



GROWING

SOUTH DAKOTA

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COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENTAL SCIENCES



SOUTH DAKOTA STATE
UNIVERSITY EXTENSION



SOUTH DAKOTA
STATE UNIVERSITY
*South Dakota Agricultural
Experiment Station*

2020 ANNUAL REPORTS

FROM THE DEAN:



When written in Japanese, the word 'crisis' is composed of two characters or kanjis – one represents danger and the other represents opportunity.

The COVID-19 pandemic has made an indelible mark in the history book of SDSU, South Dakota, our nation and world. The impacts and our responses to this crisis have been significant and are a testament to our ability to adapt to changing circumstances, how we can be responsive to those in need, how we can demonstrate our resilience and learn from these experiences.

It is very interesting to look at how the word crisis is interpreted in various cultures. The word 'crisis' in Japanese (Kiki) reflects the dual nature of the situation and describes how SDSU, and the stakeholders and communities that we serve, have responded to a dangerous situation and seized upon the opportunities that it presented. Out of necessity, we had to rapidly pivot and adapt to a new reality in our three mission areas of teaching, research and outreach. While challenging and requiring lots of ingenuity and creativity, our faculty, staff and students demonstrated tremendous adaptability, resilience and capacity to remain responsive to the needs of our stakeholders. We have learned that what we once thought was impossible is now something that we are doing routinely.

I have heard many times "I didn't think this would work, but I think we should keep this as an option going forward" when we reflect upon the various adaptations and modifications that were implemented in response to the pandemic. This edition of Growing South Dakota will share some of the many stories of adaptation, responsiveness and resilience coming from our outstanding South Dakota Agricultural Experiment Station and SDSU Extension programs. I could not be more proud of our folks in the SDSU College of Agriculture, Food and Environmental Sciences for how they continue to excel under the challenging COVID-19 conditions. A more Midwestern way of describing how we responded to the pandemic is "When life presented us with a bunch of lemons, we discovered how to make some tasty lemonade." Here is to hoping that we can all share a refreshing glass of lemonade with each other in the very near future!

Stay safe and healthy,

South Dakota Corn Endowed Dean of the College
of Agriculture, Food and Environmental Sciences

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GROWING

SOUTH DAKOTA

VOLUME 11, NO. 1, SPRING 2021

- 3** COVID-19 Impacts
- 9** Precision Agriculture: What's New
- 13** Featured Research
- 19** SDSU Extension 2020 Annual Report
- 45** South Dakota Agricultural Experiment Station 2020 Annual Report
- 55** CAFES News and Updates
- 67** Alumni News
- 75** Alumni Gone Down In History
- 81** Jackrabbits Now and Then: A Current Student and Alumni Q&A

ON THE COVER:

John McMaine, Assistant Professor and SDSU Extension Water Management Engineer, is filmed as he explains his research for the 2020 SDSU Southeast Research Farm virtual field day.

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COVID-19's IMPACT ON SDSU



EXTENSION

A Q & A WITH KARLA TRAUTMAN – DIRECTOR OF SDSU EXTENSION

Q. How did SDSU Extension programming change as a result of COVID-19?

A. During the early phases of COVID-19, SDSU Extension had to make a quick pivot and move entirely to a virtual platform for our educational outreach. This was not easy, as it took a great deal of coordination to align our technological resources with the priorities and timing for educational needs that were happening across our four programming areas all at the same time. This included converting face-to-face programs that were already scheduled on the calendar to a virtual format. Virtual programs require a great deal of planning and making the switch for some of these programs at such short notice was a significant effort. We also prioritized efforts to quickly provide virtual programs in response to needs that were emerging as a result of the pandemic.

Q. What challenges did SDSU Extension staff face in order to continue offering resources/support to the citizens of South Dakota during the pandemic?

A. In the early phases of the pandemic, the initial challenge of working remotely was significant. Just as our professionals value interacting with our clientele during in-person programs, they value interacting with their colleagues in the same manner. Working remotely during the early days of the pandemic forced us to find new ways to collaborate and communicate with each other for the purposes of planning and coordinating programs.

Another challenge was communicating and engaging with clientele. Not only were our professionals trying to gauge the needs people were having as a result of the pandemic, we were also gauging how best to make educational resources accessible as individuals, families, businesses and communities were adjusting to this new environment. While we could connect with clientele using our traditional methods (news releases, columns, radio, etc.), we discovered that social media was a critical tool in communicating with a broader audience. Using Extension's professional Twitter and Facebook pages as distribution methods for articles and fact sheets has been extremely successful.

Q. In what ways did SDSU Extension staff adapt to continue offering resources/support to the citizens of South Dakota?

A. We created a COVID response page on our website. In the early days of the pandemic, we focused primarily on providing educational articles in response to emerging needs related to COVID. As a result, the webpage was a universal site for accessing this information from all of our programming areas.

Our staff have had to navigate their own learning about a broader range of virtual education tools. They quickly learned the basics of how to use virtual platforms like Zoom and Training House, but as time has gone on, they have learned the more advanced tools these platforms offer. They have recognized the steps needed to properly facilitate virtual meetings and webinars. They are also thinking carefully about how to communicate skills that will help participants understand and navigate these technology platforms, especially as participants may not be familiar with these technologies.

We also had to envision how to maintain efforts that could not be addressed in a virtual or remote framework, like field or farm visits, and how to do those activities in a safe manner. Our Agriculture and Natural Resources staff had to work through the adjusted research restrictions when it came to doing their applied research trials and we collaborated with our research colleagues to address virtual field days and plot tours.

Q. How did SDSU Extension staff innovate to find new ways to reach their audiences?

A. I need to compliment the Extension professionals for their adaptability, flexibility and responsiveness to innovating new ways to provide educational information and resources during this

pandemic. We saw our professionals collaborate with each other and our cooperative partners to provide programming, though in different ways. In addition to providing virtual presentations and webinars, our staff found innovative ways to deliver:

- Virtual field days
- Self-guided plot tours
- Virtual food preservation training
- Virtual Master Gardener training series
- Virtual Summer Learning Series for 4-H
- Accommodated summer 4-H activities (virtual judging schools, demonstration days, public presentations)
- A series of virtual personal self-help classes called "Making Time for Me"
- Virtual Community Development Conference for South Dakota community leaders
- Virtual book reads
- Virtual exercise classes
- Smaller in-person trainings that have hands-on components (i.e., Shearing Schools)
- Modified approach to conducting field and farm visits
- Modified approach to applied research efforts

Q. How will the changes in the ways programming was offered impact the way SDSU Extension offers programming in the future? Will SDSU Extension continue to use some of the virtual means of offering programming established during the pandemic?

A. There have been some upsides to COVID-19. As a system, we realized that some programs lend themselves well to virtual methods, and as a result, more people are able to participate and obtain the information. We also have realized that some types of meetings can be held just as successfully using virtual methods, which allows more people to participate while saving on the time and travel expenses formerly required for such events. I think we will see the demand for virtual options, by both clientele and staff, continue post pandemic – especially because it allows resources to be accessible to more audiences in workable time frames (i.e., 24/7 accessibility).

That being said, the experiential learning model is the backbone of Extension. Much of our face-to-face work is action oriented – we engage learners in the learning experience (i.e., classes, field days, tours, etc.). Going forward, we will evaluate our programs with a critical lens, identifying the best way to make them available to our clientele. In most instances, having programs fully available in a face-to-face manner will be our priority. But in other instances, I think we will identify a hybrid approach to our programs in order to make them more accommodating for clientele. This will mean identifying which pieces need to be face-to-face with additional components or resources made available in a virtual framework, thus making the program more accommodating from a time and resource commitment.

COVID-19's IMPACT ON COLLEGE



A Q & A WITH BILL GIBBONS – DIRECTOR OF THE SOUTH DAKOTA
AGRICULTURAL EXPERIMENT STATION AT SDSU

Q. How did researchers have to adapt their research projects due to COVID-19?

A. During the early phases of COVID-19 in March 2020, SDSU required a relatively rapid pause in all research projects. The only exceptions were for a small list of what were termed essential activities, which included: activities related to maintaining human and animal health and safety, activities related to work on COVID-19 (which might include developing diagnostic tests, etc.), activities necessary to maintain valuable research equipment or materials, and activities necessary to maintain the integrity of long-term or highly valuable research trials.

If a researcher believed that specific activities being conducted under their guidance fell into one or more of the categories, the researcher was required to submit a short justification for the activity to their department head for

review. The justification document described the why, who, when and how the activity was to be performed, along with the health and safety practices that were to be followed. The document also included contingency plans for others to carry out the activities if the primary people became incapacitated by COVID-19.

Department heads initially assessed these requests, passing on the approved requests to CAFES leadership, who also made assessments before passing them along to SDSU's vice president of the Division of Research and Economic Development (DRED). The vice president of DRED made the final call to either approve or not approve the activity requests.

On June 1, SDSU relaxed restrictions and instead of approving on an activity-by-activity basis, the university shifted to the approach of requiring researchers and department heads to describe how human safety would be maintained as we ramped up activities. Researchers and department heads were required to develop and submit plans describing how human health and safety would be ensured as research activities were allowed to start back up. This involved following CDC guidelines for maintaining safe working environments through practices such as maintaining distance between personnel in time and space, using appropriate personal protective devices, appropriately sanitizing surfaces, avoiding use of common areas of buildings, utilizing directed traffic flow within buildings, etc. Those plans have continued to the present and we anticipate they will continue until the pandemic subsides.

Q. How did research in the college change as a result of COVID-19?

A. During the March 1 through June 1 period, CAFES had approximately 150 submitted requests to allow continuation of specific activities. Close to three quarters of those requests were approved. Activities that were not approved were largely judged to be those that could be postponed without causing loss of valuable resources or data, such as a replicated trial that could be performed at a later date.

Unfortunately, due to the timing of the COVID-19 outbreak, these decisions were made at the start of the planting season, so several replicated crop trials were not allowed to proceed, thus losing an entire growing season. For example, if a study was assessing a fertilizer treatment on a crop and averaging the data over three years, one could interrupt the study and simply add another year onto the end. However, if a crop trial was assessing changes of some parameter over multiple years as caused by a treatment, these projects were allowed to continue. For example, a trial assessing changes in soil health due to a specific crop rotation pattern could not be paused for a year and then simply picked back up in a subsequent year. In such longitudinal studies, interrupting the project would mean starting over and this would mean the loss of all investments made to that point.

Q. What challenges did researchers face in conducting research during COVID-19?

A. Most of our researchers also carry teaching or Extension appointments and fulfilling these obligations carried their own extra sets of requirements or expanded obligations. That said, from

a research standpoint, researchers were faced with first making the case to continue their essential activities and then developing and following plans to operate their research programs in a safe manner.

Research projects are funded by external sources, so researchers also had to effectively communicate with their funding sources about the delays and extra expenses that the pandemic caused. Researchers also had to balance the needs of their students, staff and post-doctoral advisees who all had specific projects to conduct. This required a great deal of flexibility and creativity to minimize the chances of COVID-19 spread while conducting research activities. Researchers also had to consider their own professional development plans and how these could be adjusted to meet future promotion and tenure guidelines. Fortunately, SDSU and most other institutions granted an automatic one-year extension on these types of deadlines.

Q. What were the benefits and challenges of holding all field days virtually?

A. We were able to make some 'lemonade' from the 'lemon' of COVID-19. We learned how to conduct virtual field days and realized that this approach allowed a much broader range of participation. We had higher numbers of people who participated virtually in our field days and they came from all across the globe. In-person field days are restricted to people within relatively short driving distance that are willing to commit a good part of a day to attend. Virtual field days require no travel, a much shorter time commitment, and parts of the virtual field day events are archived and can be viewed at any time. However, they don't allow the in-person conversations, relationship building, networking and opportunities to use our other senses like in-person events do. Therefore, moving forward, I see us using a combination of in-person field days supplemented with virtual tools to reach a broader community.

I think another benefit of COVID-19 is that it showed the effectiveness of holding some of our meetings via a virtual format. Travel is expensive and time consuming, and virtual meetings will play a larger role in the future, even when we get back to being able to meet in person. While I think everyone is tired of only meeting via virtual tools, the future will be a balance of in-person and virtual meetings.

Q. What will research in the college look like going forward?

A. Assuming the vaccines perform as expected, I think our research will resume more of a normal pattern in 2021. People are anxious to get back to doing what they love and interacting with our stakeholders. I think that COVID-19 has opened our eyes to how vulnerable people and the supply chains we depend upon are to disruptions that can quickly spread across the globe, whether it is a biological virus or a computer virus. There will be more research opportunities to develop technologies that can rapidly detect and counter these disruptions. I also think this is another driving force toward the locally made, locally consumed mindset that we increasingly see in consumers.

COVID-19's IMPACT ON ACADEMIC



PROGRAMS

A Q & A WITH VIKRAM MISTRY – INTERIM ASSOCIATE DEAN OF ACADEMIC PROGRAMS

Q. How did students, faculty and staff respond to the changes on campus and alternative learning environments?

A. When spring break 2020 arrived, we were having a regular semester. Students, as well as faculty, were looking forward to a well-deserved pause in the semester to recharge. We were looking forward to the post-spring break events on campus, such as Little “I,” campus-wide Ag Day and welcoming hundreds of high school students to campus for the state FFA convention. These plans were disrupted shortly before spring break ended when it was determined that for COVID-related safety reasons, students would not return to campus and their classes were to be delivered remotely. Students quickly adjusted to the new method of learning and interacting with their instructors. While at the present this appears to be a distant memory, it was a substantial hurdle for faculty members; the semester was already in full swing. It was remarkable how within a week, our faculty members made adjustments to the curriculum and teaching in order

to deliver content remotely. Delivery of lectures online was easier than adapting lab materials. Creative adjustments were necessary, such as recorded demos of lab content. The faculty's nimbleness to make adjustments with minimal compromise was admirable. We have always taken pride in our faculty and their commitment to teaching and knowledge of their subject matter. This unfortunate situation reaffirmed the high quality and dedication of our faculty.

Q. In response to the COVID-19 pandemic, how did CAFES adapt and re-imagine in-person events throughout the academic year?

A. The COVID Response Team, in consultation with CDC and State Health Department direction, developed comprehensive guidelines for campus operations. Based on these guidelines, a decision was made to invite students back to campus for fall 2020 and spring 2021 semesters, but with meticulously defined social-distancing, class arrangements and mask mandates. Group gatherings were also defined and limited. CAFES takes pride in its numerous student clubs and their activities, most of which are interactive and include events such as club meetings, most prominent of which is the Prexy Council Ice Cream Social at the beginning of the fall semester, CAFES Scholarship and Awards Banquet, CAFES Career Fair, CAFES Ambassador programs, prospective student visits and more. These activities are important for promoting professional development, recruiting and providing students an overall college experience. Given the high value of these programs, we determined that offering them in alternate methods was essential. A major undertaking was the Virtual Career Fair in partnership with the Office of Career Development. The fair was a major success, attracting approximately 450 students to the virtual environment to interact with 84 employers. Another notable activity was the CAFES Ice Cream Social. After detailed planning and approval by the COVID Response Team, this event was held and spread out across much of the ag section of campus, complete with pre-scooped ice cream and club displays. Large events such as scholarship and awards banquets were not held. Students still received their scholarships and recognition, and publicity for their accomplishments came via social media and mailings of scholarship booklets. Another large, interactive event, Little "I," was cancelled in spring 2020 but was held in spring 2021, incorporating social distancing and other safety protocols. Similarly, the South Dakota FFA Convention, which SDSU takes pride in hosting each year, did not occur on campus in spring 2021. We missed seeing all the FFA students and look forward to welcoming them back to campus in 2022.

Q. How did the necessary safety and health precautions implemented on campus affect the experience of first-year students?

A. The first semester on campus is perhaps the most challenging for students during their college career. Even during a normal

year, the realities of the first semester – life away from home and family, a new learning environment, personal responsibilities - are a challenge but offer opportunities for personal and professional development. In 2020 the added challenge of social distancing introduced an additional hurdle for first-year students to overcome while integrating into college life. With these challenges in mind, a campus-wide decision was made to offer most, if not all, First Year Experience Classes in a face-to-face format. This offered new students the opportunity to interact with their peers, faculty and staff in person in a safe and socially distanced environment, while experiencing college life. Upperclassmen also served as informal mentors to the new students to help them settle in, develop contacts with peers and participate in club activities.

Q. What does the future look like for in-person classes, meetings, trainings, etc.?

A. Our forced implementation of virtual methods for classes, meetings, workshops, conferences, etc., has brought forth an opportunity for the future. Technologies for virtual delivery are clearly available and continue to be refined and updated. However, there is no ideal substitute for in-person interaction, be it classes or other meetings. A common comment from students has been that while students appreciate the delivery of class materials virtually in innovative and effective methods, they miss being physically present in class to chat with their professors and peers. These hallway interactions provide additional learning opportunities and build lasting professional relationships. It is likely that in the future we will draw from the best practices of all the methods of delivery now available and create a learning environment that will be most effective and efficient while integrating the much-needed personal human element.

Q. How have the challenges of the pandemic and hybrid class schedules affected student success?

A. The total number of students that graduated during the pandemic academic year was approximately similar to those in previous years, but there certainly were challenges. Student success occurs most readily when personal efforts made by students are supplemented by interactions with peers and faculty members on campus. In virtual and hybrid modes, these interactions were not straightforward. Students needed to put forth additional effort to set up virtual visits with faculty members. In addition, if a student, their roommates or family members were affected by COVID, there was lost time from classes. Campus protocols generally enabled students to make up for lost time and content, but these have undoubtedly been additional stress factors. It is very encouraging that through the career opportunities offered by campus, placement for permanent positions and summer internships continues, demonstrating the value employers are placing on our students.

SAVE THE DATE

SOUTH DAKOTA STATE UNIVERSITY **RAVEN PRECISION AGRICULTURE CENTER GRAND OPENING**

SEPTEMBER 11, 2021

BY LORA BERG

The South Dakota State University Precision Agriculture Initiative was designed to address a need for college graduates, pertinent research and SDSU Extension expertise related to precision agriculture. The integration of computer technology with farm equipment, farm sensors, GPS navigation, satellite imagery and drone imagery has revolutionized agricultural production in recent years. This evolution has created new opportunities to fine-tune not only agronomic production, but also opened the door for precision conservation and livestock production as well. Through the Precision Agriculture Initiative planning process, South Dakota State University made a significant commitment to train agriculture's future leaders through transformative, hands-on learning experiences that will equip them to return to production agriculture or join allied industries, as well as contribute to the sustainability of agriculture and their communities. The Fall 2014 semester marked the addition of a Precision Agriculture minor to SDSU's curriculum offering. SDSU then added the first four-year degree in precision agriculture as of fall 2016. During the 2020-2021 academic year, 85 students were pursuing the major and 50 were minoring in precision agriculture. The new, 122,694-square foot Raven Precision Agriculture Center will bring all of the learning together under one roof as of fall 2021.

Students learn in a joint program between the SDSU Department of Agronomy, Horticulture and Plant Science and the Department of Agricultural and Biosystems Engineering in the College of Agriculture, Food and Environmental Sciences, along

with the Jerome J. Lohr College of Engineering.

The SDSU Precision Ag program is designed to be a global leader in transforming complex precision agriculture and natural resource conservation data into actionable information. SDSU research is developing and testing innovative methods to combine and analyze large, complex and diverse agricultural data sets and produce user-friendly tools to inform decision making for increasing profitability and sustainability. Our teaching, research and SDSU Extension personnel are combining expertise across diverse fields of study to develop processes and tools that interpret data to give decision makers timely and actionable information. The SDSU College of Agriculture, Food and Environmental Sciences is leading collaboration with the Jerome J. Lohr College of Engineering, College of Natural Sciences and other collaborators to strategically focus expertise on SDSU's precision agriculture teaching and research goals.

"Our goal is to offer students a program that provides the best hands-on experiential learning in the most premiere facilities in the nation," said John Killefer, South Dakota Corn Endowed Dean of the College of Agriculture, Food and Environmental Sciences. "We believe bringing agronomists, engineers and data scientists together in this new facility, along with providing great student learning and collaborative spaces, will support interaction on a daily basis that will foster even more innovative ideas and knowledge to advance precision agriculture. Our students are equipped to provide the solutions farmers will need to help them succeed well into the future."

CONSTRUCTION PROGRESS AS OF MAY 2021:



BY THE NUMBERS:

- **122,694** square feet
- **15** teaching labs
- **6** hands-on labs
- High Bay: **4,245** square feet, 65 feet by 65 feet with a 28-foot wide bi-fold door and **3-ton** bridge crane for student learning with real-world equipment
- Mid Bay: **2,772** square feet with a Chassis Dynamometer rated at 300 HP, PTO Dynamometer rated at 300 HP and **5-ton** bridge crane
- **12** research labs
- **22** collaborative spaces
- Office space for **50+** graduate students





LAUNCHING

A PRECISION

BY SYDNEY MEYER

Precision ranching technologies have the potential to improve ranch efficiency and producer decision making processes, thereby impacting profit margins, work-life balance, ranch sustainability and natural resource management. Through its new Precision Ranching Initiative, SDSU researchers will create techniques to fine-tune the role of livestock in a natural range ecosystem in order to add value to and improve work-life balance for South Dakota's producers.

"Precision agriculture has made a lot of headway in commodity crop production and confined animal production, but so far range livestock production systems haven't really been on the forefront of precision agriculture research, creating a relative void in technologies being applied to range systems," says Kristi Cammack, director of West River Research and Extension.

According to Jameson Brennan, an assistant professor in the Department of Animal Science and SDSU Extension Livestock Grazing Specialist, the ultimate goal of the precision ranching research will be to provide rangeland beef cattle producers with the tools and knowledge needed to incorporate novel technologies into their enterprises so they can apply regenerative management practices and improve ranch sustainability.

The South Dakota Agricultural Experiment Station at SDSU will lead research and technology development in areas such as

utilizing sensor technology to check water sources, real-time tracking of individual animal performance and behavior and developing complex models for predicting real-time forage production at the individual pasture scale to inform rotation schedules.

The Precision Ranching Initiative will integrate technology into the SDSU Cottonwood Field Station located near Philip to serve as a hub for precision ranching research. The station is home to a long-term grazing trial in which pastures have historically been maintained at low-density, average-density and high-density stocking rates. With 80 years of recorded pasture stocking density data, the station provides comparisons related to a changing environment that has seen drought, flooding and rising ambient temperatures. Given the increasingly variable environmental conditions in the Northern Great Plains, SDSU researchers will generate new knowledge to enable producers and landowners to nimbly respond and adapt to changing conditions.

"The Cottonwood Field Station is in the heart of range beef cattle country, so it is an ideal location for conducting this research," Cammack says. "A lot of producers are potentially interested in adapting new technologies but don't know which to use or how to get started using them. We will use Cottonwood as a way to demonstrate different technologies, share potential



RANCHING INITIATIVE

applications and help ranchers understand which technologies are worth their investment.”

Researchers at the station are planning to incorporate a number of new and novel technologies, including virtual fencing to rotate animals and minimize the impacts of grazing on environmentally sensitive areas.

“We plan to develop models to predict forage quality and quantity within pastures in real-time by linking weather, climate and satellite imagery data,” Brennan says. “This will make it possible for grazing managers to obtain near real-time forage information at the pasture scale so they can match forage quality and quantity to animal demand, thereby improving livestock performance and ranch profitability.”

The researchers will use GPS and motion sensing collars to record real-time daily livestock weight data so they can measure the impact of stocking rate and forage seasonality on animal performance.

“We will also develop sensors to monitor different aspects of livestock production,” Brennan says. “We are already working on developing a sensor to remotely monitor water sources, since one constant shared by all livestock is the need for sufficient access to water. The consequences of livestock not having access to water can be severe, ranging from animals escaping pasture boundaries

in search of a water source to declines in animal performance and ultimately death.”

The researchers plan to integrate precision supplementation and daily weight gain data to improve heifer development programs. Using SmartFeed and SmartScale technology from C-Lock, Inc., in Rapid City, they will study the ability to target supplementation rations to individual heifers based on real-time weight data. Brennan says the goal of this is to be able to create individual ration formulations to achieve a target rate of gain for all heifers. He explains the benefits of this research can be extended to any class of animal where targeted weights can be achieved through precision weighing and feeding.

Mobile technologies will enable integration of precision ranching methods at additional sites as well, such as the West River Agronomy Research Farm near Sturgis, for added livestock cover crop grazing work.

In addition to supporting South Dakota beef producers, the investment in precision livestock technology will enhance the existing curriculum and experiences for SDSU undergraduates in the precision agriculture program. This will create a new niche for students interested in pursuing careers in beef production and related industries.

ZACHARY SMITH

IMPACTS SDSU RESEARCH AND FEEDLOT INDUSTRY

BY SADIE VANDER WAL



Arriving at SDSU as an assistant professor in the Department of Animal Science in July 2018, Zachary Smith has substantially influenced the feedlot industry through his revitalization of the university's research feedlots at the Ruminant Nutrition Center (RNC) and the Southeast Research Farm, in addition to his numerous research studies. In fact, his research team has generated over \$1.1 million in extramural funding and in-kind contributions and produced or contributed to 22 peer-reviewed manuscripts and over 20 abstracts. To top off his research appointment through the South Dakota Agricultural Experiment Station, Smith also advises and teaches graduate students and instructs an undergraduate feedlot management course.

Research

With an overarching research theme of applied management and nutritional interventions, Smith and his research team continuously work to optimize feedlot cattle production practices and provide findings to producers through educational efforts of the South Dakota Agricultural Experiment Station and SDSU Extension Team.

"I am really interested in how we can best use specific management technologies, such as steroidal implants or novel feed additives, and how those can fit into a system and impact growth performance and carcass quality when the cattle are harvested," Smith said.

Starting in winter 2018, Smith, along with his first graduate student Dathan Smerchek zeroed in on a series of experiments investigating bedding application for feedlot cattle. The first phase of the study focused on the impact of bedding on backgrounded feedlot cattle in the extreme months of winter, followed by a second phase conducted on bawling calves from October to December in milder temperatures.

Other sub-themes to his research have included work in food safety through reducing pathogens in beef products, evaluating the effects of a cooked molasses stress tub on growth performance of newly weaned calves, and the impact of replacing common feed ingredients with novel ingredients in the diet. For studies focusing on ingredient replacements, the test diets are fed to cattle and then compared to a "gold standard" diet, containing ingredients such as corn, soybean meal or corn silage to see how the replacement of these common ingredients impacts net energy values and growth performance in feeding situations.

Smith also partners with SDSU Extension through several research efforts. Along with SDSU Extension Beef Feedlot Management Associate Warren Rusche and SDSU Extension Beef Specialist Julie Walker, the applied ruminant nutrition feedlot team maximizes the high-quality facilities at SDSU to conduct a wide variety of research simultaneously. In addition to the RNC at the Brookings campus, the team utilizes feedlot facilities at the Southeast Research Farm near Beresford, South Dakota, in collaboration with their agronomic research to study the integration of livestock in cropping systems.

"There are not many places in America that have two research feedlots within a reasonable distance of campus to conduct production scale research comparisons like we have the luxury to do with the Southeast Research Farm and the RNC," Smith said.

In such studies, Pete Sexton, Southeast Research Farm Supervisor, plants variety trials on the farm's cropland, and the resulting crop is mixed into feed for Smith's feeding trials. One





of these novel crops planted, harvested and then fed at the farm includes a new corn variety with increased expression of alpha-amylase, the enzyme that breaks down starch. After feeding the corn silage with and without the expressed gene at two different inclusion levels, the team found that the different types of corn did not make a difference on growth performance. However, the study did conclude that the higher inclusion rate of corn silage resulted in a slightly slower growth rate, which meant the cattle had to be fed two weeks longer to achieve a similar body weight at harvest. The higher inclusion rate of silage presented an increased carcass weight at harvest in comparison to the carcasses fed at a lower inclusion level and at the same degree of rib fat thickness as the other cattle. Hence, the study proved that cattle fed more corn silage for a longer period produced more beef per acre of cropland.

With corn and soybeans as the primary crop rotation in eastern South Dakota, Smith, Sexton and the research team also have sought to find another crop to incorporate into the rotation. Due to its greater yield in comparison to open pollinator lines and possessing a super pollinator trait that allows it to have less ergot contamination, hybrid rye became a crop of interest for another feed ingredient study. The investigation resulted in a blend of one-third rye to two-thirds corn performing identical to corn, which proves important to crop rotations and the utilization of another ingredient in feedlot operations.

Another agronomic and livestock integration topic currently being studied at the Southeast Research Farm includes combatting the issue of corn drying down too fast. The research focuses on the impact that kernel processing of corn silage that was harvested at a lower moisture content than ideal has on finishing phase growth performance and efficiency. Study results have shown that corn harvested two weeks later yielded more tons of silage produced.

“We have an outstanding group of crop scientists here at SDSU, and we get to take their products and use them in livestock production in order to understand how things all work together as an entire system,” Smith said. “It’s really special that we can all work together on things across all facets of production to provide solutions to stakeholders.”

“That’s why I like South Dakota; opportunities for improving the lives of stakeholders are around every corner,” Smith said. “I want to optimize feedlot production so those calves never have to leave our state.”

In addition to his research, Smith has impacted SDSU facilities immensely during his time at State. He has optimized the feedlot systems at both the RNC and Southeast Research Farm through updating technology such as the addition of the bud box and alley system to the RNC, which enables the research group to easily implement a wider variety of studies as needed.

“In his short time at SDSU, Zach has already shown himself to be a very productive researcher, obtaining significant funding from several organizations and generating findings that have been published in several key animal science journals,” said Bill Gibbons, Director of the South Dakota Agricultural Experiment Station and Associate Dean for Research for the College of Agriculture, Food and Environmental Sciences.

Keeping Economic Opportunities in South Dakota

South Dakota is one of the largest cow/calf producing states, and therefore sale barns remain fairly active year round. However, many of the weaned calves end up being sold and shipped out of state to be fed elsewhere.

“Here in South Dakota, cattle are of superior beef production genetics, resulting in feeder cattle that are arguably some of the best cattle in the world,” Smith said. “The lost economic opportunity for South Dakota cattle producers is when we export this outstanding commodity product to be fed out of state.”

According to Smith, the state feeds a half a million head each year, and feeding 1 million more of the South Dakota-raised calves in-state would result in \$650 million produced. For every \$1 in revenue, an additional \$2.50 is expected to be spent locally in return, bringing a projected \$1.63 billion of economic impact into the South Dakota economy annually.

“That’s why I like South Dakota; opportunities for improving the lives of stakeholders are around every corner,” Smith said. “I want to optimize feedlot production so those calves never have to leave our state.”

When feeding cattle, three main factors affect production. South Dakota has two of those factors covered, including having an abundance of feedstuffs at a reasonable price and a quality supply of feeder cattle. However, the state lacks a stable feeding environment, as hot summers and cold winters do not bring a positive result to feeding situations. Smith’s research theme drives him to understand how to control that third factor in categories such as cold stress in order to optimize production and keep cattle in the state.

“Keeping cattle here means more opportunities for students in our college and stakeholders in our state to have careers right here,” Smith said.

While Smith did not foresee a career in agriculture when growing up, he could not imagine having a different lifestyle.

“When you have a desire to solve problems, this is the best job to have,” Smith said. “My job and family give me purpose, and I don’t know what I would be doing without either.”



MORE THAN A

SEED



As springtime rolls around in the Midwest, farmers begin preparing for planting season. In addition to performing maintenance on equipment and evaluating soil health, farmers must select the ideal seed variety for the field, climate conditions, production goals and other factors affecting the overall profitability of that crop come harvest.

Similar to how there are multiple brands of food shelved at the grocery store, seeds come in different varieties, many of which might have been developed right here in South Dakota.

Serving as the birthplace of Cookies 'n Cream ice cream and the nation's largest two-day, student-run livestock exposition, otherwise known as Little International, the SDSU College of Agriculture, Food and Environmental Sciences is also the source of dozens of wheat and oat varieties.

However, the SDSU plant breeding program does not simply create a new seed variety overnight. The overall process spans 8-10 years, including initial breeding and selection, multiple years of testing in a range of environments and a final scale-up of the seed to commercial quantities.

From Breeding to Sale

Once an SDSU spring wheat, winter wheat or oat breeder develops a variety, the seed undergoes multiple years of evaluation across South Dakota's range of soil types and climates. These crop performance trials compare the new varieties with current commercial cultivars for agronomic traits, disease resistance, seed composition and yield and end-use characteristics such as milling and baking properties.

After evaluating the new variety's performance, the SDSU Variety Release Committee convenes to determine if the seed volume should be increased with the intent of releasing the variety for sale in the future or discontinued entirely. Upon committee approval, Foundation Seed increases breeder seed in field sizes from 1-100 acres over the span of two years, depending on the crop and potential market. Once the committee approves the named variety for public release by Foundation Seed, members of the South Dakota Crop Improvement Association (SDCIA) produce certified classes of the seed, which can then be sold to SDCIA members and other producers. Fields used for this production must receive inspection, and the resulting certified seed is tested and labeled before becoming available for anyone to plant.

Plant Variety Protection

Following approval for public release, a 12-month window opens to file a Plant Variety Protection (PVP) application for the named variety. PVP with Title V provides legal protection to developers, as the

protected variety can only be sold by the official variety name as a class of certified seed. Any seeds released by SDSU through the SDCIA have been protected by the PVP with Title V since the 1980s.

The PVP process proves especially important to the sustenance of the SDSU plant breeding program, Foundation Seed and the SDCIA. With PVP, private companies or individuals cannot legally sell protected, named varieties without the owner's permission and certification. If an infraction of PVP arises, the SDCIA and SDSU consult with a law firm to investigate, and based upon the findings, legal action may initiate against the violators.

Growing the Industry

Funding for equipment, research and land used for the seed production process originates from royalty fees, which are paid by anyone purchasing certified seed. These fees circulate back into the system to continue the development of new varieties suitable for South Dakota climates and soils.

"A small plot combine with all of the necessities that make work more efficient and data collection more accurate will cost about the same as a full size combine," Neal Foster, Executive Director of the SDCIA, said. "The royalty system has allowed for the upgrades and replacement of much of the breeding programs equipment from tractors, seeding equipment and combines."

PVP protects the royalty fees, as seed sold illegally does not return any funds back into the variety development pipeline.

"The monies generated through the royalty system are critical to keep these breeding programs going and providing better varieties for both producers and consumers," Foster said.

As a result of the negative implications of illegal sales, purchasing seed from reputable dealers becomes an integral piece to protecting funding of breeding programs such as SDSU's and safeguarding land from the introduction of new weeds and pests.

"A producer growing a commodity should recognize the importance of purchasing only seed that has been through the certification process," SDCIA past board chairman Bryan Jorgensen said.

Through meeting seed purity and quality standards, the certification process allows producers to rest easy knowing their certified seed is clean, traceable and ready to plant.

"Buying seed that has gone through the certification process gives the grower access to superior genetics, which will maximize all of the other inputs the grower has to use to grow the crop," Jorgensen said. "In short, certified seed pays!"





SD EXTENSION U





CONNECTING DURING COVID-19:

SDSU EXTENSION STAYS ENGAGED WITH YOUTH, AGRICULTURAL COMMUNITY

BY ANN HESS

From field days and farm shows to youth sports and overnight camps, many organizers across the state erred on the side of caution this past summer due to the coronavirus outbreak. While some canceled completely or postponed until 2021, others decided “the show” must go on, even if it is virtually.

As a youth development organization, 4-H prides itself in providing quality “hands-on” educational opportunities. However, the South Dakota 4-H team quickly recognized it needed to adapt in 2020 to the changing circumstances in order to still reach youth as well as aid their out of school time partners.

“We wanted to make sure that we were still providing youth with opportunities to be engaged and learning throughout the summer, regardless of what might happen with COVID,” says Christine Wood, 4-H Science Technology Engineering and Math (STEM) Field Specialist. “By combining efforts in a statewide

initiative, we wanted to lessen the burden of our staff, so they were not duplicating efforts from county to county and through collaboration, we wanted to make sure that our staff was still able to meet those local needs, but then also provide a quality program.”

In June, the South Dakota 4-H team rolled out the South Dakota Summer Adventure series, an 11-week virtual program to bring 4-H educators, topic area experts, educational content and hands-on, at-home activities to youth across the state. Each week explored a new theme, such as Garden with Me! or Crazy Critter Days, and delivered a minimum of six pieces of content, from live sessions and recorded videos to discussion boards and contests via the SDSU Training House Moodle.

Although participation varied from week to week, the South Dakota Summer Adventure series saw on average 63 youth take

part weekly. Some of the most popular topics included Dirt vs. Soil (394 youth), Container Gardens (315), Community Service (178), Explore the Space (163) and Basketball Skills (157).

Participation in the program was open to all youth, regardless of 4-H enrollment. Of those that participated, 58% were 4-Hers. Six out of school time partners also utilized the programming on-site throughout the summer months.

During the Summer Adventure program, youth competed for cash prizes for challenges ranging from digging up the longest worm to producing the best video showing what makes them proud of their community. The contests and challenges spurred nearly 750 youth entries and another 135 family entries. In total the South Dakota 4-H team awarded 170 prizes.

In addition to the participation, the feedback was overwhelmingly positive from youth:

- “The 4-H Summer Series has a big impact on me! I learned a lot and had new fun adventures. For example, I made the shower body scrub and I use it every time I shower!!! It made me challenge myself and learn new things that otherwise I would not have tried. I hope I can do it again next year!”
- “It helped me learn more about things I might not have been interested in before. It challenged me to learn different areas to see if I like them.”
- “The impact the South Dakota 4-H program has on me is great. It helped me further learn about how to plan a community service project and I can also take that to my 4-H group and show them how to plan a community service project.”

As well as parents:

- “We enjoyed it very much! At the forefront of my mind as I’m doing this, I’m thinking about how my 9-year-old stepped out of her comfort zone last week to write, type and submit her letter to the editor! Our local newspaper was very impressed that she wrote a letter and they will print it in this week’s paper!”
- “We loved the variety of topics - there was something for each of my four kids (ages 7-13) and their differing interests. They loved participating in the challenges and seeing what others submitted.”
- “This was a fantastic series of learning opportunities! I have nothing but rave reviews for the instructors and organizers. They all did a fantastic job of delivering a wide variety of content that was interesting, engaging and fun! Our girls LOVED the series! I only wish we had been able to take advantage of lessons during the first half of the summer. THANK YOU! We all learned a great deal about topics we didn’t realize would be so interesting!”

While much of the content covered throughout the series was lessons that 4-H professionals would use in face-to-face settings, Wood says moving to a virtual setting required new methods of thinking and a different type of preparation. Staff not only needed

to make sure that youth would easily have access to the materials, but many also had to strengthen their knowledge of Zoom and had to learn how to film and edit videos.

“I think the ability to do virtual programming has been a huge learning experience, and we’ve all had to, as professionals, learn how to present in a virtual environment and make content engaging, even when we’re not physically able to be in the same room,” Wood says. “I think that skillset moving forward will be even more valuable.”

Dakotafest goes digital

SDSU Extension has been educating thousands year after year at Dakotafest on topics as broad as mental health, first aid and agri-tourism to the crop price outlook and foreign animal disease prevention. Held each August in Mitchell, South Dakota, the three-day event brings together the state’s farmers and ranchers to network, learn and find opportunities for growing their family operations.

After announcing in early June 2020 that the in-person show would be canceled due to COVID-19 concerns, Dakotafest organizers decided to take the programming online and invited SDSU Extension to join the agenda. From August 18-20, 2020, Extension experts hosted virtual educational webinars addressing seasonal topics as well as issues brought forth by the pandemic. For example, Matthew Diersen, Professor and SDSU Extension Risk/Business Management Specialist covered the recent changes to Livestock Risk Protection and how it could appeal to producers with price risk. With harvest and cattle weaning on the horizon, SDSU Extension experts covered topics such as grain bin safety and mineral nutrition for calf immune function.

During the pandemic, many South Dakotans for the first time were looking for information on how to preserve food and butcher meat. Megan Erickson, SDSU Extension Nutrition Field Specialist and Hope Kleine, SDSU Extension Health Education and Food Safety Field Specialist discussed safe home food preservation techniques such as water bath canning, pressure canning, freezing and drying. Amanda Blair, Professor and SDSU Extension Meat Science Specialist discussed tips for selecting cuts of meat and preparation methods and steps consumers can take to ensure food safety when handling and cooking meat. She also shared ways to stretch your budget when purchasing meat and exploring different options for buying meat in bulk.

Heather Gessner, SDSU Extension Livestock Business Management Field Specialist, says while the SDSU Extension team missed the in-person interaction and one-on-one follow-up, the 2020 virtual Dakotafest expanded their audience participation geographically.

“The reach was more regional than those within 200 miles of Mitchell, so our message got out to a wider audience, which in turn hopefully is a positive thing for long-term impacts down the road,” Gessner says. “Most importantly we were able to maintain that mission statement and provide research-based information out to our clientele during an unprecedented time.”



SMALL BUSINESSES,

BY ANN HESS

According to the U.S. Small Business Administration's 2020 Small Business Profile report, 99% of employers in South Dakota are small businesses. Those 88,191 small businesses employ 209,403 South Dakotans, which represents 58.2% of the private sector workforce. To say small business is a strong component of South Dakota's economy is an understatement, says Peggy Schlechter, SDSU Extension Community Vitality Field Specialist.

Since 2012 the SDSU Extension Community Vitality team has hosted multiple Small Business Basics workshops in communities across the state. The program covers an extensive list of topics, including writing or updating business plans, tax and licensing, employee relations, pricing and marketing, customer service, social media and financing options. Additionally, throughout the program, a variety of entrepreneurs share real-world experiences with participants.

In early March, Schlechter was preparing to lead the fifth session of a six-session Small Business Basics training in Volga, when the first case of COVID-19 was announced in the state. South Dakota State University shut down soon after and Schlechter, who is based in Rapid City, canceled her travel plans and took the program online.

While she was not able to be there in person, the class continued to meet for the fifth session, with Schlechter leading virtually and Jameson Berreth, Volga city administrator, on-site to facilitate. By the sixth session, all participants took part over

Zoom.

"That was a great opportunity too, because some of the people that joined in had never used Zoom before, and I tried to make it feel safe and as comfortable as possible," Schlechter says. "It was interesting because that was the night we were having panel discussions. I was really glad that we had had the first four sessions face-to-face before that happened because we already all knew each other, so we were comfortable with each other. Many of the people that took the classes did not know each other before Small Business Basics classes started, so we all had that comfort level already."

Despite the program ending in a virtual format, Berreth says the city of Volga was happy to partner with SDSU Extension to put on the program.

"With many new and expanding businesses in Volga, Small Business Basics was a great opportunity to offer to our business leaders and aspiring entrepreneurs," Berreth says. "I have heard great feedback from participants regarding the Small Business Basics program. Information learned provided them with the necessary tools to take their business or business idea to the next level."

Soon after the program concluded, Schlechter says the Community Vitality team recognized the need for that dialogue to continue. Traditional brick and mortar small businesses that relied on customers walking through the door were experiencing challenging times as the public stayed home to comply with social



RURAL COMMUNITIES

BRAINSTORM, PROBLEM SOLVE DURING PANDEMIC

distancing. Rural community leaders were concerned about the economic impact from cancelling festivals and events.

The 3rd annual ENERGIZE! Exploring Innovative Rural Communities Conference, which was to take place May 5-6, 2020, in Milbank, kept getting pushed back in the year and was finally postponed to August 2021. Energize invites residents from rural communities to network with other community leaders from across the state, share success stories, get ideas and to take action to improve their own communities.

To keep that energy moving between Energize conferences, SDSU Extension kicked off a series of virtual community networking sessions entitled “Energy Bursts.” Designed to bring rural community leaders together for innovative brainstorming and problem solving, the one-hour weekly sessions were held from the end of March through June 2020. The Energy Bursts drew anywhere from four to 16 participants each week, with conversations ranging on how to open a meat locker to community plans for summer festivals.

“Nobody really knew much about COVID and how it was going to affect people and what it was going to do to businesses, so there were a lot of questions about how can we keep moving forward when you don’t know?” Schlechter says. “There were a lot of rural communities that did cancel summer events or changed them significantly so there wasn’t as much going on indoors. So, there was the fear ‘well you canceled those, those bring money into town and what was that going to do to the businesses.’”

While SDSU Extension facilitated the discussion, Schlechter

says the topics discussed came organically.

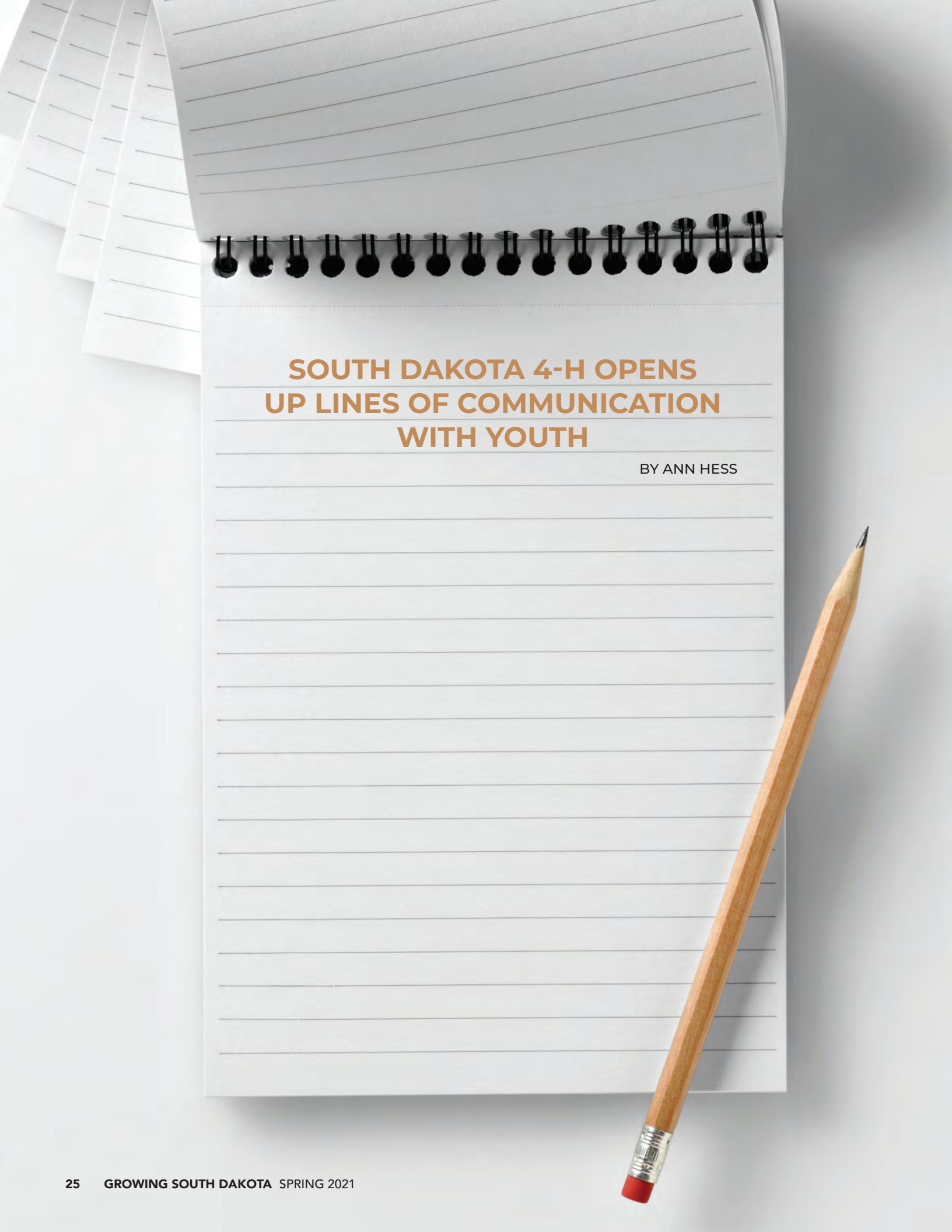
“It was just more of an opportunity to visit,” Schlechter says. “Most of the people that came on the call already knew each other and so they were comfortable with each other and they could have just as easily picked up the phone and talked one-on-one, but they really liked the opportunity for group discussion.”

As small businesses and communities had to adapt to a new socially distanced environment, Schlechter says she saw many positives come from those who chose to use the technology that was available.

“I think some of our small businesses became much better at providing customer service at a distance or through the internet, or really becoming nimble at reaching out to people that may not necessarily have come through the business that often anyway,” Schlechter says. “Those are things they are going to be able to continue to do when they get back to normal, that hopefully they don’t drop those things, but they serve the customers that walk in the store and they continue to use technology to reach out to the new customers.”

Schlechter says the Community Vitality team recognizes holding workshops, such as the Small Business Basics sessions, face-to-face works best for engaging rural community leaders and small business owners, but hosting digitally also had its benefits too.

“For several participants moving online was a means to learn a new technology that they may now be able to use within their small business to serve clients in the future,” she says.



SOUTH DAKOTA 4-H OPENS UP LINES OF COMMUNICATION WITH YOUTH

BY ANN HESS

Kaycee Jones had just finished teaching a Youth Mental Health First Aid training in early March when South Dakota schools started shutting down due to COVID-19 concerns. Geared towards adults, the program provides tools and techniques to assist young people, primarily adolescents from 12 to 18-years-old, on how to handle mental health challenges or crises. As the SDSU Extension 4-H Youth Program Advisor for Haakon and Jackson Counties, Jones says at the time she never would have predicted how fast that training would be put into practice over the next few months.

“Stress, anxiety and depression are words that are often thrown around loosely in conversation, but what effects do they truly have on young people?” Jones says. “Especially in times of challenge, unmet expectations or the unknown, feelings can be hard to express.”

As 4-H programming shifted to meet home-based needs, Jones offered daily challenges on their local 4-H Facebook page, from boredom busters and textbook lessons to mental health and mindfulness activities. She also sent out a journal to youth across her two counties as well as to 4-H Youth Program Advisors statewide to utilize. The 30-day COVID Prompt Journal asked age-appropriate questions for youth to think through and write about each day, such as:

- **Share a memory of your time being in home school that you would want to remember in 20 years.**
- **Who do you see as heroes or what heroic behavior have you seen during the pandemic? Why do you feel it is heroic?**
- **Unknowns can be scary. What would you tell a friend to help them feel better right now?**
- **What is one thing you are excited about once things get back to normal?**
- **Has social distancing (or changes in your schedule) caused you to have a really good conversation with someone? If so, what did you talk about? If not, who would you like to talk to?**

- **Has this experience brought you into a closer relationship with your family? Will it continue?**
- **You are now the teacher. How would you reach out to your students to teach them during this time?**
- **Thirty years from now, someone your age asks you to describe the COVID-19 pandemic. List 15-20 words that you would use to describe the situation and experience.**

Following the exercise, Jones says she had one graduating senior, who was already planning on studying psychology in college, say she now plans to utilize journal writing in her future career ambitions.

“It was just something that she had never experienced really, a mental health challenge, or even just that anxiety and stress that she was experiencing because of all of the cancellations and the craziness of this past year,” Jones says. “It gave her a little bit more empathy towards what potentially her future clients or patients are going to be going through and gave her some tools to understand that kind of empathy.”

Jones says she found one of the challenges of being a 4-H advisor during the pandemic was keeping those personal connections with youth via a computer.

“I sent personal emails to all my families, checking on them, visiting,” Jones says. “Being able to find that human connection and that place where when somebody is like, ‘Hey, how are you doing?’ and then being able to answer, I think that was a real success of just opening up those lines of communication in a new manner, and then being able to see the excitement we were able to generate.”

While the pandemic spurred some of these conversations, Jones says providing teens an opportunity year-round to safely and effectively communicate feelings is essential.

“These conversations with youth could focus around situational disappointments and unmet expectations, but could also encompass larger, long-term mental health challenges. In all cases, be prepared to respond in an accepting and positive manner,” Jones says. “As adults in the lives of young people, we set the precedent for how youth react and respond to changes and challenges. If an adult remains calm and understanding, youth are more likely to do the same.”

SOUTH DAKOTANS TURN TO TRUSTED SDSU EXTENSION FIELD SPECIALISTS AMID COVID

CANNING CRAZE

BY ANN HESS

“I have an abundance of cucumbers. I’ve already canned pickles, what else can I do with them?” “I can’t find anymore jars or lids. Normally I preserve by canning, how do I freeze appropriately?” “I canned, and now barely any of my jars sealed. What do I do?”

These are just a handful of questions Megan Erickson, SDSU Extension Nutrition Field Specialist, and Hope Kleine, SDSU Extension Health Education and Food Safety Field Specialist, were busy fielding this past year from South Dakotans. When the duo resurrected food preservation education efforts in 2017, their initial goal was to be a contact for consumers with canning questions and to host a few in-person workshops each year in larger communities around the state. Prior to the pandemic, there were up to 12 workshops annually, drawing in participants as young as 12 and as old as 94.

“Hope and I usually started with a presentation, and it was very detailed on the science behind canning and why we can, the importance of it and the different food preservation methods,” Erickson says. “Depending on the type of workshop, some were very individualized where we only talked about water bath canning whereas others, we tacked on pressure canning. We talked about the process that participants would do from

start to finish, but they prepped the food, prepared the canned goods and then put the products in the jars and canners. Participants did all of the work, and Hope and I were there providing guidance and answering questions that came up during the process.”

While Erickson fondly remembers canning with her grandma and Kleine reminisces about perfecting the practice with her father, the two say food preservation has become a “lost art.” Interest in canning, freezing and drying food has been growing the last five years, but slowly. Then COVID-19 hit, and

Erickson says interest “skyrocketed.”

“More people were planting their own gardens and wanting to preserve their own food to prevent waste,” Erickson says. “Food prices were also increasing, and some people were looking to grow their own food and preserve it to help save money, and then there were food shortages, so they were really looking to that economical aspect.”

Erickson and Kleine always get an uptick in calls during food preservation season, but previous years could not compare to the amount they answered in 2020.



“Megan and I are part of the North Central Regional Food Safety Team, which is a multi-state team, and this is something we all noticed, so it wasn’t just statewide, but something people were seeing everywhere,” Kleine says.

After hosting a virtual “coffee break” on food preservation in April and receiving good questions and feedback from the audience, Kleine and Erickson decided to conduct a virtual video series, to highlight each preservation topic in depth.

The Food Preservation @ Home series kicked off in June and was geared toward individuals that wanted to expand their knowledge on safe, home food preservation practices. The online course featured North Central Regional Food Safety guest speakers from North Dakota State University, Kansas State University and Montana State University and covered water bath canning, pressure canning, pickling, fermenting, dehydrating, freezing, jams and jellies, and even how to safely provide canned goods for farmers’ markets.

More than 180 registered for the Food Preservation @ Home series and the videos have garnered an additional 700-plus views on YouTube thus far. To put those numbers in perspective, last year their 12 workshops combined drew around 100 participants. While the virtual platform, like the in-person workshops, attracted a predominantly female audience, of those that registered only 30 were 60 or older.

After the video series, Erickson and Kleine received comments, such as:

- “Thank you! These have been great. I now look forward to my husband getting his first deer now that I know how easy it is to can meats!”
- “I was inspired by the last food preservation session. We decided to try dehydrating some store-bought vegetables to use in stews. Discovered it is a huge space saver. Keep up the good work!”
- “Great information. This is an excellent program- I do plan to start canning for the first time.”

Prior to the pandemic, the SDSU Extension Food Safety team was planning on rolling out the Master Food Preserver Volunteer program. A Master Food Preserver is a volunteer who helps extend SDSU Extension’s food preservation educational workshops to individuals and communities across the state by teaching community classes, staffing displays at events and serving as a resource for food preservation related questions.

Erickson and Kleine decided to proceed with a virtual training and ended up with 190 individuals interested in becoming a Master Food Preserver Volunteer. Twelve volunteers from across the state were selected to be in the first class. Their training consisted of a self-paced, seven-module online food preservation course followed by participants submitting a video debuting their food preservation skills from start to finish for Erickson and Kleine to audit.

Once they were certified, the 12 Master Food Preserver Volunteers wasted no time

getting out and educating across the state. One volunteer set up a booth and shared food preservation resources at a farmer’s market; another held an in-person apple sauce canning session with Girl Scouts. In the first couple of months of being trained, three alone committed to 28 volunteer hours, reaching 306 South Dakota residents.

Erickson and Kleine plan to offer another Master Food Preserver Volunteer session in 2021 that will be held virtually initially, with the hopes for some in-person training later on.

Whether its virtual, in-person or hybrid, both SDSU Extension Specialists say they think food preservation will continue to trend as experience levels continue to build. While many individuals choose to start with water bath canning, this year they also saw great interest in preservation practices such as fermentation and pickling.

Regardless of their preservation interests, both Erickson and Kleine hope consumers will continue to call on them.

“For any kind of good preservation question, we want people to know that they can come to us to look for evidence-based recipes, resources, any questions, and especially since COVID, there’s just been a lot of social media, Pinterest, blogs and Facebook groups that are really providing unreliable resources,” Erickson says. “Hope and I are going to continue to use our voice and spread our knowledge of food preservation to make sure that they are getting the right information that’s evidence-based, tested and safe.”

“We have always said, ‘if our participants could only take away one thing from our workshops, whether they be in person or a series online, it’s to be knowledgeable about where to get your recipe from, where you would get your information from, because there are just so many bad resources out there,’” Kleine says. “Last summer we did a huge update to our Food Preservation web page, so we do have evidence-based recipes posted on our Extension website that come from reliable resources. We encourage people to not look at Pinterest, don’t just Google it, go to your state Extension website because there are so many resources out there and that’s a trusted place where you can get your information from.”



As an SDSU Extension Family Resource Management Field Specialist, Lorna Saboe-Wounded Head is often asked what her job entails.

“My elevator speech is to tell people that I work with consumers across the state to help increase their knowledge and develop skills to better manage their resources, and the bulk of my programming is with personal finances,” says Saboe-Wounded Head.

Since the pandemic, her role within the SDSU Extension team has become quite clear to many South Dakotans as the Accredited Financial Counselor has helped several wade through so much financial confusion and questions, such as:

- “How do I get my stimulus check if I paid my taxes by check?”
- “What if I can’t make my mortgage payment, will the CARES (Coronavirus Aid, Relief and Economic Security Act) cover that?”
- “I’ve lost my job; can I halt my student loan payments?”
- “I’ve lost my healthcare coverage, where should I go for assistance?”

Some answers to those questions turned out to be simple fixes – such as making sure the correct address was on file with the Internal Revenue Service in order to receive a stimulus check – but with so much varying information being broadcast, Saboe-Wounded Head says it exemplified the importance of getting South Dakotans reliable financial information relatively quickly.

“For some people, they really needed the money and for this particular individual, if she didn’t get it set up, she could possibly have had to wait three to four more months, when she probably needed the funds right away,” Saboe-Wounded Head says.

She hopes that now people are more aware of the services she can provide, that they will come to her to work on longer term financial planning, such as Your Money, Your Goals, a program developed by the Consumer Financial Protection Bureau that helps people meet their financial goals by increasing their knowledge, skills and resources.

“When I’m presenting to Head Start or ICAP (Inter-Lakes Community Action Partnership) audiences, many times they’re interested in the program, but they don’t feel like they can do anything different in their situation,” Saboe-Wounded Head says. “I think a part of that is because there’s this emphasis on the more money you have, the less problems you have, which isn’t true. People can have the same

kind of issues, no matter what income level they are. People may not necessarily feel like my program is for them when my program is definitely for them, because I give them some tools and some strategies to work with by themselves for the situation that they’re in.”

Next year, Saboe-Wounded Head says she plans to include more education in her programming on the importance of getting finances in order, so if a pandemic comes again or a setback occurs, consumers can make better decisions in handling it and/or be in a better place financially, such as having lower debt or a larger balance in an emergency savings account.

“So, when these unexpected things happen, it’s still a challenge, but maybe you have more resources to help you work through the challenge,” Saboe-Wounded Head says.

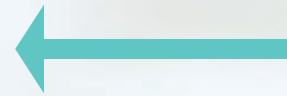
How much of a nest egg should one have? Advice often ranges from three to 12 months of non-discretionary expenses saved, but Saboe-Wounded Head suggests about \$2,000.

“Is that going to get you through the next month if you lose your paycheck? No, but it’s going to get you a little further ahead,” Saboe-Wounded Head says. “If I educate everybody and say, ‘you have to have nine to 12 months’ worth of expenses saved,’ for that family that maybe has no savings account, that’s just too overwhelming and they’re going to think, I can’t even bother with that. But if I say, ‘can you get a savings that has maybe \$1,000 or even \$500 and you have that for the next car breakdown or something like that,’ that’s a little bit more doable. What I encourage is having that cash and that savings, so that whatever happens, maybe you don’t have all the money for it, but you have something.”

In 2021, Saboe-Wounded Head is working to multiply her message by rolling out a statewide Money Mentor Volunteer program. With the Your Money, Your Goals program as a guide, the volunteer program trains individuals across the state on how to provide financial assistance one-on-one as well as in small group settings. She’s hoping to start with 20 volunteers, and perhaps get another 20 before the end of the year.

“It may be difficult to know where to find the most reliable financial information and advice,” Saboe-Wounded Head says. “SDSU Extension recognizes this challenge and is committed to helping South Dakotans navigate their financial management needs.”

One thing she thinks the pandemic has shown is that people have become a bit more budget conscious.



PROTECTING PERSONAL
FINANCES DURING A

— P A N D E M I C

BY ANN HESS



**MASTER GARDENERS ATTRACT MORE
GREEN THUMBS,
ENHANCE FOOD SECURITY EFFORTS**

BY ANN HESS



In 1973, Washington State University Extension hosted the first Master Gardener program in the nation. Today, Master Gardener programs are active in all 50 states, nine Canadian provinces and South Korea. As of 2009, when the last national census of Master Gardener volunteers was taken, there were more than 94,000 certified Master Gardeners in the United States.

Over 300 South Dakotans currently hold the title of Master Gardener through the SDSU Extension program, but as Volunteer Development Field Specialist Aimee Ladonski points out, being a Master Gardener is more than just knowing about gardening — it's about sharing that knowledge with your community in a meaningful way.

"We feel that it brings value in a variety of different ways," Ladonski says. "Master Gardener volunteers are teaching people how to grow their own food and beautify their yards. This can lead to positive health benefits such as access to fresh foods, aerobic activity outdoors and improved mental health. Volunteerism also brings benefits to the volunteer. Research from the Corporation for National and Community Service shows that volunteering can reduce stress, lower rates of depression and improve physical and mental health."

To become a certified Master Gardener, volunteers must complete 40 hours of training, pass a test and then commit to 40 hours of volunteer service in their community. To maintain that status, Master Gardeners must report 20 volunteer hours and 10 hours of continuing education annually. With 16 Master Gardener Clubs across the state, Ladonski says many Master Gardeners choose to partner together on larger scale educational efforts such as community gardens and community education events.

In February 2020, SDSU Extension was about to open registration to train another round of Master Gardeners when news of COVID-19 was starting to spread. The team decided they needed to shift gears and moved the training portion all online. Ladonski says the response was overwhelming.

Prior to 2020, the Master Gardeners class would range from 60 to 80 participants. One hundred and one signed up for the online training last year.

"We were able to reach a broader audience from a more diverse demographic," Ladonski says. "In the past, for in-person training, it required a commitment to attend class for a full day once a week for eight weeks. We understand this can be difficult for working professionals or stay-at-home parents. The majority of the course in 2020 was accessible online with some virtual evening commitments."

In-person service hours were waived in 2020 due to COVID-19, but Master Gardeners could still report hours accumulated from virtual meetings and volunteerism. While Master Gardeners couldn't host events or be on-site educating in the community gardens, they still assisted with the initial set-up as well

as the administration and assignment of plots. Some clubs also used the time to update their community garden signage with not only food safety and public health guidelines, but also protocols to follow during COVID-19.

Master Gardeners were also invited to take part in a brand new SDSU Extension program, "Grow Getters." An online garden education series, Grow Getters provided lessons, resources and hands-on, at-home activities related to gardening for youth and families.

"We had several comments from families that had never planted a garden before or had no idea how to get started in a garden, so I think this was a nice approach for those folks who needed a gentle introduction and were wanting to bring their kids along in the process," Ladonski says.

Grow Getters also contained gardening activities for those individuals who might not have access to land or be able to visit places of interest during a pandemic. The program provides links to virtual field trips of McCrory Gardens and the Local Foods Education Center in Brookings.

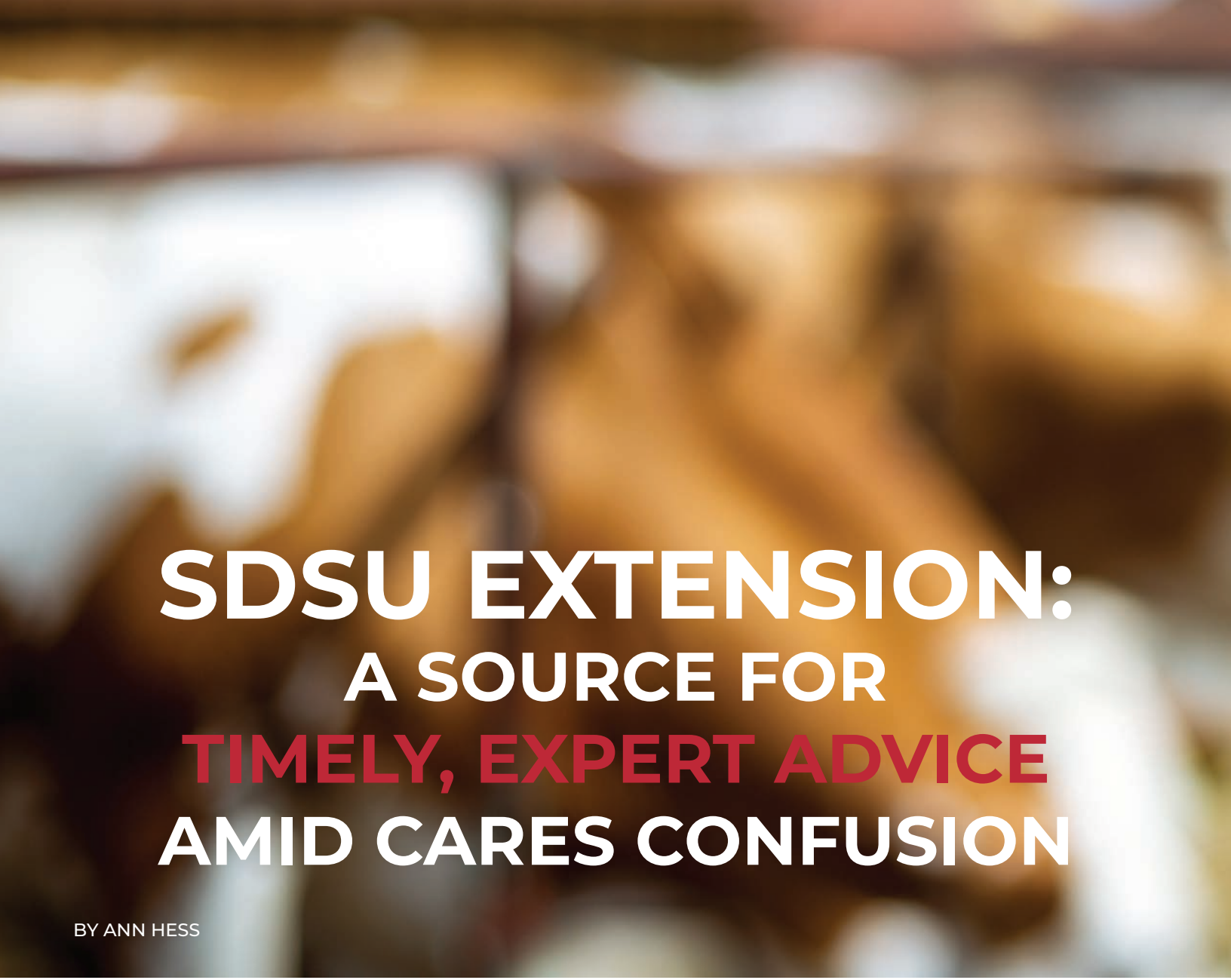
The Grow Getters kit, free to the first 75 families that signed up, is a supplement to the online lessons and allowed K-2 youth to participate no matter their resources. The kits contained over a dozen tangible activities and resources to learn from and included a basil plant for youth to grow in their windows and learn about plant parts.

"You didn't have to have a backyard or have a lot of land to be able to participate and learn from our lessons," Ladonski says.

The SDSU Extension Master Gardener program plans to continue its gardening educational component for youth and families in 2021, as well as its community garden efforts. However, Ladonski says 2020 truly highlighted the role Master Gardeners can have in assisting with community food security efforts across the state and the team plans to extend its programming in that area.

"There have been Master Gardeners that have grown an extra row in their own gardens and donated to a food pantry and there have been Master Gardeners that have used a portion of community gardens to grow produce for the underserved. We're proud of that work but it was limited in scope and not measured," Ladonski says. "In 2021, we'll maintain our community education commitment, but we're also establishing a statewide Master Gardener Food Security Task Force and food insecurity training for Master Gardeners."

Master Gardeners contribute thousands of volunteer hours to South Dakota communities each year. Those interested in becoming a Master Gardener or learning more about the program can visit: <https://extension.sdstate.edu/> or email SDSU.SDMG@sdstate.edu.



SDSU EXTENSION: A SOURCE FOR TIMELY, EXPERT ADVICE AMID CARES CONFUSION

BY ANN HESS

On March 27, 2020, the Coronavirus, Relief and Economy Security (CARES) Act was overwhelming passed by Congress and signed into law by President Donald Trump. The \$2 trillion economic relief package preserved jobs for the American industry and aided American workers and families, small businesses and state, local and tribal governments.

Because the CARES Act was tied in with some of the USDA Farm Service Agency (USDA-FSA) funding, SDSU Extension Livestock Business Management Field Specialist Heather Gessner says initially most of the questions coming to SDSU Extension early spring were agriculture related.

“People didn’t seem to have a grasp of what was really going on between the PPP [Paycheck Protection Program] and the EIDL [Economic Injury Disaster Loans] and how all that would work for them as small business owners, as family farms and ranches,” Gessner says. “Do you spend time trying to apply and then get turned down or maybe one is better than the other for you to try to get some assistance?”

Gessner primarily works with farm and ranch families

on farm management issues such as livestock budgets and marketing, risk management, estate planning, farm transitions and whole farm business planning. In April, she partnered with Victoria Dubbelde, an accounting lecturer in the Ness School of Management and Economics at SDSU, to host an educational webinar to address some of the questions surrounding the CARES Act. “What the CARES Act Means for Your Family” covered individual and dependent rebates, the effect 2019 tax returns would have, and 2020 income concerns, while also taking a comprehensive look at the stimulus loans available through PPP and EIDL.

“The Small Business Administration put the loans out, and farmers and ranchers traditionally don’t qualify for their programs,” says Gessner. “It was a whole new opportunity and we tried to get the word out to everybody, or as many people as we could, about what the whole program was and how they could apply for it and how it would affect their operations.”

Nearly 200 individuals participated in the webinar, whether live that day or later by viewing the recorded programming on



the SDSU Extension YouTube channel. In a time where so much conflicting information was being shared, Gessner says she thinks attendees valued the research-based information from SDSU Extension. For example, Dubbelde's preparation before the webinar included reading much of the 880-page amendment to the Internal Revenue Code of 1986.

"We did our due diligence learning the programs," Gessner says. "We've sifted through the research and we're providing you with correct information and our whole clientele with the best person they can talk to. When that person isn't me, I work to find the right person that helps them."

Gessner, who has been with SDSU Extension since 2001, says prior to the pandemic much of her outreach involved local face-to-face meetings with participants coming from 50 miles around. Over the last year, she has adapted to hosting meetings virtually, and the likelihood that her educational programming may attract a much more geographically diverse audience. For example, during her recent Farmland for the Next Generation workshop, she had an attendee from Alaska who was looking to buy an

acreage in South Dakota and wanted information on the right land to buy for grazing cattle.

"I've done presentations this year with people from five different countries attending," Gessner says. "That's been one of the big things that as I try to key in on, during my research in getting ready for a meeting, anybody from anywhere could be attending. I have to be ready for those types of questions or follow-up."

Finally, Gessner says she thinks the key to the virtual SDSU Extension economic programming this year was it was timely.

"I think that was one of our biggest take home messages. We were able to put a high-quality program together in a relatively short amount of time. We were proactive to the needs of the people that were calling us and answering their questions by finding the right person, even if that person is outside of the Extension system," Gessner says.

FROM PRODUCE TO PLATE:

**SDSU EXTENSION ADDRESSES FOOD
INSECURITY NEEDS DURING PANDEMIC**



Since 2016, SDSU Extension's Supplemental Nutrition Assistance Program Education (SNAP-Ed) supported Community Garden program has brought fresh produce to many rural communities and food deserts across the state, including the Native American reservations. During the pandemic, producing nutritious foods close to home not only became more practical and relevant as food prices soared and incomes shrunk, but also essential as food supply chains became disrupted.

"One community member had mentioned back in March that when everything shut down in the tribal communities, when there was no food coming in, everybody was going hungry and not just those using food assistance programs," says Kimberly Cripps, SDSU Extension Family and Community Health Field Specialist. "They were thrilled to see that the gardens were being taken care of and they were expanding them in the summer."

In 2019, Cripps estimates nearly 3,000 pounds of produce were harvested from the SDSU Extension SNAP-Ed supported Community Garden program. Last year, 5,585 pounds of total produce was harvested along with 566 cups of herbs. Of that, 3,409 pounds of produce and 482 cups of herbs were donated to local pantries. Local families took home 2,171 pounds of produce and 84 cups of herb harvested.

"Some of those are actual community gardens where some community members pay a fee and then use it for gardening, but a lot of the individuals planted extra and donated the extra produce, knowing there were more people in need this year," Cripps says.

To keep the 14 gardens thriving during a time of shutdowns and social distancing, SDSU Extension relied heavily on its 10 Summer Program Leaders, focusing on gardening efforts and education as well as 420 adult and 85 youth volunteers. Those individuals spent more than 2,749 hours in the gardens, all adhering to SDSU Extension guidelines to not only keep basic food safety considerations in mind, but also to promote the health and safety of local gardeners during the pandemic.

The SNAP-Ed supported Community Garden program provides fresh, nutritious produce for many families who couldn't otherwise afford it, but it also promotes a healthy lifestyle, a cleaner environment, community spirit and educational opportunities for youth.

"We've always had community gardens, but this year I think the community understood the value of them," Cripps says.

Virtual Curriculum

In addition to helping provide South Dakota communities with the resources they needed to create a bountiful harvest this past year, SDSU Extension also continued its Expanded Food & Nutrition Education Program (EFNEP) and SNAP-Ed support efforts, albeit virtually.

No longer allowed to conduct face-to-face classes at places such as food pantries, senior citizen centers and drug and alcohol treatment facilities, SDSU Extension paraprofessionals and professional staff created educational flyers and recipes for food

pantries to include in food boxes. They streamed live sessions and recorded videos on how to stretch the food dollar with items in their cupboards. For example, in one session participants learned how to make a meatloaf with just ground beef, breadcrumbs and salsa.

As teachers were working on transitioning their other lessons into a virtual format, several educators expressed their appreciation for SDSU Extension's virtual curriculum. Many utilized programs such as Families Eating Smart, Moving More for high schoolers, which teaches meal planning, reading food labels and keeping food safe, or EFNEP classes for upper elementary students on how to plan a healthy meal for their family. From Roberts County to Minnehaha County, teachers continued to virtually teach programs such as Organ Wise Guys and Kid Quest, to help youth and their families on food preparation techniques and healthy food choices.

Cripps says many of the teachers recognized that learning the skill of improving food choices is just as important to their students as other skills learned in the classroom.

SDSU Extension nutrition staff also penned articles and conducted radio interviews on how the kitchen can be a place to teach math and science -- from using measuring spoons and cups to teach fractions to identifying shapes, colors and sizes of fruit and vegetables as they are put into a recipe.

While the SDSU Extension nutrition team missed the in-person interaction with their SNAP-Ed and EFNEP partners in 2020, Cripps says the virtual platform helped them expand their reach.

"We have learned that we can still have an impact by doing things on a virtual basis and we've been able to reach more people by doing it virtually," Cripps says. "This year, we are working on creating recipes, videos and expanding some of our curriculum to be virtually available."



Right: Summer Program Leader Amber Weitalla (left) was one of 30 people across the nation to receive a USDA National Farm to School Community Food Champion award. A Community Foods Advocate at the Cheyenne River Indian Reservation, Weitalla harvested 1,043 pounds of produce and 169 cups of herbs to share with community members in 2020.



PANDEMIC HIGHLIGHTS

LOCAL

BY ANN HESS

When Rhoda Burrows moved to Rapid City 20 years ago, only a handful of vendors sold their produce each week at the Black Hills Farmers Market, and back then, the marketplace was open just a few months from mid-summer into early fall. Today, the Market Park is home to more than 50 vendors, who sell their produce, animal products, canned goods, coffee and more to consumers every Saturday morning, all year-round.

“Some vendors have told me this was the best year they have ever had,” says Burrows, a Professor and SDSU Extension Horticulture Specialist. “With COVID, people were thinking more about food and more about local food.”

Since 2016, Dakota Fresh Food Hub has been aggregating and delivering local food raised by 16 producers that are located within 100 miles of Sioux Falls. With support from SDSU Extension, the South Dakota Specialty Producers Association and Dakota Rural Action, the food hub is now helping put local foods on menus and on consumers’ tables. This past year, Dakota Fresh increased sales by 54%, according to SDSU Extension Community Vitality Field Specialist Kari O’Neill.

“Initially, Dakota Fresh offered their products wholesale, but as the food hub has grown, in May 2019 they began offering retail sales in Sioux Falls via both Stensland Farm locations, and they have since expanded to offering retail and wholesale delivery to Brookings, as well as retail delivery at farmers markets in Vermillion and Yankton,” O’Neill says.

O’Neill and Burrows have collaborated with other organizations to host an annual educational conference dedicated to local foods for the past 10 years. Both say the movement has been growing more

NEED FOR FOODS, SPECIALTY CROPS ACROSS THE STATE

recently across the state, especially since the pandemic. Many specialty crop producers are seeing their efforts could be less as a hobby and more as a business, and are now inquiring about food safety protocols, how to safely sell in-person at farmer's markets and how to start online ordering sites.

However, for some South Dakota producers, it's not about selling but rather subsistence farming.

"During the Local Foods Conferences, we were starting to hear more Native voices and there was an expressed interest in having their own conference," Burrows says. "At the same time there's been this food sovereignty working group for at least five to six years at Pine Ridge, that really took the 'bull by the horns' in getting the Lakota Food Summit set up."

Food sovereignty, which puts those who produce, distribute and consume food at the heart of the food systems and policies rather than the demands of markets and corporations, was just one of many topics discussed during the first annual Lakota Food Summit. Held February 2020 in Rapid City, just prior to the pandemic, the conference drew more than 150 people, focused on Lakota traditional foods.

The 24 breakout sessions and six keynote speakers covered topics such as traditional plants, foraging, gardening, buffalo, nutrition, food processing, farm to school and more. Burrows, alongside Carmelita Sully, Director of Sinte Gleska University

Garden, presented a session on high tunnels and how they can extend the growing season for local producers. In addition to artwork and role playing, the youth session put out a call to action to its 40-plus participants on how to best feed the tribes in the future, both in a healthy manner and in a sustainable fashion. The last evening featured a traditional buffalo dinner.

"The whole conference was very energetic, and people were just so excited to get together and talk about these things as a group," Burrows says.

In November, SDSU Extension held its 10th annual Local Foods Conference, albeit virtually. The interactive online event still allowed for "hands-on" participation with breakouts, panel discussions and chef cook-alongs, and did cover traditional Lakota foods, but Burrows and O'Neill say they plan to continue to help support the Lakota Foods Summit, when it can happen in-person again.

"I think there's very strong interest from all the reservations on food sovereignty and awareness around producing food and that's going to be something as we talk about it in economic terms," Burrows says. "A few of those will be selling at markets and so forth, but for many of them it's about feeding my community and my extended family, so in terms of tracking economic importance, it's below the radar but it's about providing access to healthy food for people."



CHRISTINA BAKKER NAMED SDSU EXTENSION MEAT SCIENCE FIELD SPECIALIST

BY SADIE VANDER WAL

SDSU Extension has selected Christina Bakker to serve as a meat science field specialist.

Bakker, originally from Lake Benton, Minnesota, finished her Ph.D. in animal science in May 2020 from SDSU. Prior to stepping into her Extension role in late November, she served as a post-doctoral researcher in meat science in the SDSU Animal Science Department.

SDSU Extension created the field specialist position to develop workforce training and serve as a resource for meat processors in the state.

“With this initiative, SDSU Extension is positioned to provide the training and technical resources that will support the workforce development needs of the small meat packing industry in South Dakota,” SDSU Extension Director Karla Trautman said. “This effort demonstrates our commitment to providing transformational strategies that meet the critical needs of South Dakota and its communities.”

While challenges in meat processing existed prior to COVID-19 hitting South Dakota, the pandemic highlighted issues facing labor, capacity and resources more than ever.

“When COVID hit, we were repeatedly hearing about challenges across the state concerning the lack of capacity and resources in the meat processing industry,” Amanda Blair, Professor and SDSU Extension Meat Science Specialist, said. “This new position will help fill the need for a resource focused on these challenges facing in our state meat processors.”

Small processing plants oftentimes need employees to be skilled in more than one sector of the process, which drives the demand for skilled labor. As small-scale facilities ramped up production during the pandemic, the lack of workforce training and limiting capacity became a challenge many processors faced. While this high demand has caused several small plants to look to expand and other individuals to become interested in building new plants, the need for guiding resources to navigate these developments also became prevalent.

“At some small processors, there are waitlists for animals as far out as February 2022 or later,” Bakker said. “We need to focus on building the workforce to handle current capacity limitations.”

Through her role, Bakker will help mitigate these challenges facing processors. One of her primary responsibilities includes developing a series of short courses regarding workforce development and job training. She will also serve as a resource for those with questions about expanding capacity or building new plants and can guide people to other tools that can help resolve these challenges.

“I’ve wanted to be in Extension ever since I was an undergraduate student,” Bakker said. “I am excited to teach the general public, connect with meat processors and keep information flowing in this role.”

EVERY ACRE COUNTS

PROGRAM HELPS PRODUCERS IMPROVE
PROFITABILITY OF MARGINAL LANDS



BY SYDNEY MEYER

Every Acre Counts is a new program to improve the profitability, diversity and ecosystem benefits of agriculture by using precision technologies to help producers make informed management decisions for every acre of their operations. The focus of the program is on marginal lands in South Dakota impacted by wet conditions, saline or sodic soils and eroded areas.

“Every Acre Counts provides participating producers with information that helps to increase their return on investment and gain an enhanced land management approach that will benefit the sustainability of land, water and natural resources,” says Anthony Bly, SDSU Extension Soils Field Specialist and co-director of the program.

The program is overseen by Bly and Matthew Diersen, an SDSU Extension Risk/Business Management Specialist. Cristin Weber, a precision agriculture and conservation specialist with Pheasants Forever through a partnership with SDSU Extension, is helping with the program as well.

Millions of acres across South Dakota are impacted by the low-yielding conditions of marginal lands and the financial burden of attempting to produce crops on these lands can be significant. By evaluating marginal acres and their return on investment, data summaries obtained from the program are shared with producers to assist in making decisions to optimize land use in both a sustainable and economically viable way.

“We want to help producers make more accurate land management decisions based off their own data,” Bly says. “We work with participating landowners throughout the state to precisely quantify the technical metrics of their existing operations and then generate an economic analysis report, which provides the information needed to pinpoint and quantify marginal acres on each operation.”

After the economic analysis report has been generated and shared with the producer, they have the option of choosing whether they would like to work with the team to make informed decisions about what to do with their marginal lands.

“In regard to improving short-run profitability for producers, if after evaluating their precision agriculture records a portion of crop land is found not to be making a profit, we work with the producer to assess a variety of options that could be implemented to immediately make the land profitable, whether it be

participating in Every Acre Counts or another program,” Diersen says.

To improve profitability in the long run, the team works with the farmer to assess potentially changing production practices and making improvements that lead to profitability and improved soil health for an area of unproductive land. Over time, the producer will see additional benefits for making adjustments where it’s needed to restore soil health.

“Every Acre Counts uses a working lands approach, and we have very few restrictions on what a producer can do with their marginal land,” Diersen says. “Rather than a producer abandoning an unproductive portion of land, we want to give the producer more flexibility and help them find a practice that will make the land productive and improve soil health conditions.”

SDSU Extension made the Every Acre Counts program available to all counties in South Dakota in September 2020. To kick start the program in 2019, Every Acre Counts was limited to 15 counties in eastern South Dakota that were selected to study different soil types and areas of concern. Now, producers in all South Dakota counties are invited to participate in the program.

“We are at all stages of the program now with producers across the state,” Bly says. “We are summarizing data for some producers, evaluating the data and making decisions about what to do with the marginal lands with some, and we have seed in the ground on marginal lands for some producers and others who are ready to seed come spring.”

The South Dakota Habitat Conservation Fund, U.S. Department of Agriculture/Natural Resources Conservation Service in South Dakota and Pheasants Forever are currently providing program funding through grants. Program operations support is provided by Agtegra, South Dakota Corn, Ducks Unlimited, the South Dakota Soil Health Coalition, Purina Pet Care, and South Dakota Game, Fish and Parks. Federal, state and local habitat and conservation programs will also be used to leverage funding.

SDSU Extension is seeking producers who have issues with marginal lands and are interested in gaining more information about their operation to enroll in the program.

If you would like to learn more about this program, contact Bly at Anthony.Bly@sdstate.edu or Diersen at Matthew.Diersen@sdstate.edu.

TRIBAL AGRABILITY

PROJECT ADDRESSES

DISABILITIES WHILE

MEETING CULTURAL NEEDS

BY ANN HESS

After leveling out pathways, clearing debris and installing rubber stall mats, a double amputee veteran is now able to safely get around his property. Once an avid gardener and outdoorsman, the wheelchair-bound client says he is thrilled to get back to cultivating and growing food.

One client wanted to keep a small garden in town but was concerned about drug users and alcoholics wandering into her plot at night. After putting up a fence and some sensor lights, she worries far less about discarded needles and trespassers damaging her crops.

Ever since one beginning farmer signed on to work at an incubator hub and build a high tunnel for earlier crop planting, the recovering alcoholic says he hasn't had a drop.

This is just a peek into the impact SDSU Extension's Tatanka Ki Owetu, the Renewal, AgrAbility Project is having on the Pine Ridge Reservation since the program began in 2018. Funded through the United States Department of Agriculture's National Institute of Food and Agriculture, AgrAbility projects in other states traditionally work with established producers, who have either suffered an accident or have been diagnosed with a chronic or disabling condition. Through the program, those farmers are then connected to assistive-technology resource providers such as vocational-rehabilitation programs or business providers.

A pilot AgrAbility program, Tatanka Ki Owetu is the first in the nation to work with new tribal farmers who are coming into agriculture with existing disabilities, and instead of donating a piece of machinery, the Renewal AgrAbility project is developing a sustainable infrastructure that is also culturally acceptable for participants.

"Due to the sheer concentration of trauma and the levels of persistent poverty and the fact that we are geared towards beginning farmers, we wanted to do a pilot project that focused on one reservation," says Jason Schoch, SDSU Extension Tribal Local Foods Associate and AgrAbility Project Director. "We were very particular in wanting as much tribal feedback to go into the actual proposal as possible because we wanted to focus more on mental

and behavioral health, beyond primarily just physical disabilities, and we also wanted to do this in a way that fits the Lakota culture."

Meeting those culture needs means tribal clients currently enrolled in the Tatanka Ki Owetu project are far less interested in selling their produce commercially and are more focused on feeding their families and their tiyospaye (extended family).

"A lot of our clients are specifically doing more subsistence farming rather than commercial agriculture, and that's because their main role is to address hunger," Schoch says. "Once they feel like they hit that kind of subsistence level of farming and they can take care of their own families and their extended family, then they will look to selling their surplus in local tribal markets such as reservation schools."

Building beds from barrels

Once a client signs up for the AgrAbility project, the AgrAbility team heads to their site to do a needs assessment — from physical, mental, behavioral and developmental needs to financial and logistical requirements. Each micro farm costs around \$1,500 to \$2,000 to build, and because grants can often be considered a source of income and can impact client benefits, the fabrication team teaches clients how to build these small-scale farming systems with free or low-cost, locally-available materials such as tires. For example, the fabrication team has built several wheelchair-accessible garden beds out of barrels from a car wash.

The layout not only needs to accommodate the individual's disabilities, but his or her individual plan for success at farming. Most are focusing on commodity products right now, but some have expressed interest in growing specialty products, such as a native species fruit tree or shrub, and expanding into value-added production in the future.

While they do caution clients to not take on too much, too fast, the AgrAbility team — co-led by Schoch and Co-Project Director, Patricia Hammond, who is also a Lakota small farmer and the Tribal Local Foods Program Assistant — says the micro farm model is scalable.



Left: A high tunnel is a hoop-shaped structure, covered in strong plastic, which allows for earlier planting and protects crops from weather hazards such as frost and hail.

“Some people are also very interested in, once they get up and running, looking at how things like agritourism can be blended perhaps a little bit with cultural or ecotourism type opportunities on the reservation as a way of kind of diversifying their income,” Schoch says. “But some of our folks are honest with us and they just say ‘I am uncomfortable selling food. People are hungry, so I just want to grow food and give it away.’”

The micro farm plans are then assessed further by Black Hills Works, an employment support service that helps match people with disabilities to the best working environments for them. A third party Native American evaluator from Montana also audits the plan to make sure it is operating in a culturally sensitive and appropriate way.

Land for the landless

In addition, the Renewal AgrAbility project works with two partner incubator hubs, each with an outdoor teaching garden. Rebel Earth Farms Incubator-Hub is on the eastern side of the reservation and has four 30'x100' high tunnels.

A high tunnel is a hoop-shaped structure, covered in strong plastic, which allows for earlier planting and protects crops from weather hazards such as frost and hail. To date, the AgrAbility team and its partnering organizations have successfully assisted tribal members and organizations to set up 10 high tunnels on Pine Ridge.

At these hubs, the clients learn to build and produce inside a high-tunnel environment. Their disabilities range from bipolar disorder, schizophrenia, drug and alcohol addiction, sexual assault, domestic assault and combat-related posttraumatic stress disorder to adverse childhood experiences, depression, toxic levels of stress, anxiety, panic attacks and fetal alcohol syndrome.

The second incubator hub, Feather Two Farms, is managed by partner Re-Member and also has two high-tunnels and a teaching garden but focuses mainly on working with clients with physical disabilities. The goal at Re-Member's Feather Two Farms is to show all the ways high-tunnel production can be set up to assist clients to be more mobile.

Schoch says both sites double as the main teaching sites for all agricultural trainings and as the assistive-technology centers for their part of the reservation. Each incubator-teaching site can also

become a food hub where surplus produce grown by these new farmers can be aggregated and delivered to schools, elderly centers, food banks and shelters across the reservation.

The hubs also include outdoor incubator plots that landless Lakota tiwahe (family) farmers can use for free.

Farm to school

The AgrAbility program is also starting to work directly with schools on the

reservation. In November 2019, the team assisted Little Wound School in Kyle, in applying for and receiving a Team Nutrition Grant as well as working with the Environmental Quality Incentives cost-share program through USDA-National Resources Conservation Service to set up a high-tunnel at the school. The AgrAbility farm-to-school program works with youth, ages 17-19, living with disabilities, who are about to graduate from high-school and are looking to start a career in agriculture or in an ag-support related field. Thirteen individuals with behavioral, developmental or mental health related disabilities are currently participating. The program also works with the high-school's special-needs students and their families

“Not everybody wants to be a farmer, but that doesn't mean that agriculture doesn't impact the community. Some of those students don't want to be producers,” Schoch says. “They want to start buying from other people and they want to become entrepreneurs and start up a food truck, or they want to become a chef. It's starting to impact both youth and adults on Pine Ridge.”

For example, Schoch says he had one adult client who suffers from developmental disabilities. He likes farm work but knew he couldn't run a farm by himself. He has now started a business where he offers agricultural support to other farmers and does construction for the other AgrAbility clients, such as building the wheelchair-accessible barrel beds.

Another client wanted to garden but didn't have enough land available near her home. Through the Renewal AgrAbility project, the former meth addict and her family were given the opportunity to help take care of a community farm and garden. In exchange for conducting the heavy lifting, weeding, watering, etc., the family is allowed to harvest up to a quarter of the produce.

Further funding and the future

While COVID-19 restrictions made it more difficult to do personal needs assessments with clients in 2020, the team was able to recruit some supervision as well as additional fabricators for the hubs. Shifts were staggered and staff wore masks and practiced social distancing. Some volunteers even offered to quarantine at the incubator hubs just to ensure the project would keep going.

As Renewal AgrAbility enters its third year, momentum is

building behind the project from outside contributors. Through additional funding from Farm Credit Services and CoBank, Schoch says they hope to hire two more full-time staff members. One will be dedicated to setting up the farm-to-school program, while the other will be focused on diversity in agriculture and opportunities for other minority groups to come teach new tribal farmers.

“A lot of these groups that we’re looking at trying to start working with, they already come to it with farming experience, at least in their home country or their home in the United States, and we just need to adapt their plan towards the Northern Great Plains region,” Schoch says. “A lot of studies have shown that farmers learn best from other farmers, even more so than they do necessarily from folks like ourselves, and farmer to farmer knowledge is really important.”

Long term, Schoch says he hopes the program can be duplicated, not only on the eight other reservations in the state, but on tribal lands across the nation. The team is currently drafting a “Tribal New Farmers Resource Guide,” which they aim to publish in 2022. The guide includes information on programs and funding sources from federal, state, tribal, nonprofit foundations and assistive technology providers, and is designed specifically to assist disabled tribal members in starting up their farm operations.

The Tribal New Farmers Resource Guide is divided into a four-step guide with resources to assist with beginning the farm and expanding it to protecting it through insurance and securing the farm’s future. It also includes information on farming practices,

such as permaculture, to meet tribal philosophies.

“We want to make sure we have solid feedback, not just from our evaluator, but we have solid cultural feedback from the tribal nations as to what works, what doesn’t work, what’s missing, what needs to be expanded upon, what needs to be reworded, and that it reflects the challenges that tribal people really do face when it comes to a small-scale agriculture,” Schoch says.

While they haven’t started tracking the pounds of produce from the micro farms and the incubator hubs, Schoch says there are plans in the future to start collecting that information. With COVID-19 and concerns about people’s mental health and social isolation, the team is more focused on the emotional aspect of the program right now.

“We’ve had some folks say, ‘well, you’re just doing hobby farming because of the scale, or you’re just doing gardening’ and we take a completely different approach, which AgrAbility allows because it doesn’t require selling. We say ‘no, what we’re teaching is food production’ and that’s what farming really is at its core. It’s about people and food and it’s not just about the economic drivers of agriculture,” Schoch says.

“Research shows that one of the main causes of disability in Indian country is hurriedness, so disability reduction as well as secondary injury prevention are two main goals of our project, to not just make the safe site, but get more healthy food produced locally to feed local people, and bring those malnutrition and hunger rates down.”

Below: To date, the AgrAbility team and its partnering organizations have successfully assisted tribal members and organizations to set up 10 high tunnels on Pine Ridge.



SDSU EXTENSION ENGAGES CHILDREN BY READING FOR RESILIENCY

BY ANN HESS

“I never thought my kids were feeling this way.”

That's just one of the comments Audrey Rider received this spring after she introduced a series of emotion-based books to South Dakota daycare providers, early childhood learning centers, preschool teachers and parents. For the past two years, the SDSU Extension Early Childhood Field Specialist has been working with the University of Nebraska Extension on early childhood development programming, including utilizing their Read for Resilience program. It wasn't until the pandemic struck though that Rider says she saw an increased need for the resources statewide.

“Most of the stories initially start out very emotion-based and also built around disasters and around dealing with that type of traumatic events because when the floods hit Nebraska, that was huge to them, and so then we kind of partnered because we had flooding going on at the time two years ago,” Rider says. “What was really neat is it rolled into the pandemic, and these books became something I could offer to a lot of these providers, and I got a lot of great feedback back because we were able to, with funding from the mental health grant, purchase a bunch of books through Amazon.”

From the start of the pandemic through September 2020, SDSU Extension sent more than 250 books to childcare providers across the state. The daycares and early learning centers were able to choose from nine different books to support children coping and understanding of their feelings after experiencing a disaster, loss, and/or grief. They also received reading guides with suggested activities and probing questions to help children personally connect with the experiences of the characters in the books. Rider says sometimes childcare centers even sent the books home with parents.

“Some parents would say, ‘my child's acting out, I don't know how to deal with this’ and the provider could say, ‘it might be because of the pandemic or it may be emotions of not knowing how to deal with this at home’ and they could send home the book and discuss it,” Rider says. “Experiencing a natural disaster can be very stressful for young children. By using children's literature in an interactive way, caregivers can help children heal and build resilience.”

In addition to aggressively rolling out the Read for Resilience program statewide, Rider has penned and co-authored several articles from “How to Talk to Your Kids about COVID-19” and “Managing Child Care Options When Schools Close” to “Learning at Home” and “Helping Kids Deal with Change.” She also hosted coffee hour sessions with parents and providers on tips for “self-care.”



Above: SDSU Extension Early Childhood Field Specialist Audrey Rider reads to a group of children.

One of the main lessons learned from the pandemic experience Rider says is how to best create a virtual preschool platform that is easy for childcare providers and parents to navigate.

“For a lot of these providers, whether it's home centers, even pre-school teachers to public school districts, they will pick up stuff if it's easy to take and it's ready to go, and so what we're creating now is actually all video-based curriculum through a University of Nebraska grant to create these,” Rider says. “It will be all video-based themes and virtual field trips, but also have all of the lessons in a packet, so they can take it, and it can also be something that parents can pick up. I've learned that parents are always looking for educational items, and if we can be that resource, they'll come to us, but it has to be easy to find.”

Rider says early in the pandemic she helped a few providers get connected with the proper agencies and departments for questions on CARES Act funding, safety and cleaning precautions they needed to implement before reopening and how to handle exposures and quarantines among staff and children. Now she's in touch with more than 170 childcare facilities every month sharing training opportunities offered through the University of Nebraska Extension or Family Resource Network, articles, resources on government programs, etc.

Finally, Rider says she thinks 2020 brought to light the shortage of rural daycare providers throughout South Dakota.

“Honestly, I think the pandemic opened a lot of eyes, of businesses and employers, of the need for daycares and centers, because I don't think they understood fully the importance of it until we had all these kids going home in middle of March, first part of April and how do we take care of them? We need our essential workers to work as well too,” Rider says. “I did start a taskforce a little over two years ago, looking at the need for rural daycares and just the need for daycare settings in general. Now, obviously since COVID, we've really started looking at how to get more started West River and in rural areas.”

AGRICULTURAL



EXPERIMENTATION



N NEW RESEARCH W

F A C E S



BEN HAUSE: *Assistant Professor, Virologist*
Department of Veterinary and Biomedical Sciences

Hause's research interests lie in emerging viruses associated with swine and cattle diseases in addition to the development of vaccines and diagnostic assays for the detection of the viruses to minimize the impact of infection. Hause is especially interested in emerging and neglected swine and cattle viruses which have an impact on animal production. Additionally, Hause is also an investigator at SDSU in the Governor's Office of Economic Development Center for Biologics Research and Commercialization where his research will focus on the development of vaccines to combat infectious diseases of livestock.



SUTIE XU: *Assistant Professor*
Department of Agronomy, Horticulture and Plant Science

Xu's research interests mainly rely on interdisciplinary studies to understand the influence of anthropogenic, environmental and biotic factors on physical, chemical and biological processes in soils. Xu's future research will focus on soil health under sustainable, natural and agroecosystem management and precision farming.



LAURA HASSELQUIST: *Assistant Professor*
Department of Teaching, Learning and Leadership

Hasselquist's research interests are in reading and writing in the context of the agricultural education classroom and the agriculture industry. Hasselquist believes it is important to prepare students with the proper literacy skills needed to be successful in the workforce, and understanding current practices is an important step in the process.



CHUN-MING (JIMMY) LIN: *Assistant Professor, Veterinary Pathologist*
Department of Veterinary and Biomedical Sciences

Lin is a veterinary pathologist and assistant professor with experience in diagnostic and investigative pathology in companion and food animals. His primary research interests focus on the immunopathogenesis of swine viral diseases, especially porcine circovirus, parvovirus and coronavirus. He also has abundant experience in the development of new diagnostic assays and vaccines.



HECTOR MENENDEZ: *Assistant Research Professor, SDSU Extension Livestock Grazing Specialist*
Department of Animal Science

Menendez is applying Systems Thinking and System Dynamics methods to tackle complex livestock grazing problems. This multidisciplinary research program utilizes tools like mathematical modeling, group learning and cutting-edge precision and artificial intelligence technologies to address critical needs of both extensive western rangeland and eastern pasture-farm based grazing systems. Menendez's research will identify high-leverage, systemic and transformative solutions and improve stakeholder understanding, adoption and implementation of sustainable, regenerative and profitable livestock grazing strategies through Extension programs.



BISHNU KARKI: *Assistant Professor*
Department of Biology and Microbiology

Karki's research interests are in developing new and improved products for food, feed and energy applications by using renewable resources. Karki's current research is focused on the bioconversion of agro-industrial waste into value-added products and protein co-products using different forms of thermo-chemical, biological and microbial processes. Karki is also investigating the effect of novel processing technologies on structural, nutritional and functional characteristics of proteins of prairie crops and other agricultural co-products.



JAMESON BRENNAN: *Assistant Research Professor, SDSU Extension Livestock Grazing Specialist*
Department of Animal Science

Brennan is an assistant professor in the Department of Animal Science with a specialization in livestock grazing behavior. Brennan's research focuses on incorporating precision technology into rangeland beef production systems to improve grassland and livestock management. He will be looking to develop tools to integrate diverse data sources and investigate new technologies for monitoring aspects of rangeland production.



TROY WHITE: *Assistant Professor*
Department of Teaching, Learning and Leadership

White's research focuses on the integration of problem solving and STEM (science, technology, engineering and mathematics) into secondary (7-12) agricultural power, structures and technology (PST) courses (mechanics, engines, welding, electricity, woodworking, etc). White's current focus is on determining areas where successful integration has occurred in other secondary ag pathways, like plant and animal science courses, and looking for ways to adapt those successes to the PST pathway. He then provides curricular resources and inservice training for secondary teachers based on enhancing STEM principles and engineering design processes.

REPORTS

RESEARCH



LORA PERKINS: *Associate Professor, Native Plant Initiative Lead Faculty, Associate Professor of Agronomy, Horticulture and Plant Science*
Department of Natural Resource Management

The goal of Perkins' research is to improve the sustainability of agriculture production by evaluating the effect of perennial native plants on soil health over time and how the change in soil health spreads within and outside research plots. With this new knowledge and understanding, she will evaluate how new agriculture practices, including monoculture plots of native perennial plants as part of precision agriculture portfolio, will improve soil health.



KENNETH OLSON: *Professor, SDSU Extension Beef Specialist*
Department of Animal Science

Olson is working to provide beginning producers in South Dakota with the information, tools and the networks they need to adjust traditional production methods to accommodate their new enterprises. The goal of Olson's program is to help beginning producers understand, evaluate and expand how their operations' goods and services fit within the larger beef cattle and agriculture industries. His program is primarily focused on helping women and Native Americans in South Dakota who are looking to begin their own operation. Olson's project also has a goal of creating agrotourism hubs by providing these producers with the knowledge they need to focus their enterprises on agrotourism.



ZHENG RONG GU: *Professor*
Department of Agricultural and Biosystems Engineering

Gu's Research and Extension Experiences for Undergraduates (REEU) project will provide a hands-on training program for undergraduates in an interdisciplinary environment in basic and applied research of agricultural systems. Over a five-year period, 50 undergraduate students will be trained in the REEU program. Every undergraduate fellow will work with one or two faculty mentors and graduate students in different research groups. Gu's project will focus on providing undergraduate students with a diverse range of experiences with the goal of boosting their interest in pursuing graduate study and future careers in sustainable agriculture, water resources, food safety, animal health and production, crop health and production, or the environment.



WANLONG LI: *Professor*
Department of Biology and Microbiology

The goal of Li's project is to improve yield potential and nitrogen use efficiency of wheat by prime editing the microRNA recognition element in Growth Regulation Factor 4 genes. His project takes the advantage of the recently developed precision genome editing technology to modify the N modulator Growth Regulation Factor 4 to increase nitrogen use efficiency and grain yield. Li's project will create synonymous mutations to overexpress Growth Regulation Factor 4, evaluate the mutation effect on yield components and nitrogen use efficiency and develop breeding-ready germplasm. With this, his project is expected to contribute to a more profitable and sustainable U.S. wheat industry and rural economy.



ZACHARY SMITH: *Assistant Professor
Department of Animal Science*

Smith, in collaboration with researchers from North Dakota State University, Iowa State University, University of Minnesota and consulting nutritionists, will be conducting surveys of corn for beef cattle diets stored as high moisture corn or high moisture ear corn. These surveys will be used to determine the effect corn hybrid, moisture content, harvest date and method, environmental conditions, processing methods, pack density and particle size have on neutral detergent fiber, starch, and starch digestibility. Smith hopes that understanding how the harvesting and processing of high moisture corn or high moisture ear corn affects variability in the corn will help producers make more reliable management decisions. This will give Smith, and other researchers, the ability to provide knowledge-based advice to beef producers who use high moisture corn or high moisture ear corn.



SRINIVAS JANASWAMY: *Assistant Professor
Department of Dairy and Food Science*

The goal of Janaswamy's research is to develop and establish the protocols to extract cellulose fraction from renewable agricultural residues and agricultural processing by-products to make strong and biodegradable films. Lignocellulose biomass is an inexpensive, environmentally friendly, and economically sustainable biomaterial that can be obtained from a range of agricultural residues and agricultural processing by-products that can be used to make biodegradable films. The long-term goal of his research is to develop an economical and sustainable solution to replace plastics, and therefore improve human health and Janaswamy believes that cellulose extracted from biomass is a potential solution.



EMMANUEL BYAMUKAMA: *Associate Professor, SDSU Extension Plant Pathologist
Department of Agronomy, Horticulture and Plant Science*

Byamukama's research project is focused on preventing yield loss caused by bacterial leaf streak in wheat through extensive screening of potential nanoparticles, biopesticides, and biological control agents that can effectively control bacterial leaf streak development in spring wheat. Currently, there are no proven in-season management practices that growers can use to manage bacterial leaf streak. His project also seeks to perform comprehensive variety screening to determine varieties that are tolerant to bacterial leaf streak. Byamukama's research and extension activities will lead to the development of recommendations that growers can use to manage bacterial leaf streak effectively.



STEPHEN GENT: *Professor, Director of the North Central Regional Sun Grant Center
Department of Mechanical Engineering*

The primary goal of the Sun Grant Program is to address national energy needs and establish a national bioeconomy through coordinated regional research, education, and Extension activities focused on agriculture and forest-based bio-based fuels, bio-products and bio-power. The goal will be addressed by implementing and managing a coordinated competitive grants program that targets the unique challenges and opportunities specific to the five individual regions of the Sun Grant Program. The grants will contribute to the North Central Regional research, development, and outreach needs.



AMBER LETCHER: *Associate Professor, SDSU Extension 4-H Youth Development Specialist
Department of Counseling and Human Development*

Letcher's project is utilizing research-informed practices to provide educational programming about prescription opioid misuse to youth in rural farming and ranching communities. Letcher is also developing research-informed resources about prescription opioid misuse for use by farming and ranching families, Extension staff and healthcare providers. Based on best practices for prevention programming and education, Letcher's project will include day-long, Youth Empowerment Day (YED) events. YED's will target 6-12 grade youth and provide opportunities to gain knowledge and skills to prevent prescription opioid misuse. The project team will also be creating accessible educational materials on topics such as safe use of opioids, warning signs of opioid misuse, and more for farming and ranching families, as well as community professionals who provide human services in rural communities.



EKATERINA KOROMYSLOVA: *Assistant Professor
Department of Construction and Operations Management*

The goal of Koromyslova's project is to contribute to the food, agricultural, natural resources, and human science education practices by creating a teaching framework to address the gap in professional skills that impact employability and job retention of college graduates. Koromyslova's project will be accomplished through three phases over a three-year period. The first phase of her project entails designing, implementing, and sustaining curricula changes that facilitate student professional skills, with particular focus on under-represented student groups. In the second phase, Koromyslova will disseminate the new evidence-based framework for curriculum transformation and support its implementation across different disciplines at South Dakota State University and beyond. And finally, she will promote participation of undergraduate students in research projects and encourage their interest in continuing education at the graduate level. Koromyslova's project will help college graduates be better prepared for effective transition from school to the workplace, and ready to face challenges of the modern business environment.



CRYSTAL LEVESQUE: *Associate Professor of Swine Nutrition
Department of Animal Science*

Levesque, in collaboration with the University of Minnesota, University of Nebraska-Lincoln, North Dakota State University and the allied livestock production industry, is developing a series of communication and leadership activities to coincide with conventional graduate programs. Students graduating from graduate or professional programs related to livestock production are frequently less prepared than necessary for success in allied industry careers. Specifically, they often lack well-honed interpersonal communications skills and practical experience in livestock production systems. Levesque's project is designed to work together with traditional science and classroom activities required to complete research-based or course-based M.S. degrees, preparing graduate students for the workforce by helping them develop communications and leadership skills.

The objective of Levesque's second project is to develop predictive biomarkers based on changes in reproductive tissue associated with pregnancy success to predict age at puberty in gilts. She expects that these biomarkers can be developed into a tool for use in commercial swine barns to identify gilts more likely to achieve high reproductive success. Application of an on-farm tool would be expected to increase sow herd retention rates and improve the quality of piglets resulting in a positive economic impact on pork production. Levesque will identify potential biomarkers of reproductive development through serum concentrations of reproductive hormones at key points in gilt reproductive development. She will then confirm and validate the identified biomarkers of reproductive development in pre-pubertal gilts in commercial swine facilities to strengthen predictive accuracy and practical application of the technique.

STATE DIAGNOSTIC LAB FULFILLS NEED FOR HUMAN COVID-19 TESTING

BY CHRISTIE DELFANIAN



South Dakota State University students can know within 24 to 48 hours whether they are positive for COVID-19, thanks to the South Dakota Animal Disease Research and Diagnostic Laboratory on campus.

ADRDL director Jane Christopher-Hennings said, “Diagnosing COVID-19-positive individuals as soon as possible is an essential part of slowing the virus spread.” ADRDL, which has both biosafety level 2 and 3 laboratories, is one of more than 20 laboratories in the U.S. Department of Agriculture National Animal Health Laboratory Network certified to do human testing to combat the COVID-19 pandemic.

The One Health Laboratory uses the polymerase chain reaction, or PCR, test, the same test the South Dakota Department of Health performs to diagnose COVID-19. Thus far, One Health has met COVID-19 testing needs for SDSU’s Student Health Clinic and Counseling Services, but the laboratory is available to support the South Dakota Department of Health’s testing efforts, if needed.

“Our scientists run about 200,000 PCR tests every year on animals alone, so we are used to doing this type of high complexity, high throughput testing,” Hennings said. ADRDL scientists have played a key role in diagnosing animal disease outbreaks, such as the highly pathogenic avian influenza and porcine coronaviruses.

Hennings, who is also head of SDSU’s Department of Veterinary and Biomedical Sciences, was aware in March 2020 the state might need assistance with human COVID-19 testing. She and her staff moved quickly when they received the official request in July.

Through a partnership with Avera Health and Physician’s Laboratory Ltd., the new One Health Laboratory received

approval by Aug. 4, 2020, to do human COVID-19 testing as prescribed by the Clinical Laboratory Improvement Amendments of 1988. The human testing is done in a separate BSL3 laboratory within the ADRDL facility.

“It has really been a team effort aimed at increasing our COVID testing capacity,” said SHCCS associate director Brenda Andersen. Her staff has three rapid point-of-care testing machines with which they can process three samples every 15 minutes. However, she pointed out, “When it comes to running large numbers of samples, we like the PCR system.”

More than 600 students were tested for COVID-19 in the three days prior to Thanksgiving. “This makes a big difference in terms of capacity,” she added.

“The Student Health Clinic has been a great partner,” Hennings said. The clinic orders the tests and keeps track of the personal information. “We get a tube with a swab in it for testing and a bar code on it. The PCR test takes about three hours and we can run as many as 186 samples at one time. Typically, if we get the samples by noon, we can have our results done by later that afternoon.”

The results are recorded based on the bar codes and sent to the student health clinic where staff matches the code to the personal information to notify the students as well as the S.D. DOH. Electronic records have further streamlined the notification process.

Daniel Scholl, SDSU vice president for research and economic development, said, “We are thankful for how everyone has worked together on this viral testing strategy to protect our students. Dr. Hennings and her team have done exemplary work to launch the One Health Diagnostic Laboratory, while maintaining ADRDL’s high level of services to animal health.”



SOUTH DAKOTA MESONET

UPDATE:

BY NICOLE HUDSON

Operated by South Dakota State University with the support of local station sponsors, the South Dakota Mesonet is the state's agricultural weather network. The South Dakota Mesonet is comprised of 32 stations across the state of South Dakota.

The offices of Senators Mike Rounds and John Thune recently announced that South Dakota State University will receive a \$12.8 million Army Corps of Engineers contract to expand and upgrade the SD Mesonet. This is part of a larger \$48.2 million project to improve capabilities and coverage of state mesonets in five states that serve the Upper Missouri River Basin.

A mesonet is a network of weather stations for monitoring “mesoscale” weather, which requires closer spacing and more frequent reporting. They are often equipped with specialized instrumentation like soil thermometers.

The Army Corps of Engineers contract will allow the SD Mesonet to provide improved flood forecasting and drought monitoring. The expanded network of over 140 stations will put nearly every South Dakotan within 20 miles from a professional grade weather system.

The SD Mesonet has many valuable tools for users, including a Spray Tool, Livestock Stress Tool, Agriculture Weather Tool and more.

The SD Mesonet Spray Tool reports live weather conditions for pesticide applicators with updates every five minutes. In order to

track this information, the SD Mesonet stations are equipped with sensors that detect temperature inversions. This information, in addition to wind speed and direction, temperature, humidity and an abbreviated weather forecast are all posted to the Spray Tool to inform an applicator about current weather conditions. The Spray Tool also provides an estimate of boom-height wind speed and Delta T.

The SD Mesonet has teamed up with SDSU Extension to provide the Livestock Stress Tool. The tool uses data collected from the 32 stations to provide different measures of livestock environmental stress. The tool offers environmental stress forecasts for the next 48 to 72 hours for any station. It includes wind chill index, heat index, temperature humidity index and comprehensive climate index data.

The comprehensive climate index is the newest measure of livestock stress. It uses temperature, humidity, wind speed and solar radiation to derive one value describing environmental stress on livestock under both cold and hot conditions.

The Agriculture Weather Tool measures several data points that are useful for Mesonet users. The tool reports precipitation versus crop water demand, soil temperature, growing degree days and stress degree days.

SD Mesonet live and archived data are available at mesonet.sdstate.edu.



THE WEST RIVER RESEARCH FARM MAKES PROGRESS IN 2020

BY NICOLE HUDSON

The West River Research Farm has finished construction on a building that will provide researchers working from the location with a shop space, storage, office spaces, classroom space and laboratories for research and graduate students. Located near Sturgis, South Dakota, the 111-acre farm is dedicated to finding new farming solutions to promote more resilient, regenerative production systems. They are able to find these solutions by taking on projects that producers are interested in but may not have the time or resources to examine themselves.

The new building at the West River Research Farm will give researchers the ability to conduct all of their research from one location. The shop space will allow for equipment to be repaired on-site and storage will allow for more equipment to be kept at the farm. Laboratory space will give researchers and graduate students the ability to conduct tests right at the farm and office spaces give them a space to analyze the data they collect. The classroom space will be used to host SDSU Extension events and other events for the public and producers.

At any given time, 10-15 different research trials are being conducted at the farm. Researchers at the farm strive to conduct research that reflects the needs of the West River farming and ranching community it serves. Being in an area of significant cattle production, the research farm continues to find innovative ways that cattle can be integrated into grain cropping systems.

"SDSU's West River Research Farm near Sturgis serves as a hub for western South Dakota agronomy," said Kristi Cammack, Director of the SDSU West River Research and Extension and

associate professor.

"Conducting agronomy research in such a place is important to western South Dakota producers. It is exciting to be able to integrate a livestock grazing component into the research, as many producers are interested in using cover crops in their operations."

The farm is conducting a variety of research including variety testing for winter wheat, spring wheat, sorghum and field peas in soil and climate conditions more representative of western South Dakota; cover cropping trials examining the use of fall-planted and full-season cover crops following small grains, intercropping cover crops and corn; integrating livestock into small grain production; developing native rhizobia to improve nitrogen fixation in pulse crops; and examining endophyte seed treatments on crop production and nutrient use.

"The semi-arid climate that we are in poses some real challenges for agricultural production. This requires farmers and producers to think creatively and be adaptive," said Chris Graham, SDSU Extension Agronomist. "Hopefully the research from this farm will support that creative spirit and spur future innovation."

Into the future, researchers hope to expand the research capacity of the farm by increasing collaborations across the region and with colleagues located at the Brookings campus. They also hope to use the site to engage with the public and producers better through Extension events, workshops, short courses and more.

BERG AGRICULTURAL HALL





N COLLEGE W S



SOUTH DAKOTA STATE UNIVERSITY'S CENTER OF EXCELLENCE FOR BISON STUDIES EXPANDS TEAM

BY SYDNEY MEYER

South Dakota State University's Center of Excellence for Bison Studies welcomes postdoctoral researcher Jeff Martin. Martin will help the center increase its research capabilities and provide greater support to bison producers in South Dakota. He is based at the West River Research and Extension facility in Rapid City.

Martin's research currently focuses on utilizing thermal imagery to measure the thermoregulation of bison and exploring how nutrition of bison changes along the Great Plains. Martin is originally from a bison ranch in Maiden Rock, Wisconsin, and has a bachelor's degree in geology and a master's degree in geosciences from East Tennessee State University, as well as a Ph.D. in wildlife and fisheries sciences from Texas A&M University.

"The overarching theme of my research is to explore how bison respond to the direct effects of increasing climate variability and climate change, as well as how the indirect effects of these things will change how bison grow and reproduce in response to changes in forage quality and water availability," Martin said.

Decreasing forage productivity also decreases bison productivity. Decreased bison productivity affects the sustainability and profit margins of bison producers, which Martin says is a big concern of his.

"While they are the largest native mammal to North America, bison are the smallest they have ever been in their nearly 1.5-million-year evolutionary record and are expected to continue to decline in size by nearly 50% with projected scenarios of warming and drought in the Great Plains," Martin said. "This is a cornerstone of my research: seeking to understand how we can best adapt our management practices to maintain sustainability."

Martin has published several articles on the utility of the fossil record to help improve the conservation of bison and better understand how bison change their size and shape in response to different climatic pressures such as increasing temperature or worsening drought. While working on his Ph.D., he took a physiological approach to understanding how bison change their size and shape



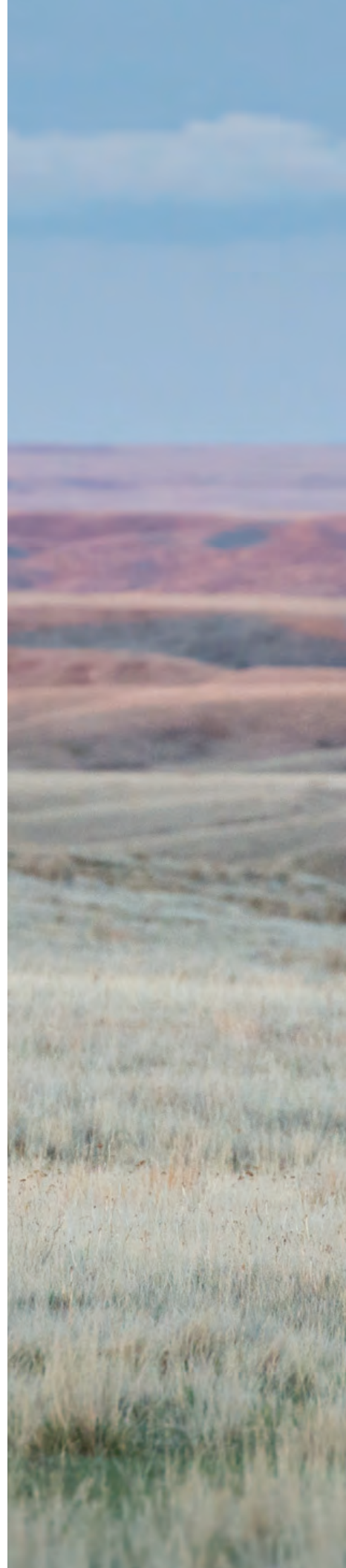
Above: Martin's research currently focuses on utilizing thermal imagery to measure the thermoregulation of bison and exploring how bison nutrition changes along the Great Plains.

in response to climate. He studied 19 bison herds ranging from Saskatchewan to Texas with a thermal imaging camera to measure how bison balance their heat in the summer and winter along the entire length of the Great Plains.

In his new role, Martin says he is looking forward to collaborating with and assembling teams to advance research, extension and education about bison. "There is already a great group of people who are working on various bison projects and I look forward to sharing their research findings through the Center of Excellence, as well as conducting my own research on bison."

Martin believes that the Center of Excellence for Bison Studies is filling a much needed role that helps to centralize and create information and knowledge about bison for many groups of people, including bison herd managers on private operations and public parks, to Native American tribes who rely on bison production and preservation, to the general public who are curious about bison and how they interact with their surroundings and how they are produced as a healthy source of protein.

"It is our aim to provide information and services to improve the production and conservation of our national mammal: the bison," Martin said.



A photograph of a bison grazing in a grassy field. The bison is in the foreground, facing left, with its head down. The background shows rolling hills under a blue sky with some clouds.

The future of America's national mammal continues to brighten as officials from South Dakota State University, the National Bison Association and the National Buffalo Foundation formally launched the Center of Excellence for Bison Studies in September, to be headquartered at SDSU's West River Research and Extension facility in Rapid City.

The 2018 U.S. Farm Bill authorizes the USDA's National Institute for Food and Agriculture to recognize centers of excellence in research, extension and education in the food and agricultural sciences. The Center of Excellence for Bison Studies will be coordinated through SDSU, but will include active participation by researchers and extension officials from other land grant universities, including 1994 tribal land-grant colleges and universities.

The center will focus on research activities to improve bison herd health and the economic viability of both private and tribal bison producers.



JONATHAN JENKS RETIRES

AFTER 29 YEARS DEVOTED TO WILDLIFE SCIENCE EDUCATION AND RESEARCH

BY ANDREA SCHUBLOOM

For the past 29 years, Distinguished Professor of Natural Resource Management at South Dakota State University, Jonathan Jenks, has devoted his professional life to researching wildlife populations and educating young people hoping to enter the wildlife ecology and natural resource management industries.

Growing up in rural Massachusetts, Jenks was exposed to wildlife at a young age. Upon completing his high school education, Jenks attended Unity College in Maine where he earned an associate degree in environmental science and a bachelor's degree in wildlife management. He then attended the University of Maine where he earned his master's degree in wildlife management, and later completed his Ph.D. in wildlife and fisheries ecology from Oklahoma State University.

After completing his Ph.D. in July of 1991, Jenks moved to South Dakota where he started his career as an assistant professor of wildlife and fisheries sciences at SDSU. Throughout his career, he has worked with many different species of wildlife but has grown to enjoy learning about bighorn sheep, whitetail deer and mountain lions the most.

"They were all exciting species to work on," said Jenks. "However, my more recent work with bighorn sheep diseases and

mountain lions in the Black Hills has been really interesting. Since my graduate degrees focused on whitetail deer, it has been great to continue working on that species as well."

Jenks has conducted and broadly published research that addresses wildlife questions using ecological theory to provide knowledge and management tools for agency resource biologists. He also has conducted extensive research on the ecology of large mammals that inhabit South Dakota and the Northern Great Plains Region; research driven by the need to maximize opportunity for harvesting these species in addition to gathering knowledge about mountain lions that have recolonized the Black Hills of South Dakota and Badlands Region of North Dakota.

"One of the best things about being at SDSU has been being able to work in both eastern and western South Dakota," said Jenks. "I've enjoyed working with students and wildlife professionals in different regions of the state and seeing the diversity in species in the different areas of South Dakota."

Over the years, Jenks has collaborated with numerous faculty at SDSU, other universities and state and federal agencies, resulting in over \$16 million in grant and contract awards.

Through his research, Jenks has mentored 15 Ph.D. and 65

master's students at SDSU and has served on numerous Ph.D. and master's student committees. Influenced by his mentorship and guidance, many of his former students now teach and conduct research at other schools and universities across the United States.

"Dr. Jenks has been committed to the success of our department and to our undergraduate wildlife and fisheries program," said Michele Dudash, head of the Department of Natural Resource Management at SDSU. "He was always willing to teach new courses to broaden our students' educational opportunities and skill sets. His scholarship combined with his graduate student mentoring has produced many wildlife management professionals who occupy positions throughout the country."

Other former students of his are employed by state, federal and Native American agencies including the United Nations, U.S. Fish and Wildlife Service, United States Geological Survey, National Park Service, United States Forest Service, USDA Animal and Plant Health Inspection Service, Natural Resource Conservation Service, Wyoming Game and Fish Department, Oregon Department of Fish and Wildlife, New Mexico Department of Game and Fish, North Dakota Game and Fish Department, Idaho Department of Fish and Game, Montana Fish, Wildlife & Parks, Minnesota Department of Natural Resources, Wisconsin Department of Natural Resources, Alaska Department of Fish and Game, Nebraska Game and Parks Commission, Penobscot Nation Fish and Game

Committee, Lower Brule Sioux Reservation Department of Wildlife, Fish and Recreation, and South Dakota Department of Game, Fish and Parks.

"Throughout my time at SDSU in both the undergraduate and graduate wildlife and fisheries programs, Dr. Jenks has been an incredible advisor, mentor and friend," said Kevin Robling, one of Jenks' former students and Department Secretary for South Dakota Game, Fish and Parks. "He has made a lasting positive impact on my professional career and, for that, I sincerely thank him for his commitment and service to SDSU and to the wildlife professionals throughout this country. His contributions to big game research and adaptive management have greatly influenced South Dakota Game, Fish and Parks' management strategies that will be carried onto future generations of wildlife professionals and the constituency they serve."

"It has been a pleasure working with all these students during my years at SDSU," said Jenks. "It's very exciting to see them go on to get jobs in the field – it's part of my job to help them become employed and I'm very happy that they've been successful."

To future students, Jenks advises they learn as much as they can about the species and techniques so they are well prepared to enter the profession. He also suggests they join professional societies, as he did, to interact with other professionals and stay updated on what is happening in the industry.

In addition to mentoring graduate students, Jenks has taught six different undergraduate and graduate courses and 23 special

topics classes to hundreds of students at SDSU. He also has shared his knowledge and research by publishing over 200 peer-reviewed papers and 95 reports and lay articles, serving as editor, co-editor and chapter contributor for two books, three invited book chapters and one solely authored book, and has given over 500 presentations at regional, national and international meetings.

Furthermore, Jenks has provided leadership to The Wildlife Society (TWS) and American Society of Mammalogists (ASM) at the state, national and international levels. He served as president of the South Dakota TWS chapter from 1994-1995 and was a member of the TWS publications committee from 1994-1995 and TWS program committee from 2003-2020. Additionally, he served as host of the 88th ASM Annual Meeting in 2008, chair of the ASM coordination committee from 2005-2020 and was the associate editor for the Journal of Mammalogy from 2009-2011.

Jenks was the first recipient of the SDSU College of Agriculture and Biological Sciences Griffith Faculty Research Award in 2003 and Distinguished Researcher Award in 2008. His other university recognitions and awards include the F.O. Butler Foundation Excellence in Research Award in 2003, being named Distinguished Professor of Wildlife and Fisheries Sciences in 2006 and the Excellence in Graduate Student Mentoring Award in 2014. Jenks also served as a network and statistics representative and graduate program coordinator for the former Department

of Wildlife and Fisheries Sciences, the graduate program coordinator for the Department of Natural Resource Management and participated as a member of the Animal Care and Use and Research Scholarship committees at SDSU.

His honors from outside universities and organizations include being named a fellow of The Wildlife Society in 2006, and being a recipient of the Professional Excellence Award from the Department of Wildlife Ecology at the University of Maine in 2009 and the Distinguished Wildlife Alumnus Award from the University of Maine in 2011.

His time spent educating students and industry professionals and conducting vital and relevant wildlife research have earned him the new title of Distinguished Professor Emeritus of Wildlife Science, effective as of Jan. 21. Upon his retirement, Jenks plans to continue his involvement with The Wildlife Society, facilitate completion of research projects with his remaining graduate students and devote more time to his hobbies of hunting, fishing and recreating and traveling the country with his wife Gail.

"During my tenure at SDSU, I have been fortunate to be able to contribute to the building of a strong and viable wildlife program," said Jenks. "I will surely miss teaching and learning with students about wildlife and their environments, hearing from past students about their current activities, and the interactions and collaborations with many of the faculty and staff at South Dakota State University, which has been my professional home since my arrival in July 1991."

"One of the best things about being at SDSU has been being able to work in both eastern and western South Dakota. I've enjoyed working with students and wildlife professionals in different regions of the state and seeing the diversity in species in the different areas of South Dakota."

ANIMAL SCIENCE GRADUATE STUDENTS RECEIVE INTERNATIONAL RESEARCH AWARDS

BY SADIE VANDER WAL



Lydia Hite



Christina Bakker

Two South Dakota State University graduate students in the Animal Science Department received top honors at the International Congress of Meat Science and Technology (ICoMST) research competition held virtually last summer. Lydia Hite and Christina Bakker each received first place in their respective categories for their research.

Bakker, originally from Lake Benton, Minnesota, finished her Ph.D. in animal science last May from SDSU. She achieved first place in the Ph.D. division in the sustainability/production/food waste category. Her dissertation, titled “Influence of feeding a cover crop mixture including

brassicas during backgrounding on carcass characteristics and beef tenderness,” focused on how diet management during the backgrounding and finishing phases of beef production can impact carcass characteristics and meat quality.

Hite, originally from Gracey, Kentucky, received first place in the sustainability/production/food waste category of the master’s division of the competition. Her research, titled “Influence of Carcass Chilling System on Chuck, Loin, and Round Temperature Decline,” investigated the differences in chilling systems utilized on beef carcasses, specifically between air chilling and spray chilling.

“As a master’s student, Christina was the senior graduate student I always looked up to throughout my degree and went to for advice,” Hite said. “While we were in separate divisions, being able to celebrate together has been a blast.”

Bakker was advised by Kyle Grubbs, assistant professor of animal science, and Keith Underwood, associate professor of animal science, during her Ph.D. Hite is advised by Grubbs.

“They did an outstanding job presenting, and they were very prepared,” Underwood said. “It was a strong poster competition.”

Both professors played an integral part in not only the students’ research, but also the coordination of the entire

research competition and associated conference this year. Grubbs served as chair of the ICoMST research competition, while Underwood chaired the American Meat Science Association (AMSA) Reciprocal Meat Conference (RMC), which was held in conjunction with ICoMST this year. While ICoMST is an international technical and scientific meeting that is held across the world every year, RMC is a U.S.-based yearly meeting of the AMSA. Due to the global pandemic, the two meetings were held virtually at the same time this year.

The ICoMST research competition consisted of undergraduate, master’s and Ph.D. divisions, with three topic areas in each division, including muscle biology/fresh meat quality, processing/technology/food safety and preservation and sustainability/production/food waste. Each competitor submitted a pre-recorded presentation, and judges from across the world watched each presentation before holding a live virtual question and answer segment with each student researcher. Competition results were announced on August 3 during the ICoMST opening session.

Having two students from the same university place first in this international-scale competition is not a common occurrence. However, Underwood and Grubbs both noted that pushing their students to think about the applications of their research is very important for carrying out the land grant mission of the university, which further proved the importance of Hite and Bakker’s projects to the judges.

“The fact they both won is fantastic, and it shows how they have applied their research to real-world knowledge,” Grubbs said. “Their projects demonstrated that.”

Hite’s research has enabled her and Grubbs to design and build a carcass spray chilling system in the SDSU meat lab similar to systems currently used across the beef industry. This system aids in improving yields by reducing moisture lost during the chilling process. As many beef producers rely on carcass and meat quality for their profits, Bakker’s focus on diet management and carcass impact enables her to help producers make management decisions that bring them the greatest profit and higher quality meat products for consumers.

The pair credits the dedication and support of SDSU’s Animal Science faculty and meat science program for pushing them to succeed with their research.

“I think the biggest thing having two first place finishes says about our department and program is how much our group supports one another,” Bakker said. “I think this accomplishment tells the world that we may be small, but we are not to be overlooked.”



KRISHNAN RECEIVES INTERNATIONAL AWARD FOR CEREALS ANALYSIS

BY CHRISTIE DELFANIAN

Professor Padu Krishnan of South Dakota State University's Department of Dairy and Food Science received the 2020 Edith A. Christensen Award for Outstanding Contributions in Analytical Methodology from the Cereals and Grains Association. He is the first South Dakota State University faculty member to get the award, which recognizes the central role analytical methods play in cereal and grain research.

Krishnan has been a member of the Cereals & Grains Association, formerly known as the American Association of Cereal Chemists International, since 1984 when he was a graduate student at North Dakota State University.

"I am honored to receive this prestigious award," Krishnan said. "This award recognizes my scientific contributions in analytical methodology, and service to the society through leadership for approved methods. It is a wonderful acknowledgement by peers from industry and academia. It is important to have the right metrics in assessing the quality of our food. We need the best science-based tools to ensure a safe and wholesome food supply which preserves confidence of the food consumer."

At South Dakota State, Krishnan has spearheaded efforts to improve the nutritional and end-use quality of wheat and oats through his cereal quality laboratory in SDSU's Young Brothers Seed Technology Laboratory on the Innovation Campus. In addition to collaborating with SDSU wheat and oat breeders, Krishnan has worked with national food companies, including General Mills, Grain Millers Inc., Quaker Oats Company, Nestlé

Food Company and Schwan's Company.

He also receives U.S. Department of Agriculture National Institute of Food and Agriculture funding through the South Dakota Agricultural Experiment Station.

Krishnan and his graduate students have developed and continue to refine near-infrared spectrometer calibrations for evaluating the quality of oats. The NIR calibration allows researchers to measure beta glucan—the soluble fiber that gives oats its cholesterol-lowering power, fat and protein. This is done rapidly and simultaneously using a single analytical platform.

"Measuring multiple constituents simultaneously within seconds makes this a powerful decision-making tool for the breeder and the food processor," Krishnan said. He is also formulating new oat products, such as beverages, breads and butter, with improved texture and taste that takes oats beyond the breakfast aisle.

He also developed a process of converting dried distillers grain from corn ethanol plants into a food-grade product that can fortify baked goods to increase their protein and fiber content. He has integrated food-grade DDG into everything from Chinese steamed bread to flat breads and cookies.

In addition, Krishnan has published research on new methods of measuring folic acid in food and new ways to estimate bread loaf volume, which he refers to as "the holy grail of the baking industry."



PAYBACK:

SDSU SWINE EDUCATION & RESEARCH FACILITY IMPACT EXCEEDS INVESTMENT

BY LORA BERG

The value of research grants, student accomplishments and swine industry impact has exceeded the initial investment made in the South Dakota State University Swine Education and Research Facility in less than five years.

The SDSU Swine Education and Research Facility grand opening was held on October 1, 2016. Construction of the \$7.4 million facility was made possible by a nearly unprecedented show of regional support and collaboration by more than 120 donors.

“Along with the support of the donors who made our SDSU Swine Education and Research Facility possible, comes the responsibility of making sure we are good stewards of our stakeholders’ investment in both the facility and in our swine program. We have taken that responsibility very seriously,” says Bob Thaler, Distinguished Professor of Animal Science and SDSU Extension Swine Specialist.

Thaler says SDSU’s team of swine research and Extension professionals have brought in more than \$7.7 million in research grants and gifts as of Spring 2021. “That is a milestone that we are really excited about,” he says. “We have received more in gifts and grants than it cost to build the facility.”

Accomplishments include:

- Research leading to 56 refereed journal articles
- 1,600 undergraduate students participated in hands-on labs in the facility since 2016
- 14 M.S. and Ph. D. students trained in the facility and have earned their degrees
- 12 graduate students are focusing on swine-related studies taking place in the facility
- More than 700 people have toured the SDSU Swine Education and Research facility, including visitors from China, Vietnam,

the Philippines, Indonesia, Thailand, Nigeria, Mexico, Canada and Germany.

- Virtual Operation Main Street – 51 live, virtual, student-led tours in the facility have been cyber-linked to conferences and classrooms across the United States and in at least one foreign country to reach 1,678 people in 22 states to support the National Pork Board’s Operation Main Street Program.
- SDSU Swine Day has been established as an annual event to showcase research and accomplishments related to our swine program.

“Our state-of-the-art facilities are equipped to provide students with the hands-on learning experiences that are preparing them to pursue careers in the swine industry,” explains Joe Cassady, head of the SDSU Department of Animal Science. “This project would not have been possible without the dedicated efforts and generosity of our alumni, stakeholders and friends.”

The South Dakota Pork Producers Council, Minnesota Pork Board and Iowa Pork Producers Association all contributed to the project and were joined by many others from Minnesota and South Dakota. The project also received funding support from private financial commitments made by individuals, families, organizations and businesses in South Dakota and surrounding states. An allocation of \$2.03 million in state-appropriated funding was made, in addition to \$1 million allocated by the South Dakota Board of Regents from the Higher Education Facilities Fund, helping to bring the project to fruition.

“We plan on continuing our current trajectory of success while making SDSU the university of choice for young people interested in a career in pork production, as well as serving as the go-to source for swine-related research and information,” Thaler says.

SDSU

MEAT LAB RAMPS UP PRODUCTION TO HELP PORK PRODUCERS IN NEED

BY ANN HESS

On April 12, 2020, Smithfield Foods, Inc. – one of the largest pork processing facilities in the United States and representing 4% to 5% of U.S. pork production – announced it was closing its Sioux Falls, South Dakota site due to a COVID-19 outbreak among employees. More than 550 independent family farmers that supply the plant – many from South Dakota – were left scrambling to find a place to take their market hogs.

More Midwest meat packers soon followed suit in shuttering and/or operating at reduced capacity. By May 4, 2020, U.S. pork capacity reached its lowest point, with 45.9% of plants idled due to employee cases of COVID-19, according to Steve Meyer, an economist with Partners for Production Agriculture.

South Dakota pork producers were soon turning to auction barns, local butchers, meat lockers and even neighbors to help minimize the number of hogs that were backing up on farm.

A fully inspected slaughter facility for all red meat species, the South Dakota State University Meat Lab has the ability to portion on the fabrication side and produce fully cooked or further processed products. However, since the meat lab was built in the 1980s, the main purpose for the facility has been to support research, teaching and SDSU Extension.

Keith Underwood, associate professor in the Department of Animal Science, says the SDSU Meat Lab typically sees 600 to 800 students come through every semester for instruction, with another 10 to 15 undergraduate students working in the facility annually to get more hands-on training.

During the spring of 2020, most of the meat lab research had been put on hold while students and staff finished the semester remotely. By early May, the students, faculty and staff were focusing solely on final exams and filling up the lab freezers. Then a call came from the Governor's Office of South Dakota asking if the SDSU Meat Lab may be able to help harvest these market hogs with no place to go.

"Our locker plants were pretty well booked up and quite busy at the time and with things going on with COVID-19 in some of our larger plants, and them learning how to deal with the CDC guidelines and regulations and not being able to operate at a 100% capacity, anything SDSU could do to help, was hopefully beneficial," Underwood says.

Initially the staff focused on slaughtering and processing 20 hogs a week, but as requests started coming in, the SDSU Meat Lab started taking on more, bumping up to 30, 60, and even 90



Above: Bob Thaler (right) and a student employee move hogs into the SDSU Meat Lab for processing.

one week in June.

"Dr. Dusty Oedekoven, State Veterinarian, and the South Dakota Animal Industry Board were integral partners in making this successful," says SDSU Extension Swine Specialist Bob Thaler. "As we increased the number of harvest dates, that also increased the workload for the Animal Industry Board personnel. Their flexibility and willingness to work the extra hours were essential and greatly appreciated."

Agriswine Alliance, Inc. was one of the first businesses to utilize the SDSU Meat Lab's services. According to Blair Truebenbach, the agricultural cooperative was approached by several of their Hutterite clients, who wanted to harvest and donate the excess pork to local South Dakota communities, but soon found they needed to work with a fully inspected facility.

"Everyone was really thankful the SDSU Meat Lab was able to participate and donate a bunch of their time," Truebenbach says.

From May 12 to July 31, a total of 392 hogs were slaughtered, 150 carcasses were shipped and 32,817 pounds of finished product were produced at the SDSU Meat Lab. The finished pork products were distributed by the South Dakota Pork Producers Council and Pipestone System at food giveaways around the state, and the carcasses were sent on to butchers to meet a demand for retail pork on the western side of the state.

In May, Agriswine Alliance joined the SDPPC at Aberdeen's Hog Wild Pork Giveaway. More than 13,000 pounds of South Dakota pork was distributed that day.

"It was such a stressful time during the pandemic that something as simple as getting 10 pounds of protein to bring home -- families were really grateful for, and with no cost," Truebenbach says. "SDPPC donated that and I think it took a lot of burden off a lot of families and it might have been a burden they didn't realize they were carrying."

Underwood hopes the effort was beneficial to some of the producers that were a little long on pigs.

"We only slaughtered about 400 through our summer, but just to give you an indication, that's about twice as many animals as we traditionally slaughter in a year, and that's three times as many pigs we slaughter in a year," Underwood says. "So, for us, that was pretty good production."

FIRST CLASS OF STUDENTS COMPLETE WIZIPAN LEADERSHIP AND SUSTAINABILITY PROGRAM BASED AT CRAZY HORSE MEMORIAL

BY SYDNEY MEYER

The first class of students to enroll in the new Wizipan Leadership and Sustainability Program recently completed the semester-long experience offered through a unique partnership between South Dakota State University and The Indian University of North America of Crazy Horse Memorial. The new program provides students with a unique, immersive academic experience grounded in Native philosophy.

Nine students earned a 15-credit hour certificate in Leadership and Sustainability from SDSU after completing the program. The students attended classes and lived in a modern, suite-style residential and instructional facility at Crazy Horse Memorial in the Black Hills of South Dakota.

"The program creates a unique atmosphere for students," said Kristi Cammack, director of SDSU's West River Research and Extension. "This cohort style of studying and living can help students succeed by building a support system that can last beyond the program itself."

Coursework for the program combines American Indian studies, natural resource management, global food systems and leadership. The courses encourage students to evaluate and understand the relationship of care of self, care of community, care of environment and care of culture. Students are encouraged to work together to solve complex problems and also to work on problems that are relevant to them and their communities.

Students had the opportunity to integrate concepts from each of their individual classes into capstone projects that reflected their own self-determined learning styles and interests. Rachel Lindvall, SDSU Wizipan Coordinator, stated that "I was highly impressed to see the level of these projects in each of the classes. Students reflected upon what they had learned in the classroom, in their own investigations, and in the field and applied it cohesively and often insightfully to this work."

Lindvall said the students frequently expressed their enthusiasm for the opportunities to visit in-person, as well as virtually, with knowledgeable guest speakers who were experts in their subject areas, many with an Indigenous perspective. The program also included outdoor field trips that gave new insights to students often not familiar with

local natural and agricultural resource bases.

"The spirit of this program is closely aligned with the Wokini initiative at SDSU and helps SDSU expand its efforts to support American Indian student success," Cammack said. "Students from SDSU and other universities can gather together in the Black Hills, a sacred area that holds a multitude of hands-on learning opportunities for students."

Classes are taught by instructors from both SDSU and The Indian University of North America in an innovative, interdisciplinary, hands-on style emphasizing Indigenous experiential learning through field trips, mentorship, group discussions and collaborative inquiry projects.

Tuition, lodging and a complete meal plan were funded by the Crazy Horse Memorial Foundation for all students in the program. Many students also took advantage of part-time employment opportunities at Crazy Horse Memorial.

"The Wizipan program and the partnership with South Dakota State University are among the ways that Crazy Horse supports and strengthens Native students and communities," said Laurie Becvar, Crazy Horse Memorial president and chief operating officer. "Generous charitable gifts to the Memorial and its Indian University of North America make it possible to fully fund the program for students."

To enroll in the program, students ideally are currently enrolled in a degree granting college, university, technical school or other higher educational institution and are in good academic standing. Preference is extended to enrolled members of Federally Recognized tribes, however admission is open to all qualified students.

The program will host its next class in fall 2021.

For more information about the program or application, visit the Wizipan Leadership and Sustainability Program website at <https://www.sdstate.edu/wizipan> and at <https://crazyhorsememorial.org/story/the-university> or contact Rachel Lindvall, Wizipan Leadership and Sustainability Program Coordinator at rachel.lindvall@sdstate.edu or Kristi Cammack, director of SDSU's West River Research and Extension, at kristi.cammack@sdstate.edu or Whitney Rencountre, associate director of enrollment management of The Indian University of North America, at whitney.rencountre@crazyhorse.org.









ALUMNI E W S



Q&A

WITH ANDI FOUBERG

Upon graduating from South Dakota State University in 1999, **Andi Fouberg** returned to SDSU in 2014 to pursue her passion at her alma mater. After serving as President and CEO of the South Dakota State University Alumni Association for seven years, Fouberg continues to advocate for alumni interaction and the importance of staying connected even after students leave campus to start their careers.



Q. When was the Alumni Association established?

A. 1889 – 16 members of the class of 1889 met after commencement and formed the Dakota Agricultural College Alumni Association. We celebrated our 125th during my first few months.

Q. What are the goals of the SDSU Alumni Association?

A. The South Dakota State University Alumni Association fosters a spirit of loyalty and community among its alumni, students, and friends. It is our job to keep alumni and friends connected to the university and one another. We steward meaningful relationships, manage engaging experiences, tell the University's story in relevant ways and think of ourselves as collaborators and catalysts.

Q. Is the Alumni Association just for alumni? How do others become involved?

A. We are very purposeful about making sure that graduates, former students, faculty, staff and friends of SDSU feel welcome. If you want to be included in that list, just let us know! The more Jackrabbits, the merrier!

Q. What events and traditions are associated with the alumni association?

A. We are the home of the Distinguished Alumni program for the university; think of this as a university-wide hall of fame. We honor six alumni each year. We also sponsor the Family of the Year program that recognizes a family each year with a strong connection to SDSU. Our tailgate before home football games is open to everyone. We partner with our chapters in hosting events too, including a social at the Black Hills Stock Show and the pre-game events at the Summit League tournament. We send out STATE magazine to alumni and friends three times a year and an e-newsletter monthly.

Q. What travel opportunities are available to members?

A. We have an annual trip as part of our Jackrabbit Journeys program. The trip is open to all alumni and friends and the cost depends on the destination. These are popular programs for alumni associations because for those people interested in group travel, this gives the group a point of connection right off the bat. They may not know one another, but they do have and know things in common. We use a travel company and they talk about how easy it is to establish the group when they have this connection point even if they are generations apart in age.

Q. For someone interested in starting a local alumni chapter, how do they get one started? What do local chapters do?

A. Give us a call. We have local chapters and a couple of interest-based chapters. Local chapters host events to try to bring alumni together. Picnics, tours, socials, speakers, etc., there are a wide variety of activities.

Q. What inspired you to return to SDSU to serve in this role?

A. I left South Dakota a couple of times between graduating and returning to this job. When I was in college, VJ Smith was in this job and I always thought that if the timing were right when it opened that it might be a good fit for me. When it opened in 2014, it seemed like the right time to come back to Brookings.

Q. What has made you so passionate about working with alumni?

A. There is so much value in staying connected to your alma mater; colleges are better off when alumni are involved. That might be supporting students physically through attending events or financially through scholarships and other funds. Staying connected to your academic department and instructors helps them stay up-to-date on preparing future students for the workplace. Maybe you will be in a position to provide an internship for a current student, etc. The more you know about what is happening at your alma mater, the more likely you are to be able to help, and when your alma mater is doing well, it makes your degree even more valuable. Rising tides lift all boats.

Q. What advice would you give recent alumni?

A. In college, many students are involved in philanthropic efforts – find those in your life outside of college, too. We have an annual event, #JacksGiveBack, designed for everyone to participate, and the Foundation has One Day for STATE, a day of giving – these are great places for young alumni to stay involved at SDSU. College is such a pivotal experience for so many, don't leave and not look back. The people you met here, friends, faculty, staff, etc. are part of your circle now. And if possible, come back and see us!

VISIT STATEALUM.COM TO GET CONNECTED!

PIPES

SDSU GRADUATES ARE HELPING FARMERS

With nearly 50 former South Dakota State University students currently employed at PIPESTONE, SDSU alumni are making their mark in the swine and animal health industries across the United States by helping farmers to remain independent, improve the health of their livestock, transition operations to the next generation and create the farms of tomorrow.

Over the past 75 years, PIPESTONE has evolved to support the needs of the individual family farmer and the rapidly growing swine industry. What started as the Pipestone Veterinary Clinic in 1942 as a large animal veterinary practice, has grown to become an array of farmer services that includes production-driven research, nutrition management, animal health, record keeping, marketing and business service components. In 1988, the Pipestone System was founded by Dr. Gordon Spronk and Dr. G.F. Kennedy to manage sow farms owned by independent family farmers. Just two years later, the first Pipestone System-managed sow farm was established. Today, PIPESTONE is the third-largest hog producer in the United States, employs over 1,300 employees across 12 states, operates six clinic locations in four states and serves over 1,500 farmers nationwide.

Finding Success at PIPESTONE

For 2006 SDSU microbiology and biology alum, Hannah Walkes, her career with PIPESTONE began shortly after graduating from college. In 2007, she started with the company as a biosecurity coordinator where she implemented and audited biosecurity procedures at sow farms to ensure the animals were kept healthy. Years later, Walkes now serves as the president of Pipestone Veterinary Services where she oversees clinic operations, daily business functions and works with their 150-person veterinary services team to provide solutions to independent family farms and swine clients across the Midwest.

"I had a passion to work directly with farmers, so my roles continued to evolve to do more in that realm," said Walkes. "It's most rewarding sitting at the kitchen table with a family helping them determine what they want their farm of tomorrow to look like and determining how PIPESTONE can help facilitate. Additionally satisfying is seeing their desire to bring the next generation home and crafting steps necessary to make that goal a reality."

As a current PIPESTONE employee and SDSU alum, Walkes enjoys the partnership between the company and the university and the opportunities it provides her to interact with SDSU faculty, staff and students.

"We have a great relationship with the university and so many of our employees are SDSU alumni and bleed blue and yellow too," said Walkes. "We work heavily with the South Dakota Animal Disease Research and Diagnostic Lab for diagnostics and disease research projects, and we appreciate the professors and leadership for seeking feedback on what the next generation of workforce needs to be."

Walkes often visits classes at SDSU to talk with current students about their future after graduation and the career opportunities that PIPESTONE has to offer.

"The number one piece of advice I try to share with students is to be willing to get their hands dirty and take the opportunities that are available in a company with morals and values that align with theirs, and not just jump at the job with the fanciest title or shiny truck," said Walkes. "SDSU students embody a lot of that Midwest work ethic, which sets them apart."



PIPESTONE®

TODAY CREATE THE FARMS OF TOMORROW

BY ANDREA SCHUBLOOM

Pursuing Opportunities at PIPESTONE

Recent SDSU agricultural communications alum, Alicia Mogler, was one of those students ready to chase the opportunities available to her.

"I grew up on a wean-to-finish hog operation and I want to talk to consumers about where their food comes from," said Mogler. "I completed a couple internships with PIPESTONE, and that experience opened my eyes to how much people don't understand about what farmers do every day to care for their animals and provide a safe and healthy protein source."

As a public relations intern at PIPESTONE during the summers of 2017 and 2018, Mogler helped host open houses at local sow farms and helped manage the PIPESTONE Discovery Barn at several county and state fairs in Minnesota, South Dakota and Iowa, which offers fair visitors a glimpse into the swine industry through on-site farrowing and educational exhibits.

"The agriculture industry has so many career opportunities," said Mogler. "PIPESTONE provided me an opportunity in public relations outside of the barn to talk to consumers about what is going on inside of the barns, and it all just fell into place."

Mogler's internship experience with PIPESTONE motivated her to pursue a career field where she could help tell farmers' stories to consumers. Immediately after graduating from SDSU in May 2019, she started her career with PIPESTONE as a communications coordinator. In her role, Mogler writes weekly employee newsletters, conducts employee surveys and annual sustainability reports, helps plan company culture camps, manages the Discovery Barn and fair schedules, advocates for the swine industry at non-agricultural events and assists in raising funds and collecting donations for PIPESTONE's international charities and the PIPESTONE Cares initiative.

"What I enjoy most is interacting with consumers and educating them on where their food comes from," said Mogler. "My favorite part is seeing them understand that farmers truly care about their animals and the food they are providing."

Mission-Driven

When asked about their favorite part of working for PIPESTONE, Walkes and Mogler both mentioned the company's mission: "Helping farmers today create the farms of tomorrow."

"We're very passionate about our mission and you can see it," said Mogler. "We'll go the extra mile for our farmers."

They also mentioned PIPESTONE's core values – integrity, caring, commitment, growth and teamwork.

"It is so much more rewarding to work for a company that does good rather than just provides a good paycheck," said Walkes.

"PIPESTONE is a good company that follows their core values and cares for their employees," said Mogler. "If you want to grow, they are willing to do that with you. PIPESTONE cares and they show it."



Top: Hannah Walkes, president of Pipestone Veterinary Services
Bottom: Alicia Mogler, communications coordinator at PIPESTONE



MEETING GROWING NEEDS IN THE INDUSTRY:

A Q&A WITH PIPESTONE
SYSTEM CO-FOUNDER
AND VETERINARIAN
DR. GORDON SPRONK

Q. What was the inspiration behind creating the Pipestone System?

A. We met a need – the farm was changing, and it needed to change to meet society's need for the production of safe and competitive protein sources. The genetics, health, production techniques and buildings on farms all needed to be improved. So, we simply saw the need and helped our farmers to meet that need. A clear difference between the Pipestone System model and others is that the sow farms are owned by independent family farmers. Pipestone simply manages the farms for them and provides them a healthy weaned pig to their grow finish sites. It is best for communities if the ownership of the land and the livestock stays local.

Q. Since your start with PIPESTONE, how have you seen the company evolve over the years?

A. PIPESTONE has evolved from being a local company that does business in one county to a global company that does business across the United States, South Central America, Europe, Asia and Russia. It's evolved from two veterinarians and two staff working in one location to over 40 veterinarians, more than 1,300 staff, and six different clinic locations. There have been so many changes, they are almost too numerous to count.

Q. What has been most rewarding about your career with PIPESTONE?

A. Seeing the next generation of farmers come home; there is nothing more rewarding than seeing a family operation that has grown enough and been successful enough that the next generation wants to take over that farm. It is very rewarding when we're able to generate wealth and it stays in the local community – when rural areas prosper and thrive, that's rewarding.

Q. As a veterinarian yourself, what do you think the need for veterinarians will be like in the future?

A. The need is for food animal veterinarians – and land grant universities, like SDSU, have an opportunity to provide those professionals, both nationally and internationally, because of its agricultural background and foundation that it has stayed true to over the years. We're going to need more food animal veterinarians, and that's a need that SDSU may be uniquely qualified to meet.

Q. Why would you encourage the younger generation to pursue a career in veterinary medicine and get involved in the animal health industry?

A. It is a career of outstanding possibilities because there is one thing that people will always do – they will always eat and be searching for food; they want safe, abundant and healthy food, and agriculture is a basic need that fulfills those wants. I would encourage any student with a love of agriculture, specifically animals, to pursue this career.

Q. What is your hope for the next generation of agriculturalists?

A. I would hope that they are even better stewards than I was. We are stewards of the land, but we can also be stewards of business.

Q. Agriculture looks a lot different now than it did 40 years ago. What is your advice to young professionals who are or will be entering the agricultural industry soon?

A. Never stop learning. Just because you graduated, doesn't mean you should stop learning. Always learn. And once you learn, pass your knowledge on and always teach.



From left to right: Brady, Eric and Sean Haberman

THE HABERMAN BROTHERS: AN AGRICULTURAL SYSTEMS TECHNOLOGY FAMILY TRADITION

BY SADIE VANDER WAL

It is not an uncommon occurrence for siblings of Agricultural Systems Technology (AST) alumni to enter the same degree program their older predecessors had pursued. For the Haberman family, this has occurred not once, but twice in the last decade.

Sean, Eric and Brady Haberman, originally from Okabena, Minnesota, each graduated from the AST program within the last six years. Sean, the oldest of the three, graduated in 2015, followed by Eric, who graduated in 2017, and Brady, who graduated in 2019. Despite their shared degree path, each has pursued a different sector of the agriculture industry in their current jobs, with Sean working in ag equipment sales at Jaycox Implement in Worthington, Minnesota, Brady as a startup coordinator for Interstates in Sioux Falls, South Dakota, and Eric as a sales agronomist for Asmus Farm Supply in their hometown.

"Growing up, we shared a lot of the same interests, so it doesn't surprise me we all decided to pursue the same major," Sean said. "I think it is kind of neat that we all graduated with the same degree but are all doing different things with our careers."

Raised in the agriculture industry, the trio knew that SDSU's strong agriculture programs would provide them with a degree suited for a variety of career paths in the industry.

Sean's passion for learning about emerging technologies in agriculture initially attracted him to the AST program. His experiences as a student helped him realize his career path and provided him with the knowledge and connections to commence that career in the right direction.

Their older brother's experience proved to Eric and Brady that SDSU could be the right fit for them, too.

"I went to visit my brother when I was a senior in high school, and I really enjoyed the atmosphere of Brookings," Eric said. "In

fact, I never toured another campus."

Eric also enjoyed learning more about the technology advancements being made in the industry, in addition to the well-rounded coursework involving agricultural engineering, agronomy and precision agriculture that the AST program provided.

In addition to his brothers' positive experiences in AST, the variety of class choices and hands-on opportunities with the newest agricultural technology further drew Brady to continue the new "family tradition" of pursuing an AST degree. As a result of the program and his college choice, he felt prepared for his first job following graduation.

"The instructors at SDSU gave us real-world examples and always made time to help," Brady said. "The variety and number of classes offered allowed me to choose what I would enjoy learning."

Because of their closeness in age, each brother has benefitted from one or both of the others in preparing for SDSU and the AST program, such as recommending which classes to take and which courses would best fit their interests in agriculture. Even though Sean was the first one to enter the program, he had a built-in study partner in Eric as they took a few classes together when Eric started college a few years later.

"If I didn't understand something, I could just call Sean and have him help me out," Eric said.

Connected by blood and by their shared passion for agriculture, the Haberman brothers look back at SDSU and the AST program as the foundation for their careers and their own unique family tradition.

BEN REIFEL:



Photos and story information courtesy of SDSU Archives and Special Collections.

A NATIVE AMERICAN LEGACY

BY SADIE VANDER WAL

Upon hearing the name “Ben Reifel,” many current SDSU students immediately think of one of the newer, non-traditional residence halls on campus. However, what many might not realize is the rich history and story behind the name of the building itself. A South Dakota native, Reifel served as the first United States legislator of Sioux ancestry and the sole American Indian in Congress in the 1960s. Today, he stands as a symbol of SDSU pride, an advocate for the Native American community and a public servant to the nation and people of his home state.

Born in 1906 on the Rosebud Indian Reservation to a German-American father and a Lakota Sioux mother, the South Dakota native was an enrolled member of the Rosebud Sioux Tribe with the Indian name of “Lone Feather.” Working on his family’s farm for a few years after graduating the eighth grade, he attended the School of Agriculture, an agricultural high school in Brookings, South Dakota. After completing his education there, he enrolled in South Dakota State College, paying his own tuition through one of the first loans ever made available to American Indians. Earning a bachelor’s degree in agriculture in 1932, Reifel was active in a variety of clubs and organizations, including agricultural club, Alpha Zeta, Little International, Officers’ Mess, Board of Control and Scabbard and Blade. One of his favorite SDSU traditions included Hobo Day, which he continued to promote at the nation’s capital during his congressional terms.

After graduating, Reifel began working for the Bureau of Indian Affairs (BIA) on the Pine Ridge Reservation in 1933. With his background in the Lakota language and relationship with the reservations, he spent much of his time promoting new programs under the Indian Reorganization Act of 1934. While many opposed the act, Reifel successfully implemented the programs in South Dakota reservations.

Called to active duty in 1942, Reifel briefly left the BIA to serve in World War II, being stationed across the U.S. before serving in France and Germany. After his release in 1946 with the rank of Lt. Colonel, he was appointed superintendent of the Fort Berthold Indian Reservation in North Dakota. Reifel’s position there was interrupted by his acceptance into Harvard University, where he

earned his master’s degree in 1950 and Ph.D in 1952.

Upon graduation, he returned to South Dakota to serve as superintendent of the Pine Ridge Reservation before being appointed to director of the Aberdeen Area Bureau of Indian Affairs office.

Reifel served for five terms as Representative from South Dakota’s First Congressional District, beginning with his first election in 1960. As the first person of Sioux ancestry to serve in Congress, Reifel served as a strong supporter of American Indian issues, earning several awards throughout this career. In addition, he worked diligently for the agriculture industry of the Midwest, opposing cuts in farm support programs and backing the Oahe irrigation program.

After completing his terms to Congress, President Richard Nixon appointed Reifel to serve as the first Interior Secretary for Indian and Territorial Affairs for the U.S. Department of the Interior. Other positions he served in after his congressional career included chairman of the National Capital Planning Commission and assistant to the director of the National Park Service, a position where he discussed Indian land tourism with tribal leaders.

Returning to South Dakota, Reifel established the first Native American collection at the South Dakota Art Museum in Brookings, South Dakota, where he was a trustee. After retiring in 1970, Reifel received honorary doctorates from SDSU, the University of South Dakota and Northern State College.

Reifel died of cancer on January 2, 1990, upon which the State of South Dakota issued a legislative commemoration certificate for his life of service.

With a career marked by several accomplishments and awards, Reifel is most remembered for his service to the state of South Dakota, the entire nation and Native Americans. Today, with buildings like the SDSU dormitory and the Cedar Pass Visitor Center at Badlands National Park named after him, Reifel continues to be remembered in the heart of his homeland. In fact, his congressional desk currently sits in the SDSU Alumni Center in President and CEO Andi Foubert’s office, and, when you sit at the desk, you can see Ben Reifel Hall across campus. Reifel’s legacy will never be forgotten here at SDSU.



SDSU ALUM

CLEVELAND ABBOTT

DEDICATED HIS LIFE'S WORK TO CREATING EQUAL OPPORTUNITIES

BY SYDNEY MEYER

Cleveland “Cleve” Abbott, the first African American varsity athlete at South Dakota State University, devoted his career to creating equal opportunities for all college athletes, specifically women and students of color. The athletic programs he developed became the model for the modern NCAA athletic system, and he created the first organized women’s college athletic programs.

Born in Yankton in 1894, his family later moved to Watertown where he excelled in sports. After graduating from high school, Abbott attended SDSU where he starred in track, football, baseball, basketball and tennis, earning 14 varsity awards. He gained a bachelor’s degree in dairy science, graduating in 1916.

“In terms of Cleveland Abbott, it is not an overstatement to

call him the ‘Jackie Robinson of SDSU’, in that he integrates our athletic teams, but impressively many years before Robinson does the same for major league baseball,” said Douglas Wermedal, associate vice president for student affairs at South Dakota State University.

While a student at SDSU, Abbott’s academic record and athletic ability were brought to the attention of Booker T. Washington, founder of Tuskegee University (then the Tuskegee Institute) in Alabama, by then-SDSU President Ellwood Perisho. Abbott was recruited by Washington to help lead an effort to break American Jim Crow segregation laws through sports. He accepted a job offer from Washington to serve as a coach, teach dairy science and manage a herd of 50 Jersey cows.

“Booker T. Washington was searching for a man of color to

combine integrity, scholarship and athleticism to transform the stature and place in American society for his students," explained Tuskegee University archivist Dana Chandler in a Tuskegee University article.

Shortly after beginning in his role at the university, he put his career on hold to serve in World War I and became a respected Army intelligence officer and leader of men in France.

At the conclusion of the war, he continued his education in Kansas and then Harvard. He joined the faculty at Kansas Vocational School in Topeka, Kansas, serving as coach and Commandant of Cadets.

Abbott was asked to return to Alabama in 1923 to be the eighth head football coach for Tuskegee University. He ended up coaching the team for 32 seasons. Under his leadership, the university held a record of 202 wins, 97 losses and 27 ties, including six undefeated seasons topped by six black college football national championships. The university honored his legacy by naming the stadium after him - the Cleveland Leigh Abbott Memorial Alumni Stadium.

Abbott also served as director of the Department of Physical Education. Under his leadership, Tuskegee University athletic programs became the model for the modern NCAA athletic system. With his wife Jessie, Abbott created the first organized women's college athletic programs.

"His efforts to help women brought to the world stage the first black woman to receive an Olympic gold medal, Alice Coachman," Chandler said. "Abbott built a preeminent athletic program for all students — but for young female students, it was the chance to compete with others."

Abbott became the first person of color to serve on the U.S. Olympic Committee in 1946.

There is a long list of excellence awards given during his life and his early death in 1955 has not stopped them:

- **National Football Hall of Fame - 1948**
- **South Dakota Sports Hall of Fame - 1968**
- **South Dakota State University Hall of Fame - 1968**
- **NACDA All-Time Hall of Fame - 1971**
- **Tuskegee University Hall of Fame - 1975**
- **Southern Intercollegiate Athletic Conference Hall of Fame - 1992**
- **Alabama Sports Hall of Fame - 1995**
- **USA Track and Field Hall of Fame - 1996**
- **Watertown Sports Hall of Fame - 2002**
- **American Football Coaches Association Trailblazer Award - 2005**
- **USA Track and Field and Cross-Country Coaches Association - 2010**
- **Black College Football Hall of Fame - Class of 2012**
- **South Dakota Hall of Fame - 2018**
- **South Dakota State University Distinguished Alumni - 2020**

Abbott Hall, a residence hall completed in 2010 on the campus of South Dakota State University, was also named in honor of him.

Abbott
center



Abbott, (Center) Watertown.

Three times all-state center and a monogram of athletics at State. He was a star on the defense were ever made over him. Abbott has four football credit. He has played his last season at State for practice next.

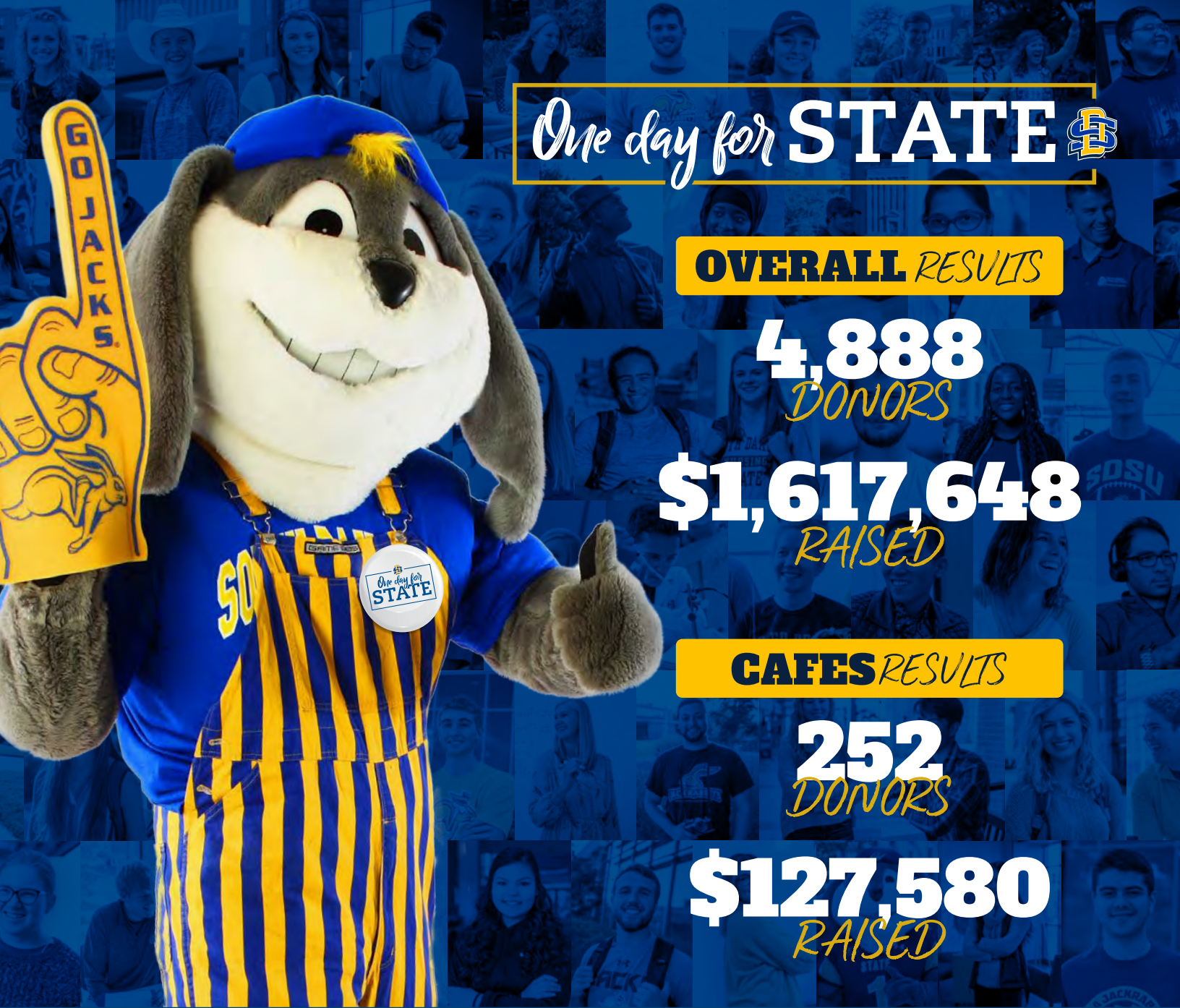
"Cleve" Abbott



Gilbert, 1914 Hamline, Minnesota, and made the team State Colligate basket shooter and above a 1915 State Colligate. One of the best guards in the State Colligate expect Capt.-elect Gilbert and his State Colligate again next year.

Photos courtesy of SDSU Archives and Special Collections.





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2020-2021 LEGENDS AND LEADERS

ABBOTT AND ALVERSON SELECTED AS DISTINGUISHED ALUMNI

BY SDSTATE ALUMNI ASSOCIATION

Cleveland “Cleve” Abbott, a 1916 dairy alum, and Ron Alverson, a 1974 agronomy alum, have been selected as members of the 2020-2021 class of Distinguished Alumni by the South Dakota State University Alumni Association.

CLEVELAND “CLEVE” ABBOTT ’16



Abbott, the first African-American athlete at South Dakota State, majored in dairy but made his mark at Tuskegee (Alabama) University, where he coached from 1923 to 1955 and produced 38 national titles in four sports.

Born in Yankton in 1894, the family later moved to Watertown and Abbott earned 16 varsity sports letters. At State, he earned 14 letters in football, basketball, baseball, track and tennis as well as being captain of the basketball team.

His success at Tuskegee included coaching two Olympic gold medal high jumpers—Alice Coachman in 1948, the first African-American woman to win a gold, and Mildred

McDaniel in 1956 with a world record mark of 5-9. Abbott also twice served on the U.S. Olympic Track and Field Committee

Abbott, the second inductee into the Jackrabbit Sports Hall of Fame, was a 1996 inductee to the USA Track and Field Hall of Fame and was honored with the Trailblazer Award from the American Football Coaches Association in 2005.

He initially joined Tuskegee as an assistant coach and an agricultural chemist, where he worked with famous scientist George Washington Carver.

RON ALVERSON ’74



Alverson earned a degree in agronomy in 1974 and returned to the family farm near Chester.

In the nearly five decades that followed, he has become a national leader in the field of corn and ethanol production as well as environmental stewardship. Among those backing his nomination were former U.S. Senate Majority Leader Tom Daschle; Brian Jennings, CEO of the American Coalition for Ethanol; and Lisa Richardson, executive director of South Dakota Corn.

Alverson, a lifelong resident of the Chester area, was one of the founders of the South Dakota Corn Growers Association and a past president.

He helped establish the state’s penny-per-bushel corn checkoff program, which supports agricultural research, promotion and education. A pioneer in the ethanol industry, he helped start Dakota Ethanol in Wentworth, the first farmer-owned ethanol plant in the state and served as its first president.

In 2009, he was named a South Dakota State University Eminent Farmer.

Other members of the 2020-2021 class of Distinguished Alumni include:

- Keith Corbett ’75/M.Ed. ’87, Brookings – chemistry
- Mary Kay Helling ’77/M.S. ’82, Brookings – human development and family relations
- David Schaefer ’81, Rapid City – general and commercial economics
- Gene Sieve ’90, Excelsior, Minnesota – mechanical engineering

The Alumni Association will honor this class of deserving individuals as part of the 2021 Hobo Day festivities.



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JACK RABBITS NOW & THEN



Matthias Kunerth

Currently Pursuing: Master's degree in Economics

Undergraduate Degree: Agricultural Business

Hometown: Fulda, Minnesota

Graduation Year: December 2021

Q. What do you enjoy most about your program?

A. The one thing that I have enjoyed most about the program is the exposure to many new ideas and ways of thinking. I feel that having a greater wealth of knowledge in different areas of business operations is highly valuable in aiding me to become an effective business manager in the future.

Q. What are your plans after graduation?

A. Following graduation, I intend to apply my skills working as a fully licensed commodity broker to help farmers minimize risk in their pricing decisions.

Q. How would you spend a million dollars?

A. If I had a million dollars, the first thing I would do is invest 40% of it in the stock market, specifically in exchange-traded funds and large tech companies. I would invest another 50% into a business start-up idea of mine that looks at decreasing labor demand when emptying grain bins. I would use the remaining 10% as a down payment on a house following graduation.

Q. What is your dream job?

A. My dream job would be to become the U.S. Secretary of Agriculture. I believe having the opportunity to serve the nation as an ambassador on behalf of agriculture would be challenging, but would also allow me to make an impact on the food supply chain in a way that can positively impact generations to come.

Q. If you could meet any famous person deceased or alive, who would it be and why?

A. If I could meet any famous person, I would choose to meet Thomas Alva Edison. He is arguably one of America's greatest inventors, registering 1,093 patents in his lifetime. I would like to ask him what drove him to constantly seek new ways to improve the lives of so many. I would have also enjoyed hearing what his visions were for the future of technology in the world.

Ashley Wiesen

Degree: Agricultural Leadership

Years at SDSU: 2011-2016

Hometown: Willow Lake, South Dakota

Current City: Canby, Minnesota



Q. What is your current job title and place of employment?

A. I am a Territory Origination Manager with ADM in Marshall, Minnesota, and started in this role in December 2019.

Q. Describe your typical day at work.

A. Each day is different for me, which is a reason I love what I do. In general, I spend most of my days sitting with farmers around their kitchen tables going through their financials and helping them to develop a grain marketing plan to add the most value to their operation that we can.

Q. What is the most rewarding part of your job?

A. It's a tie between seeing customers be profitable after following the plan we developed and watching them pass down their farm to the next generation – something about that just makes me so excited for them.

Q. What is your favorite memory from your time at SDSU?

A. So many great memories – meeting my husband, my time on Students' Association, Little "I" weekend, etc. My favorite of all was the fire alarm going off during my final presentation regarding safety and security on campus in one of my leadership classes. I'm pretty sure my professor thought it was part of our plan...needless to say, we got an A.

Q. What is the most important leadership lesson you have learned and how has it helped you today?

A. Make sure your voice is heard. As a young female in agriculture, a field predominately of men, it would be very easy for me to sit on the sidelines and not speak up and voice my opinion on how things should be done, what is right, etc. Never be too shy to speak up in a meeting!

Q. What do you like to do outside of work?

A. I like to spend my free time helping at our family's farm (we raise Registered Limousin and Lim-Flex Cattle with my in-laws) or spending it on the lake with my husband and son. I also run a graphic t-shirt business on the side.

DREAM BIGGER

I am a proud South Dakota State University alum. I am proud because of who has come before me, laying the groundwork for a culture of hard work, ambitious dreams and accomplishments; the preceding generations paved the way for opportunity. I am proud because the peers I went to school with years ago are admirable and respectable individuals that I am honored to call friends today. Finally, I am proud because there is a bright future, as our students, alumni, faculty and staff continue to imagine, innovate and invest in the years ahead.

The identity of our university evolves over time to reflect the priorities of individuals, families and organizations that want to dedicate their time and resources to our success. Our alumni encourage us to see ourselves in a way that stretches beyond what we think is capable with today's resources and challenge us to innovate and dream bigger.

Late last summer, I attended a meeting with a small group of donors and SDSU faculty. The meeting's intent was to discuss the future needs of a newly developed joint venture between SDSU and the University of Minnesota, and the vision and direction between the university and the donors were in alignment. I was excited to see the years of effort from SDSU faculty be so well received. As the meeting came to a close, one of the donors made a statement that has stuck with me – he asked myself and the faculty team to keep “dreaming bigger.”

In the months following that meeting, SDSU has dared to dream bigger. We have achieved goals that seemed unachievable just months before. On campus we attended in-person classes, held an in-person graduation ceremony, competed in a national football championship game, won a national livestock judging award and had the largest fundraising year in SDSU history – all in the midst of a global pandemic. When the chips are down and the odds are stacked against us, we rise up and dare to dream bigger.

South Dakota State University is home to the best innovators, thinkers, dreamers and doers. When we put our minds to it, we achieve great things. However, it is important to recognize that we do not always reach our goals, and that is okay because we are building something special every time we dare to dream bigger.

Mark Sandager, '11



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Southeast Research
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- 3 | Oak Lake Field Station, Astoria
- 4 | Northeast Research Farm, South Shore
- 5 | Dakota Lakes Research Farm, Pierre
- 6 | Cottonwood Field Station, Philip
- 7 | SDSU West River Research & Extension, Rapid City
- 8 | West River Research Farm, Sturgis



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Plan to join SDSU faculty and staff for field days and events at these locations in 2021. Watch extension.sdstate.edu for future event information.