on the national level, recognizing outstanding achievement and potential for meaningful contributions to scientific research. Since 2000, only five SDSU students have won the Goldwater scholarship, which provides up to \$7,500 for tuition and fees.

Foley presented his research during a poster session at the American Society for Microbiologists regional conference. He helped develop a standardized laboratory protocol and a system of making an anaerobic media to grow the gut bacteria. In addition, he has identified some bacteria species that help decrease *C. diff.* infection rates in co-cultures. The goal is to develop probiotic mixes in a pill form that will inhibit the growth of *C. diff.* and return the patient's gut microbiome to normal.

Foley hopes to earn a medical degree and then a doctorate degree so he can do medical research.

Research on a new influenza virus that affects pigs and cattle has helped doctoral student **Chithra Sreenivasan** earn the Joseph P. Nelson Graduate Scholarship Award. The scholarship, given each year to an outstanding graduate student, recognizes original scientific research and provides \$8,500 for tuition and expenses.



The new influenza virus, now called influenza D, does not affect humans, Sreenivasan explains. SDSU alumnus Ben Hause, now a research assistant professor at Kansas State University, discovered the virus, which he identified and characterized as part of his doctoral work under the tutelage of professor Feng Li. Li and professor Radhey Kaushik secured a National Institutes of Health grant for nearly \$400,000 to continue this work.

Both faculty members have joint appointments in the Biology and Microbiology and Veterinary and Biomedical Sciences Departments. Sreenivasan's current study uses the guinea pig model to compare virulence among bovine and swine influenza D strains and human influenza C. She has just begun analyzing the data. In addition, she is developing a way to study the virus in living cells

David Graper has been named Coordinator of the SDSU Extension Master Gardener Program and **Rebecca Bott** has been named the Interim Dean of the Van D. and Barbara B. Fishback Honors College.

FALL MEANS SDSU FOOTBALL

The SDSU Jackrabbit football team is gearing up for their 2016 season. If you are visiting campus, bring your yellow and blue and cheer on the team. The schedule and themes for home games includes:

- Sept. 10 vs. Drake (Iowa), 6 p.m.
- Sept. 17 vs. Cal Poly (Beef Bowl), 6 p.m.
- Oct. 1 vs. Western Illinois (Military Appreciation Night), 6 p.m.
- Oct. 22 vs. Youngstown State (Hobo Day), 2 p.m.
- Nov. 5 vs. Missouri State (Hall of Fame Game), 2 p.m.
- Nov. 12 vs. University of South Dakota (SD Showdown Series), 2 p.m.

*All times Central



Regents Approve Undergraduate Resident Tuition For New Iowa Students At Four Universities

Iowa high school students now have another reason to choose a university in South Dakota. Action by the South Dakota Board of Regents in late March allows Iowa students who are first-time freshmen or new transfer students to qualify for undergraduate resident tuition at South Dakota State University, as well as the University of South Dakota, Dakota State University and Northern State University.

The tuition discount, based on current-year rates, is a \$2,170.50 reduction for each new Iowa student over the course of a full academic year. The change is effective with the summer 2016 academic term.

"Iowa has been an area that South Dakota State University has successfully recruited for Jackrabbits and this program will allow us to be a strong value for those new students for years to come," said Doug Wermedal, State's Associate Vice President for Student Affairs.

Sheep In South Dakota Exhibit At Ag Heritage Museum

The South Dakota Agricultural Heritage Museum is featuring a new exhibit highlighting South Dakota sheep production, past and present. The Unspun Tale: Sheep in South Dakota, includes oral histories, family photographs, and artifacts from all corners of South Dakota to enrich the exhibit.

South Dakota ranks fifth in US sheep production, with the often-overlooked industry playing a vital role in South Dakota's agricultural economy.

"We want this exhibit to speak to an audience that has no prior knowledge of sheep but will walk away wanting to know more," says Gwen McCausland, South Dakota Agricultural Heritage Museum Director. "We hope this exhibit brings awareness to how important the sheep industry was – and still is – for both South Dakota and the rest of the nation."

The exhibit will be on display until December 31, 2016. The museum will be offering a series of educational programming relating to cooking lamb, fiber arts and sheep production management. For more information visit www.agmuseum.com.



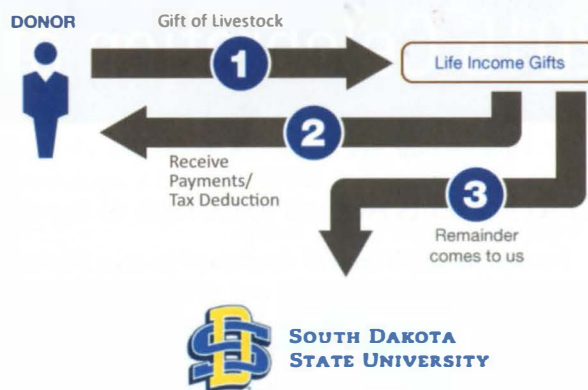
GIFTS THAT PAY YOU INCOME

GOOD	BETTER	BEST
Make charitable gifts to offset taxes after selling land, grain, machinery, or livestock	Utilize a charitable trust to protect land or assets from taxes when sold, benefitting worthy causes	Utilize SDSU's gift planning options in the decision process for <u>maximum mutual benefit</u>

Sell Tax Free, Receive Income for Life & Create a Lasting Legacy

Your land, cattle, and grain are valuable assets that you can direct to support SDSU for generations to come. A gift from your dedication and hard work can establish your legacy at SDSU.

For example, if donating livestock, you will not realize taxable income as you would after a sale. You can use that donation to fund a program at SDSU that you are passionate about. You may also save on federal and state income taxes.



SDSU's Gift Planning team has the expertise to provide additional options and helpful suggestions to consider before you proceed with a sale of land or ag-related business inventory.

Please give us a call:



Marc Littlecott, CAP®
(Brookings/East River)
605-695-6235

Bruce Nearhood, CFP® '81
(Rapid City/Pierre & West River)
605-484-8916

Toll-Free: (888) 747-SDSU | www.SDStateFoundation.org



A



D



E



B



C



F

2016 Celebration of Faculty Excellence

SDSU Presents Awards to College of Agriculture & Biological Sciences Faculty

A: Faculty Award Winners in the Animal Science Department, from left: Associate Professor and SDSU Extension Specialist for Equine Science, Rebecca Bott – *Sewry Colloquium Service Lecture*; Professor and SDSU Extension Specialist for Swine Animal Science Robert Thaler – *Faculty Award for Global Engagement*; Assistant Department Head and Associate Professor Rosie Nold – *F.O. Butler Award for Service in Extension/Outreach*; Professor and SDSU Extension Specialist for Beef Reproduction Management George Perry – *F.O. Butler Award for Excellence in Research*; Associate Professor Michael Gonda – *Timothy J. Nichols Outstanding Undergraduate Advising Award*; SDSU President Barry Dunn; and Professor Cody Wright, – *F.O. Butler Award for Excellence in Teaching*.

B: *Dr. Harold and Barbara Bailey Award for Excellence in Academic Department Leadership*: Volker Brozel, Biology & Microbiology Department Head and Professor, with Harold Bailey

C: *College of ABS Outstanding Researcher and Scholar*: Sen Subramanian, Plant Science Associate Professor, with SDSU President Barry Dunn

D: *Edward Patrick Hogan Award for Teaching Excellence*: Associate Professor, Biology & Microbiology Madhav Nepal, at right, and Edward Hogan

E: *College of ABS Distinguished Professor*: Plant Science Professor Sharon Clay with former SDSU President David Chicoine

F: *F. O. Butler Award for Excellence in Research and Excellence in Graduate Student Mentoring Award*: Biology and Microbiology Professor Feng Li



Gamma Sigma Delta Names Award Winners

- A: *Outstanding Graduate Student Award*: Charles Halfmann, Biology and Microbiology, with Alexander “Sandy” Smart, 2016-17 Gamma Sigma Delta Chapter President, left, and SDSU President Barry Dunn, right
- B: *Honorary Service Award*: Cheryl Beste, Animal Science, with SDSU President Barry Dunn
- C: *Outstanding Senior Award*: Middle, Keith Konold, Agricultural Sciences with Alexander “Sandy” Smart, 2016-17 Gamma Sigma Delta Chapter President at left, and SDSU President Barry Dunn
- D: *Teaching Faculty Award*: At left, Michael Gonda, Animal Science, with SDSU President Barry Dunn
- E: *Outreach Faculty Award*: Russell Daly, Veterinary and Biomedical Sciences, SDSU Extension Veterinarian, second from left; and *Distinguished Alumnus*: Dustin Oedekoven, Interim Secretary of the SD Department of Agriculture and State Veterinarian, second from right; with Alexander “Sandy” Smart, 2016-17 Gamma Sigma Delta Chapter President at left, and Madhav Nepal, 2015-16 chapter president at far right

- F: *Research Faculty Award*: Ruanbao Zhou, Biology and Microbiology, at left, with SDSU President Barry Dunn

- G: *Distinguished Service to Gamma Sigma Delta Faculty Award*: Sharon Clay, Plant Science, with SDSU President Dean Dunn

Student Poster Award Winners (not pictured):

Doctorate Category:

- First – Timothy Bruce, Natural Resource Management;
 Second – Suresh Damodaran, Plant Science;
 Third – Ishwary Acharya Dairy Science

Master's Category:

- First – Vivek Shrestha, Biology and Microbiology;
 Second - Gregory Thompson, Biology and Microbiology;
 Third – Ethan Anderson, Biology and Microbiology

Undergraduate Category:

- First – Lacey Quail, Animal Science;
 Second – Joshua Young, Natural Resource Management;
 Third – Matthew Hummel, Natural Resource Management

Growing Knowledge From Field To Fork

SDSU Local Foods Education Center Being Established



CONSTRUCTION BEGAN THIS SPRING ON A NEW 1.3-acre teaching and learning facility that will benefit South Dakota State University students and community members interested in local foods production.

The South Dakota State University Local Foods Education Center will be located on Medary Avenue on the northern edge of the SDSU campus. It will be fully dedicated to student and public teaching and learning, emphasizing hands-on field experience with small-scale food production and distribution practices.

The Local Foods Education Center is based on a foundation of student learning, ecosystem sustainability, and consumer access to a safe and stable food supply.

“We will teach students, young and not-so-young, the basics of small-scale food production. This new space will help give students hands-on experience while teaching concepts encompassing the entire spectrum from field to fork,” says David Wright, SDSU Plant Science Department Head. “There is increased public awareness of the source of the food we eat and the reliability of its safety. These are highly emotional issues for today’s consumers and are drivers of change. That is why local foods production has become a core of our horticulture curriculum.”

Consumer demand for food that is locally produced, marketed and consumed is generating increased interest throughout the United States. As interest grows, so do questions about

modern production techniques and best management practices.

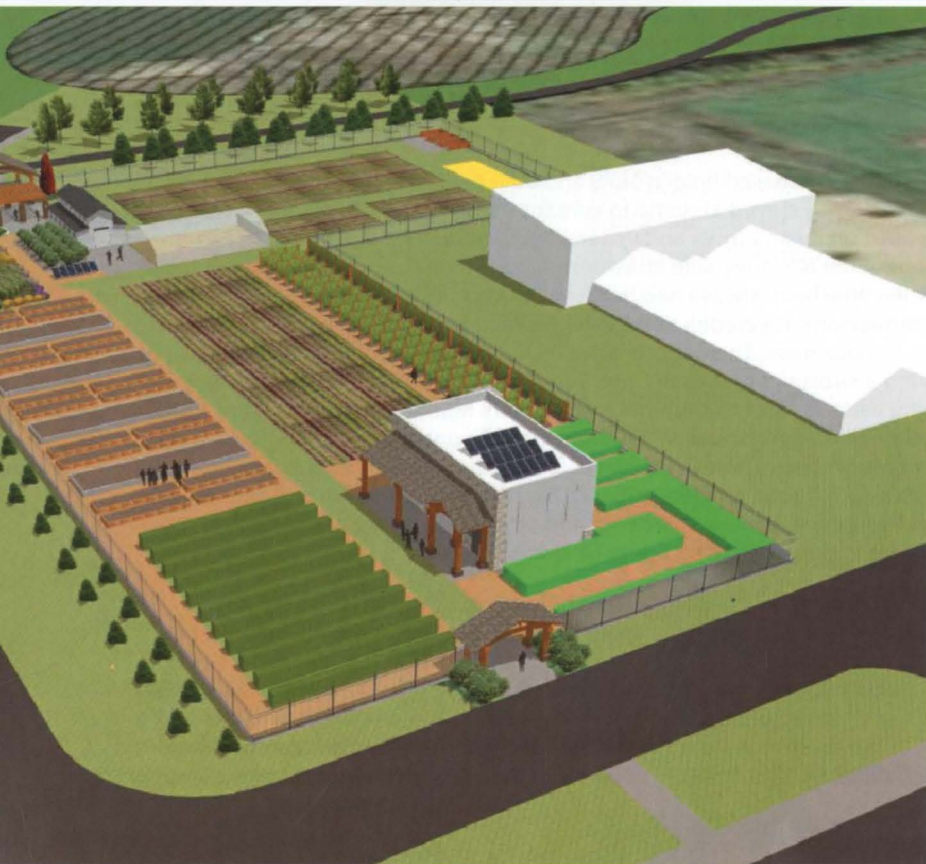
Wright notes that, “Though ‘local’ has a geographic connotation, there is not consensus on a definition in terms of the distance between production and consumption.” Farms that support local foods production can be as far away as 50 miles.

Consumers who prefer locally grown food also care that it is grown in an environmentally acceptable manner. Students will learn organic production techniques, low-volume irrigation and it will include habitat to support bees and butterflies.

Construction of the Local Foods Education Center will take place in three phases. The first phase of construction – initiated in the spring of 2016 – includes



Pictured are building plans for the South Dakota State University Local Foods Education Center which supports every aspect of SDSU's horticulture curriculum. The new facility will provide students with experience in areas ranging from business concepts related to food production and growing vegetables, to arboriculture and management of small tree fruits and vining fruits. The Local Foods Education Center is based on a foundation of sustainability and will feature a pollinator habitat to support bees and butterflies.



Renderings by Tanner Aiken, SDSU Facilities and Services

site preparation and infrastructure development. For the second phase, Wright anticipates the first food crops will be planted in the spring of 2017. The third phase will include a new building on the site to house teaching labs where students can gain hands-on experience learning food processing and safety techniques.

Funds to begin the first phase of the project were graciously provided by SDSU in addition to a \$100,000 grant from the Wells Fargo Foundation. "We are very grateful for the support we've been given to make this project a reality," Wright says. For more information, contact David Wright at david.wright@sdstate.edu, or call 605-688-5123.

By Lora Berg, Director of Marketing and Communications for SDSU College of Agriculture & Biological Sciences

Steve Helling



“SDSU gave me a broader outlook on life and the world in general. Wide-ranging courses from engineering, philosophy, child development, education, nutrition and agriculture opened up a world of possibilities and gave me a thirst to know more.”

Current Role: Owner of Hillside Prairie Gardens, a USDA organically certified garden/farm located south of Brookings, SD, where he and his family grow and market 25 different fruits and vegetables. Recently retired from the position of Construction Manager for Brookings Area Habitat for Humanity (BAHFH).

Rural Roots: Helling grew up on diversified dairy farms near Mitchell and Mount Vernon, SD. As a result of growing up on a farm, he says, “I have always been interested in agriculture.”

SDSU Experience: Helling says he “followed his older brother Mark to SDSU” in 1971 to pursue a degree in civil engineering later switching to a self-directed Bachelor of Science degree. The brothers were first-generation college students. Having previously attended a country school and then small high school in Mount Vernon, Helling says, “SDSU gave me a broader outlook on life and the world in general. Wide-ranging courses from engineering, philosophy, child development, education, nutrition and agriculture opened up a world of possibilities and gave me a thirst to know more. The Introduction to Philosophy course taught by David Nelson was one of my favorites.” Helling earned a M.S. degree in Guidance and Counseling from SDSU in 1978.

Transitions: In 1975, as a backpack guide at Sky Ranch, a camp in the Rockies, Helling met his future wife Mary Kay, who was also on staff. They were married in 1976, and Mary Kay transferred from Purdue to finish her Bachelor’s and Master’s degrees in Child Development and Family Studies at SDSU. (She completed her Ph.D. at Purdue in 1992 and is presently Associate Vice President for Academic Affairs at SDSU.) For several years, Helling worked for the Nebraska-based Center for Rural Affairs in farm energy outreach in South Dakota.

Family Farm: The Helling family purchased land in 1979 and built their own home. A family of four children followed and Helling stayed at home to care for them, while also developing a small farm enterprise focused on raising fruits and vegetables. The kids were very involved in the process and throughout the 80s, they sold strawberries, raspberries and various vegetables. Helling says that while they have always had gardens, it wasn’t until about seven years ago when it took off commercially. He credits that to his two sons, Jacob and Andrew, taking on major roles to grow the business. Their efforts have included launching a garlic growing business, establishing a subscription-based Community Supported Agriculture enterprise, as well as developing sales to local restaurants and Farmers Markets. Today, all four of the Helling children are continuing involvement that mirrors their agrarian upbringing: Jacob and Andrew operate an organic farm (Twin Organics) at River Falls, Wisconsin; son Alexander is a gardener while working full-time for Denver-based Star Communities, which certifies cities in sustainability; and daughter Heidi is a gardener and writer who has released her first book: *Prairie Grown Stories and Recipes from a South Dakota Hillside*.

Sense of Community: From his rural upbringing to his time at SDSU, community has always been important to Helling. He says, “While at SDSU, I learned what being a part of a community meant. Several years of living in both residence halls and Lutheran student houses helped me better understand interpersonal relationships.” Today, he remains actively involved with his church, serves on the Board of the Lutheran Student Center at SDSU and is currently President of the Brookings Area Farmers Market. As former construction manager for Brookings Area Habitat for Humanity, he supervised the construction of 56 homes built for families in need.

Sage Advice: Asked what advice he’d given to current students, Helling concludes, “Stay open to new ideas and experiences; you really never know where you will end up.”



Continued Excellence

South Dakota State University has a new president in place.

I was among the hundreds of people that packed the Roberts Reception Hall on April 25 to see the Board of Regents announce that Dr. Barry Dunn would become the 20th president in our university's history. My happiness for Dean Dunn is hard to describe, but it wasn't what was foremost in my mind.

What was foremost in my thoughts was my happiness for this place that I love so much. I have absolutely no doubt that he is the right person for the job. In my view, there's no question that he will build upon the positive momentum created under President David Chicoine's watch.

The College of Agriculture and Biological Sciences, too, will build upon the great momentum that has been created during Dean Dunn's tenure.

Rest assured that, while a transition in leadership within the College will take place, the sense of urgency regarding the work done here will not change. A primary reason is that Dean Dunn has created a leadership team of extremely committed and talented individuals. That team will continue to do what it's been doing: teach, conduct research, and educate the public through Extension programs.

To steal a phrase from President Chicoine, "The generosity of our donors creates our margin of excellence."

Your funding of scholarships, programs, faculty support, new facilities and more will continue to be a key to our success. We are grateful to each of you who invest in this awesome University. We ask others to join the cause.

Together, this new era will take us to places we had not previously imagined. GO JACKS!

MIKE BARBER '97



SDSU Local Foods Education Center will grow knowledge from field to fork

Construction is underway on a 1.3-acre teaching and learning facility that will benefit South Dakota State University students and community members interested in local foods production.

The SDSU Local Foods Education Center will be located on Medary Avenue on the northern edge of campus. It will be fully dedicated to student and public teaching and learning, emphasizing hands-on field experience with small-scale food production and distribution practices.

The Local Foods Education Center is based on a foundation of student learning, ecosystem sustainability, and consumer access to a safe and stable food supply.

Consumer demand for food that is locally produced, marketed and consumed is generating increased interest throughout the United States. As interest grows, so do questions about modern production techniques and best management practices. David Wright, SDSU Plant Science Department Head, notes, "Though 'local' has a geographic connotation, there isn't consensus on a definition in terms of the distance between production and consumption." Farms that support local foods production can be as far away as 50 miles.

The first phase of the project was made possible by a \$100,000 grant from the Wells Fargo Foundation. "We are very grateful for the support we've been given to make this project a reality," Wright says.

For more information or to make a contribution, please contact:

Mike Barber
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SDSU Foundation
1-888-747-7378 (toll-free)
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