It’s about the challenges of cemeteries. It’s about patients and their family members. It’s about death.

When assistant professor Mary Isaacson approached Pine Ridge Reservation elders about end-of-life care last summer, she wasn’t sure how they would react. In July, trained Lakota elders used the brochures they developed to discuss wills and advanced-care directives with their peers.

For her work with Native Americans, Isaacson was named the outstanding researcher for the College of Nursing at the South Dakota State University February Faculty Celebration of Excellence.

For Isaacson, the project was an opportunity to combine her expertise as a hospice nurse with her passion for Native American health care. "Geography is one of the major challenges," said Isaacson. Pine Ridge is the second-largest reservation in the country, stretching over 1.5 million acres.

From May to September 2014, Isaacson met with alongside health workers that came from the reservation to the surrounding need for specialized care planning or advanced directives.

In their care for Native Elders or Wakanki In Their Care for Ours Elders or Wakanini, Isaacson explained that the issue about the law is the one of education. "It’s about having the conversation plan ahead."

When choosing the artwork, group members also wanted the moose on the brochure to be symbolic. The moose are on the last part of the chapter, showing that the moose are sacred, Isaacson explained. In their care for Native Elders or Wakanki In Their Care for Ours Elders or Wakanini, Isaacson explained that the issue about the law is the one of education. "It’s about having the conversation plan ahead."

Elder m eals are served to distribute brochures in an outlying community need their services, Isaacson explained that the issue about the law is the one of education. "It’s about having the conversation plan ahead."

In their care for Native Elders or Wakanki In Their Care for Ours Elders or Wakanini, Isaacson explained that the issue about the law is the one of education. "It’s about having the conversation plan ahead."

Isaacson also wants to recruit and train another male elder.

When the project was complete, a group of five to six individuals in each group continue to need their services, Isaacson explained that the issue about the law is the one of education. "It’s about having the conversation plan ahead."

In their care for Native Elders or Wakanki In Their Care for Ours Elders or Wakanini, Isaacson explained that the issue about the law is the one of education. "It’s about having the conversation plan ahead."

"The doctor just told me I had cancer and was shocked," she recalled. Her daughter helped her get support and treatment. That was eight years ago.

Catches The Enemy, who worked with the Ogalala Sioux Tribal burial program in the 1990s, said she wants people to know the options they have and encourages them to plan ahead.

Isaacson explained that the issue about the law is the one of education. "It’s about having the conversation plan ahead."

"I hope what we can do can be carried on. It is much needed," she has learned, education is empowering.

For Isaacson, the project was an opportunity to combine her expertise as a hospice nurse with her passion for Native American health care. "Geography is one of the major challenges," said Isaacson. Pine Ridge is the second-largest reservation in the country, stretching over 1.5 million acres.

"The doctor just told me I had cancer and was shocked," she recalled. Her daughter helped her get support and treatment. That was eight years ago.

Catches The Enemy, who worked with the Ogalala Sioux Tribal burial program in the 1990s, said she wants people to know the options they have and encourages them to plan ahead.

Isaacson explained that the issue about the law is the one of education. "It’s about having the conversation plan ahead."

"I hope what we can do can be carried on. It is much needed," she has learned, education is empowering.

For Isaacson, the project was an opportunity to combine her expertise as a hospice nurse with her passion for Native American health care. "Geography is one of the major challenges," said Isaacson. Pine Ridge is the second-largest reservation in the country, stretching over 1.5 million acres.

"The doctor just told me I had cancer and was shocked," she recalled. Her daughter helped her get support and treatment. That was eight years ago.

Catches The Enemy, who worked with the Ogalala Sioux Tribal burial program in the 1990s, said she wants people to know the options they have and encourages them to plan ahead.

Isaacson explained that the issue about the law is the one of education. "It’s about having the conversation plan ahead."

"I hope what we can do can be carried on. It is much needed," she has learned, education is empowering.
Diversity

Teaching diverse learners requires responsiveness to students’ needs

Social justice, inclusion and equity—those are friends you make through the work that earned assistant professor Christine Nguyen of the Department of Teaching, Learning and Leadership recognition as the outstanding scholar for the College of Education and Human Sciences. “I look at educational leadership through the lens of equity and social justice,” explained Nguyen, who has been at SDSU since 2012. She earned her master’s in school administration and then her doctorate in educational leadership from the University of North Carolina-Greensboro.

“Diversity and inclusion are not just about ethnicity,” said the Koren native, citing gender, ability and disabilities, social and economic class and religion in addition to race. “It’s the interplay of all those markers and how to cater to students’ diverse needs in the classroom.”

Nguyen has authored or co-authored five book chapters and three journal articles in the last three years. She also mentors minority undergraduate students through a grant from Women and Gender, which supports research through the SDSU Foundation.

Leading program growth

Nguyen has helped increase enrollment in the English as a Second Language (ESL) program from four to 10 students. She teaches three of four required courses for the ESL endorsement.

Before coming to the United States to do graduate work, Nguyen taught English for eight years in Kenya. In one of the schools, she said, “I had 1,000 students to teach 45 students.” Despite this, she added, “Those ninth-graders were so eager to learn.”

Nguyen introduces education students to ESL through a linguistic diversity unit in an undergraduate human relations class. Once they learn that ESL endorsement improves their chances of getting a teaching job, they are interested, Nguyen explained.

Then a colleague takes them on a field trip to Huron, and Nguyen said, “That was the deal.” Of the 450 students in the Huron public schools, 30 percent are in the ESL program, according to ESL advisor Kurt Hisker. Half of those are Asian and the rest are Hispanic.

Teaching students to adapt to change

As she prepares future teachers, Nguyen said “one of the challenges is that our world is changing so dramatically.”

When freshmen encounter in the classroom when their graduate work will be very different compared to what it is now, she pointed out.

“You have to teach students to be responsive to the students they will later instruct in their classrooms, whatever they come from,” Nguyen said. “Reamong others, she asked, “Our students are not usually trained to think that way.”

When it comes to learning about their relationship to a diverse world, “informants, students think that learning about diverse students and developing inclusive communities is learning about those ‘people,’” Nguyen wrote in her doctoral philosophy statement.

She recalled her students were surprised that 80 percent of all ESL learners in American schools come from the United States. “Some didn’t believe it,” she added, emphasizing the need for students to distinguish knowledge from opinion and examine their own biases and assumptions about people who are different from themselves.

Based on their 8-12 experiences, students want a script they can follow, such as 10 strategies to teach diverse learners, Nguyen explained. “In college, we ask them to think differently.”

Two students from similar backgrounds can have very different responses to her classes. “Some students from rural communities at the front of the classroom want more,” she said, and “Others feel this will never touch me.”

She approaches this challenge by helping students “understand how important it is for me,” she said. “Learning is a shift in identity. We cannot shut the door and say it doesn’t affect us. We need to understand how we can work together to help each other.”

“Me, learning is about becoming,” she said. “I challenge my students not to just know and do, but to become.”
Research

iCook 4-H program teaches youngsters, caregivers to prepare healthy meals

Looking at concepts such as heroism and ambition through the lens of Renaissance literature gives students a different perspective, according to English professor Bruce Brandt. “If you see the world through the eyes of people living with different assumptions about life,” he said, “Modern students can find lots of things that can lead them to be better people.”

Brands specializes in the English Renaissance, teaching courses on Shakespeare and Renaissance drama, prose, and poetry. The Nebraska native came to SDSU in Fall 1979 after completing his doctorate at Harvard. “I’ve always felt like I was pursuing a life that focused on issues of value and what’s important to people in the sense of what we do in the humanities,” said Brandt, who was named the outstanding scholar for the College of Arts and Sciences in 2015 Faculty Celebration of Excellence.

Exploring ambition, heroism

Most of his scholarly work has been about the writings of Christopher Marlowe, a contemporary of Shakespeare, Brandt explained. He was editor of the Marlowe Society of America newsletter for 10 years and served terms as vice president and president of the Marlowe Society. Though the stories involve kings, queens and wars, the issues they face are relevant today.

For example, Marlowe was one of the earlier writers to address the question: “What would you sell your soul for?” Brandt explained. “All of the writers who tackled the question had to come up with something that would seem sensible to a person of their time.”

In the late 16th century, Marlowe’s “Doctor Faustus” wanted knowledge, but in the 21st century, he said, “we would just Google it.” That then opens discussions about “What is the big temptation for our age? What is that we really dream of and value?”

In the 1587 play, “Edward the Great,” Marlowe’s hero began life as a shepherd in an era when social class determined a person’s fate, but he climbed the noble title ladder based on his conquests. “He would like to live in a world with certain values and since he doesn’t live in the world, he is going to create it,” said Brandt.

“Tamburlaine’s cruelty and attractiveness” lead audiences to debate “whether he just doesn’t care or if stirred up by his own self-description,” Brandt explained. The work addresses issues about creating warriors and what it means to be a conquistador.

In addition, Brandt noted, “Shakespeare probably was the first English playwright to create a very clear-cut homosexual character.” However, he pointed out, “at the time, the word homosexual did not exist yet and the understanding of gender differed greatly from our own.”

Analyzing longstanding issues

Students also connect with the characters in Shakespearean literature, according to Brandt. In looking at “Hamlet,” he pointed out, “Who doesn’t have some issues concerning a father who has given them an impossible task and a mother whom they have disappointed?” These are real questions.

“Many young people get into the older literature, it helps them safely explore some of these questions,” Brandt said. “Putting it in the other place allows them to look at it more analytically.”

Planning to issue of education and social justice, Brandt said, “I never thought I would be teaching at a school that is such a positive environment.”

Cindy Berg, who accompanied her granddaughter, Branno Noltbruch, said, “I understood how well she could do in the kitchen.”

To measure physical activity, 25 percent of the intervention group wore accelerometers for a week prior to and four months into the program. When it comes to helping children become more active, graduate student Chase Merfeld said, “Parents are agents of change.”

However, Merfeld found that demonstrating children’s voluntary behavior and increasing moderate to vigorous physical activity will require a more intense intervention than iCook.

Based on the raw data, iCook got positive marks from the participants and parents reported increased self-confidence to do the cooking according to Kattelmann. The families now educates feedback each class. Researchers took physical measurements of the children and parents filled out quality-of-life questionnaires at nine, 12, and 24 months.

Educators also encouraged families to set attainable goals and then followed up at the next lesson, according to Kattelmann. MiKAela’s mom, Sheda Hall, said she found that planning meals ahead of time helps with budgeting and time management.

Creating lifetime habits

Researchers used an interactive website to keep participants connected after the lessons were completed, Kattelmann explained. Each family received a mini-video recorder and instructions on how to upload videos and photographs to the website to show how they met weekly or monthly challenges, such as eating a seasonal vegetable or doing a yoga pose.

Those who completed the challenges were entered in a drawing for a gift card. “One boy bought an iPad with the money he won,” Kattelmann added. However, she admitted, online participation was limited.

Helping children and caregivers gain confidence in their ability to make healthy food choices and to prepare meals will help prevent obesity, Kattelmann explained. “It’s about reinforcing parenting through cooking.”

Left:
Gathered around leader Tracey Lehrke is an iCook session in Sioux Falls.
Front row (from left): Aspen Snaza, Emma Ellis and Shawn Parker.
Back row (from left): Michelle Moen and Philip Hansen. They participated in the program at Sioux Falls.
Right:
The iCook curriculum encourages playing games to promote physical activity. Students participated in a relay race, played a pioneer hand game, played a toss game, learned a fun dance, played a tug of war, and played a video game.

“Tamburlaine the Great” and “Edward the Great” are two of Marlowe’s plays that are being performed as part of the 2015 Christmas Madrigal Feast at SDSU’s Sanford School of Music.

Joel Salzberry/Argus Leader

Cindy Berg, who accompanied her granddaughter, Branno Noltbruch said, “I understood how well she could do in the kitchen.”

To measure physical activity, 25 percent of the intervention group wore accelerometers for a week prior to and four months into the program. When it comes to helping children become more active, graduate student Chase Merfeld said, “Parents are agents of change.”

However, Merfeld found that demonstrating children’s voluntary behavior and increasing moderate to vigorous physical activity will require a more intense intervention than iCook.

Based on the raw data, iCook got positive marks from the participants and parents reported increased self-confidence to do the cooking according to Kattelmann. The families now educates feedback each class. Researchers took physical measurements of the children and parents filled out quality-of-life questionnaires at nine, 12, and 24 months.

Educators also encouraged families to set attainable goals and then followed up at the next lesson, according to Kattelmann. MiKAela’s mom, Sheda Hall, said she found that planning meals ahead of time helps with budgeting and time management.

Creating lifetime habits

Researchers used an interactive website to keep participants connected after the lessons were completed, Kattelmann explained. Each family received a mini-video recorder and instructions on how to upload videos and photographs to the website to show how they met weekly or monthly challenges, such as eating a seasonal vegetable or doing a yoga pose.

Those who completed the challenges were entered in a drawing for a gift card. “One boy bought an iPad with the money he won,” Kattelmann added. However, she admitted, online participation was limited.

Helping children and caregivers gain confidence in their ability to make healthy food choices and to prepare meals will help prevent obesity, Kattelmann explained. “It’s about reinforcing parenting through cooking.”

Dance seven steps to Sierra’s Nocturnal Guests, a swing dancing club, performs during the SDSU Department of Music’s iCook event in Sioux Falls.

The iCook curriculum encourages playing games to promote physical activity. Students participated in a relay race, played a pioneer hand game, played a toss game, learned a fun dance, played a tug of war, and played a video game.

“I’ve always felt like I was pursuing a life that focused on issues of value and what’s important to people in the sense of what we do in the humanities. Bruce Brandt, English professor

The music department takes guests back to the Renaissance through its biennial Christmas Madrigal Feast, complete with a four-course meal, Miserere songs and even court jesters. Attendees get a glimpse of the era that professor Bruce Brandt shares with students in his English Renaissance literature classes.
The smoky haze from forest fires that cause business closures, airports and schools in Southeast Asia during the dry season is more than an inconvenience—it’s a health hazard.

“This is not a natural disaster, but it happens every year,” said Malaysian native Melvin Lee. “It affects the whole continent.”

“You can’t even breathe,” added his sister Rachel. The siblings earned their civil engineering degrees from South Dakota State University in December 2015.

Indonesia’s forest has been a focal point to counter nearly 2.5 million acres of Kalimantan peat swamp forest fires in recent years, which has contributed to Indonesia becoming the third-largest emitter of carbon, according to professor Mark Cochrane, a senior scientist at the Geospatial Sciences Center of Excellence.

Since 2013, he has been using satellite imaging, field studies and computational modeling to help the Indonesian Forest Research and Development Agency assess the progress being made to reduce carbon emissions through a three-year, US$2.2 million NASA grant. For his work, Cochrane received an award for faculty engagement in global research at the university’s 2015 Celebration of Faculty Excellence.

Cochrane collaborates with carbon emissions expert Robert Yokelson, a chemistry professor from the University of Montana, and professor Bambang Hino Indaharto, a forensic fire expert at Bogor Agricultural University in Indonesia. This year, SDSU postdoctoral scientist Erianto Indra Putra, a forest and land fire specialist from Bogor Agricultural University, joined the team.

Creating a disastrous situation
The Mgah Nga Piraya, which began in 1996, sought to raise enough money to feed the Indonesian population. Former Indonesian President Soeharto authorized the construction of nearly 2,900 miles of channels to drain the peat swamp forests and then loggers came in to clear the land. Those jobs went to local communities, which already struggled with subsistence-level farming. Many workers earned jobs in the sawmills, but many struggled as they burned peat domes and logged areas to create agricultural land.

Before the forest was cleared, people made a living hunting and fishing, but now they struggle with subsistence-level farming. “You can’t even breathe,” added his sister Rachel. The siblings earned their civil engineering degrees from South Dakota State University in December 2015.

Indonesia’s forest has been a focal point to counter nearly 2.5 million acres of Kalimantan peat swamp forest fires in recent years, which has contributed to Indonesia becoming the third-largest emitter of carbon, according to professor Mark Cochrane, a senior scientist at the Geospatial Sciences Center of Excellence.

Since 2013, he has been using satellite imaging, field studies and computational modeling to help the Indonesian Forest Research and Development Agency assess the progress being made to reduce carbon emissions through a three-year, US$2.2 million NASA grant. For his work, Cochrane received an award for faculty engagement in global research at the university’s 2015 Celebration of Faculty Excellence.

Cochrane collaborates with carbon emissions expert Robert Yokelson, a chemistry professor from the University of Montana, and professor Bambang Hino Indaharto, a forensic fire expert at Bogor Agricultural University in Indonesia. This year, SDSU postdoctoral scientist Erianto Indra Putra, a forest and land fire specialist from Bogor Agricultural University, joined the team.

Creating a disastrous situation
The Mgah Nga Piraya, which began in 1996, sought to raise enough money to feed the Indonesian population. Former Indonesian President Soeharto authorized the construction of nearly 2,900 miles of channels to drain the peat swamp forests and then loggers came in to clear the land. Those jobs went to local communities, which already struggled with subsistence-level farming. Many workers earned jobs in the sawmills, but many struggled as they burned peat domes and logged areas to create agricultural land.

Before the forest was cleared, people made a living hunting and fishing, but now they struggle with subsistence-level farming. “You can’t even breathe,” added his sister Rachel. The siblings earned their civil engineering degrees from South Dakota State University in December 2015.

Indonesia’s forest has been a focal point to counter nearly 2.5 million acres of Kalimantan peat swamp forest fires in recent years, which has contributed to Indonesia becoming the third-largest emitter of carbon, according to professor Mark Cochrane, a senior scientist at the Geospatial Sciences Center of Excellence.

Since 2013, he has been using satellite imaging, field studies and computational modeling to help the Indonesian Forest Research and Development Agency assess the progress being made to reduce carbon emissions through a three-year, US$2.2 million NASA grant. For his work, Cochrane received an award for faculty engagement in global research at the university’s 2015 Celebration of Faculty Excellence.

Cochrane collaborates with carbon emissions expert Robert Yokelson, a chemistry professor from the University of Montana, and professor Bambang Hino Indaharto, a forensic fire expert at Bogor Agricultural University in Indonesia. This year, SDSU postdoctoral scientist Erianto Indra Putra, a forest and land fire specialist from Bogor Agricultural University, joined the team.

Creating a disastrous situation
The Mgah Nga Piraya, which began in 1996, sought to raise enough money to feed the Indonesian population. Former Indonesian President Soeharto authorized the construction of nearly 2,900 miles of channels to drain the peat swamp forests and then loggers came in to clear the land. Those jobs went to local communities, which already struggled with subsistence-level farming. Many workers earned jobs in the sawmills, but many struggled as they burned peat domes and logged areas to create agricultural land.

Before the forest was cleared, people made a living hunting and fishing, but now they struggle with subsistence-level farming. “You can’t even breathe,” added his sister Rachel. The siblings earned their civil engineering degrees from South Dakota State University in December 2015.

Indonesia’s forest has been a focal point to counter nearly 2.5 million acres of Kalimantan peat swamp forest fires in recent years, which has contributed to Indonesia becoming the third-largest emitter of carbon, according to professor Mark Cochrane, a senior scientist at the Geospatial Sciences Center of Excellence.

Since 2013, he has been using satellite imaging, field studies and computational modeling to help the Indonesian Forest Research and Development Agency assess the progress being made to reduce carbon emissions through a three-year, US$2.2 million NASA grant. For his work, Cochrane received an award for faculty engagement in global research at the university’s 2015 Celebration of Faculty Excellence.

Cochrane collaborates with carbon emissions expert Robert Yokelson, a chemistry professor from the University of Montana, and professor Bambang Hino Indaharto, a forensic fire expert at Bogor Agricultural University in Indonesia. This year, SDSU postdoctoral scientist Erianto Indra Putra, a forest and land fire specialist from Bogor Agricultural University, joined the team.

Creating a disastrous situation
The Mgah Nga Piraya, which began in 1996, sought to raise enough money to feed the Indonesian population. Former Indonesian President Soeharto authorized the construction of nearly 2,900 miles of channels to drain the peat swamp forests and then loggers came in to clear the land. Those jobs went to local communities, which already struggled with subsistence-level farming. Many workers earned jobs in the sawmills, but many struggled as they burned peat domes and logged areas to create agricultural land.

Before the forest was cleared, people made a living hunting and fishing, but now they struggle with subsistence-level farming. “You can’t even breathe,” added his sister Rachel. The siblings earned their civil engineering degrees from South Dakota State University in December 2015.

Indonesia’s forest has been a focal point to counter nearly 2.5 million acres of Kalimantan peat swamp forest fires in recent years, which has contributed to Indonesia becoming the third-largest emitter of carbon, according to professor Mark Cochrane, a senior scientist at the Geospatial Sciences Center of Excellence.

Since 2013, he has been using satellite imaging, field studies and computational modeling to help the Indonesian Forest Research and Development Agency assess the progress being made to reduce carbon emissions through a three-year, US$2.2 million NASA grant. For his work, Cochrane received an award for faculty engagement in global research at the university’s 2015 Celebration of Faculty Excellence.

Cochrane collaborates with carbon emissions expert Robert Yokelson, a chemistry professor from the University of Montana, and professor Bambang Hino Indaharto, a forensic fire expert at Bogor Agricultural University in Indonesia. This year, SDSU postdoctoral scientist Erianto Indra Putra, a forest and land fire specialist from Bogor Agricultural University, joined the team.

Creating a disastrous situation
The Mgah Nga Piraya, which began in 1996, sought to raise enough money to feed the Indonesian population. Former Indonesian President Soeharto authorized the construction of nearly 2,900 miles of channels to drain the peat swamp forests and then loggers came in to clear the land. Those jobs went to local communities, which already struggled with subsistence-level farming. Many workers earned jobs in the sawmills, but many struggled as they burned peat domes and logged areas to create agricultural land.

Before the forest was cleared, people made a living hunting and fishing, but now they struggle with subsistence-level farming. “You can’t even breathe,” added his sister Rachel. The siblings earned their civil engineering degrees from South Dakota State University in December 2015.

Indonesia’s forest has been a focal point to counter nearly 2.5 million acres of Kalimantan peat swamp forest fires in recent years, which has contributed to Indonesia becoming the third-largest emitter of carbon, according to professor Mark Cochrane, a senior scientist at the Geospatial Sciences Center of Excellence.

Since 2013, he has been using satellite imaging, field studies and computational modeling to help the Indonesian Forest Research and Development Agency assess the progress being made to reduce carbon emissions through a three-year, US$2.2 million NASA grant. For his work, Cochrane received an award for faculty engagement in global research at the university’s 2015 Celebration of Faculty Excellence.

Cochrane collaborates with carbon emissions expert Robert Yokelson, a chemistry professor from the University of Montana, and professor Bambang Hino Indaharto, a forensic fire expert at Bogor Agricultural University in Indonesia. This year, SDSU postdoctoral scientist Erianto Indra Putra, a forest and land fire specialist from Bogor Agricultural University, joined the team.

Creating a disastrous situation
The Mgah Nga Piraya, which began in 1996, sought to raise enough money to feed the Indonesian population. Former Indonesian President Soeharto authorized the construction of nearly 2,900 miles of channels to drain the peat swamp forests and then loggers came in to clear the land. Those jobs went to local communities, which already struggled with subsistence-level farming. Many workers earned jobs in the sawmills, but many struggled as they burned peat domes and logged areas to create agricultural land.

Before the forest was cleared, people made a living hunting and fishing, but now they struggle with subsistence-level farming. “You can’t even breathe,” added his sister Rachel. The siblings earned their civil engineering degrees from South Dakota State University in December 2015.

Indonesia’s forest has been a focal point to counter nearly 2.5 million acres of Kalimantan peat swamp forest fires in recent years, which has contributed to Indonesia becoming the third-largest emitter of carbon, according to professor Mark Cochrane, a senior scientist at the Geospatial Sciences Center of Excellence.

Since 2013, he has been using satellite imaging, field studies and computational modeling to help the Indonesian Forest Research and Development Agency assess the progress being made to reduce carbon emissions through a three-year, US$2.2 million NASA grant. For his work, Cochrane received an award for faculty engagement in global research at the university’s 2015 Celebration of Faculty Excellence.

Cochrane collaborates with carbon emissions expert Robert Yokelson, a chemistry professor from the University of Montana, and professor Bambang Hino Indaharto, a forensic fire expert at Bogor Agricultural University in Indonesia. This year, SDSU postdoctoral scientist Erianto Indra Putra, a forest and land fire specialist from Bogor Agricultural University, joined the team.

Creating a disastrous situation
The Mgah Nga Piraya, which began in 1996, sought to raise enough money to feed the Indonesian population. Former Indonesian President Soeharto authorized the construction of nearly 2,900 miles of channels to drain the peat swamp forests and then loggers came in to clear the land. Those jobs went to local communities, which already struggled with subsistence-level farming. Many workers earned jobs in the sawmills, but many struggled as they burned peat domes and logged areas to create agricultural land.

Before the forest was cleared, people made a living hunting and fishing, but now they struggle with subsistence-level farming. “You can’t even breathe,” added his sister Rachel. The siblings earned their civil engineering degrees from South Dakota State University in December 2015.
Diagnosing infected herds

R esearchers have resulted in eight licenses in the last 15 years, produced nine invention disclosures that have resulted in additional license agreements. These tests are important, not only to identify animals infected with PEDV, but also to develop herd management and treatment strategies.

Detecting antibodies

ADRS researchers have developed a variety of tests to evaluate an animal’s immune response by identifying PEDV antibodies. For example, in 2014, the researchers had developed monoclonal antibody reagents to detect antibodies in tissues infected with PEDV and viable cells in cell culture. That technology was licensed to develop PEDV diagnostic tests, a Brooks Animal health company, which develops tests to use in research and diagnostic laboratories.

A variety of serological tests that detect PEDV antibodies resulted in additional license agreements. These tests are important, not only to identify animals previously exposed to PEDV but also to evaluate their immunity to the virus.

Supporting research, vaccine development

ADRS researchers have a good understanding of the entire industry and the implications of very proactive research and diagnostic work to deal with field-based problems,” said Scott Davies, director of research at PigProteins Veterinary Services. The company has won three veterinary clinical-on-site licenses in Minnesota and two in Iowa—the most licenses in three years by a small company. “We set the record in 2014, but I don’t think we didn’t have as active a year in 2015,” said Davies. “We need to be proactive and do our best to please our customers.”

Water, waste water filtration

After the Pork Industry Center for Environmental Research (PICER) experiment in 2013, Animal Disease Research and Diagnostic Lab researchers moved quickly to give veterinarians tools to identify waterborne PEDV. “We didn’t have much for diagnostic tools,” said Eric Nelson, an ADRS researcher and veterinary and biomedical sciences professor. “Though PEDV had been in England since the 1970s, this was the first time we dealt with it.”

The tests of toxins, antibodies and receptors developed to identify infected animals and evaluate candidate vaccines have produced nine invention disclosures that have resulted in eight licenses in the last three years, according to Wil Yoder, assistant vice president for technology transfer and commercialization.

For his work at ADRS, Nelson received the Pat and Ken Govoni Intellectual Property Commercialization Award at the 2013 Facility Celebration of Excellence. Since 2007, Nelson has been an inventor or co-inventor on 27 intellectual property disclosures. “It’s a weird effect,” Nelson said, pointing to the work of researchers associates Steve Lawson, Dan Gillmore and Jason Sperger as well as junior microbiology and graduate students.

An estimated 2 million doses of the vaccine were produced that year, according to Hanneke van der Werf, a marketing manager at Smithfield. “We need a vaccine to stop the virus from spreading,” she said. “We couldn’t do this work without their support.”

Together, the team set out to develop a PEDV vaccine that could be used on a large scale, that would be affordable and that would have a long shelf life. The researchers had previously worked with the vaccine through a grant from the European Union and the European Centre for Disease Prevention and Control. They also worked with the Sherwood and Elizabeth Berg Young Foundation for Biomedical Research and the Sustainable Farming Foundation.

Wintersparkles project

Smithfield provided some equipment, and the company was able to do the pilot testing without difficulty. The project’s success gave the team an opportunity to pilot test the vaccine in other countries. “We’ll be able to use the pilot filters for a previous project,” Langner said.

One argument for using the filters was that they were able to remove more suspended solids but require more frequent backwashing, which makes them more efficient with less labor. “The pilot plant tests show what we can do,” Schmit said.

Based on the levels of suspended solids in the incoming wastewater, Schmit said, “These filters are an integral part of the wastewater treatment process and are necessary to meet surface water discharge permit requirements.”

The researchers found that the nature of the suspended solids, rather than the amount of water flowing through the filters, dictated the length of time the filter could be used before backwashing. “The filter runs for about 30 minutes, then the solids are removed and the filter is cycled back into service,” Schmit said.

Feedback from the 22 participating communities showed that the project was a success. “We want to support breast-feeding moms and we can and the culture to make breast-feeding foster, love, not the exceptions,” said Thoms. The initiative will also fulfill goals set by the Governor’s Task Force on Infant Mortality. “Brookings is just the perfect community because it already has the Brookings Supports Breastfeeding team in place,” she pointed out. Planning for expansion has just gotten underway.

Experience, networking fund...
Research

Dairy scientist harnesses power of techniques to improve the texture of high-protein yogurt

Improving texture of high-protein yogurt

Optimizing spray drying

For a project in high solids drying, master’s student Usha Patel concentrates milk using a lab-scale rotary evaporator.

Optimizing spray drying

A new commercial-scale dryer at the Dairy Plant will then dry the Dahiya concentrates using a lab-scale rotary evaporator.

Optimizing spray drying

Pharmaceuticals’ study helps prevent antibiotic-induced kidney failure

Looking at numbers

People associate vancomycin with nephrotoxicity,” said Sanford collaborator pharmacist Randa Hammerschmidt. She recalled that the question about whether the combination of vancomycin and piperacillin-tazobactam increased risk that came up during a weekly residency program meeting. Others involved in the study were Sanford pharmacist Beth Locker and Jamie Shields.

The antibiotics can be used for several types of infections, including skin and soft tissue infections, as well as pneumonia. Hammerschmidt explained, “Based on our population, we see this combination quite frequently.”

The researchers identified 715 Sanford USD Medical Center adult patients who received vancomycin and piperacillin-tazobactam or both during two- to three-month periods, one in 2009 and another in 2010. From 2009 to 2010, the procedure for administering piperacillin-tazobactam decreased from a 30-minute to a 4-hour infusion time.

More than 20 percent of the 109 patients who received both antibiotics in the shorter infusion time developed acute kidney failure, according to Hadding. Among the 109 who received the drug combination infusion over the longer period, the incidence of kidney failure was 8.8 percent.

This is significantly higher than the overall 10.9 percent rate of acute kidney failure for all the patients in the study, he noted. When only piperacillin-tazobactam was administered, the kidney failure rate decreased to 3.5 percent for the shorter infusion time and 8.4 percent for patients who received the antibiotic over the 4-hour period.

“Piperacillin-tazobactam results in more renal toxic failure than vancomycin,” Hadding pointed out. When vancomycin alone, the kidney failure rate dropped to 0.8 percent.

Although using research on patients receiving the antibiotics vancomycin and piperacillin-tazobactam at a Sanford hospital, Hadding believes this is the first time this combination has been studied.

“Even if these findings can help rule out antibiotic use, it is important that these patients be monitored,” he said.

The researchers were surprised to find that some patients who didn’t receive antibiotics were categorized as receiving both antibiotics and were included in the study.

Bucking said that had been an oversight that was not caught.

“The differences were very subtle,” she said, “and the inclusion of antibiotic-free patients overestimated the effect of antibiotics.”

Continued back cover

Pharmaceuticals study helps prevent antibiotic-induced kidney failure

“People associate vancomycin with nephrotoxicity,” said Sanford collaborator pharmacist Randa Hammerschmidt. She recalled that the question about whether the combination of vancomycin and piperacillin-tazobactam increased risk that came up during a weekly residency program meeting. Others involved in the study were Sanford pharmacist Beth Locker and Jamie Shields.

The antibiotics can be used for several types of infections, including skin and soft tissue infections, as well as pneumonia. Hammerschmidt explained, “Based on our population, we see this combination quite frequently.”

The researchers identified 715 Sanford USD Medical Center adult patients who received vancomycin and piperacillin-tazobactam or both during two- to three-month periods, one in 2009 and another in 2010. From 2009 to 2010, the procedure for administering piperacillin-tazobactam decreased from a 30-minute to a 4-hour infusion time.

More than 20 percent of the 109 patients who received both antibiotics in the shorter infusion time developed acute kidney failure, according to Hadding. Among the 109 who received the drug combination infusion over the longer period, the incidence of kidney failure was 8.8 percent.

This is significantly higher than the overall 10.9 percent rate of acute kidney failure for all the patients in the study, he noted. When only piperacillin-tazobactam was administered, the kidney failure rate decreased to 3.5 percent for the shorter infusion time and 8.4 percent for patients who received the antibiotic over the 4-hour period.

“Piperacillin-tazobactam results in more renal toxic failure than vancomycin,” Hadding pointed out. When vancomycin alone, the kidney failure rate dropped to 0.8 percent.

Although using research on patients receiving the antibiotics vancomycin and piperacillin-tazobactam at a Sanford hospital, Hadding believes this is the first time this combination has been studied.

“Even if these findings can help rule out antibiotic use, it is important that these patients be monitored,” he said.

The researchers were surprised to find that some patients who didn’t receive antibiotics were categorized as receiving both antibiotics and were included in the study.

Bucking said that had been an oversight that was not caught.

“The differences were very subtle,” she said, “and the inclusion of antibiotic-free patients overestimated the effect of antibiotics.”

Continued back cover

Plants

exchange carbohydrates for nitrogen, phosphorus from mycorrhizal fungi

A n ancient, mutually beneficial relationship between plants and fungi has evolved over time, allowing plants to grow better and avoid the risk of food spoilage and disease.

Researchers have found that high-performance isolates of mycorrhizal fungi can be used to detect and control these problems. For her work, Bucking was recognized as the outstanding researcher for the College of Agriculture and Biological Sciences at the 2015 Faculty Celebration of Excellence.

Establishing balanced relationships

“Fungi need the host plant to reproduce, Bucking explained. “Spears in the soil germinate and the hair-like fungal structures called hyphae then penetrate into the plant roots and form an intimate interface, referred to as arbuscules, within the host root. The hyphae then generate an extensive network of fibers that the root takes up soil nutrients far beyond the plant’s root system.”

Supply and demand determine the amount of nutrients and carbon that exchange in this mutualistic relationship, according to Bucking. To explore these complex antagonistic and collaborative relationships with the hosted organ in plant and fungi, she pointed out. “The fungi, if used efficiently, can provide the plant with an improved growth, producing plants that are more robust and have a better stress resistance.”

“Plants in the soil are not living in a sterile condition,” Bucking said. “We do not in terms of yield a combination of plant traits and the microbial community associated with the plants, along with their ability to take up nutrients of these microorganisms.”

Though Bucking acknowledged the need to increase food production using inorganic fertilizers, she noted “excessive fertilizer application can cause a list of environmental problems.”

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impacting the environment.

Increasing the efficiency with which crops are fertilized and with their microbial communities and take up nutrients will reduce costs and increase production without negatively impact...
Practicing pharmacists noticed that patients given two common intravenous antibiotics tended to develop kidney failure—what they and subsequent researchers found has led to changes in the way these drugs are administered and closer monitoring of renal function. (Photo courtesy of Sanford Health)

Tyler Turek, pharmacy clinical manager at Sanford USD Medical Center, said, “Overall, this study highlighted our awareness of the need to consider alternative therapies whenever clinically appropriate.”

Hellwig and his colleagues presented their results at the February 2012 Society of Critical Care Medicine annual meeting. Their work was one of two studies subsequently highlighted in the June 2012 Pharmacy Practice News.

“It opened the doors for lots of others to look at it further,” he said. Researchers from the University of Florida-Jacksonville, Duke University and Campbell University in North Carolina and the University of Maryland published similar studies in a 2014 issue of Pharmacotherapy.

“This work continues to highlight the role that our pharmacists have as experts who can identify opportunities for improvement in medication-related care,” Turek said.

Hellwig agreed. “Within a hospital setting, we are able to identify these types of problems, then do the research to clarify what the results actually are and how to use those results in daily monitoring of patients in the hospital.”