COWPOKE NEWS

Department of Animal & Food Sciences
Oklahoma State University
Spring 2020

Alumni and Friends:

Things have been a little different around campus lately due to COVID-19, but our faculty, staff, and students have quickly adapted. Thank you for your continued support of our department.

I'd like to thank my interns for the spring 2020 semester; Sadie Raasch, Adriana Toste, Kendall Harshman, and Braeden Coon. They worked on creating content for this edition of Cowpoke News, as well as our social media platforms.

Many events were unfortunately cancelled this spring and summer, but our faculty and staff are working on creating new live webinars and online contests. Although we will miss seeing students, youth, and the community around our campus, we are happy to continue to provide learning opportunities through this new forum. Please find more information about these events on our website calendar.

Stay up-to-date on the latest news by following us on social media. We hope you enjoy reading about the OSU Department of Animal and Food Sciences in this edition of Cowpoke News!

Rebekah Alford
Editor

Upcoming 2020 Online Events

April 30 - May 21 *(Thursdays)*	2020 OCES Beef Cattle Nutrition In-Service - Growing and Finishing Cattle
May 14 - June 18 *(Thursdays)*	Rancher's Thursday Lunchtime Series
June 9	Oklahoma 4H & FFA Virtual Horse Judging Contest
June 10	Virtual Livestock Judging Camp
June 23, June 30, July 7	Oklahoma Agricultural Instructor & Extension Educator Youth Livestock Evaluation Coaches “In-Service” Webinar Series
July 22 - 24	Virtual Hippology (during Round Up)

Learn more or find more events online at afs.okstate.edu/calendar.

COWPOKE NEWS

Welcome to the Spring 2020 Edition of Cowpoke News! We hope you enjoy reading about the Oklahoma State University Department of Animal and Food Sciences.

Cowpoke News is published three times a year. We strive to keep students, alumni, and friends of the department informed about our activities and successes. Cowpoke News is distributed through both e-mail and mail and is available 24/7 at afs.okstate.edu/cowpoke-news. To subscribe, e-mail us at cowpokenews@okstate.edu or mail in your request. Please give us your full name and either your e-mail or mailing address.

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In this Edition

PHOTOS | PAUL BECK, ANDREA WARNER, ADRIANA TOSTE, KENDALL HARSHMAN, SARAH DROWN & BRAEDEN COON

ON THE COVER

Ranjith Ramanathan, associate professor in the OSU Department of Animal and Food Sciences, is on the cover of this edition. He currently teaches both undergraduate and graduate level food science courses, and is affectionately called 'Dr. Ram' by his students.

Ramanathan's long-term research goal is to better understand the role of postmortem meat biochemistry to increase both the body of knowledge and economic benefits associated with improvements in muscle food appearance, particularly beef color. His research focuses on both fundamental and applied aspects of beef quality to better understand beef color issues. Read more on page 8.

INFORMATION & SPONSORS

DIETS & DAIRY

Researchers investigate how diet could improve the health of close-up dairy cows

As low milk prices continue to be a huge challenge for dairy farmers across the nation, producers are searching for every outlet available to increase their production yields and profit margins. This is why Andrew Foote began researching the effects diet can have on milk yield and health issues postpartum dairy cows sometimes experience.

Foote has a long history of studying ruminant nutrition, particularly in cattle. Originally from Plainview, Texas, Foote's initial interest in agriculture was sparked at a young age when he began to raise livestock in FFA. Foote first became involved in ruminant nutrition research as an undergraduate student at Tarleton State University. After graduate school, he began working as a research scientist for the United States Department of Agriculture.

Now as an assistant professor at Oklahoma State University, Foote realized the impact poor profit margins can have for dairy farmers. This led him to conduct research on whether incorporating added vitamin D to a dairy cow's negative dietary cation-anion differences (DCAD) diet would result in increased milk production and decreased health incidences as cows transition into lactation.

Foote and Dakota Zapalac, animal science graduate student, conducted the research trial at the OSU Ferguson Family Dairy Center. The state-of-the-art facility was instrumental in conducting precise and valid research. The animal handling equipment at the dairy allowed for the ease needed for feeding treatments and the collection of samples. The Insentec feeders allowed for the measurement of postpartum feed intakes, the DeLaval milking parlor equipment provided an accurate system for monitoring milk yields, and the Gallagher walk across scale was crucial for collecting detailed measurements of body weight.

As part of the trial, 15 dairy cows were selected for research; nine Holsteins and six Jerseys. All cows were expected to calve within two months, also known as close-up dairy cows. The cattle were divided into groups, hand-fed different rations

containing alternative forms of Vitamin D, and offered free-choice hay. A properly formulated diet for close-up dairy cows allows for an increase in calcium mobilization and results in an easier transition into lactation.

These diets were formulated to supply a negative dietary cation-anion balance. Negative DCAD diets are designed to be lower in potassium and sodium while being higher in chloride and sulfur. Research has shown that these changes in diet result in an increased ability to absorb calcium from feed and mobilize calcium from the bones, which often helps prevent milk fever, Foote said.

Milk fever is a serious calcium deficiency common in newly freshened cows that start producing milk quickly after giving birth. Cows that get milk fever require immediate treatment to stay alive and to prevent other complications.

"The rapid onset of large amounts of milk production pulls a lot of calcium out of the blood of the cows," Foote said. "If this happens too fast, the cows will not have enough calcium

in their blood for their muscles to contract."

This is why feeding a negative DCAD diet for the last 21 to 28 days of gestation, along with vitamin D, is essential for establishing adequate calcium metabolism and sufficient active transport of calcium. Vitamin D has a critical role in calcium homeostasis and absorption, similar to why vitamin D is added to milk for human consumption, Foote said.

A negative DCAD diet combined with a high intake of Vitamin D has the potential to increase milk production and decrease postpartum diseases caused by a lack of calcium mobilization. This includes milk fever and other conditions such as displaced abomasum, metritis, and ketosis.

The overall goal of this trial was to observe the effects of negative DCAD diets with different forms of vitamin D on postpartum feed intake, milk yield, milk components, and calcium utilization. As there has been little research on the effect of the various forms of vitamin D on dairy cows, Foote and his team used conventional vitamin D and hydroxyvitamin D, which is the form converted by the liver. Foote decided that conducting this trial would be beneficial for analyzing ways to strengthen health traits post-calving while also hopefully increasing milk yield.

"By properly managing cows prior to calving, including feeding increased levels of vitamin D, they could significantly increase milk production in the critical early lactation period," Foote said.

During a six-month period, the cattle were monitored using blood, urine, and milk samples. The blood samples were taken to monitor the calcium levels of the animals before and after calving. The urine samples were used to measure the cow's pH level and calcium excretion prior to beginning her lactation. Along with daily milk records, milk samples were collected twice a week for two weeks after calving to determine the concentration of milk fat, protein, and somatic cell count.

Feed intake following calving was also measured and recorded daily using the Insentec feeding system at the dairy. This system also measures the frequency and size of each individual feeding event.

It was found that animals receiving additional vitamin D in negative DCAD diets had higher calcium levels prepartum and postpartum, as well as had a significant increase in milk production. The hydroxyvitamin D group produced even more milk than the other vitamin D group.

This indicated that not only were cows better prepared to start lactation with higher calcium levels, but their milk yields were also higher. In addition, feed intake for the control groups were higher than those of the treatment groups. As a result, cattle supplemented with vitamin D in negative DCAD diets produced more milk with less feed.

While more research is needed to see if the results are repeatable, this trial ignited the start to what could be an immense discovery for dairy farmers throughout the industry.

"We would also like to see mechanistically how vitamin D, and specifically hydroxyvitamin D, increases milk production while decreasing feed intake," Foote said. "These results could provide a huge benefit to dairy producers. By properly managing cows prior to calving, including feeding increased levels of vitamin D, they could significantly increase milk production in the critical early lactation period."

A Passion for Research

Making new discoveries is an exciting prospect for those who love research. This is true for Ranjith Ramanathan, a meat quality associate professor and Noltensmeyer Endowed Chair in the Oklahoma State University Department of Animal and Food Sciences.

"Research always fascinated me." said Ramanathan. "It is always fun to understand the unknown in a systematic approach. If the outcome of the research can help producers or industries, then it is a very rewarding experience."

After earning his bachelor's degree, Ramanathan received an opportunity to work on a project determining the effects of gamma rays on meat quality. He soon became fascinated with meat science research.

"I thought it's an interesting area," Ramanathan said. "After two years of research, I decided to pursue an M.S. degree in meat science. I was fortunate to get admission at the University of Connecticut. My major professor, Dr. Richard Mancini, offered a Ph.D. position and still in this same area."

Now as an OSU faculty member, Ramanathan's research focuses on understanding the biochemical basis of meat discoloration. His lab utilizes both applied and fundamental approaches to improve meat quality and understand meat discoloration. His current research projects include improving the value and appearance of dark-cutting beef and improving the color stability of aged beef.

"My research program primarily focuses on limiting food wastage due to meat discoloration," Ramanathan said. "Nearly 15% of beef is discounted in price due to discoloration, leading to a price reduction of whole muscle cuts or grinding of the meat for rapid sale."

In addition to his own research, Ramanathan serves as research coordinator for both the department and the Undergraduate Research Scholars (UGRS) Program. For departmental research, his primary responsibilities include enhancing collaboration, sharing research success with administrators and alumni, and building a nationally recognized animal and food science research program.

"We have excellent faculty, and it is always exciting to work with them and to learn about their research," Ramanathan said. "As a land grant university, we aim to serve farmers and food and animal industries of Oklahoma and around the world."

Faculty in the department conduct various animal and food science research projects involving animal health and wellness, food safety, genetics, meat science, non-ruminant nutrition, physiology, ruminant nutrition, and sustainability. This allows undergraduate students in the UGRS program to develop their research skills on a wide range of projects alongside faculty and graduate students.

"Research programs are essential to developing hands-on experience through cutting-edge research skills and to provide additional opportunities in their career," Ramanathan said. "The research experience helps to reinforce concepts learned in the classrooms. Additionally, students can attend conferences and develop communication skills. Several students have presented their research at national conferences."

The students also get access to OSU farms and facilities, like the Robert M. Kerr Food and Agricultural Products Center where they can learn from professionals and work on projects ranging from solving industry problems to creating food products. FAPC works on projects for several companies, including Tyson, Cargill, JBS, and Seaboard.

"It is really fascinating to see students transition from someone with no research experience into becoming a pro. Several students [from the

program] have gone on to graduate school, professional school, and won prestigious awards."

Training and mentoring students is extremely important to faculty within the department of animal and food sciences. Ramanathan himself has mentored many students in his research lab throughout the years. He is currently mentoring four graduate and six undergraduate students. The students in his lab work in different areas related to meat quality and food wastage, Ramanathan said.

"Developing next-generation scholars in food and meat science is critical to meet future scientific challenges and national workforce needs," Ramanathan said. "Graduate student advising has been one of the most rewarding and gratifying experiences in my career. Advising helps many students not only prepare for successful career paths, but also to grow and develop as responsible citizens."

Taylor Price started off working in Ramanathan's lab as an undergraduate student. Now pursuing her master's in food science, she was happy for the opportunity to continue researching under Ramanathan's guidance.

"It has been such an awesome experience working in Dr. Ram's research lab," said Price. "As a student, I have been challenged to learn new techniques that have pushed me outside of my comfort zone, as well as how to collaborate with other lab mates in accomplishing the different projects we tackle throughout the week. It has been amazing to learn the techniques behind the results you read about in papers and to be able to perform them."

Price is now experienced enough to help train and guide others conducting research. It is a very close lab group and they rely on each other whenever a big project needs to be completed, Price said.

"Dr. Ram's guidance has greatly impacted my academic success," Price said. "Besides learning new research techniques, he has given

me so many opportunities to improve myself as a student and as a person. He has allowed me to mentor undergraduates and high school students, allowing me to tweak my teaching style to fit the way different people learn."

Working with Ramanathan has not only improved her research skills, but has impacted her overall attitude towards research, Price said.

"Not only have I learned new techniques for several different assays from lipid oxidation, to microbiology, to tenderness, but I have also learned more about what it takes to be a good researcher," Price said. "Dr. Ram often speaks of a need for passion for the research we are doing, as well as an open mind. We hope for certain results in some instances, but we are trying to answer a question, even if our answer is that what we tried did not work."

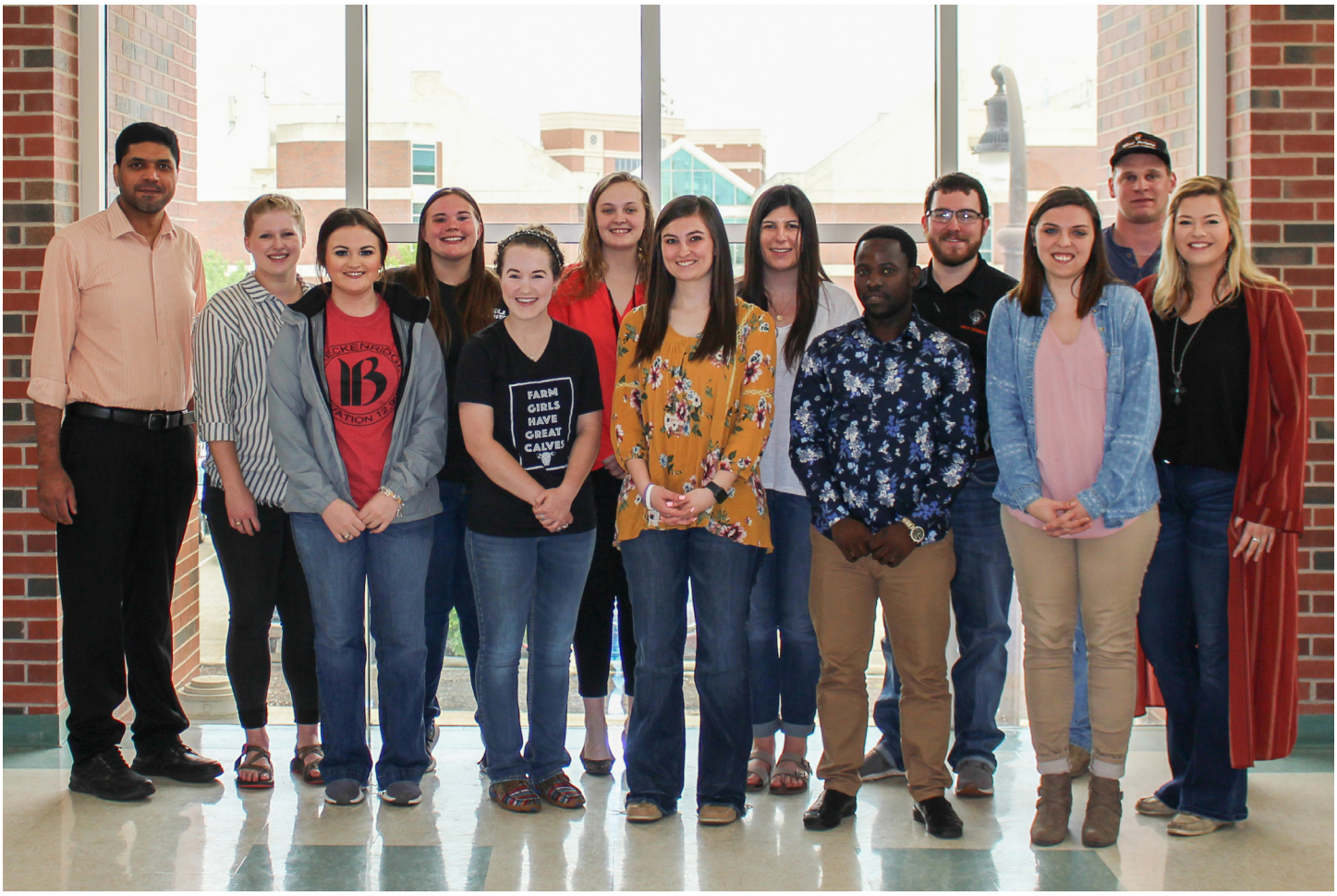
Ramanathan recommends his students take classes that will develop their interests and expand their knowledge, Price said. He also encourages them to explore different career options and to make as many network connections as they can, she added.

"Dr. Ram has truly played an integral part in developing who I am as a student and person, and helping me to not only reach my academic goals, but apply that success to other aspects of my life as I continue to pursue my passion," Price said. "Knowing it is alright to fail, the willingness to try something new, and the personal challenge to come up with a creative way to fix a problem has been so helpful and rewarding and has made me appreciate research so much more."

Ramanthan's research skills and success in the field of meat sciences hasn't gone unnoticed. In 2019, he was recognized with both the American Chemical Society Agricultural and Food Chemistry Division's Young Scientist Award and the American Meat Science Association's Distinguished Achievement Award. The American Society of Animal Science also presented him with the Outstanding Young Animal Scientist Award for both research and teaching in 2018 and 2017, respectively.

In addition to his professional success, he has earned the admiration of his students. According to Rate My Professors, he has a 4.7 out of five rating with 100% of his students saying they would take a class with him again. The department recognized his success in 2019 by presenting him with the Tyler Award, which recognizes professional achievement by OSU animal and food sciences faculty in the areas of research, teaching, or public service.

“Dr. Ram is the person who gave me a chance to start research, and the chance to stay at OSU for graduate school," Price said. "I am so incredibly grateful for his investment in me as a student, and am so thankful for the numerous opportunities he has provided. Dr. Ram is an amazing professor, researcher, and mentor, and has greatly impacted the lives of countless students at Oklahoma State.”



Undergraduate Research Scholars

DEPARTMENT OF ANIMAL AND FOOD SCIENCES

Students in the Department of Animal and Food Sciences Undergraduate Research Scholars program gain hands-on experience through cutting-edge research completed alongside faculty, graduate students, technicians and research unit managers. There are numerous projects students can assist with, ranging from laboratory work to field studies.

How It Works

APPLY
Animal and food science students who have above a 3.0 GPA are eligible to apply.

APPROX. 20 STUDENTS ARE SELECTED EACH YEAR
Students are paired with a mentor based on their research interests.

GAIN VALUABLE SKILLS
Mentors help students to navigate the research process and to develop critical thinking and communications skills.

OPPORTUNITY TO PRESENT RESEARCH
Students have the ability to attend national meetings, publish peer-reviewed manuscripts in reputable journals and earn Undergraduate Research Scholar transcript designation.

FAST FACTS
Participants have been admitted to graduate (Master's and Ph.D. programs), veterinary, dental and medical school.

HIGHLIGHTS
Students have earned more than $160,000 from more than 80 research awards and university wide scholar grants since 2012.

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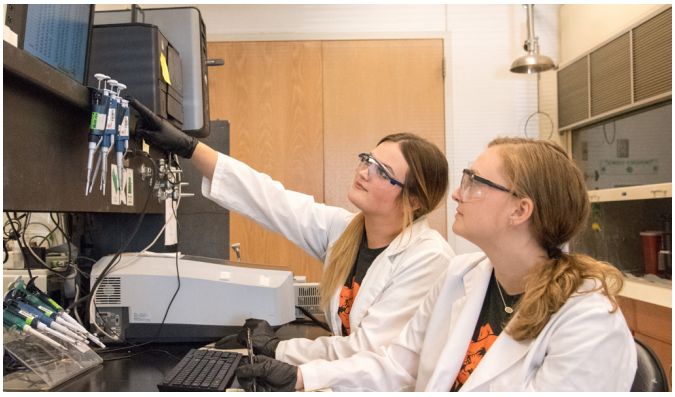

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TAYLORING a TANGLE

OSU graduate student dedicates research to uncover the correlatrion between four major agricultural impacts

Meat discoloration, greenhouse gas emissions, agriculture economics and consumer preferences. These four things may seem unrelated, but to Taylor Price, an Oklahoma State University food science graduate student, they are tangled together in a powerful web.

According to the Food and Agriculture Organization of the United Nations, the population of the world is set to increase by 2.3 billion by the year 2050.

In other words, more people, less resources and an increased demand for food.

"My current research concerns sustainability and economic loss in the beef industry," Price said. "I love getting to apply my skills and interest to help solve real world problems and impact the agricultural industry."

Price's research stems from a project 16 years in the making. Ranjith Ramanathan and Jason Warren, OSU faculty, met by chance at a meeting where they discussed their respective research. Ramanathan's research focuses on the factors affecting meat discoloration and how to reduce meat loss while Warren's research expertise involves greenhouse gas quantification.

The driving force behind Price's desire to begin this project was the aspect of sustainability, she said. Sustainability is how agriculturalists will complete the task and goal that is 2050, she added.

"The goal of my research is to calculate greenhouse gas emissions for wasted food products," Price said.

According to the Inventory of United States Greenhouse Emissions and Sinks, the U.S. emitted 6.5 billion metric tons of greenhouse gases in 2017 alone.

Greenhouse gas emissions are believed to impact climate change, Price said. Climate change has become a major topic in the agricultural industry, she added.

"The changing climate affects society and ecosystems in a variety of ways," according to the U.S. Environmental Protection Agency.

The EPA lists multiple possible impacts of climate change including risk of heat-related illnesses, increased air pollution, increased heat waves, droughts and floods that may reduce crop yields, increased sea levels that could erode coastal ecosystems and eliminate wetlands, and the alteration of were species live and interact that could change entire ecosystems.

"This research is not focused on taking a climate change stance," Price said. "The focus is to provide information and statistics to be used for future research projects."

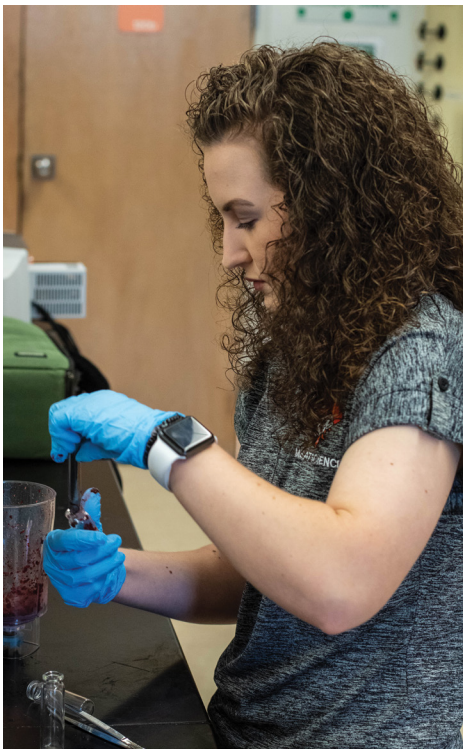
Price is researching greenhouse emissions across meat animal proteins and fruit/vegetable combinations. Using a gas chromatography machine in Warren's research lab, she is able to measure the emissions put off by the waste of these products.

"Since my research has just begun, I am using different combinations to establish a base," Price said.

According to information from the University of Colorado Boulder, gas chromatography allows gases to be broken into pure components and then measured accordingly.

With these numbers, Price plans to decipher the amount of greenhouse emissions correlating with food waste in landfills.

According to the United States Department of Agriculture, in 2010, food loss and waste at the retail and consumer levels equaled 113 pounds,



“ I love getting to apply my skills and interest to help solve real world problems and impact the agricultural industry.”

or 31 percent, of the food supply. Financially, this is equivalent to almost $162 billion.

“For the economic loss, we are trying to compile numbers and formulas from agriculture economists,” Price said.

The research is set to use the numbers and formulas to determine how much discolored beef attributes to economic loses in the beef industry, Price said. Plus, using this data can help determine how much discolored beef adds to the food waste total, she added.

Information provided by the USDA Food Safety and Inspection Service states, “When meat is fresh and protected from contact with air, it has the purple-red color that comes from myoglobin, one of the two key pigments responsible for the color of meat. When exposed to air, myoglobin forms the pigment, oxymyoglobin, which gives meat a pleasingly cherry-red color.”

According to the USDA FSIS, light exposure and contact of myoglobin and oxymyoglobin to oxygen leads to the formation of metmyoglobin, a pigment that turns meat brownish-red.

This color change alone doesn't mean the meat has spoiled, but it can affect the way consumers perceive the product.

Discolored beef is safe to consume, the metmyoglobin pigment is not dangerous, Price said. Consumers throw away discolored beef because they believe it is spoiled, she added.

Price is focusing on discolored beef because color is a major factor for consumers when looking to purchase meat products.

When people throw out discolored beef that is not spoiled, they add to the amount of food waste in landfills, Price said. Then, the waste emits greenhouse gases as it decomposes, she added.

As part of the research experiment, Price plans to evaluate consumer preferences of discolored beef.

“The consumer acceptability will be tested next fall, during football season,” Price said. “I can target consumers in a heavily populated and well-trafficked area while establishing a benchmark for consumer acceptability and price in discolored beef.”

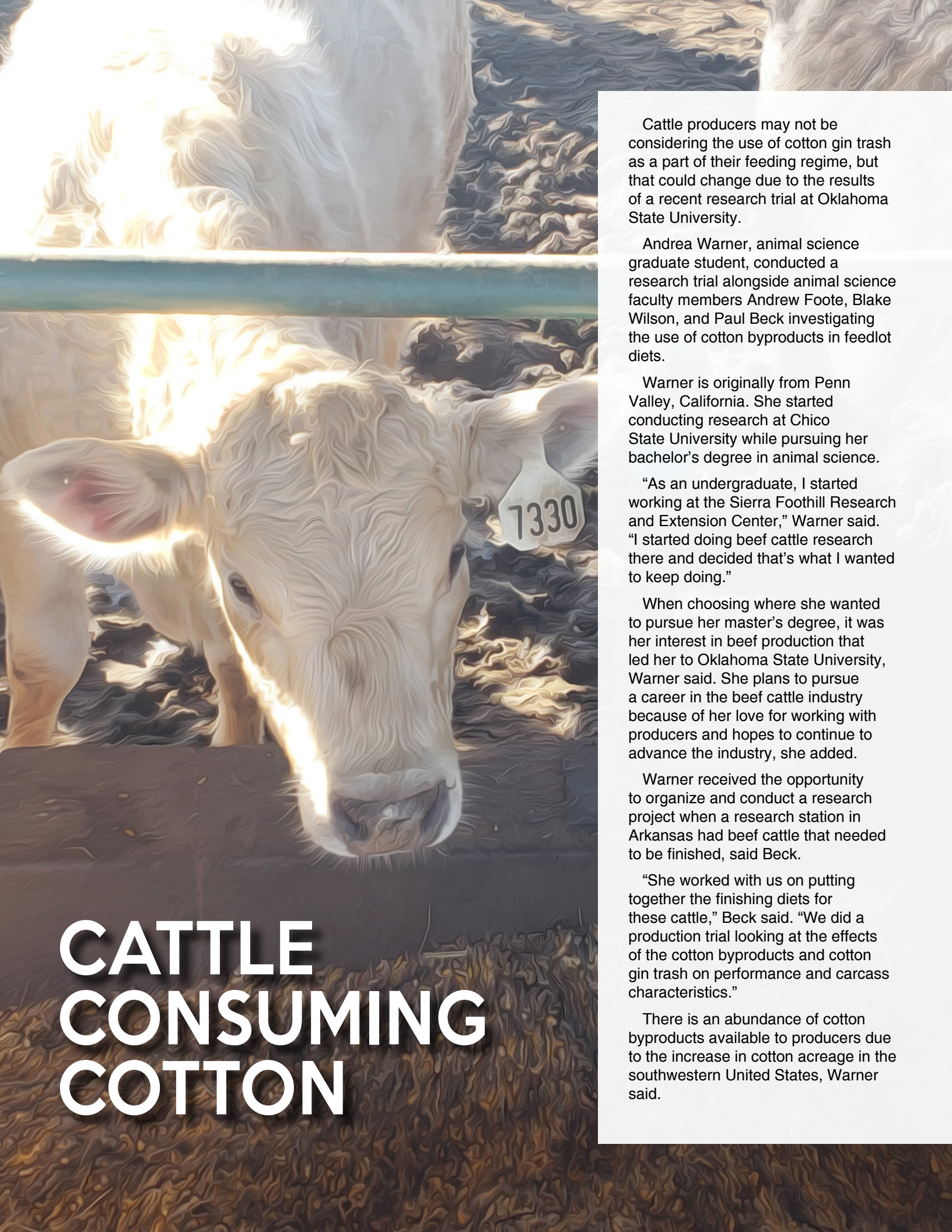
The data gained in this research can be used to change consumer acceptability of beef discoloration, Price said. It will help agriculturalists educate consumers, who are prone to throwing away product before it spoils, about beef discoloration, she added.

“This research is important because we have not updated the number for economic loss of discoloration in the beef industry for 20 years,” Price said.

This research can be used to supply the beef industry with updated numbers on discolored beef and how much the industry uses each year, Price said. Moreover, it will help agriculturalists understand the impact of food waste on the gas emissions coming from landfills, she added.

“I am hoping to add information,” Price said. “To get a more complete understanding behind consumer preference, the chemistry behind it, and even the gases that can be produced from wasted food products.”

STORY & PHOTOS | BRAEDEN COON



CATTLE CONSUMING COTTON

Cattle producers may not be considering the use of cotton gin trash as a part of their feeding regime, but that could change due to the results of a recent research trial at Oklahoma State University.

Andrea Warner, animal science graduate student, conducted a research trial alongside animal science faculty members Andrew Foote, Blake Wilson, and Paul Beck investigating the use of cotton byproducts in feedlot diets.

Warner is originally from Penn Valley, California. She started conducting research at Chico State University while pursuing her bachelor's degree in animal science.

"As an undergraduate, I started working at the Sierra Foothill Research and Extension Center," Warner said. "I started doing beef cattle research there and decided that's what I wanted to keep doing."

When choosing where she wanted to pursue her master's degree, it was her interest in beef production that led her to Oklahoma State University, Warner said. She plans to pursue a career in the beef cattle industry because of her love for working with producers and hopes to continue to advance the industry, she added.

Warner received the opportunity to organize and conduct a research project when a research station in Arkansas had beef cattle that needed to be finished, said Beck.

"She worked with us on putting together the finishing diets for these cattle," Beck said. "We did a production trial looking at the effects of the cotton byproducts and cotton gin trash on performance and carcass characteristics."

There is an abundance of cotton byproducts available to producers due to the increase in cotton acreage in the southwestern United States, Warner said.

"The most widely used cotton byproduct is whole cottonseed, which is a unique feedstuff due to its high protein, fat, and fiber content," Warner said. "A less commonly used byproduct is cotton gin trash, which contains the sticks, burrs, leaves, stems, and dirt remaining after the ginning process. Although gin trash is low in protein and fat, it is a source of physically effective fiber, which is used in feedlot diets to stimulate mastication and maintain rumen pH."

Another benefit of the cotton gin trash is its low cost, Warner said. This byproduct has the potential to be used in feedlots in the southwestern United States to decrease feed cost while maintaining performance, she added.

"We've talked to feedlot managers and feedlot nutritionists about this project and there is a lot of interest in this in the industry, because of this whole cottonseed being available and how we can use that most effectively in these diets," Beck said.

The study was conducted at the OSU Willard Sparks Beef Cattle Research Center, a state-of-the-art beef research and educational facility. Sixty-four crossbred beef steers were fed for either 140 or 168 days depending on weight block, Warner said.

"Cattle were blocked by body weight upon arrival and randomly assigned to one of two treatment diets," Warner said. "The control diet consisted of dry rolled corn, wet corn gluten feed, prairie hay, and a molasses based liquid supplement. The cotton byproduct diet consisted of dry rolled corn, whole cottonseed, and cotton gin trash."

At the conclusion of this study, the cattle eating the diet with gin trash had heavier body weights, greater average daily gain, and higher dry matter intake than the control steers, Warner said.

"The cotton fed steers had heavier hot carcass weights, greater fat thickness, more kidney, pelvic and heart fat, greater dressing percentage, and increased yield grade than control steers," Warner said. "No differences were observed for quality grade, rib eye area, or marbling score between treatments."

The cattle fed the cotton diet usually had a lower fecal consistency score, Warner said.

"A higher fecal score is associated with a further extent of digestion; therefore, these results may suggest that the cotton diet was less digestible than the control diet," Warner said. "There were no differences in fecal pH observed between treatments throughout the experiment."

Blood samples were taken from the steers on eight different days during the experiment to determine urea nitrogen, glucose, and lactate levels, Warner said. The blood samples showed performance differences were not due to differences in glucose or protein metabolism, she added.

"In conclusion, this experiment determined that cotton byproducts can be effectively used as the protein, fat, and fiber sources in a finishing diet without compromising performance or carcass quality," Warner said.

The results of this study have been presented at field days, released in press articles, and presented at scientific meetings, Beck said.

"We need to have more of these kinds of projects where we're working across teaching, research, and Extension to bring the stakeholders and taxpayers of Oklahoma the full benefit of what we are capable of doing in the animal and food sciences department," Beck said.

This project showcases the university's land-grant mission of teaching, research, and Extension, Beck said. The results will have an impact in the industry and help producers and their livelihoods, he added.

STORY | SADIE RAASCH **PHOTOS | ANDREA WARNER**

Practice Makes Perfect

Hours of studying, researching, writing and learning. Then you're watching a timer count down from three minutes and it is all the time you have to explain the work you've been put into your research. This is a small glimpse of the pressure competitors of the Three Minute Thesis contest face as they give presentations on their research. Conner McDaniel, food science graduate student, has experienced this multiple times over the past three years.

Originally from Ardmore, Oklahoma, McDaniel transferred to Oklahoma State University after receiving her associate degree from Murray State College. She graduated from OSU in 2017 with a bachelor's degree in food science. In 2019, she received her master's degree and is currently working on her doctorate in food science.

McDaniel definitely found a passion for the field of food science. However, this wasn't her original major when she came to OSU.

"I was a different major when I first came here, and then I took Dr. Ram's Intro to Food Science course," McDaniel said. "Prior to that, I didn't have any knowledge about the major, and through his class and talking with him I decided to change."

Within the field of food science, McDaniel became interested in food safety and started conducting research under the mentorship of Ravi Jadeja, OSU food safety specialist. Her research involves working with different antimicrobials to improve produce safety. By reducing pathogens, the food industry can use various alternatives to what is currently used so the safety of produce is increased, McDaniel said.

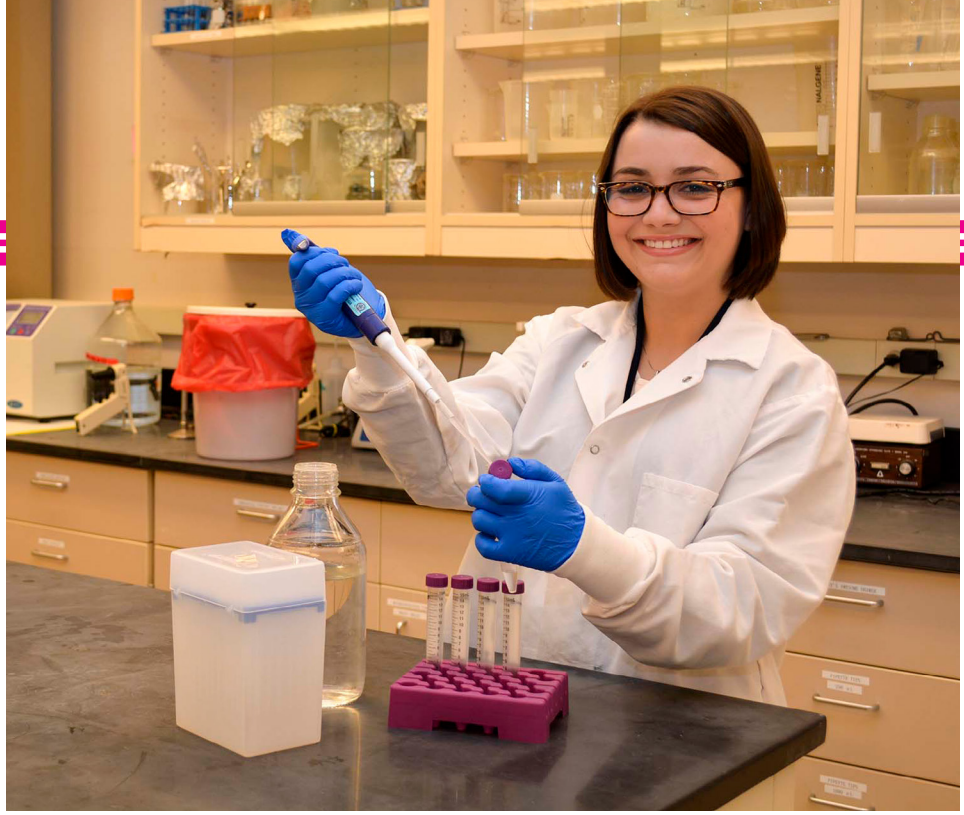
"In the U.S., each year approximately 48 million people get sick due to foodborne illnesses," Jadeja said. "Fresh produce is the number one cause of foodborne illnesses in the country. Conner's research focuses on the control of pathogens from fresh produce. This research has the potential to improve the overall safety of fresh produce and reduce foodborne illnesses."

It is vital to find alternative ways to reduce contamination in produce in order to lower the number of people who are becoming sick from foodborne illnesses, McDaniel said.

McDaniel noticed early on that her research, while important, was complicated and hard to explain to people who do not have a science background. She would try to discuss her research with friends and family members, but found it was difficult to convey exactly what she was doing.

"Researchers are often found using 'scientific lingo' to explain their research," Jadeja said. "This makes it very difficult for anyone from outside of the scientific community to understand the importance of the research."

McDaniel began learning about a research communication competition called the Three Minute Thesis (3MT). The 3MT challenges graduate students to provide a three-minute oral presentation over their research



in a way the general public could understand. One static slide is the only visual aid the competitors can use during their presentation.

The competitors are given three minutes to present their research to a panel of judges, all while watching their time count down, McDaniel said.

"My first years of my master's [degree], Dr. Jadeja encouraged me to participate in it," McDaniel said. "I was terrified of public speaking and had no interest in doing it."

Like many people, McDaniel wasn't confident in her public speaking ability, and the thought of standing in front of a crowd and presenting her research scared her. With encouragement from her faculty mentor, she decided to participate in the 3MT. She placed second in the collegiate-level competition her very first year.

The next year, she placed first in the collegiate-level competition and earned the right to compete at the university-level. During her third year competing in this contest, she won both the college and the university contests. With each new year, her speaking abilities and confidence grew. In March of 2020, she was able to compete at the regional competition in Birmingham, Alabama.

"I felt proud because this has been three years in the making for me," McDaniel said. "It was refreshing to see how far I've come, from the scared person who didn't think she could stand in front of anybody and talk and then being able to do something like that. I think it really just proves you really can do anything you set your mind to and overcome any fears or obstacles you face and get to where you want to be if you put in the time and the work to get there."

The 3MT contest has helped McDaniel develop the ability to explain her research in a way that is easy to understand and built her confidence in public speaking, Jadeja said.

"When you think about three minutes and about public speaking, you think it's such a long time, especially when you have no confidence in yourself to do it," McDaniel said. "When you get down to it and actually try to explain everything you do research wise in only three minutes, it gets a lot more complicated."

The experience of competing in the 3MT has been eye opening for McDaniel. It made her realize the importance of communicating her research in a way that is easy for people to understand so the significance of her research can be realized, she said.

"Being able to explain your research is so important and it helps the general public want to adopt recommendations," Jadeja said. "It also helps to increase funding opportunities for research projects."

McDaniel said she encourages anyone who is interested in presenting their research in the 3MT to do it.

"At the end of the day, on the day of the competition its only three minutes," McDaniel said. "Anybody can do anything for three minutes and those three minutes could be what you need to help build the confidence to be a better public speaker."

STORY | SADIE RAASCH PHOTOS | MANDY GROSS, MEGAN SILVEIRA & JAMES SULLIVAN

For the love of swine

Herd manager mentors students and improves genetics at Oklahoma State University Swine Research and Education Center

Jim Coakley has been involved with the swine industry for as long as he can remember. He turned his passion into a career when he became the herd manager at the Oklahoma State University Swine Research and Education Center.

"My family has been raising hogs for as long as I can remember," Coakley said. "Before accepting this job at the school, my kids and I operated a small show pig operation in Hobart, Oklahoma, raising primarily crossbred hogs."

Coakley attended OSU and graduated in 1997 with a bachelor's degree in agricultural education. He was an agricultural education teacher for 22 years before becoming the swine herd manager at OSU in 2018.

"I love interacting with students, which is exactly why I'm still doing it," Coakley said. "However, at the college level this is a different kind of interaction I have."

Coakley enjoys having the freedom to make decisions that will benefit a larger group of students. He can take his passion for working with youth and apply it to his job at the center, where he mentors the next generation of swine industry professionals.

"He interacts with his students great, and holds them all to a high expectation," said Scott Carter, animal science associate professor and swine center facility supervisor.

Coakley not only has these expectations for his students but also for the center, and has a niche for seeing good genetics, Carter said.

"He is producing not only hogs for a show, but also education and multiple other purposes," Carter said. "He produces hogs to meet a purpose for everyone."

Coakley believes in growing the genetics at the center while blending both new and old techniques. He is wanting

to keep the foundation breed of Yorkshires, as well as crossbreds, but plans to bring in new genetics to the farm. Coakley believes this will help with marketing the swine herd.

"I believe if something has worked, there is no need to change it." Coakley said. "But there's always room for adjustment."

In the future, Coakley is excited to see where these new genetics could take the center. He has plans for being more engaged in online sales and bringing more attention to the activities of the center.

Coakley has many fond memories of OSU. When asked about his favorite experience as herd manager, it was an easy answer for him.

"My favorite moment was when the Oklahoma State University Swine Farm exhibited the Champion York Gilt at the 2018 World Pork Expo," Coakley said.

The center shows and sells swine at three to five national shows every year. Opening sale day is very rewarding for Coakley as he gets to see customers line up to look at the stock both he and the OSU students have worked so hard to raise and take care of. He also enjoys being around individuals who share his passion for the animals. Getting to work closely with people in the swine industry is one of his favorite parts of being the herd manager.

"I get to work with swine and people every day," Coakley said. "What's not to love? And, I'm doing it at my alma mater. That's the icing on the cake – and I like cake!"

Working at his alma mater has given Coakley a brand-new outlook on OSU. He truly appreciates the family atmosphere he has experienced while working at the university.

"One thing that has stuck out to me is that Oklahoma State University is family," Coakley said. "I never realized how close everyone is while I was a student because I went home every weekend to help my dad, but now I get to see a family network every day."

Coakley truly enjoys all the aspects that come with being the herd manager for the OSU swine center. He gets to take his passion for working with both the kids and hogs and apply it to a career.

"I'm only working with one species – the species I love," Coakley said.

“ I get to work with swine and people every day. What’s not to love? ”

The Oklahoma Swine Research and Education Center was dedicated in 2004. This center is a total confinement facility, which features modern waste and odor management technologies. Along with that, there is an indoor facility used for swine judging and education purposes.

The swine center focuses on high-quality Yorkshire and crossbred sows, along with commercial pigs used for nutrition research. The herd is known for great genetics and has produced numerous national show champions and high selling boars through the years.

Some recognition with these winnings includes the Champion Yorkshire Gilt at the 2018 World Pork Expo. Along with this, OSU still holds the record for the highest selling purebred boar sold by a college or university. This took place in 2001 at the National Type Conference, and the Yorkshire boar, named Holyfield, sold for $70,000.

The farm will show and sell at multiple national shows each year. The center employs students, who help with the everyday care of managing the hogs and the center.

OSU Students Receive Prestigious FMI Foundation Scholarship

Charley Rayfield and James Hearn, food science graduate students studying under Ravi Jadeja, were each selected to receive a prestigious foundation scholarship worth $3,000 from the Food Marketing Institute (FMI). Rayfield and Hearn have been extremely involved in the Food Science Program at Oklahoma State University. They each took advantage of the numerous opportunities for training, certifications, and hands-on learning.

"Charley and James routinely get involved in Extension client projects, where they help food companies with installation and auditing of food safety and quality systems compliant to regulatory and third-party audit requirements," said Jadeja.

The FMI Foundation scholarship is extremely competitive, with only 10 to 14 exceptional graduate students being selected to receive the national award each year. To qualify, students must be currently enrolled in food and agricultural science majors and have an interest and passion in the field of food safety auditing. FMI also considers academic ability, leadership potential, motivation, and initiative.

"Being chosen for this scholarship gave me a sense of validation and accomplishment," said Rayfield. "When placed in a pool of extremely qualified and diverse individuals from across the United States, knowing that my application rose to the top was a very gratifying feeling. Receiving the scholarship was another reminder of how valuable all of my undergraduate and graduate experiences are, and how invaluable they will be as I move from being a student to working in the food industry."

The FMI Foundation, in partnership with the Safe Quality Food Institute (SQFI), also provided an education travel grant to cover the registration fee, hotel, meals, and roundtrip airfare for Rayfield and Hearn to attend the 2019 SQFI Conference in San Antonio, Texas.

"Attending the 2019 SQFI Conference allowed me to network with various food industry leaders from across the United States and around the world," said Rayfield. "I was able to gain new perspectives and further my knowledge of auditing. By attending this conference, I was able to see current issues that the food industry is facing along with proposed solutions by the leaders of those fields."

OSU has had seven students selected for the FMI Foundation scholarship since 2016. Jadeja attributes this to the robust OSU Food Science Program, which provides training opportunities in various areas of food science.

"My experiences as an undergraduate studying food science with an emphasis in food safety were extremely helpful when I began applying for the scholarship," said Rayfield. "During my time as an undergraduate, I received numerous food safety certifications, had the invaluable opportunity of working with Oklahoma food companies, as well as expanded my knowledge through various research projects. All of my academic experiences, coupled with my leadership experience from the university, college, and department, enabled me to stand out as a scholarship applicant."

Rayfield says she looks forward to one day giving back to the industry that has given her so much to ensure her success as a student and future professional.

STORY | REBEKAH ALFORD PHOTOS | REBEKAH ALFORD & TODD JOHNSON

STUDENTS COMPETE IN ANNUAL RESEARCH COMPETITION

Nine animal and food science graduate students participated in the 34th Annual Whiteman Research Competition on February 14th, 2020. Each student provided a short oral presentation over their research projects.

The competition was started by Joe Whiteman upon his retirement from Oklahoma State University. The purpose of the competition is to help prepare graduate students to give effective presentations about their research. A significant cash award is provided annually to the top three graduate students.

The winners of the competition were announced in April. Alexi Moehlenpah, Anna Goldkamp, and Megan Gross won 1st, 2nd, and 3rd place, respectively, for their research presentations. All participants and the titles of their research presentation are listed below.

Alexi Moehlenpah *(1st Place)*
Oklahoma State University Continuing Education Online Courses for Extension Educators in 2020

Anna Goldkamp *(2nd place)*
Characterization of tRNA expression profiles in Large Offspring Syndrome

Megan Gross *(3rd Place)*
Predicting Dry Matter Intake of Gestating and Lactating Beef Cows

Jared Harshman
Effect of Biolex Feed Additive on Nursey and Wean-To-Finish Pig Performance

Amanda Holder
Voluntary individual intake and performance of mature cows compared to primiparous heifers consuming a low-quality forage

Frank Kiyimba
Assessing Mitochondrial Functional Differences Between Normal-pH and Dark-cutting Beef

Hasitha Premathilake
The Presence of a Core Microbiome in the Equine Uterus

Cedrick Shili
Effect of a Corn-Expressed Phytase on Growth Performance, Blood Metabolites and Fecal Microbiota of Nursery Pigs Fed Diets with Reduced Calcium, Phosphorous and Protein

Dakota Zapalac
Effects of Negative DCAD Diets with Vitamin D on Post-Partum Performance of Dairy Cattle

STORY | REBEKAH ALFORD PHOTO | ADRIANA TOSTE

EXTENSION

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Vac 45 Program Opportunities and Considerations

Join our Beef Cattle Extension team, experienced livestock marketers and ranchers to learn and share beef cattle production, management and marketing tips.

- **Thursday, May 14, 2020 |** 12:30 - 1:00 p.m.
  Vac 45 Program Health and Management Influence on Calf Prices
  - Kellie Raper, Extension Livestock Marketing Specialist

- **Thursday, May 21, 2020 |** 12:30 - 1:00 p.m.
  Considerations in Herd Health Programs Designed for Vac 45 Certification
  - Rosslyn Biggs, Beef Cattle Extension Specialist

- **Thursday, May 28, 2020 |** 12:30 - 1:00 p.m.
  Nutritional Programs and Implants for Vac 45 Programs
  - Paul Beck, Extension Livestock Specialist

- **Thursday, June 4, 2020 |** 12:30 - 1:00 p.m.
  Putting it Together: Budget and Breakeven Projections for Fall 2020
  - David Lalman, Extension Beef Cattle Specialist

- **Thursday, June 11, 2020 |** 12:30 - 1:00 p.m.
  Marketing Vac 45 Cattle: What We Have Learned the Last 20 Years
  - Bill Barnhart, Oklahoma City West Livestock Market
  - David Cantrell, Rancher and Extension Educator

- **Thursday, June 18, 2020 |** 12:30 - 1:00 p.m.
  Steps to Certify and Market Your Calves Through the Oklahoma Quality Beef Network
  - Jeff Robe, Oklahoma Quality Beef Network Coordinator

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- **Register Online:**
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  Extension Beef Cattle Specialist
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  405-744-6060

Advocating for the Beef Industry

Sarah Drown, OCCW president, chosen to represent American National Cattlewomen's Association

Sarah Drown was one of the three college students chosen to represent the American National CattleWomen, Inc. (ANCW) as part of their 2020 Collegiate Beef Advocacy Program team (CBAP).

Drown, an agricultural communications and agribusiness junior at Oklahoma State University, was selected and installed for the year-long commitment in February at the Cattle Industry Convention, which was held in San Antonio, Texas.

This opportunity will allow her to travel across the country, learn more extensively about the beef industry, and learn how to better advocate for it, Drown said.

"The American National CattleWomen's Beef Advocacy Program was created for beef industry advocates interested in bridging the gap between the farm and the fork," according to the program's webpage.

"This program connects the collegiate leaders to the beef industry where they can have unlimited access to leadership, their peers, cattlemen and cattlewoman, and beef industry professionals. They will grow as individuals, strengthen their leadership skills, and establish networks."

Along with Drown are two other students: Madison Forbes who attends the University of Iowa and Fallon Plaisance who attends Louisiana State University.

Forbes is an eighth generation farmer who grew up raising cattle on her family's cow-calf operation in Iowa, while Plaisance has been involved in her family's seedstock operation where they raise registered grey Brahman cattle for local, state, and national shows.

With each of the Collegiate Beef Advocates coming from very diverse backgrounds within the beef sector, it has helped Drown become more well-versed in different aspects of the industry.

As part of the program, Drown and her team are set to travel throughout the nation to states including Colorado and Ohio. During the summer, she is scheduled to visit Denver where the National Cattlemen's Beef Association plans to hold their annual meeting. Following their busy year of advocating for the beef industry, the CBAP team will finish their reign at next year's national convention in Nashville, Tennessee.

In addition, Drown also has the opportunity to attend industry tours with companies such as Greeley Hat Works and Certified Angus Beef.

She accredits her inspiration to apply for the program to Haley Goodall, a previous Oklahoma State University student and Oklahoma Collegiate Cattlewomen's student club member who served as a Collegiate Beef Advocate in its early years of implementation. Drown has wanted to apply for the program ever since hearing about it from Goodall.

One of the experiences Drown is looking forward to most is the opportunity to travel to Washington D.C. to attend a legislative conference. Over the course of two days, members of ANCW, including the CBAP team, will be on Capitol Hill advocating and lobbying for the beef industry.

"I'm most excited for the Washington conference just because my interests and my passions are in legislature,

and growing up I was really interested in lobbying and policy," Drown said. "We'll literally be able to be hands on with our state senators and representatives and go through that process of what it looks like to be fighting for something you're passionate about."

Drown is thrilled for the opportunity to get policy through that will benefit an organization and industry she believes in.

Drown is no stranger to the beef industry. She grew up on her grandparents' cow-calf operation in Southern California. The operation is completely family-run, which has allowed her to be very involved in cattle from a young age. She was also very active in 4-H and FFA, which helped develop Drown's knowledge and desire to promote the industry.

Drown believes her role as a Collegiate Beef Advocate will give her the skills necessary to be successful in her future career.

Drown plans to attend law school after she graduates in 2021. Her career goal is to become an attorney, so this opportunity will provide her with first-hand experiences in representing something she is passionate about.

"It's a lot of learning how to network with people and also communicate on a team," Drown said.

Drown carries out her passion for the beef industry throughout her involvement in extracurriculars at OSU, including the OCCW club where she currently serves as president. In addition, Drown is a member of the Sigma Alpha Professional Agricultural Sorority and a McKnight Scholar and mentor for their freshman class. Drown will also be serving as an Ag Ambassador for the OSU Ferguson College of Agriculture in the coming year.

"As someone who grew up in 4-H and FFA and wanted to advocate for agriculture no matter what, this gives me the opportunity to practice and hone in on those public speaking and relationship skills that will help me in the future," Drown said.

Student Spotlights

Madelyn Scott - Food Science

Meet Madelyn Scott! Madelyn is originally from Central High, Oklahoma, where she grew up around animal agriculture.

"I have been competitively showing livestock around the nation since I was nine years old," said Madelyn. "My family and I primarily spent time showing sheep, goats, and pigs."

She also grew up around cattle, as her father is a ruminant nutritionist.

Oklahoma State University was the perfect fit because she plans to be involved in agriculture for the rest of her life and OSU is one of the top agriculture schools in the country.

Madelyn likes the department of animal and food sciences because the students and staff are so welcoming and are genuinely rooting for you to succeed, she said.

Madelyn has found many different ways to be involved on campus. She is a member of the Meat Science Quiz Bowl Team, the Meat Science Association, the Food Science Club, and is currently competing on the 2020 Meat Judging Team.

You can usually find Madelyn in Ranjith Ramanathan's food science lab where she works as part of the Undergraduate Research Scholars Program.

The information and connections she has made through her research have allowed her to acquire multiple skills that are applicable to the food science industry.

Madelyn is majoring in food science with the meat science option. She plans to attend graduate school in meat science before pursuing a career in protein research and development.

Erica Auchard - Animal Science

Meet Erica Auchard! Erica is from Council Grove, Kansas, where she has grown up with an extensive background in cattle and crops. Her family is active throughout the year, running double-stock cattle in the summer, a starter yard in the winter, and a commercial cow/calf operation year-round. They also grow corn, soybeans, and forage crops in addition to their cattle business.

Auchard decided to go to OSU because she fell in love with the campus. In addition, Auchard was lucky enough to receive the McKnight Leader Scholarship as an out-of-state student, which helped make her decision. She credits the OSU Department of Animal and Food Sciences for helping her build relationships with students and faculty members.

She has continued to build her experience in the beef industry while working at the OSU Purebred Beef Center which has allowed her to see a different aspect of the industry.

"I didn't grow up around the purebred industry, so all of this has been a learning experience," said Auchard. "I have learned a lot about the purebred/seed-stock side of the cattle industry and have made many great friendships."

She is majoring in animal science with an animal biotechnology option.

"I decided on the animal biotechnology option because I know that's where the future of ag is going," said Auchard.

Auchard also feels this will help her once she begins pursuing a master's degree in animal health. Following graduate school, Auchard plans to join the workforce to gain skills and knowledge before eventually returning to her family's operation. Her ultimate goal is to own and operate her own feedlot which will allow her to share the knowledge she has learned while attending OSU.

Lindsay Biscoe - Food Science

Meet Lindsay Biscoe! She is originally from Sayre, Oklahoma. She grew up on a farm where her family raises commercial cattle and winter wheat.

Lindsay said her father is a proud graduate of Oklahoma State University.

“He would bring my mom and me to football games when I was younger. I was one of those blonde headed, blue eyed girls in their OSU cheerleader outfit, whose only dream was to be a cowboy myself,” said Lindsay. “I still can’t quite believe I made it.”

Lindsay has found multiple ways to be involved as a student in the OSU Department of Animal and Food Sciences. She is currently serving as the Oklahoma State Ferguson College of Agriculture student council representative for the Food Science Club and the Meat Science Association.

One of Lindsay’s favorite experiences has been her time spent as a student worker at the Robert M. Kerr Food and Agricultural Products Center (FAPC).

“The time I have spent at FAPC has been some of the most fun, challenging, and enriching times of my life,” said Lindsay. She has especially enjoyed the relationships she has built with staff, professors, graduate students, and her fellow student employees.

Lindsay is majoring in food science with a food safety option.

“When I walked through the doors of FAPC, I fell in love with the world of meat science. The science part of that scared me, so I started looking at the food safety option. I have really enjoyed learning about our food source and what makes it safe. Someday, in the near future, I hope to be a part of the process.”

Lindsay wants to use her degree to explore her love for meat science. Her career goal is to work as a food safety auditor or work in a quality assurance position.

Chelsea Shelton - Animal Science

Meet Chelsea Shelton! She is originally from Mariposa, California, and comes from a long line of agriculturalists with both of her parents being raised in diverse farming backgrounds. Growing up, Chelsea began showing swine in 4-H and continued to get even more involved in the industry once she joined FFA.

After hearing of OSU’s agriculture reputation and talking with representatives at conventions, Chelsea decided to tour campus and see America’s Brightest Orange firsthand. Chelsea believes coming to OSU was the best decision she has made.

“The campus is beautiful and it felt like home. The students, staff, and community are all so friendly and supportive,” said Chelsea.

Chelsea is majoring in animal science with an ag education option and accredits FFA for growing her knowledge and excitement for this field, which ultimately developed into her passion.

“I decided to go this route because I wanted to make an impact in the lives of students just as my agriculture teachers and advisors made a long lasting impact on me,” said Chelsea.

She is active in clubs and activities within the OSU Department of Animal and Food Sciences and has also assisted with research experiments at the OSU Swine Research and Education Center.

Chelsea says the department has become her family and “home away from home.” She loves the fact there is always a smiling face and the supportive faculty strive to help students find their passion and different opportunities.

After graduation, she plans to teach students about agriculture education and hopes to inspire others as an ag teacher. She looks forward to using the skills, experiences, and techniques she has learned at OSU to assist her throughout her future.

Increasing Stocking Rates and Enhancing Performance of Growing Steers

Zane Grigsby, animal science graduate student, and Paul Beck, OSU beef Extension specialist, recently finished the first year of an experiment using a novel distiller's grains based range cube to increase stocking rates and enhance performance of growing steers grazing native prairie and bermudagrass in Oklahoma. The multi-year experiment is investigating the impacts of supplementation and increased stocking rates on performance of growing steers, economics of the stocker cattle enterprise, and range conditions.

"The enterprise services that the stocker-cattle segment supplies to the beef industry are well characterized," said Beck. "These services include providing the market with immunocompetent weaned feeder cattle that have been acclimated to feed bunks and water sources and have been grouped in load lots."

Another service is providing placement area for calf numbers that are in excess of feedyard capacity, which occurs when large numbers of calves are marketed simultaneously.

Stocking rate is the fundamental management factor under producer control that has a major impact on animal performance, economics, and long-term sustainability of native range-based ecosystems. As stocking rate increases, individual animal growth rate declines, yet total bodyweight gain per unit of land area increases up to a point where individual animal growth rate gets so low the total gain per unit of land area begins to decline.

"Producers are under significant economic pressures to maximize production per acre, which can prove harmful to the range condition where desired forage species are overgrazed decline in the stand," said Beck. "Feeding high levels of supplemental feed based on corn co-products of the ethanol production industry can offset forage consumption by grazing cattle and lead to higher stocking rates, without the reductions in forage mass and animal performance."

These feeds have been used as supplements to cattle grazing bermudagrass, wheat pasture, and old-world bluestem to increase stocking rate by 33 to 100%, while increasing animal performance and limiting impacts on forage growth and development.

Since similar research is limited in native grass-based systems in the arid regions of western Oklahoma, this project is being conducted in two locations in western Oklahoma; Klemme Research Range in Besse and USDA ARS-Southern Plains Range Research Station (SPRRS) in Ft. Supply.

At both ranges, steers were stocked at six acres/steer and supplemented with 2.5 pounds of dried distillers grains (DDGS) cubes/day during the late summer only. The research at the USDA range also included an increased stocking rate of four acres per growing calf along with supplemental DDGS cubes fed at a daily rate of 0.75% of bodyweight throughout the grazing season.

In the initial year of the experiment, late season supplementation increased gains at SPRRS from July to late September from 1.2 pounds per day in negative control steers to 1.9 pounds per day for Oklahoma Super Gold steers. The supplementation program increased net return per steer by $30/head. In both locations, increasing stocking rates and feeding the High Supplement treatment increased season long average daily gains and doubled total gains per acre and net return per acre.

This research will be repeated over several years to determine the impacts on economics and range conditions at these sites over time.

STORY | REBEKAH ALFORD PHOTO | PAUL BECK

A- Cowhorse Classic

SATURDAY JUNE 20, 2020 | A- RANCH | CLAREMORE, OK
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OSU Rockin Style

Rockin W x OSU Double Babe

This extremely athletic gelding is big hearted with the build and size to complete any job. With approximately 45 rides on him he is confident and willing to do any task. He is soft in the bridle and easily responds to leg pressure. Been ridden on trails and pasture, roped on, tracked the heel-o-matic, drug logs, and introduced to cattle. "Woodrow" has the potential to be the top pick in a string on the ranch or in the performance pen. Eligible to enroll in the Bonanza Cutting, Breeders Invitational,PCCHA Stakes, NRCHA Stallion Stakes, Abilene Spectacular, NCHA Super Stakes, Select Stallion Stakes, Future Fortunes and Ruby Buckle. Stands approximately 14.3 hands.

OSU Playin With Guns

OSU Top Gun x Princess Dunit Royal

This gentle gelding can get along with anyone and aims to please. With approximately 45 rides on him he is confident inside and outside of the arena. He works well off light leg pressure and a soft rein. Been ridden on trails and pasture, roped on, tracked the heel-o-matic, drug logs, and introduced to cattle. His calm demeanor and attentive attitude make him able to go any direction as a prospect on the ranch or in the performance industry. Stands approximately 14.0 hands.

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OSU Guns N Roses

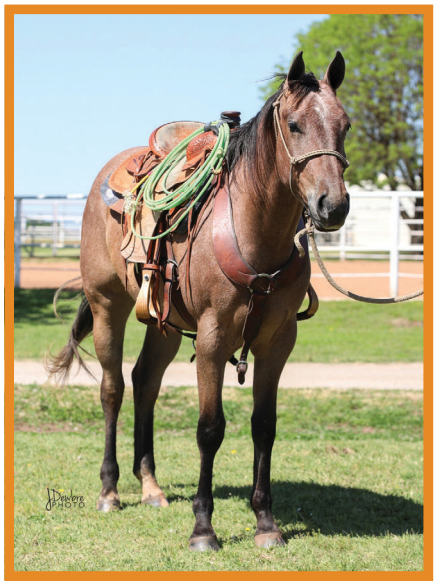
OSU Top Gun x Lena Peppy Rose

This striking dun filly is as athletic as she looks. With approximately 45 rides on her she easily flexes at the poll and works on a loose rein. She is smart and easy going inside and outside of the arena. Been ridden on trails and pasture, roped on, tracked the heel-o-matic, drug logs, and introduced to cattle. This filly's sweet disposition and talent make her able to go any direction as a prospect in the calf or heel side of the roping pen, on the ranch, or in the performance industry. Stands approximately 14.0 hands.

OSU Sugar N Sparks

OSU Top Gun x Cowboys Shining 701

This eye-catching filly moves out with a long, ground covering stride. With approximately 45 rides on her she strives to please in any situation, both inside and outside of the arena. Been ridden on trails and pasture, roped on, tracked the heel-o-matic, drug logs, and introduced to cattle. This filly's sweet personality, laid back attitude, and athletic ability makes her able to go any direction as a prospect on the ranch or in the performance industry. Stands approximately 14.3 hands.



OSU Good As Gold

OSU Top Gun x Dudette W Goldseeker

This sweet filly has a laid back demeanor with a soft and comfortable stride to match. With approximately 45 rides on her she is easy going both inside and outside of the arena. Been ridden on trails and pasture, roped on, tracked the heel-o-matic, drug logs, and introduced to cattle. This filly's long stride and willing attitude makes her able to go any direction as a prospect on the ranch or in the performance industry. Stands approximately 15.0 hands.

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