

# COWPOKE NEWS

*The Department of Animal Science, Oklahoma State University*



## INSIDE:

- Studying the Adaptability of Beef Cattle
- Fighting Antibiotic Resistance With Innate Immunity
- The Role of New Technologies in Global Food Security
- Effects of Technology Use in Beef Production Systems





## Animal Science COWPOKE NEWS

The Research Edition of Cowpoke News is published once a year by the Department of Animal Science within the College of Agriculture Sciences and Natural Resources at Oklahoma State University. We strive to keep students, alumni, and friends of the department informed about the research, activities and success in our department.

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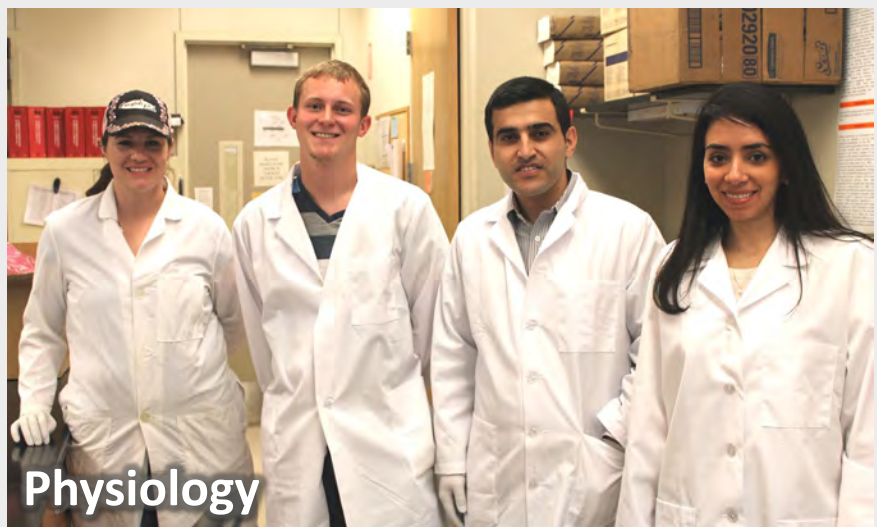
All Cowpoke newsletters are available on our website at <http://ansi.okstate.edu/newsletter/cowpoke-news>.

## Meet Some of Our Researchers!



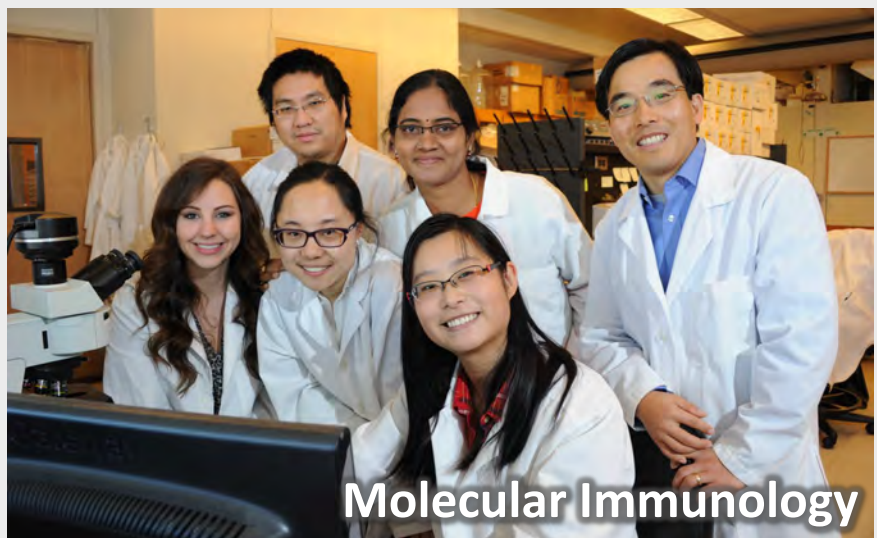
### Food Science

Left to Right: Pushpinder Litt (graduate student) and Buddhini Jayasundera (graduate student) are mentored by Dr. Divya Jaroni.



### Physiology

Left to Right: Jessica Chase (graduate student), Caleb Smith (undergraduate research scholar), Bahaa Aloqualiy (graduate student), and Belinda Gomez (graduate student) are mentored by Dr. Jennifer Hernandez Gifford.



### Molecular Immunology

Left to Right: Amanda Curtis (graduate student), Li An Fong (graduate student), Zhuo Deng (graduate student), Dr. Lakshmi Sunkara (research assistant professor), Xuwen Sheng-Wieneke (graduate student) and Dr. Glenn Zhang (professor). Amanda, Li An, Zhuo, and Xuwen are mentored by Dr. Glenn Zhang.

**On The Cover**

A picture of cattle using an Insentec feeding system at the OSU Willard Sparks Beef Research Center is on the cover of this issue. By using the Insentec feeding system, OSU researchers are able to track how much feed and water each animal consumes. Read more about this system on page 5.



**News From The Assistant Department Head**

A Letter From Clint Krehbiel ..... 3

**Featured Stories**

Faculty Spotlight..... 4

OSU Animal Science Researchers Awarded \$1,000,000 Grant to Study Adaptability of Beef Cattle to Climate Variability..... 5

Fighting Antibiotic Resistance Through Alternative Treatments ..... 7

The Role of New Technologies in Global Food Security – Improving Animal Production Efficiency and Minimizing Impacts. .... 9

Effects of Technology Use in Beef Production Systems on Meat Quality, Consumer Palatability Ratings and Strip Loin Muscle Dimensions..... 11



**Research**

Faculty Research ..... 13

Faculty Publications ..... 15

Research Reports ..... 17

Graduate Student Research ..... 18

USDA Fellows ..... 21

Visiting Scholars ..... 22

Thesis and Dissertations..... 23

Undergraduate Research ..... 24



**Events & Activities**

BMBGSA Research Symposium ..... 26

Pushpinder Litt Presents Poster at IAFP Annual Meeting ..... 27

Managing Farm Health For Public Health Conference..... 27

ARSBC Conference ..... 27

**Other**

Animal Science Weekend Schedule ..... 28

Featured Picture and Quote ..... 28

Announcements..... 29

Sponsors..... 30



# News From the *Assistant Department Head*

Dear Alumni and Friends,

We are very excited to present you with our first Research Edition of the Cowpoke News. Our department has a strong and proud history of excellence in Research, and we are striving to become even better in the future. In 2012, the faculty in the Department of Animal Science met for a time of “research visioning”. The purpose was to provide new and current faculty with an overview of opportunities to connect and build/strengthen our research core; to enhance our level of scholarship (teaching, research, and extension); to build on our culture of achieving excellence; and to develop a short- and long-term vision of the future research program(s) in the Department of Animal Science at Oklahoma State University.

As a result of this meeting, **5- to 10-year goals** were established to:

- Be a national/international leader in Food Security and Safety
- Continue to build on our strength as a Beef Cattle Center of Excellence
- Establish a cutting edge program in Animal Behavior and Well-Being
- Ensure the “Sustainability” of producing Livestock in OK
- Raise funds and construct a new “Animal Nutrition and Physiology Center”

Dr. Rusk and I are proud to say that our faculty members are well on their way to achieving these goals. In 2013, Animal Science faculty members brought in \$1,430,500 in extramural grant funding, which generated approximately \$200,620 in facility and administrative costs for Oklahoma State University. Our Animal Science Faculty published 51 refereed manuscripts, which equates to 5.5 publications per Research faculty full-time equivalent (FTE). The majority of these manuscripts were published in top-ranked journals with high impact factors, including Domestic Animal Endocrinology, Journal of Animal Science, Theriogenology, Peptides, PLoS ONE, among others. We had a total of 68 graduate students, which equals 7.3 graduate students/Research FTE. Our graduate students are among the best and brightest in the nation, and continue to represent us very well at scientific meetings.

In addition to our graduate students, our research faculty members have done an excellent job of engaging undergraduate students in research. In 2013, we had 4 Wentz Scholars, 4 Niblack Scholars, 1 OK-Leadership Scholar, and 4 Freshman Research Scholars. Many of our former scholars have gone on to graduate school or vet school. We are continuing to grow the number of our undergraduate students engaged in research.

We dedicated the new Insentec Feed Efficiency Building at the Willard Sparks Beef Research Center on Oct. 4, 2013. This facility has generated a \$121,531 industry grant to study “Effects of altering beef production systems on animal performance, carcass characteristics, production economics, heat stress, and animal behavior” and, recently, a \$1,000,000 USDA AFRI grant to study “Beef cattle selection and management for adaptation to drought”. The latter grant will keep the facility occupied through 2018. We were honored to host USDA Under Secretary Ed Avalos on August 27, 2013. The Under Secretary was very impressed with this facility!

In this edition, you will find stories featuring on-going research projects, our list of 2013 publications, and meet our current graduate students and undergraduate research scholars. We hope you enjoy our first Research Edition of the Cowpoke News!

Sincerely,  
Clint Krehbiel

# Faculty Spotlight

Megan Rolf grew up on a small cow-calf operation in east central Kansas near LeRoy. She was active in 4-H, FFA, and the North American Limousin Junior Association, where she served four years on the national board of directors. Rolf successfully competed in numerous public speaking events, beef production competitions, and quiz bowls through these organizations.

Following high school graduation, Megan attended Kansas State University, where she earned a B.S. in Animal Science with a science/pre-vet option in 2005. While there, she worked in the school of veterinary medicine where she was introduced to immunology and virology wet lab research in the Department of Diagnostic Medicine and Pathobiology while completing her animal science honors project on cytoplasmic inheritance. Megan relocated to Columbia, MO to pursue a M.S. in Animal Science at the University of Missouri, with a focus on use of SNP data to generate genomic relationship matrices. She also examined the use of model

predicted feed intakes in tandem with genomic data for the improvement of feed efficiency. After completion of her M.S., she completed a Ph.D. in Genetics at MU, with a research focus on the exploration of methods to separate training and validation populations for improving across-breed genomic selection models for carcass traits. Rolf joined the faculty of the Department of Animal Sciences at Oklahoma State University in July of 2012 as Assistant Professor of Beef Cattle Management and State Beef Cattle Extension Specialist. Her extension goals include increasing awareness and understanding of genetic and genomic selection tools within the beef industry. She also works towards helping producers identify the appropriate mating and crossbreeding systems to accomplish their breeding objectives and helping producers manage genetic potential to adapt their herds to prevailing environmental conditions. Her research program is focused on the use of genetic and genomic data to improve beef cattle

sustainability through increasing producer profitability, decreasing natural resource usage, and increasing consumer satisfaction with beef. Currently, her lab consists of two undergraduate research scholars, three M.S. students and one Ph.D. student who are working on projects related to use of predicted feed intake data for genetic evaluation, developing novel phenotypes related to water intake and water efficiency in beef cattle, exploring the role of the mitochondrial genome in cattle production, utilizing genomic technologies to understand how cattle adapt to adverse environmental conditions, and consumer acceptance of biotechnology in food production. Megan has developed a variety of extension and research collaborations both within and outside the department and strives to obtain funding that assists with the integration of research and extension efforts to increase technology transfer to the beef industry and develop tools and educational modules that utilize new research findings and are directly applicable to beef producers.



Photo Courtesy of Oklahoma State University



# Studying the **Adaptability of Beef Cattle** to Climate Variability

A team of researchers from the Oklahoma State University Department of Animal Science were the recent recipient of a \$1,000,000 grant to study adaptability of beef cattle to climate variability. The grant was awarded through the United States Department of Agriculture National Institute for Food and Agriculture competitive grants program and focuses on adaptation of cattle to drought conditions. The project focuses heavily on water use in beef production and water management on cattle ranches.

This research will be conducted at various locations throughout the state and nation, but the bulk of the work will be completed at the Willard Sparks Beef Research Center. OSU's Willard Sparks Beef Research Center is equipped with an Insentec system, which allows for the collection of individual animal feed and water intake in a pen setting within a normal feedlot environment.

"Individual animal feed and water intake records, along with the genomic, behavioral, health, temperament, nutritional, and environmental data that

is being collected will be vital to the success of this project," said Dr. Megan Rolf, an assistant professor in the department as well as a state extension specialist and the project director for this grant.

Feed efficiency has been a popular focus amongst beef cattle researchers for years, but scientists have not focused much on how cattle utilize water in the production of beef. Large-scale water intake studies have not been possible in the past due to the absence of technology that would allow the collection of these data.

"Water efficiency is not a traditional economically-important trait, but water is becoming more important as we move into the future, not only because of drought but also increased competition for limited water resources," Rolf said. "Although large-scale water-intake studies have not been performed on cattle due to technological limitations, similar research has been conducted with laboratory animals and water intake was a heritable trait in those species. If these traits are also heritable in beef

cattle, we can make selection decisions to improve an animal's genetic merit."

The \$1 million project is the first of its kind, focusing on the measurement of water intake efficiency at the same time researchers are measuring feed efficiency on a large scale. Paired with extensive weather data as well as health, genomic, and behavioral data, this project will yield a powerful dataset with which to explore selection and management for adaptation to drought in beef cattle.

The overall goal of the project is to develop beef cattle and production systems that are more readily adaptable to variable climates.

One of the ways that this project will facilitate that is through the development of decision support tools for producers across the US. These tools should enhance the ability of producers to manage their natural resources during drought as well as provide enhanced care for their cattle during harsh environmental conditions.

The overall goal of the project is to

develop beef cattle and production systems that are more readily adaptable to variable climates. One of the ways that this project will facilitate that is through the development of decision support tools for producers across the US. These tools should enhance the ability of producers to manage their natural resources during drought as well as provide enhanced care for their cattle during harsh environmental conditions.

“Improved management tools are vital to allow beef producers to better manage operational risk and existing natural resources,” Rolf said. “One important aspect of this study is that scientists are taking research results and tying them directly into decision-support tools that producers can use.”

One of the primary outcomes of the project is the development of water management tools, working in conjunction with the Oklahoma Mesonet. Rolf said a major objective is to expand the “cattle comfort index” so the information provided is usable by beef producers no matter where they reside in the nation. Longer term, the

project scientists, along with the Oklahoma Mesonet, will focus on development of a water resource management tool that will help producers manage water resources during times of scarcity.

“Given the world’s ever-increasing population, it is more important than ever to develop and promote beef production systems that are economically sustainable for both producers and consumers while also fostering environmental stewardship,” said Clint Krehbiel, co-principal investigator and research coordinator for the OSU Department of Animal Science.

**Collaborators and Co-PIs on the project:** Drs. Michelle Calvo-Lorenzo, Sara Place, Chris Richards, Clint Krehbiel, Udaya DeSilva, Raluca Mateescu, Deb VanOverbeke, DL Sep, and AI Sutherland.

**Students invested in the project include:** Kristi Allwardt (graduate student project coordinator), Justin Lyles, Emily Andreini, Kimberly Branham, Kathy Havigland, Ashley Brooks, Jake Reed, Cody Hixon, Andrew Grimes, Nadine O’Neill and Heidi Miller.

## Collaborators/Co-PIs



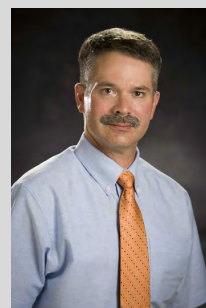
*Dr. Michelle Calvo-Lorenzo*



*Dr. Sara Place*



*Dr. Chris Richards*



*Dr. Clint Krehbiel*



*Dr. Udaya DeSilva*



*Dr. Deb VanOverbeke*

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*Left to Right: Ashley Brooks (graduate student) Dr. Megan Rolf, Kristi Allwardt (graduate student project coordinator) standing in front of the Insentec feeding system, which is used to determine how often, how long, and how much each animal eats and drinks. The photo is courtesy of Oklahoma State University.*



# Fighting Antibiotic Resistance Through Boosting Animal Innate Immunity

*By Rebekah Alford*

Antibiotics have been instrumental in treating disease, but antibiotic resistance, the ability of a microorganism to evolve a resistance to the drugs used to fight them, is becoming a worldwide health concern.

According to the US Food and Drug Administration (FDA), 70% of pathogens are currently resistant to at least one antibiotic, and pathogens known as 'superbugs' can tolerate multiple antimicrobials.

The development of resistance has a relation to antibiotic prescription. When patients fail to take all of their medication, the chances that resistant strains survive and reproduce increases.

Antibiotic resistance not only affects human health, but also that of livestock since antibiotics are used in livestock production for growth promotion and

disease prevention. In 1996, the European Union (EU) created legislation that put restrictions on antibiotics in an attempt to slow the damage antibiotic resistance could cause the cattle industry. The United States Food and Drug Administration (FDA) followed in their footsteps in December 2013 with a new regulation aimed at phasing out the use of antibiotic growth promoters.

Antibiotic resistance is becoming a growing concern of scientists, who are now searching for alternative treatments before some infections become incurable. One of the scientists working on solving this issue is Dr. Glenn Zhang.

Dr. Zhang is a Professor in Oklahoma State University's Department of Animal Science. He was initially trained as a molecular immunologist and started working on the regulation of animal

innate immunity during his Ph.D. studies at Kansas State University.

Ever since, he has been working on the identification and characterization of novel host defense peptides and dietary modulation of animal innate immunity.

Dr. Zhang's objectives are to delineate molecular mechanisms of innate host defense and to devise effective strategies to enhance disease resistance of humans and animals without the dependency on antibiotics. He realized a need to develop alternative treatments that will attack antibiotic-resistant pathogens without causing the risks typically associated with antibiotic treatment and is researching for a way to change the treatment target completely by boosting the host's immune defenses to increase the likelihood of pathogen clearance. He may soon be capable of successfully treating



infection by altering synthesis of the peptides of the innate immune system.

Dr. Zhang determined that host defense peptides (HDP), a major part of the innate immune system, could be a possible alternative to antibiotics. HDP are known to be effective in killing both Gram-negative and Gram-positive bacteria, mycobacteria, enveloped viruses, fungi, parasites and transformed cancerous cells. HDP accomplishes this through direct mechanisms that often see HDP attacking the membranes of pathogens.

Additionally, HDP has also been known to interfere with the synthesis of DNA, RNA, proteins and cell walls. HDP has a surplus of immunomodulatory functions on both the innate and adaptive immune systems. These functions include the ability to alter host gene expression, act as chemoattractants and/or induce chemokine production. Since HDP acts on the host and not the pathogen, the compounds do not create a risk of resistance.

Dr. Zhang and his team explored the immunomodulatory mechanisms of specific HDPs to determine their ability to prevent infection. They then began

looking for compounds to stimulate HDPs, starting with all free saturated fatty acids of 1-18 carbons. Earlier studies had shown that SCFA fatty acids have the capability to induce HDP synthesis and enhance bacterial clearance.

Research by Dr. Zhang and his team found that SCFA's and cyclic adenosine monophosphate (CAMP) synergized with sugars and certain plant extracts to promote HDP synthesis in chicken cells. Through additional research, they discovered that the strongest HDP inducers for pig and chicken cells is 4-carbon butyrate, and the strongest HDP inducers for human cells is 6-carbon hexanoate and 7-carbon heptanoate.

Dr. Zhang's research has yielded promising results that show dietary supplementation of HDP-stimulating compounds to be a potential antibiotic free strategy to infectious disease control and prevention.

To learn more about Dr. Zhang and his research on antibiotic resistance, contact Dr. Glenn Zhang or visit [http://ansi.okstate.edu/the-department/departments/uploaded\\_files/files/Zhang\\_Intl\\_Innovation.pdf](http://ansi.okstate.edu/the-department/departments/uploaded_files/files/Zhang_Intl_Innovation.pdf).

## Dr. Glenn Zhang



Dr. Glenn Zhang is originally from China. He is a professor of Animal Molecular Biology. Dr. Zhang has diverse research interests, but he currently focuses on the regulation of innate immunity as well as the role of microbiota in animal health and productivity. Dr. Zhang's experimental approaches include the state-of-the-art technologies in molecular biology, immunology, metagenomics, RNA sequencing, and bioinformatics.

His lab web page can be viewed at <http://ansi.okstate.edu/research/labs/zhang>.

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Dr. Zhang with a group of his researchers. Front Row (L to R): Zhuo Deng, Glenn Zhang, Wentao Lyu, Lakshmi Sunkara, and Xuwen Sheng-Wieneke. Back Row (L to R): Amanda Curtis, Audra Solis, Kelsy Robinson, Hannah Paradis, Sydney Stewart, Li An Fong, and Kumil Al Jumaia.

# The Role of New Technologies in Global Food Security – Improving Animal Production Efficiency and Minimizing Impacts

*By Dr. Clint Krehbiel*

Approximately 870 million out of 7 billion people (12.5% of the global population) are estimated to have been undernourished from 2010 to 2012. As the world population continues to increase, food security on a global scale must become a greater priority. Along with population growth, economic growth and the rise of the middle class in developing countries are expected to further increase demand for meat, milk and eggs. Although addressing food security on a global scale will require everyone working together, increasing production efficiency of livestock and poultry in an environmentally and economically sustainable manner needs to be a priority for animal agriculture.

During the past 40 years, development and adoption of new technologies has greatly enhanced livestock production by decreasing resource use and output of waste per unit of product produced.

With the world population expected to reach 9.5 billion by 2050, new knowledge of genomics, physiological processes, nutrient utilization, and animal well-being must lead to new management practices that are economically, environmentally, and socially sustainable, in order to meet the projected food demand.

Application of growth technologies commonly used in livestock production has greatly enhanced food security and sustainability. These growth-enhancing compounds increase production and improve feed efficiency of livestock. Long-term use of the growth-enhancing technologies has proven that the compounds are a safe, effective way to enhance lean-tissue deposition, and the changes in performance result in an economic benefit to both consumers and producers. In addition, land necessary to produce equivalent amounts of food for

consumers and the environmental impact of the livestock industry is greatly decreased when growth technologies are used. Withdrawal of growth technologies (i.e., steroidal implants, ionophores, and beta-adrenergic agonists) would have negative consequences on environmental and economic sustainability of livestock production, and would increase use of resources, carbon emissions, and production costs per kilogram of meat produced. In addition to growth technologies, reproductive biotechnologies have contributed many improvements in agriculturally important traits in livestock. These technologies not only have great potential for improving practical agricultural applications such as resistance to disease, reduced environmental impact, and improved productivity traits, but also for biomedical applications such as those



which produce therapeutic proteins in milk or blood, or generation of organs for human transplant.

Scientists in the Department of Animal Science at Oklahoma State University have been examining the effects of feedlot production systems with and without the use of growth technologies compared to an all-natural production program on feedlot performance and carcass characteristics. Treatments consisted of an all-natural treatment (NAT), a conventional treatment (CONV), and a conventional treatment with the addition of a beta-adrenergic agonist (CONV-Z). The NAT cattle received no growth promoting technologies. CONV-Z steers gained 3.8% faster and were 5.3% more efficient than CONV steers, and CONV steers gained 32.8% faster and were 26.7% more efficient than NAT steers. There was a 35.7% improvement in carcass gain, a 32.6% improvement in carcass efficiency, and a 21.8% improvement in dietary energy conversion efficiency for CONV-Z steers compared to NAT steers. Hot carcass weight (HCW) was increased by nearly 18 lbs. for CONV-Z steers compared to CONV steers, and 100 lbs. compared to NAT steers. The results of this study clearly show the advantage in using growth enhancing technologies on performance and carcass characteristics of feedlot cattle. Based on the per capita US beef consumption in 2012 of 81.9 lbs., the added HCW for a single CONV-Z steer compared to a NAT steer is enough to feed 1.22 more US Citizens per year per animal.

As society has increasing concern over technologies used in animal production, it will be imperative to communicate the “win-win-win” story of how increased animal productivity, reduced environmental impacts and improved animal well-being are inter-related. Further investigation should be explored to determine the effects of growth

enhancing technologies used in complete production systems on product acceptability and animal well-being so that management decisions can be made to meet the three goals of sustainability: socially acceptable, economically advantageous, and environmentally friendly. One question being raised by the industry is, “Are these production and environmental advantages accompanied with unintended negative effects on animal behavior and well-being?” The current study is one of the first to be published that addresses this question in finishing cattle. This experiment concluded that these growth promoting products do not negatively affect the behavior, mobility, or the overall observed health and well-being of finishing beef steers.

Global food security depends on developing technologies for improving production and production efficiencies of livestock while adapting to and mitigating climate change, protecting crops, livestock, and ecosystems from the threat of pests and diseases, and improving the nutritional quality and safety of food products for consumers worldwide. In addition, vibrant and sustainable livestock production is the basis for economic development and stability in rural communities. Therefore, developing technologies that can improve livestock production while minimizing environmental impacts, improving natural resource management, optimizing animal well-being, and ensuring the health and safety of consumers should be our goal.

Drs. Clint Krehbiel, DL Step, Michelle Calvo-Lorenzo, Chris Richards, Sara Place, Gretchen Mafi, Deb VanOverbeke, and Eric DeVyst worked as Co-PIs for this project. Students included Casey Maxwell, Bryan Bernhard, Blake Wilson, Kathryn Moyer, Catherine Haviland, Charlotte O’Neill, Justin Lyles, and Bailey Harsh.

## Dr. Clint Krehbiel



Dr. Clint Krehbiel is Assistant Department Head at OSU Department of Animal Science. Dr. Krehbiel’s research focuses on tissue and whole-animal energy and protein metabolism in ruminants, regulation of lipid metabolism in ruminants, impact of animal health and immune function on animal growth and carcass merit, nutritional/management strategies of adapting and subsequently feeding beef cattle on high-concentrate diets while minimizing risk of metabolic disorders, and systems research to improve efficiency of nutrient utilization by growing and finishing ruminants.

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# Effects of Technology Use in Beef Production Systems on Meat Quality, Consumer Palatability Ratings and Strip Loin Muscle Dimensions

*By Bailey Harsh*

Beta-agonists and steroidal implants are important beef production technologies that have had a crucial role in helping cattle feeders to be profitable in the face of an ever-shrinking U.S. cattle inventory, fluctuating corn prices and high beef demand. In the later stages of feeding, when cattle start to deposit more fat than muscle, the use of growth-promoting technologies such as beta-agonists and steroidal implants can help to increase muscle synthesis, ultimately increasing feed efficiency and the pounds of lean beef produced.

While these technologies are economically important to producers and have helped to improve beef's overall price competitiveness compared to other proteins, there is some change in palatability associated with the use of these technologies. Since tenderness, as well as juiciness and flavor, are major components of consumer eating satisfaction it's important to understand the effect technology use may have on consumer palatability.

Therefore, the objectives of the study were to examine the effects of beef production systems with and without the use of the beta-agonist zilpaterol hydrochloride (marketed by Merck Animal Health under the brand name Zilmax) on consumer acceptance compared to an all-natural production system. In addition, the study was designed to discover whether or not consumers find differences between

steaks from an all-natural (NAT), conventional (CONV), or conventional with Zilmax (CONV-Z) production system and if differences are found, how similar they are to objective tenderness measurements (Warner-Bratzler shear (WBSF), slice shear (SS)) and trained taste panelists.

Three hundred and thirty-six crossbred beef steers were randomized to one of the three production systems. The conventional and Zilmax steers were both implanted upon arrival with Revalor-XS (40 mg of estradiol and 200 mg of trenbolone acetate), and were supplemented with Rumensin and Tylan for the entire feeding period (33 and 9 mg/kg of monensin and tylosin daily, respectively). Zilmax steers received a diet including Zilmax (6.76 mg of ZH/kg) for the last 20 days before slaughter with a 3 day withdraw. Natural cattle received no growth promoting technologies of any kind.

Forty-four USDA Low Choice carcasses were identified from each production system and strip loins were collected. Loins were sliced into one-inch thick steaks and steaks from each were aged for 14 or 21 days. Steaks for sensory analysis and instrumental tenderness were thawed for 24 hours and cooked on a conveyor oven to a medium degree of doneness. At an OSU football game in Stillwater, OK a 400-person consumer panel was conducted where consumers blindly tasted 21 day aged samples from

each production system and evaluated them for tenderness, juiciness, flavor and overall liking. In a controlled taste panel room, a group of eight trained panelists evaluated both 14 and 21 day aged samples for tenderness, juiciness, connective tissue and specific flavors (beefy, buttery, metallic and oxidation).



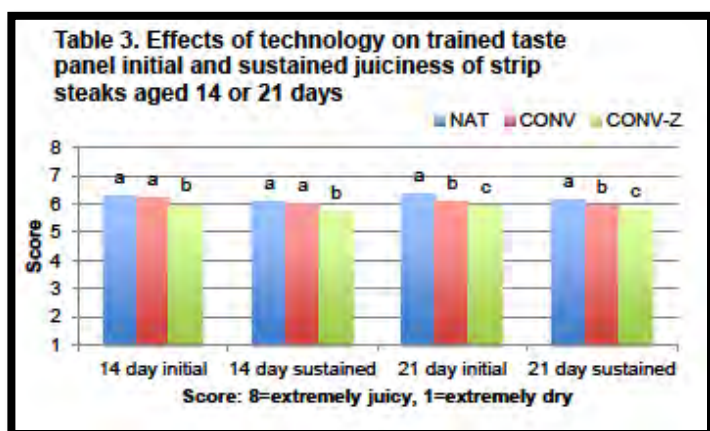
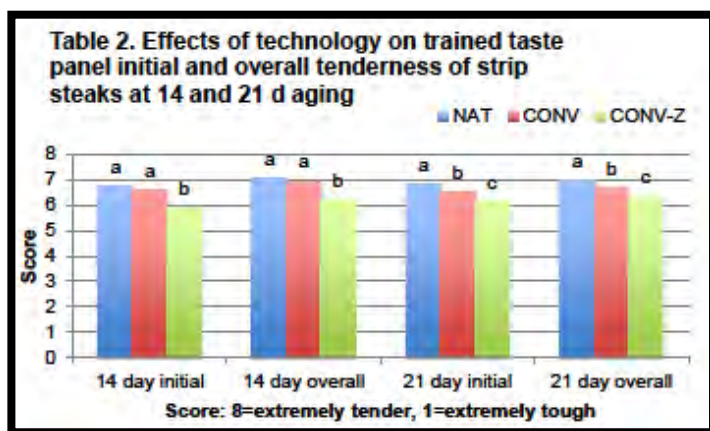
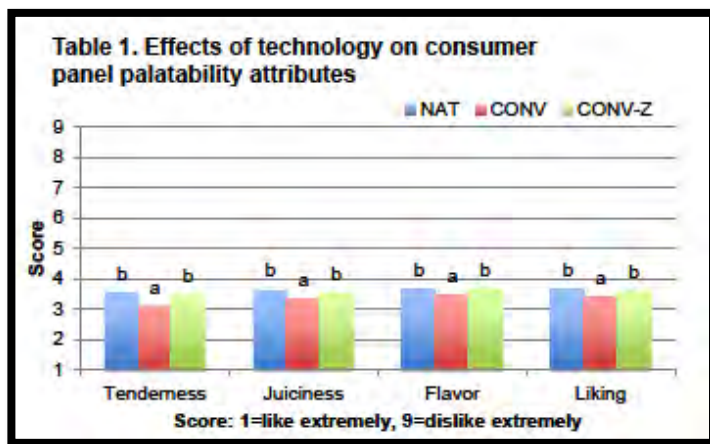
Slice shear tenderness data showed both natural and conventional steaks were more tender than those from cattle that received Zilmax, however tenderness of all steaks improved with increased aging. Consumers preferred conventional steaks in terms of tenderness, juiciness, flavor and overall liking but, interestingly, found steaks from natural and Zilmax cattle to be the same in all these attributes (Table 1).

Trained panelists ranked natural and conventional steaks similar for juiciness and tenderness at 14 day aging with

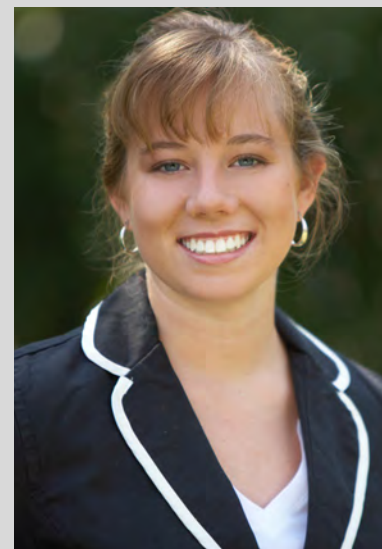
Zimax rated less juicy and tender compared to natural and conventional. By 21 day aging, natural steaks were ranked as more tender and juicy compared to conventional, but both were again rated higher than Zimax steaks (Tables 2 & 3). The trained panelists' tenderness findings reflected differences shown through WBSF.

The data showed consumers were unable to detect tenderness or palatability differences found by WBSF,

SS and trained panelists. Consumers rated 21 day aged steaks from cattle supplemented with zilpaterol hydrochloride similar to steaks from all-natural cattle. However, instrumental measurements and trained panelist found significant differences between the two. Ultimately, the use of Zimax and other growth promoting technologies are of great benefit to beef production systems as long as consumers find the quality to be acceptable.



## Bailey Harsh



Bailey Harsh graduated with a M.S. degree in Food Science during the fall 2014 semester. Her research focused on meat quality attributes that are associated with varying live animal management systems. Bailey was mentored by Dr. Deb VanOverbeke. Bailey will be pursuing a Ph.D. at the University of Illinois.

Bailey worked closely with Dr. Gretchen Mafi on the research project. For more information about "Effects of Technology Use in Beef Production Systems on Meat Quality, Consumer Palatability Ratings and Strip Loin Muscle Dimensions," please contact Dr. Gretchen Mafi.

## CONTACT

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# Research Grants

*Below are active grants in the Department of Animal Science that are nationally competitive.*

**Dr. Scott Carter (PI).** Design4 and ENSOL, LLC. Efficacy of low-cost waste treatment tanks to reduce the potential environmental effects of manure. 10/15/13 – 12/31/15. \$14,287.

**Dr. Steven Cooper (PI).** Land O'Lakes, Inc. Energex Equine Trial. 6/1/12 – Completion. \$17,392.

**Dr. Jennifer Hernandez Gifford (PI).** NIFA/USDA. National Needs Fellowship Program in Application of Genomic and Computational Biology to Animal Production. 2/1/13 – 1/31/18. \$238,500.

**Dr. Jennifer Hernandez Gifford (PI).** University of South Carolina. Comparative Approach to Identify Functional Amino Acid Response Elements of Genes Controlling Ovarian Function. 1/1/14 – 12/31/14. \$15,000.

**Dr. Divya Jaroni (PI).** USDA/University of Arizona. Improving the Safety and Quality of Organic Leafy Greens: Assessment of good Production Practices along the Farm to Fork Continuum. 1/1/12 – 8/31/15. \$414,530.

**Dr. Divya Jaroni (PI).** USDA/NIFA. Reduction of Escherichia Coli O157:h7 on Small-Scale Cow/Calf Operations Using Best Management Practices. 6/1/12 – 1/31/15. \$559,651.

**Dr. Divya Jaroni (PI).** USDA. BAX-Q7-System to Increase Efficiency and Accuracy of Microbial Detection in Environmental and Food Matrices. 12/1/13 – 11/30/14. \$27,500.

**Dr. Clint Krehbiel (PI).** Merck Animal Health. Effects of altering beef production systems on animal performance, carcass characteristics, production economics, heat stress, and animal behavior. 3/18/13 – Completion. \$112,200.

**Dr. Clint Krehbiel (PI).** Feedlot Animal Health. Utilization of near-infrared reflectance spectroscopy technology to characterize feedstuffs procured in beef feedlots in Western Canada. 4/1/13 – 3/31/15. \$88,637.

**Dr. Clint Krehbiel (PI).** Nutrition Physiology Company. Effect of Bovamine Defend on the performance of beef cattle during the receiving/growing phase. 11/1/13 – 3/1/15. \$52,323.

**Dr. Clint Krehbiel (PI).** Flagship Omega 3 Beef. Effects of Feeding Algae on Feedlot per Fatty Acid Composition of Longissimus. 2/1/14 – 12/31/14. \$5,000.

**Dr. Clint Krehbiel (PI).** Zoetis. Impact of vaccination with an intranasal and injectable vaccine versus two competitive modified live combination vaccines. 2/17/14 – 8/31/14. \$120,093.

**Dr. Clint Krehbiel (PI).** ODAFF. Agriculture Research and Education Extension. 8/1/14 – 6/30/15. \$25,000.

**Dr. David Lalman (PI).** Alltech, Inc. Effects of Bio-Mos on Passive Immunity in Beef Cows. 1/1/12 – 6/14/14. \$106,250.

**Dr. David Lalman (PI).** Alltech, Inc. Effects of Optimase and Rumensin in Beef Cows. 1/1/13 – Completion. \$68,791.

**Dr. David Lalman (PI).** KSU/USDA Climate Change. Resilience and Vulnerability of Beef Cattle Production in the Southern Great Plains under Changing Climate, Land Use and Markets. 2/15/13 – 2/14/15. \$155,949.

**Dr. David Lalman (PI).** ADM Alliance Nutrition, Inc. Intake and in-field stability of monensin-containing Mintrate XL 20 pressed tubs fed to stocker cattle grazing summer pastures. 6/15/13 – Completion. \$56,059.

**Dr. David Lalman (PI).** Intervet, Inc. DBA Merck Animal Health. Effects of Ralgron on growth performance of suckling steer calves in Oklahoma when administered at 30-90 days of age. 4/21/14 – Completion. \$31,325.

**Dr. David Lalman (PI).** ADM Alliance Nutrition. 1425 ADM Alliance Nutrition Rumensin Tub Study. 7/15/14 – Completion. \$60,233.

**Dr. Gant Mourer (PI).** Oklahoma Beef Council. Oklahoma Beef Quality Assurance (BQA) Expansion Initiative. 10/1/14 – 9/30/16. \$37,267.

**Dr. Peter Muriana (PI).** OCAST. Antimicrobial Peptides Produced Lactic Acid Bacteria for Inhibition of Pathogens. 2/1/12 – 12/31/14. \$105,000

**Dr. Sara Place (PI).** NCBA. Current Approaches of Beef Cattle System Life Cycle Assessment - A Review. 2/1/14 – 5/31/15. \$5,422.

**Dr. Ranjith Ramanathan (PI).** USDA. Application of Metabolomics to determine the interrelationship between postmortem metabolite profile and beef color. 1/1/14 – 12/31/15. \$78,626.

**Dr. Chris Richards (PI).** NOVUS International, Inc. Evaluation of Mintrex Beef chelated trace minerals on clinical signs, immune response variables, and mineral balance in calves following natural exposure to bovine viral diarrhea virus type 1b and subsequent Mannheimia haemolytica infection. 12/1/12 – 06/30/14. \$31,591.40.

**Dr. Chris Richards (PI).** USDA – AFRI. 2014 Feedlot Receiving Calf Health and Well Being Conference Grant. 3/1/14 – 2/28/15. \$10,000.

**Dr. Chris Richards (PI).** University of Arkansas. Bringing Risk Management Education to Producers through YouTube and Other Social Media Outlets. 7/1/14 – 6/30/15. \$11,115.

**Dr. Megan Rolf (PI).** University of Arkansas. Incorporation of Risk Management Strategies into the Master Cattleman Program. 7/1/13 – 12/31/14. \$18,073

**Dr. Megan Rolf (PI).** USDA. Beef Cattle Selection and Management for Adaptation to Drought. 5/1/14 – 4/30/19. \$1,000,000.

**Dr. Megan Rolf (PI).** Langston University. Genomics of Resilience in Sheep to climatic Stressors. 6/2/14 – 8/31/16. \$124,537.

**Dr. Megan Rolf (PI).** NIFA Higher Education Challenge Grants Program. 2014 Applied Reproductive Strategies in Beef Cattle Conference Grant. 8/1/2014 – 7/31/15. \$5,000.

**Dr. Megan Rolf (PI).** TCFA. Use of Systems Research to Improve Beef Cattle Feed and Water Use Efficiency. 9/1/14 – 8/31/19. \$3,360.

**Dr. Lakshmi Sunkara (PI).** Innovad. Impact of Butyrate-Based Products on Growth Promotion, Antimicrobial Peptide Expression, and Intestinal Microflora Balance in Broiler Chickens. 3/1/14 – 6/30/15. \$46,008.

**Dr. Deborah VanOverbeke (PI).** National Beef Packing Company. To Investigate the Effects of Sodium Metasilicate on Organoleptic Properties of Ground Beef. 2/23/12 – 8/31/15. \$15,090.

**Dr. Deborah VanOverbeke (PI).** National Cattlemen’s Beef Association. OSU – Meat Science Graduate Research Assistantship. 10/1/13 – 9/30/15. \$30,000.

**Dr. Deborah VanOverbeke (PI).** NIFA/ USDA. Instron 5943 Dual Column Tabletop Model Testing System. 2/1/14 – 1/31/15. \$17,300.

**Dr. Deborah VanOverbeke (PI).** USDA ARS El Reno. ARS Meat Quality. 9/1/2014 – 8/31/19. \$15,000.

**Dr. Robert Wettemann (PI).** SmartStock, LLC. Development of Algorithms to Determine an Increase in Ruminant Temp in Cattle. 6/1/13 – Completion. \$9,882

**Dr. Guolong (Glenn) Zhang (PI).** OCAST. Antimicrobial Therapy Using Immunomodulatory Peptides (Years Two and Three). 8/1/13 – 7/31/15. \$90,000.

**Dr. Guolong (Glenn) Zhang (PI).** OCAST. Development of Immune Boosting Feed Additives. 9/1/13 – 8/31/14. \$45,000.

**Dr. Guolong (Glenn) Zhang (PI).** OSU Cowboy Technology. Natural Immune Boosting Feed Additives as Alternatives to Antibiotics. 1/1/14 – 12/31/14. \$50,000.

## Research Focus

**Michelle Calvo-Lorenzo:**  
Animal Well-Being

**Scott Carter:** Swine Nutrition

**Steven Cooper:** Equine Nutrition

**Udaya DeSilva:** Molecular Genetics

**Craig Gifford:** Physiology

**Jennifer Hernandez Gifford:**  
Reproductive Physiology

**Gerald Horn:**  
Beef Cattle Nutrition and Management

**Divya Jaroni:**  
Food Microbiology and Pre-harvest Food Safety

**Clint Krehbiel:**  
Beef Cattle Nutrition and Health

**David Lalman:**  
Cow/Calf and Stocker Cattle Applied Nutrition and Management

**Gretchen Mafi:** Meat Science

**Gant Mourer:** Beef Cattle

**Peter Muriana:** Food Microbiology

**Sara Place:** Beef Cattle Sustainability

**Ranjith Ramanathan:**  
Meat Science/Biochemistry

**Chris Richards:**  
Feedlot and Stocker Cattle Applied Nutrition and Management

**Megan Rolf:** Genomics

**Leon Spicer:**  
Dairy Cattle Reproductive Physiology

**Lakshmi Sunkara:** Molecular Biology

**Deborah VanOverbeke:** Meat Science

**Robert Wettemann:**  
Reproduction and Endocrine Function of Beef Cattle

**Guolong (Glenn) Zhang:**  
Molecular Biology

# Faculty Publications

*Below are the 2013 publications for Oklahoma State University Department of Animal Science. (Faculty members are indicated by \*).*

Aad, P. Y., S. E. Echternkamp, and \*L. J. Spicer. 2013. Possible role of IGF2 receptors in regulating selection of 2 dominant follicles in cattle selected for twin ovulations and births. *Domestic animal endocrinology* 45(4):187-195.

\*Bloomberg, B. D., \*G. G. Mafi, B. J. Pye, J. L. Wahrmond, \*C. J. Richards, J. B. Morgan, and \*D. L. Vanoverbeke. 2013. Impact of health management, health treatments, and zilpaterol hydrochloride supplementation on carcass quality, color, and palatability traits in heifers. *Journal of animal science* 91(7):3465-3473.

Buchanan, J. W., A. J. Garmyn, \*G. G. Hilton, \*D. L. VanOverbeke, Q. Duan, D. C. Beitz, and \*R. G. Mateescu. 2013. Comparison of gene expression and fatty acid profiles in concentrate and forage finished beef. *Journal of animal science* 91(1):1-9.

\*Carter, S. D. and H. Kim. 2013. Technologies to reduce environmental impact of animal wastes associated with feeding for maximum productivity. *Animal Frontiers* 3(3):42-47.

Cortinovis, C., F. Pizzo, \*L. J. Spicer, and F. Caloni. 2013. Fusarium mycotoxins: effects on reproductive function in domestic animals--a review. *Theriogenology* 80(6):557-564.

Guelker, M. R., A. N. Haneklaus, J. C. Brooks, C. C. Carr, R. J. Delmore, Jr., D. B. Griffin, D. S. Hale, K. B. Harris, \*G. G. Mafi, D. D. Johnson, C. L. Lorenzen, R. J. Maddock, J. N. Martin, R. K. Miller, C. R. Raines, \*D. L. VanOverbeke, L. L. Vedral, B. E. Wasser, and J. W. Savell. 2013. National Beef Tenderness Survey-2010: Warner-Bratzler shear force values and sensory panel ratings for beef steaks from United States retail and food service establishments. *Journal of animal science* 91(2):1005-1014.

\*Hernandez Gifford, J. A. and \*C. A. Gifford. 2013. Role of reproductive biotechnologies in enhancing food security and sustainability. *Animal Frontiers* 3(3):14-19.

Howard, S. T., D. R. Woerner, J. A. Scanga, \*D. L. VanOverbeke, \*G. G. Mafi, J. L. Igo, M. D. Salman, J. D. Tatum, and K. E. Belk. 2013. North American Beef Tenderness Survey 2011-2012: benchmarking tenderness and sample shipping procedures. *Journal of animal science* 91(12):5981-5988.

Igo, J. L., \*D. L. VanOverbeke, D. R. Woerner, J. D. Tatum, D. L. Pendell, L. L. Vedral, \*G. G. Mafi, M. C. Moore, R. O. McKeith, G. D. Gray, D. B. Griffin, D. S. Hale, J. W. Savell, and K. E. Belk. 2013. Phase I of The National Beef Quality Audit-2011: quantifying willingness-to-pay, best-worst scaling, and current status of quality characteristics in different beef industry marketing sectors. *Journal of animal science* 91(4):1907-1919.

Jiang, W., \*L. T. Sunkara, X. Zeng, Z. Deng, S. M. Myers, and \*G. Zhang. 2013. Differential regulation of human cathelicidin LL-37 by free fatty acids and their analogs. *Peptides* 50:129-138.

Knobel, S. M., \*G. G. Mafi, C. M. De Witt, J. B. Morgan, \*C. J. Richards, and \*D. L. VanOverbeke. 2013. The impact of postharvest interventions on the color stability and, subsequently, the palatability of beef from cattle fed wet distillers grain. *Journal of animal science* 91(3):1468-1479.

\*Krehbiel, C. 2013. The role of new technologies in global food security: Improving animal production efficiency and minimizing impacts. *Animal Frontiers* 3(3):4-7.

Lents, C. A., F. J. White, N. H. Ciccioli, L. N. Floyd-White, I. Rubio, D. H. Keisler, \*L. J. Spicer, and \*R. P. Wettemann. 2013. Metabolic status, gonadotropin secretion, and ovarian function during acute nutrient restriction of beef heifers. *Journal of animal science* 91(9):4146-4157.

Linneen, S. K., \*G. L. Mourer, J. D. Sparks, J. S. Jennings, C. L. Goad, and \*D. L. Lalman. 2014. Effects of mannan oligosaccharide on beef-cow performance and passive immunity transfer to calves. *The Professional Animal Scientist* 30(3):311-317.

\*Mateescu, R. G., A. J. Garmyn, R. G. Tait, Jr., Q. Duan, Q. Liu, M. S. Mayes, D. J. Garrick, A. L. Van Eenennaam, \*D. L. Vanoverbeke, \*G. G. Hilton, D. C. Beitz, and J. M. Reecy. 2013a. Genetic parameters for concentrations of minerals in longissimus muscle and their associations with palatability traits in Angus cattle. *Journal of animal science* 91(3):1067-1075.



- \*Mateescu, R. G., D. J. Garrick, R. G. Tait, Jr., A. J. Garmyn, Q. Duan, Q. Liu, M. S. Mayes, A. L. Van Eenennaam, \*D. L. VanOverbeke, \*G. G. Hilton, D. C. Beitz, and J. M. Reecy. 2013b. Genome-wide association study of concentrations of iron and other minerals in longissimus muscle of Angus cattle. *Journal of animal science* 91(8):3593-3600.
- McMurphy, C. P., S. K. Linneen, \*G. L. Mourer, B. P. Holland, \*G. W. Horn, and \*D. L. Lalman. 2013. Effects of stocker-phase grazing system and implantation on performance and carcass characteristics of fall-born steers. *The Professional Animal Scientist* 29(1):27-32.
- Paddock, Z. D., D. G. Renter, X. Shi, \*C. R. Krehbiel, B. DeBey, and T. G. Nagaraja. 2013. Effects of feeding dried distillers grains with supplemental starch on fecal shedding of *Escherichia coli* O157:H7 in experimentally inoculated steers. *Journal of animal science* 91(3):1362-1370.
- Patil, A. A., A. J. Ouellette, W. Lu, and \*G. Zhang. 2013. Rattusin, an intestinal alpha-defensin-related peptide in rats with a unique cysteine spacing pattern and salt-insensitive antibacterial activities. *Antimicrobial agents and chemotherapy* 57(4):1823-1831.
- \*Place, S. E. and F. M. Mitloehner. 2014. The nexus of environmental quality and livestock welfare. *Annual review of animal biosciences* 2:555-569.
- Ramey, H. R., J. E. Decker, S. D. McKay, \*M. M. Rolf, R. D. Schnabel, and J. F. Taylor. 2013. Detection of selective sweeps in cattle using genome-wide SNP data. *BMC genomics* 14:382.
- Schumacher, L. L., B. C. Love, M. Ferrell, \*U. DeSilva, R. Fernando, and J. W. Ritchey. 2013. Canine intestinal histoplasmosis containing hyphal forms. *Journal of veterinary diagnostic investigation : official publication of the American Association of Veterinary Laboratory Diagnosticians, Inc* 25(2):304-307.
- Sharman, E. D., P. A. Lancaster, \*C. R. Krehbiel, \*G. G. Hilton, \*D. R. Stein, \*U. Desilva, and \*G. W. Horn. 2013a. Effects of starch- vs. fiber-based energy supplements during winter grazing on partitioning of fat among depots and adipose tissue gene expression in growing cattle and final carcass characteristics. *Journal of animal science* 91(5):2264-2277.
- Sharman, E. D., P. A. Lancaster, C. P. McMurphy, A. J. Garmyn, B. J. Pye, \*G. G. Mafi, C. L. Goad, W. A. Phillips, J. D. Starkey, \*C. R. Krehbiel, and \*G. W. Horn. 2013b. Effect of rate of body weight gain in steers during the stocker phase. I. Growth, partitioning of fat among depots, and carcass characteristics of growing-finishing beef cattle. *Journal of animal science* 91(9):4322-4335.
- Sharman, E. D., P. A. Lancaster, C. P. McMurphy, \*G. G. Mafi, J. D. Starkey, \*C. R. Krehbiel, and \*G. W. Horn. 2013c. Effect of rate of body weight gain of steers during the stocker phase. II. Visceral organ mass and body composition of growing-finishing beef cattle. *Journal of animal science* 91(5):2355-2366.
- Stackhouse-Lawson, K. R., \*M. S. Calvo, \*S. E. Place, T. L. Armitage, Y. Pan, Y. Zhao, and F. M. Mitloehner. 2013. Growth promoting technologies reduce greenhouse gas, alcohol, and ammonia emissions from feedlot cattle. *Journal of animal science* 91(11):5438-5447.
- Su, K., J. Q. Moss, \*G. Zhang, D. L. Martin, and Y. Wu. 2013. Bermudagrass Drought Tolerance Associated with Dehydrin Protein Expression during Drought Stress. *Journal of the American Society for Horticultural Science* 138(4):277-282.
- Su, K. J. Q. Moss; \*G. Zhang; Y. Wu, and D. L. Martin. 2013. Membrane lipid composition and drought tolerance in Bermudagrass. *International Turfgrass Society Research Journal* 12:445-452.
- \*VanOverbeke, D. L. A., J.A. 2013. QUALITY MANAGEMENT Farm Level: Safety and Quality of Beef. Pages 173-177 in *Encyclopedia of Meat Science*. 2nd ed. C. D. a. M. Dikeman, ed. Elsevier.
- Wang, A. N., C. J. Cai, X. F. Zeng, F. R. Zhang, \*G. L. Zhang, P. A. Thacker, J. J. Wang, and S. Y. Qiao. 2013. Dietary supplementation with *Lactobacillus fermentum* I5007 improves the anti-oxidative activity of weanling piglets challenged with diquat. *Journal of applied microbiology* 114(6):1582-1591.
- Wasala, L., J. L. Talley, \*U. Desilva, J. Fletcher, and A. Wayadande. 2013. Transfer of *Escherichia coli* O157:H7 to spinach by house flies, *Musca domestica* (Diptera: Muscidae). *Phytopathology* 103(4):373-380.
- Zeng, X., \*L. T. Sunkara, W. Jiang, M. Bible, \*S. Carter, X. Ma, S. Qiao, and \*G. Zhang. 2013. Induction of porcine host defense peptide gene expression by short-chain fatty acids and their analogs. *PloS one* 8(8):e72922.
- Zorrilla-Rios, J. M., P. A. Lancaster, C. L. Goad, \*G. W. Horn, \*G. G. Hilton, and J. G. Galindo. 2013. Quality evaluation of beef carcasses produced under tropical conditions of México. *Journal of animal science* 91(1):477-482.
- Zorrilla-Rios, J. M. L., P.A.; \*Horn, G.W.; Goad, C.L.; \*Hilton, G.G.; Carrasco, D.M. 2013. Prediction of cutability of beef carcasses processed in Jalisco State, Mexico. *Avances en Investigación Agropecuaria* 17(2):65-77.

# Research Reports

## What Are Research Reports?

The Oklahoma State University Department of Animal Science faculty and graduate students create Research Reports in order to inform stakeholders, educators and researchers about the exciting research being conducted in our department. The research in our department focuses around animal science and food science. The reports describe the methods, results, and conclusions found by researchers during their scientific investigations.

The Department of Animal Science Research Reports began in 1958 and were called "Feeder's Day Reports" until 1967. Between 1968 and 1972, they were known as "Animal Science Progress Reports". The first year they were referred to as "Research Reports" was 1973. Reports written before 1995 were printed and bound; they are available at select libraries across the country. The Animal Science website shows all research reports from 1995 to the present. The Research Report program stopped from 2010 to 2012, but has been rebooted by the department.

The Department of Animal Science published thirteen research reports in 2013 and they are now available online at <http://ansi.okstate.edu/research/research-reports-1>.

*The following is a list of Research Reports published by the OSU Department of Animal Science in 2013.*

"Cyclic voltammetry to determine myoglobin reduction potential and oxygenation," R. Ramanathan, R. Nerimetla, S. Krishnan, D. L. VanOverbeke, and G. G. Mafi.

"Effects of bale feeder type and processing on hay waste, intake, and performance of beef cattle," by A. J. Sexten, C. P. McMurphy, G. L. Mourer, C. J. Richards, C. Jones, R. Huhnke, and D. L. Lalman.

"Effects of bale feeder type, monensin supplementation, limit feeding, and hay ammoniation on hay waste, intake, and performance of beef cattle," by J. D. Sparks, S. K. Linneen, and D. L. Lalman.

"Effects of bale feeder type, monensin supplementation, and limit feeding on hay waste, intake, and performance of beef cattle," by J. D. Sparks, S. K. Linneen, and D. L. Lalman.

"Effects of protein supplementation of fall calving cows on cow performance and calf growth," by K. J. McLean, B. H. Boehmer, and R. P. Wettemann

"Effects of vitamin E on color stability of strip loin steaks from cattle fed distillers grains," by B. D. Bloomberg, G. G. Mafi, K.G. Hanger, C. J. Richards, J. B. Morgan, and D. L. VanOverbeke.

"Evaluation of antimicrobials allowed for use in meats against multi-strain cocktails of Salmonella, Escherichia coli O157:H7, and Listeria monocytogenes using a kinetic growth inhibition assay," by C. B. Bottini and P. M. Muriana.

"Evaluation of commercially available near-infrared reflectance spectroscopy for nutrient prediction of DDGS," by A. R. Harding, C. F. O'Neill, M. L. May, L. O. Burciaga-Robles, and C. R. Krehbiel.

"Maintenance energy requirements of gestating beef cows and plasma concentrations of thyroxine and triiodothyronine," by T. A. Pye, B. H. Boehmer, and R. P. Wettemann.

"Prediction of as-is barley silage dry matter by near infrared reflectance spectroscopy," by C. F. O'Neill, A. R. Harding, M. L. May, L. O. Burciaga-Robles, and C. R. Krehbiel.

"Relationship of USDA marbling groups with palatability of beef longissimus muscle," by A. J. Garmyn, G. G. Hilton, J. B. Morgan, and D. L. VanOverbeke.

"Supplementation of monensin to beef cows consuming low-quality forage during late gestation and early lactation," by S. K. Linneen, J. D. Sparks, A. McGee, G. W. Horn, D. L. Lalman, and D. R. Stein.

"The effect of elevated ambient temperature on ruminal temperatures of beef cows," by B. H. Boehmer, T. A. Pye, and R. P. Wettemann.

# Graduate Research

Graduate students in the Department of Animal Science represent 15 states and 7 foreign countries. The quality of our graduate students remains high, as indicated by their numerous honors, awards, and job placement, and they continue to excel in research competitions. They have been highly sought after by universities and employers across the country.

The Department of Animal Science offers graduate students a wide variety of courses. Graduate students work closely with experienced faculty while pursuing their educational goals and are given the opportunity to present their research findings at conferences and symposiums across the country. Presenting research fine tunes a student's communication skills and also gives students a chance to discuss their research and ideas with other scholars and researchers.

The Department of Animal Science offers programs leading to a Master of Science (M.S.) degree in Animal Science and Food Science. The Doctor of Philosophy (Ph.D.) degree may also be obtained in Animal Science or Food Science. Additionally, a Master of Animal Science non-thesis option is offered which is not a research oriented degree. The M.S. non-thesis option is considered a "terminal" degree, designed for students who want to advance in agricultural careers that do not usually offer advantages or incentives for acquiring a doctorate. The Plan of Study for each degree program is determined by the student and his/her advisory committee. In the M.S. degree programs, students are expected to take courses in areas that support their discipline or interest, that are above and beyond the courses normally required for a B.S. degree in that major or closely related major. For the Ph.D. degree,

students take courses related to their major that are beyond those for the M.S. degree. The emphasis is usually on research at the Ph.D. level. To learn more about our graduate program, visit <http://ansi.okstate.edu/prospective-students/graduate>.

## Master of Science (M.S. Degree)

Animal Science or Food Science degrees are available.

The master's degree may be earned by one of three plans of study:

**Plan I** - with thesis, 30 credit hours, consisting of 24 hours of course work and six hours of research with a grade of "SR."

**Plan II** - with report, 32 credit hours, consisting of 30 hours of course work and two hours of research with a grade of "SR."

**Plan III** - with no thesis or report, 32 credit hours of course work, including the creative component. The creative component may be a special report, an annotated bibliography, a project in research or design, or other creative activity, as designated by the advisory committee. Courses numbered 5000 or 6000 may not be used on a plan of study involving a creative component.

## Doctor of Philosophy (Ph.D. Degree)

Animal Science or Food Science degrees are available.

The Doctor of Philosophy degree requires a minimum of 90 credit hours beyond the bachelor's degree, or a minimum of 60 credit hours beyond the master's degree in a related discipline.

## Master of Agriculture (M.Ag. Degree)

The Master of Agriculture degree is a "terminal" degree designed for students who want to advance in agricultural careers that do not usually offer advantages or incentives for acquiring a doctorate.

*The following are graduate students in the Department of Animal Science involved in research studies at Oklahoma State University.*

### Blanchefort Allahodjibeye Djimsa

**Degree:** M.S. Food Science

**Area:** Food Science

**Mentor:** Dr. Ranjith Ramanathan

**Research:** Fluorescent properties of myoglobin during heat-induced denaturation.

### Kristi Allwardt

**Degree:** M.S. Animal Science

**Area:** Genetics

**Mentor:** Dr. Megan Rolf

**Research:** Development and characterization of water intake and efficiency phenotypes for genetic evaluation in beef cattle.

### Bahaa Aloqaily

**Degree:** Ph.D. Animal Science

**Area:** Physiology

**Mentor:** Dr. Jennifer Hernandez Gifford

**Research:** Identifying the role of IGF-1 receptors on WNT and FSH inhibition of ovarian steroidogenesis.

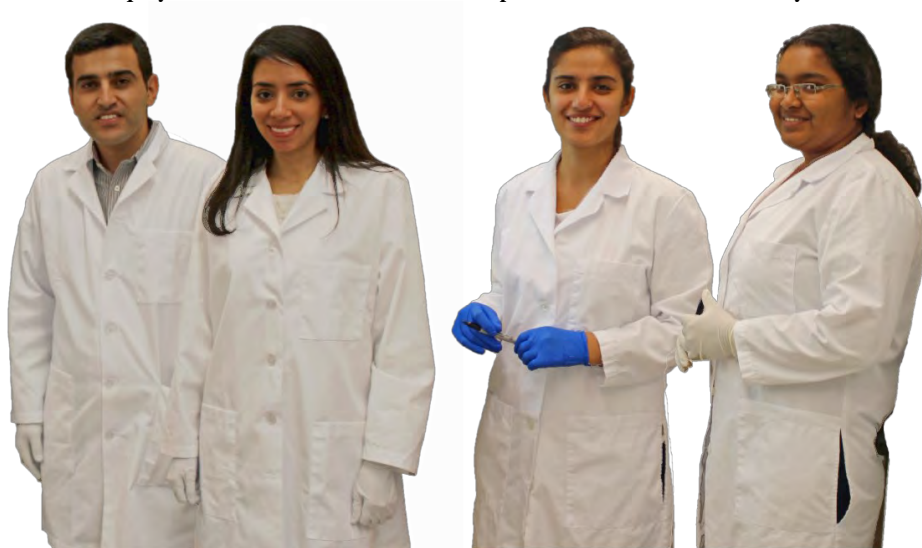
### Emily Andreini

**Degree:** M.S. Animal Science

**Area:** Beef Sustainability

**Mentor:** Dr. Sara Place

**Research:** Evaluation of an enteric methane emissions measurement system for cattle.

**Corbit Bayliff****Degree:** M.S. Animal Science**Area:** Nutrition**Mentor:** Dr. David Lalman**Research:** Cow/calf nutrition and management.**Brit Boehmer****Degree:** Ph.D. Animal Science**Area:** Physiology**Mentor:** Dr. Bob Wettemann**Research:** Evaluation of maintenance energy requirement in beef cows.**Kimberly Branham****Degree:** M.S. Animal Science**Area:** Behavioral Genetics**Mentor:** Drs. Megan Rolf & Michelle Calvo-Lorenzo**Research:** Comparison of actual versus predicted feed intake phenotypes for genetic evaluation of feed efficiency in beef cattle.**Ashley Brooks****Degree:** M.S. Animal Science**Area:** Genetics**Mentor:** Dr. Megan Rolf**Research:** Assessing and addressing consumer misconceptions of the use of biotechnologies in beef production.**Justin Brooks****Degree:** M.S. Food Science**Area:** Food Microbiology**Mentor:** Dr. Divya Jaroni**Research:** Food microbiology.**Justin Buchanan****Degree:** Ph.D. Food Science**Area:** Breeding & Genetics**Mentor:** Dr. Divya Jaroni**Research:** Deriving gene networks underlying fatty acid composition of the triacylglycerol and phospholipid fractions in angus longissimus muscle.**Corey Carpenter****Degree:** M.S. Animal Science**Area:** Nutrition**Mentor:** Dr. Scott Carter**Research:** Effect of diet strategy on performance of Tyson wean to finish pigs.**Jessica Chase****Degree:** M.S. Animal Science**Area:** Physiology**Mentor:** Drs. Jennifer Hernandez Gifford and Craig Gifford**Research:** Maternal immune responses in early pregnancy in cattle.**Jarrold Cole****Degree:** M.S. Animal Science**Area:** Nutrition**Mentor:** Dr. David Lalman**Research:** Effects of an intensified cow/calf production system in the Southern Great Plains.**Zhuo (Judy) Deng****Degree:** Ph.D. Animal Science**Area:** Molecular Biology**Mentor:** Dr. Glenn Zhang**Research:** Role of intestinal microbiota in animal health and productivity.**Andrea English****Degree:** M.S. Food Science**Area:** Food Science**Mentor:** Dr. Ranjith Ramanathan**Research:** Understanding the mechanism of failure to bloom in dark cutting beef.**Li An Fong****Degree:** M.S. Animal Science**Area:** Molecular Biology**Mentor:** Dr. Glenn Zhang**Research:** Synergistic effect of butyrate and sugars on chicken host defense gene expression.**Belinda Gomez****Degree:** Ph.D. Animal Science**Area:** Physiology**Mentor:** Dr. Jennifer Hernandez Gifford**Research:** Signal transduction in ovarian follicle maturation and granulosa cell estrogen biosynthesis in the bovine, ovine, and rodent.**Taylor Graham****Degree:** M.S. Food Science**Area:** Food Science**Mentor:** Drs. Gretchen Mafi & Blake Bloomberg**Research:** Value and impact of suspended fresh technology on high value beef middle meats.**Bahaa Aloqaily****Belinda Gomez****Pushpinder Litt****Buddhini Jayasundera**

**Catherine Haviland**

**Degree:** M.S. Animal Science

**Area:** Nutrition

**Mentor:** Dr. Chris Richards

**Research:** Rumen temperature as a biomarker for feedlot cattle health and well-being.

**Badrinath Jagannathan**

**Degree:** M.S. Food Science

**Area:** Microbiology

**Mentor:** Dr. Peter Muriana

**Research:** Characterization and optimization of bacteriocin production by lactic acid bacteria.

**Buddhini Jayasundera**

**Degree:** M.S. Food Science

**Area:** Microbiology

**Mentor:** Dr. Divya Jaroni

**Research:** Identification of contamination sources and prevalence of Escherichia coli O157:H& and other STEC on small-scale cow/calf operations.

**Pushpinder Litt**

**Degree:** Ph.D. Food Science

**Area:** Food Science

**Mentor:** Dr. Divya Jaroni

**Research:** Effect of antimicrobials against Escherichia coli O157:H7 on fresh produce.

**Samantha Lowman**

**Degree:** M.S. Animal Science

**Area:** . Physiology

**Mentor:** Dr. Dan Stein

**Research:** The demographics, perceptions, and knowledge base of students enrolled in the Introduction to Animal Science course at OSU.

**Justin Lyles**

**Degree:** M.S. Animal Science

**Area:** Livestock Well-being

**Mentor:** Dr. Michelle Calvo-Lorenzo

**Research:** Assessment of pain relief by ethyl alcohol analgesia in the castration of piglets.

**Wentao Lyu**

**Degree:** Ph.D. Animal Science

**Area:** Molecular Biology

**Mentor:** Dr. Glenn Zhang

**Research:** Understanding the transcriptional regulatory mechanisms of chicken host defense genes.

**Amanda Manley**

**Degree:** M.S. Animal Science

**Area:** Nutrition

**Mentor:** Dr. Clint Krehbiel

**Research:** Ruminant nutrition.

**Adam McGee**

**Degree:** Ph.D. Animal Science

**Area:** Nutrition

**Mentor:** Dr. Dave Lalman

**Research:** Cow/calf nutrition and management.

**Kathryn Moyer**

**Degree:** M.S. Animal Science

**Area:** Nutrition

**Mentor:** Dr. Clint Krehbiel

**Research:** Impact of B-adventeric agonists.

**Morgan Neilson**

**Degree:** M.S. Animal Science

**Area:** Meat

**Mentor:** Dr. Gretchen Mafi

**Research:** Consumer perception of ground beef and ground beef sliders with varying levels of lean finely textured beef.

**Kass Pfeiffer**

**Degree:** M.S. Animal Science

**Area:** Meat

**Mentor:** Dr. Gretchen Mafi

**Research:** Beef quality attributes of grain vs grass finished beef.

**Steven Quanz**

**Degree:** M.S. Animal Science

**Area:** Nutrition

**Mentor:** Dr. Jerry Fitch

**Research:** Nutrition and management.

**Miles Redden**

**Degree:** Ph.D. Animal Science

**Area:** Nutrition

**Mentor:** Dr. David Lalman

**Research:** Cow/calf nutrition and management.

**Jake Reed**

**Degree:** Ph.D. Animal Science

**Area:** Nutrition

**Mentor:** Dr. Clint Krehbiel

**Research:** Beef cattle management.

**Cheyenne Robinson**

**Degree:** M.S. Animal Science

**Area:** Physiology

**Mentor:** Dr. Leon Spicer

**Research:** Hormonal and developmental control of Micro-RNA 221 in bovine theca cells.

**Kelsy Robinson**

**Degree:** Ph.D. Animal Science

**Area:** Molecular Genetics

**Mentor:** Dr. Glenn Zhang

**Research:** Role of intestinal microbiota in animal health and productivity.

**Katy Satee**

**Degree:** M.S. Animal Science

**Area:** Meat

**Mentor:** Dr. Deb VavOverbeke

**Research:** Meat quality.

**Luis Schutz**

**Degree:** Ph.D. Animal Science

**Area:** Physiology

**Mentor:** Dr. Leon Spicer

**Research:** Characterization of production of Fibroblast Growth Factor 9 by bovine granulosa and theca cells.

**Xuwen Sheng**

**Degree:** Ph.D. Animal Science

**Area:** Molecular Biology

**Mentor:** Dr. Glenn Zhang

**Research:** Nutritional regulation of human host defense peptide synthesis.

**Tabatha Taylor****Degree:** M.S. Animal Science**Area:** Industry Leadership**Mentor:** Dr. Steven Cooper**Research:** Assessing the impact of an equine training course as it relates to the knowledge and practical skill acquisition of incoming freshmen.**Hung King Tiong****Degree:** Ph.D. Food Science**Area:** Food Science**Mentor:** Dr. Peter Muriana**Research:** Using Orbitrap mass spectrometry to investigate the molecular basis of adherence in *Listeria monocytogenes*.**Kyle Thompson****Degree:** Ph.D. Animal Science**Area:** Nutrition**Mentor:** Dr. Clint Krehbiel**Research:** Bovine respiratory disease.**Morgan Totty****Degree:** M.S. Animal Science**Area:** Industry Leadership**Mentor:** Dr. Leon Spicer**Research:** Effects of FGF9 on CCND1 and CDK4 gene expression in bovine granulosa and theca cells.**Paul Priyesh Vijayakumar****Degree:** Ph.D. Food Science**Area:** Food Science**Mentor:** Dr. Peter Muriana**Research:** Bacteriocins of lactic acid bacteria as potential biopreservatives for RTE meats.**Lingna Zhang****Degree:** M.S. Animal Science**Area:** Physiology**Mentor:** Dr. Leon Spicer**Research:** The role of cingulin in regulating proliferation and steroidogenesis of bovine theca cells.

# USDA Ph.D. Fellows

Oklahoma State University's Department of Animal Sciences was awarded a USDA/NIFA National Needs Fellowship grant aimed at training outstanding graduate students in the targeted national need areas within agricultural sciences. This training grant titled "Graduate Training for the Next Generation of Scholars in Application of Genomic and Computational Biology for Animal Production" was secured by PIs Dr. Raluca Mateescu and Dr. Jennifer Hernandez Gifford, and co-PIs Dr. Glenn Zhang and Dr. Megan Rolf and provides funding to support graduate training of three doctoral students.

Our Department has a long-standing tradition of excellence in research and extension with the goal of discovering, developing and disseminating scientific knowledge to address industry and producer-related problems by adding to the knowledge base of scientific information. In recent years, as genomic selection using high-density genotyping is generating much interest among animal breeders as a method to advance breeding programs, close working relationships were established between faculty within the Department of Animal Science, Department of Biochemistry and Molecular Biology, and Department of

Agricultural Economics to discover genetic mechanisms controlling livestock traits of economic importance, evaluate the potential benefit of incorporating genomic selection and disseminate results and ultimately implement relevant discoveries.

Our vision is to prepare graduates to think critically and apply the scientific method and their new found knowledge of animal genomics, animal molecular biology, computational biology and quantitative genetics in conducting research aimed at solving the needs of the animal industries.



**Belinda Gomez** is originally from El Paso, Texas and is working with Dr. Jennifer Hernandez Gifford. She is pursuing a Ph.D. in Animal Science with an emphasis on ovarian signaling pathways regulating steroid production.



**Kelsy Robinson** is originally from Monticello, Arkansas and is working with Dr. Glenn Zhang. She is pursuing a Ph.D. in Animal Science with a focus on the role of intestinal microbiota in animal health and productivity.



**Rita Flores**, a newly recruited fellow, will be working with Dr. Jennifer Hernandez Gifford starting in January. Rita is completing a M.S. degree at TAMU-Kingsville conducting research on the role of adiponectin in the developing corpus luteum.

# Visiting Scholars



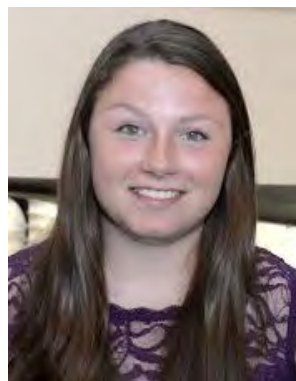
**Jose Faleiro Neto** is visiting from Brazil. He is working as a research scholar and is being advised by Dr. Clint Krehbiel. Jose is researching the impact of essential oils on ruminal fermentation and beef cattle performance.



**Ishtar Silva Lara** is enrolled in a dual degree master's program between OSU and Universidad Popular Autónoma del Estado de Puebla (UPAEP) in Mexico. Ishtar is pursuing an AgriBusiness Degree at UPAEP and an Animal Science Degree at OSU. She is being advised by Dr. Gerald Horn.



**Marco Albonico** visited Dr. Leon Spicer's lab in April 2014 from the University of Milan in Italy. His research involved evaluating the role of mycotoxins on ovarian steroidogenesis and cell proliferation in vitro using bovine granulosa and theca cells.



**Kaylin Belskie**, a visiting M.S. student, joined Dr. Ranjith Ramanathan's lab in May 2013 from the University of Connecticut. Her research involved assessing the role of mitochondrial proteome in beef color stability.



**Mahesh Nair**, a visiting Ph.D. student, joined Dr. Ranjith Ramanathan's lab in July 2013 from the University of Kentucky. While here, he researched the intramuscular variations in mitochondrial functionality of bovine semimembranosus.



**Dr. Pauline Aad** visited Dr. Leon Spicer's lab in July 2014 from Notre Dame University in Lebanon. Her research involved evaluating fibroblast growth factor receptor gene expression in bovine granulosa and theca cells.



**Dr. Chrilukovian "Chris" Wasike** is a visiting Borlaug Fellow from Maseno University's School of Agriculture and Food Security in Kenya. He started working with Dr. Megan Rolf during the fall 2014 semester in conjunction with Langston (the main training center).



**Long Zhang** joined Dr. Glenn Zhang's lab in September 2014 on a joint PhD program with Sichuan Agricultural University in China. He is sponsored by China Scholar Council, Ministry of Education to spend the next two years working on comparative analysis of avian host defense peptide genes.

# Thesis & Dissertations

*The following M.S. and Ph.D. students graduated in 2014 during the spring, summer, and fall semesters.*

**Raj Adhikari:** “Identification of gas-producing organisms isolated from raw beef ingredients, meat processing surfaces and vacuum-packaged beef filets.” Raj was advised by Dr. Peter Muriana and received his M.S. in Food Science. He is pursuing a career in the Food Science.

**Bryan Bernhard:** “Effects of growth-promoting technologies on behavior, mobility, health parameters and heat stress of finishing steers.” Bryan was advised by Dr. Clint Krehbiel and received his Ph.D. in Animal Science. Bryan is now working as an Assistant Professor of Ruminant Nutrition in the Department of Animal Science at Texas Tech University, Lubbock.

**Amanda Curtis:** “Regulation of chicken beta-defensin 9 expression by cyclooxygenase-2 inhibitors.” Amanda is advised by Dr. Glenn Zhang. She received her M.S. in Animal Science in fall of 2014. Amanda plans on pursuing a MBA at OU or OSU.

**Jordan Denton:** “Antimicrobial efficacy of essential oils and their primary constituents against Escherichia coli O157:H7 on organic leafy greens.” Jordan was advised by Dr. Divya Jaroni. He received his M.S. in Food Science. Jordan is pursuing a career in food science or food safety.

**Phillip Gunter:** “Use of distillers grains with solubles (DDGS) as a replacement for fertilizer N and P in stocker cattle programs on Old World Bluestem pasture.” Phillip was advised by Dr. Gerald Horn. He received his M.S. in Animal Science. Phillip is starting the doctoral program in Ruminant Nutrition at Auburn University under Dr. Russell Muntiferung.

**Andrew Harding:** “The use of near infrared reflectance spectroscopy for the characterization of barley and wheat grain entering feedlots in western Canada.” Andrew was advised by Dr. Clint Krehbiel. He received his M.S. in Animal Science. Andrew is now pursuing a Ph.D./DVM degree at Kansas State University.

**Bailey Harsh:** “Effects of technology use in beef production systems on meat quality, consumer palatability and muscle dimensions of strip loins.” Bailey was advised by Dr. Deb VanOverbeke. She received her M.S. in Food Science. Bailey plans on pursuing a Ph.D. at the University of Illinois.

**Cody Hixon:** “Effects of Bovamine Defend® and vaccine route of administration on health and performance of newly-arrived calves to feedlots.” Cody was advised by Dr. Clint Krehbiel and received his M.S. in Animal Science. Cody has accepted a job as the Manager of Dollar K Cattle Co. in Elmore City, OK.

**Renee Kinsey:** “Effects of modified atmosphere packaging on retail color stability in fresh beef.” Renee was advised by Dr. VanOverbeke. She received her M.S. in Animal Science with an emphasis on Food Science. Renee is working as a Food Technologist at Curly’s Foods.

**Sara Lineen:** “Application of feed additive technologies to enhance health and performance of forage-fed cattle.” Sara was advised by Dr. Lalman. She received her Ph.D. in Animal Science. Sara is now an Assistant Professor at Penn State in the Animal Science Department.

**Casey Maxwell:** “Comparison of technologies in beef production systems.” Casey was advised by Dr. Clint Krehbiel. He received his Ph.D. in Animal Science. Casey has accepted a position as a Beef Technical Consultant for Elanco Animal Health in Canyon, Texas.

**Blake Wilson:** “Ancillary therapy utilization and trace mineral supplementation in beef cattle: Impacts on clinical health, immune response variables, animal performance, and carcass traits.” Blake was advised by Dr. Clint Krehbiel. He received his Ph.D. in Animal Science. Blake became an Assistant Professor at the OSU Department of Animal Science.

**Kassie Jo Winn:** “Production, carcass, and meat quality characteristics of commercial crossbred gilts and barrows fed two different diets.” Kassie was advised by Dr. Gretchen Mafi. She received her M.S. in Food Science. Kassie became a lab manager for OSU Animal Science Meat Research Labs.



# UG Research

At Oklahoma State University, we believe that undergraduates should have the opportunity to obtain hands-on research experience. This is why we developed the Animal Science Undergraduate Research Scholars Program to engage students in research.

Knowledgeable faculty members serve as mentors for undergraduate students while they gain valuable experience working on cutting-edge research projects side-by-side with faculty, graduate students, research technicians and research unit managers.

The program engages promising undergraduates and provides a solid foundation in research methods to better prepare them for industry and academic careers in the fields of Animal and/or Food Sciences.

Once in the program, research scholars are mentored and assisted with the process of applying for undergraduate research grants, such as the Wentz and

Niblack Research Scholar programs. Both programs require a competitive research proposal and allow students to work on a research project of their own design.

Research Scholars are required to submit a research proposal to an on-campus agency by their second year in the program. Whether or not the student is successful with the proposal, the student may remain an ANSI Research Scholar and continue working with his/her mentor.

Future students can also apply for the Freshman Research Scholarship program, which provides an opportunity for sixty ambitious students to extend their education beyond the classroom by engaging in research under the guidance of innovative faculty researchers.

Getting hands-on research experience as an undergraduate can help students to hone in on their educational and career goals, as well as build key lab techniques and skills. This training will better prepare them for future research opportunities,

such as graduate programs and future careers.

View more information on ANSI undergraduate research, go to <http://ansi.okstate.edu/current-students/ug/research>.

## Animal Science Undergraduate Research Scholars

### Ashtin Bechtold

Mentored by Dr. Dan Stein.

**Research:** WHO FILLS THE SEAT: the perception on contemporary issues of the students enrolled in the Introduction to Animal Science course at Oklahoma State University.

### Taylor Bills

Mentored by Dr. Craig Gifford.

**Research:** Oxidative reduction potential of serum from cattle during early pregnancy and disease.

### Savannah Byford

Mentored by Dr. Sara Place.

**Research:** Sustainable animal agriculture tradeoff.

### Carson Cooper

Mentored by Dr. Scott Carter.

**Research:** The effects of plant extracts on growth and performance of nursery pigs.

### Courtney Elroy

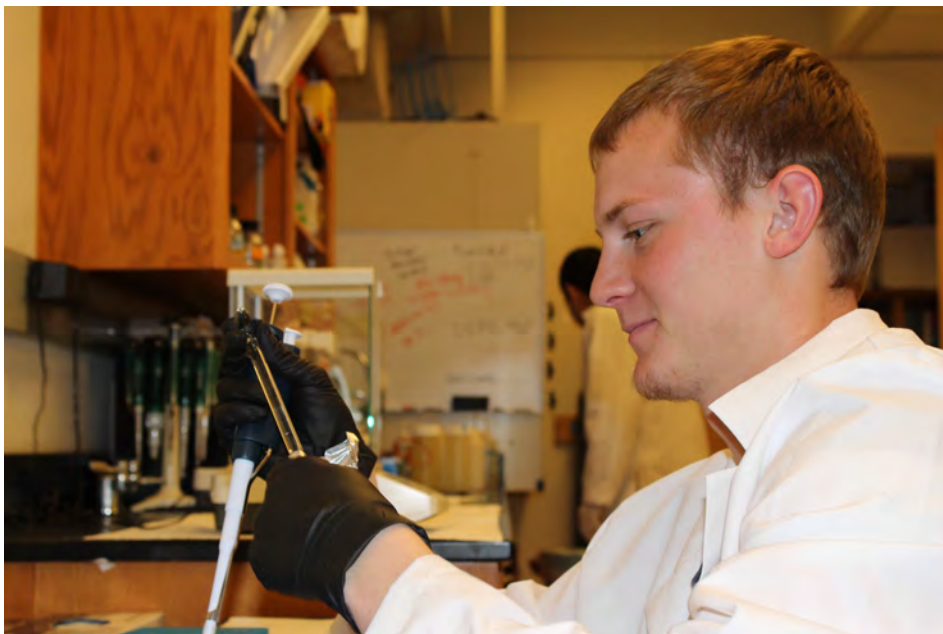
Mentored by Dr. Ranjith Ramanathan.

**Research:** The effects of processed grape seed on dough quality.

### Nick Elroy

Mentored by Dr. Ranjith Ramanathan.

**Research:** Myoglobin denaturation and fluorescent properties of nitric oxide and carboxymyoglobin.



*Caleb Smith (shown above) is an Animal Science Undergraduate Research Scholar and is mentored by Dr. Jennifer Hernandez Gifford. He is working on development of a pig IgG ELISA assay to measure response to GnRH immunization.*

### **Emily Ferranti**

Mentored by Dr. Calvo-Lorenzo.

**Research:** Effects of ethyl alcohol analgesia on pig behavior during castration.

### **Alexis Gullic**

Mentored by Dr. Jennifer Hernandez Gifford.

**Research:** Identification of parentage in a horse herd using microsatellite markers.

### **Leah Harrison**

Mentored by Dr. Divya Jaroni.

**Research:** Inhibitory effects of organic sanitizers against pathogenic and spoilage microorganisms on baby spinach.

### **Catherine Horsley**

Mentored by Dr. Craig Gifford.

**Research:** Receptor (chemosensory) transporter protein-4 transcript analysis during early pregnancy and disease in cattle.

### **Lindsay King**

Mentored by Dr. Jerry Fitch.

**Research:** Understanding and interpreting student perceptions of technologies used in animal production.

### **Kyre Larrabee**

Mentored by Dr. Sara Place.

**Research:** Relationship between rumen pH and animal performance traits before and after water restriction in beef cattle.

### **Jessica Neal**

Mentored by Dr. Megan Rolf.

**Research:** Exploration of mitochondrial genome differences between dairy breeds with differing milk fat and production potential.

### **Audrey Richardson**

Mentored by Dr. Michelle Calvo-Lorenzo.

**Research:** Beef cattle cold stress and adaptation to drought.

### **Caleb Smith**

Mentored by Dr. Jennifer Hernandez Gifford.

**Research:** Development of a pig IgG ELISA assay to measure response to GnRH immunization.

### **Sydney Stewart**

Mentored by Dr. Glenn Zhang.

**Research:** Dietary modulation of host innate immunity.

### *Wentz Research Scholars*

#### **Jacqueline Ervin**

Mentored by Dr. Leon Spicer.

**Research:** Understanding the Role of Endothelins and Their Receptors in Follicular Development in Cattle.

#### **Hannah Paradis**

Mentored by Dr. Glenn Zhang.

**Research:** Development of natural alternatives to antibiotics.

#### **Shelby Spring**

Mentored by Dr. Ranjith Ramanathan.

**Research:** Characterizing the role of lipid oxidation products in beef enzymatic metmyoglobin reduction.

#### **Sarah Schobert**

Mentored by Dr. Dan Stein and Ali Beker.

**Research:** Impact of brooding on broiler chicks growth and performance.

### *Niblack Research Scholars*

#### **Julia Matera**

Mentored by Dr. Craig Gifford and Jennifer Hernandez Gifford.

**Research:** Cytotoxicity of histones in acute respiratory disease in feedlot cattle.

#### **Will Shaffer**

Mentored by Dr. Megan Rolf.

**Research:** The influence of horn fly load on economically important traits in beef cattle.

### *Freshman Research Scholars*

#### **Molly Drakeley**

Mentored by Dr. Craig Gifford.

**Research:** Serum amino acid analysis in cattle with naturally acquired bovine respiratory disease.

#### **Madelyn May**

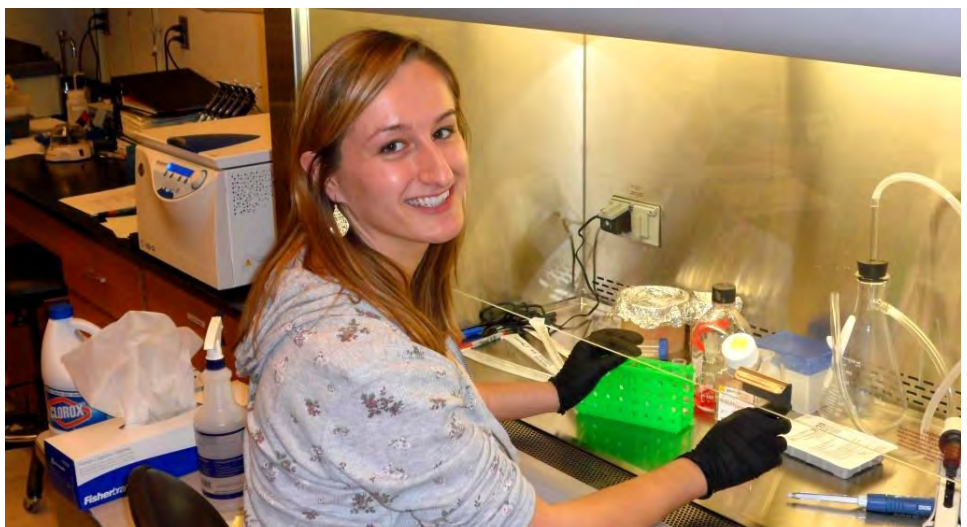
Mentored by Dr. Gretchen Mafi.

**Research:** Sensory characteristics of steaks from bulls, steers castrated traditionally, and immuno-castrated steers.

#### **Emily Wilkinson**

Mentored by Dr. Gretchen Mafi.

**Research:** Evaluation of heat-in bag and serve products produced by ambassador foods.



*Julia Matera (shown above) is a 2 time Niblack Research Scholar recipient and is researching the cytotoxicity of histones in acute respiratory disease in feedlot cattle.*

# Events & Activities

## Research Symposium

Animal Science Undergraduate Research Scholars presented their independent research projects at the 11th Annual Research Symposium in Biological Sciences on September 18 and 19, 2014. The symposium was hosted by the Biochemistry and Molecular Biology Graduate Student Association (BMBGSA).

1st and 2nd place went to Animal Science Undergraduate Research Scholars for the poster competition portion of the symposium. Jessica Neal was awarded 1st place for her research poster, "Effect of polymorphism in Lactate Dehydrogenase B on beef color stability," and Caleb Smith was awarded 2nd place for his research poster, "Beta-catenin is Regulated in Bovine Follicular Development and Dominant Follicle Selection."

Below is a list of all research titles that were presented by students from the Department of Animal Science – (\*) indicates the faculty mentors.

"Species Specific Effects On Non-Enzymatic Metmyoglobin Reduction," by **Nick Elroy**, J. Rogers, G.G. Mafi, D.L. VanOverbeke, S.D. Hartson, \*R. Ramanathan.

"Effects of water- and oil-based rosemary on ground beef quality," by **Kaylee Price**, A.R. English, G.G. Mafi, D.L. VanOverbeke, \*R. Ramanathan

"Fluorescent properties of myoglobin during heat-induced denaturation," by **Molly Shelby**, A.R. English, G.G. Mafi, D.L. VanOverbeke, \*R. Ramanathan.

"Cattle requiring multiple treatments for bovine respiratory disease exhibit decreased capacity to protect against histone cytotoxicity," by **Julia Matera**, B. K. Wilson, D.L. Step, J. Hernandez Gifford, C. R. Krehbiel, and \*C. A. Gifford.

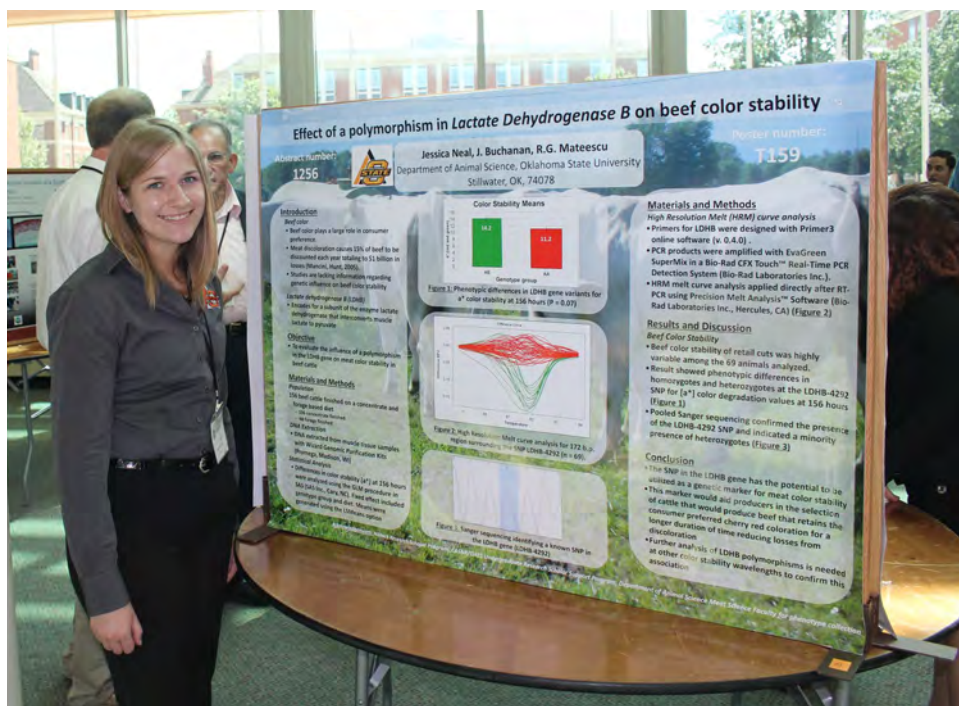
"Beta-catenin is Regulated in Bovine Follicular Development and Dominant Follicle Selection," by **Caleb Smith**, B.H. Aloqaily, B.I. Gómez, C.A. Gifford, D.M. Hallford, and \*J.A. Hernandez Gifford.

"Effect of polymorphism in Lactate Dehydrogenase B on beef color stability," by **Jessica Neal**, J. Buchanan, and \*R.G. Mateescu.

"Effect of maternal protein supplementation on prenatal and postnatal calf growth," by **Klair Hartzold**, B.H. Boehmer, E. Ferranti, and \*R.P. Wettemann.

"Identification of gas-producing organisms isolated from vacuum-packaged retail beef products, incoming raw materials, and the manufacturing environment," by **Raj B. Adhikari** and \*P. Muriana.

"Fumonisin B1 combined with deoxynivalenol or Beta-zearalenol affects bovine granulosa cell proliferation and steroid production in vitro," by **Marco Albónico**, L.F. Schutz, F. Caloni, C. Cortinovis, and \*L.J. Spicer.



Jessica Neal with her winning poster at the BMBGSA Research Symposium. Here poster title was "Effect of polymorphism in Lactate Dehydrogenase B on beef color stability."

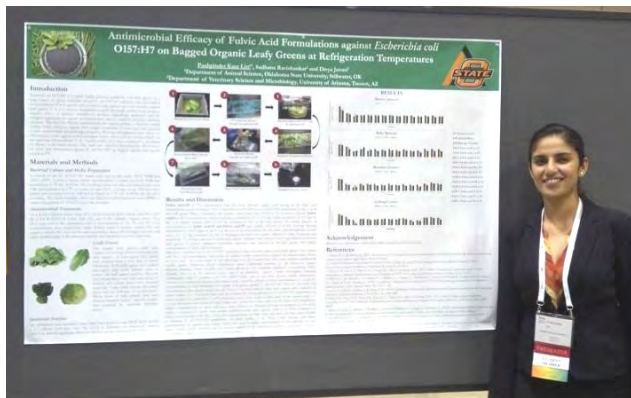
## Pushpinder Litt Presents Poster at IAFP Annual Meeting

Pushpinder Kaur Litt, a graduate student pursuing her Ph.D. in Food Science, presented two posters on her research at the International Association of Food Protection (IAFP) Annual meeting held in Indianapolis, IN from Aug 2nd, 2014 to Aug 6th, 2014.

Below are the titles of her poster:

“Antimicrobial Efficacy of Fulvic Acid Formulations against *Escherichia coli* O157:H7 on Bagged Organic Leafy Greens at Refrigeration Temperatures.”

“Inhibitory Activity of Hydrogen Peroxide, Water and Organic Sanitizers Against *Escherichia coli* O157:H7 on Organic Leafy Greens.”



## Managing Farm Health For Public Health Conference

OSU Animal Science Extension and Oklahoma Beef Quality Assurance Program hosted a conference titled “Managing Farm Health for Public Health” on November 12th, 2014 in Shawnee, OK.

Topics discussed at the conference included:

- Challenges in farm to public activities.
- Prevalence of pathogens in cattle.
- Pre-harvest livestock pathogen management.
- Farm to public hazard analysis and critical control points.
- Role of the Oklahoma Department of Health.
- Consumer farm pathogens perceptions.
- Communicating key points with livestock producers and the public.

Dr. Divya Jaroni, an Assistant Professor of food microbiology at Oklahoma State University, was one of the speakers for

the conference. Dr. Jaroni’s research focuses on the development of control strategies to reduce food-borne pathogens in food animals and fresh produce, as well as improving food safety at pre- and post-harvest levels. Her work has resulted in a patent and the commercialization of pre-harvest feed additives that reduce *E. Coli* and *Salmonella* in cattle.

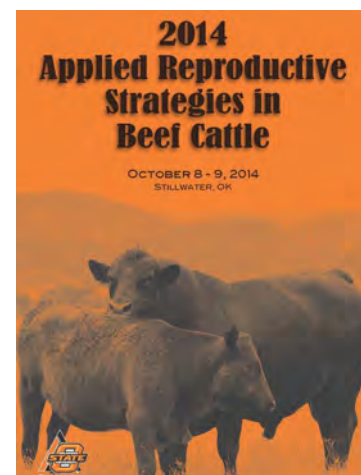


## Applied Reproductive Strategies in Beef Cattle Conference

The Applied Reproductive Strategies in Beef Cattle Conference was held on the OSU campus October 8th - 9th in the Student Union. 218 people attended the conference. The Oklahoma State University Conference Planning Committee consisted of Dr. Megan Rolf, Dr. Dan Stein, Gant Mourer, and Dr. Dave Lalman.

The conference was supported by Agriculture and Food Research Initiative Competitive Grant no. 2014-67015-22075 and no. 2012-02355 from the USDA National Institute of Food and Agriculture.

Dr. Thomas Coon, OSU DASNR VP, Dean, and Director, addressed the attendees at the beginning of the event. Speakers for the event included Dr. Scott Brown, Dr. Joseph Dalton, Dr. Rick Funston, Dr. Craig Gifford, Dr. John Gilliam, Dr. John B. Hall, Dr. Rod Hall, Dr. Peter J. Hansen, Dr. Sandy Johnson, Dr. David Lalman, Dr. G. Cliff Lamb, Dr. David Patterson, Dr. George Perry, Dr. Megan Rolf, Dr. Matthew Spangler, Dr. Daniel Stein, Dr. Jerry Taylor, Dr. Alison Van Eenennaam, Roger Wann, and Dr. Robert Wettemann.



# Animal Science Weekend

Registration forms will be available in the "Update Newsletter" coming in January 2015.

## Friday, April 10th

- 6:00 pm ASAA Gala Reunion**  
ConocoPhillips Alumni Center
- 6:00 - 7:00 pm Social Hour**  
Cash Bars & Heavy Hors d'oeuvres
- 7:00 pm Gala Reunion Program**  
Recognition of Bob Kropp's career, 50-year Teams, Current Judging Teams, & more
- 8:30 pm Scholarship Auction**  
New, exciting items in Live & Silent Auction
- 10:00 pm - 12:00 am Music and Dancing**

## Saturday, April 11th

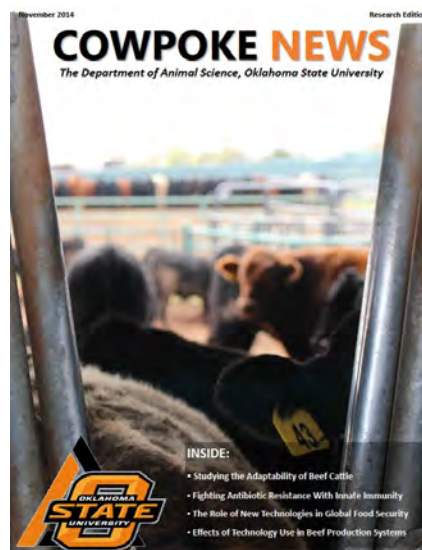
- 9:00 am Old Timers Judging Contest**  
Animal Science Arena
- 11:15 am "Totusek Arena" Naming Celebration**  
Animal Science Arena
- 12:00 pm Luncheon**  
Animal Science Arena
- 1:00 pm Annual Meeting of ANSI Alumni Assoc.**  
Animal Science Arena
- 5:45 pm Animal Science Banquet**  
Wes Watkins Center

## Sunday, April 12th

- 1:00 pm Cowboy Classic Sale**



## Featured Photo



### Alternate 2014 Research Edition Cover Photo

Notice the number 43 tag on the ear creeping into the frame? Number 43 is on the cover of this edition. He kept sneaking into the photos, looking for his chance at stardom.

## Quotes

"The measure of greatness in a scientific idea is the extent to which it stimulates thought and opens up new lines of research."

- Paul A.M. Dirac

## Cowpoke News Team

Thank you to all Oklahoma State University Department of Animal Science faculty, graduate students, and undergraduate research scholars for your contributions to the very first research edition of Cowpoke News.

A special thanks to Dr. Clint Krehbiel, Dr. Jennifer Hernandez Gifford, and Jamie Sadler.

# Alumni Association

2014—2015 ALUMNI ASSOCIATION  
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# ANNOUNCEMENTS

## **2015 ASAA Gala Reunion Honorees**

The Animal Science Alumni Association will honor Dr. Bob Kropp and his advisees, students, and friends at our 2015 ASAA Gala Reunion, as well as the 1965 Meat and Livestock Teams. The Gala will be held on April 10th, 2015.

## **2016 ASAA Gala Reunion Honorees**

We will honor Dr. Mark Johnson and his livestock judging teams at our 2016 ASAA Gala Reunion on April 1st, 2016.

## **Bob Kropp Hall of Fame Pledge Card**

Official pledge cards will be sent out soon and may include the link for online donations. If you would like a pledge card, please make sure the ASAA has your contact information by contacting Kim Brock at [kim.brock@okstate.edu](mailto:kim.brock@okstate.edu).

## **ASAA Needs Your E-mail**

The Animal Science Alumni Association is currently seeking out e-mail addresses for Animal Science Alumni. If you are OSU Animal Science Alumni, please e-mail your information to Kim Brock at [kim.brock@okstate.edu](mailto:kim.brock@okstate.edu).

## **Purebred/Teaching Center Endowments**

An investment in permanent endowments within the Department of Animal Science will keep OSU's tradition and legacy of dominance alive and well. These permanent endowments will help ensure that our facilities and purebred herds will be maintained for future Cowboys who will become the legends of tomorrow. Dairy Center, Equine Center, Purebred Beef Center, Sheep and Goat Center, and Swine Center Endowment Funds exist to support programs and operations within the Department of Animal Science. For more information, please contact Kathy McNally at 405-385-5606 or [kmcnally@OSUgiving.com](mailto:kmcnally@OSUgiving.com)

## **OSU Research Week**

OSU Research Week is scheduled for February 16th-20th, 2015. Research Week 2015 will be featuring keynote speaker Ira Flatow, a NPR science correspondent and award-winning journalist presenting "Unusual Patents: Where Do Ideas Come From?"

The Dr. Joe V. Whiteman Award is for excellence in oral presentation of scientific information and competition. The award is open to all graduate students in the Department of Animal Science. Any presentation given at a scientific meeting since the Animal Science Banquet last year, or that will be given before September 2015 is eligible. First place will receive \$750 and a plaque. Second and third place awards are \$500 and \$250, respectively. The presentations will be judged by several Animal Science Faculty.

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# Department of Animal Science



## Thank You!

Thank you for taking the time to read the Oklahoma State University Department of Animal Science newsletter, Cowpoke News! I hope you have enjoyed reading about the students, staff, and faculty.

## To Subscribe

The Cowpoke Newsletters are published three times a year and are available on our website at <http://www.ansi.okstate.edu/newsletter>.

If you would like to be added to our e-mail list, please contact us at [cowpokeneeds@okstate.edu](mailto:cowpokeneeds@okstate.edu).

If you would like for us to mail you the Cowpoke News, please e-mail us or mail your request to Rebekah Alford at:

Rebekah Alford  
Oklahoma State University  
RM 204 Animal Science Bldg.  
Stillwater, OK 74078

## Visit Our Campus

Interested in Oklahoma State University? Come visit our campus! Our university offers tours Monday through Saturday. You can choose from the following:

### Group Campus Tours

Group campus tours are available to students in grades 9-12. You must have a least 10 students for the group tour.

### Self-Guided Tours

Unable to attend a scheduled tour? Choose a self-guided option that you can complete at your convenience.

### Alumni Tours

Tours for alumni are offered each Friday at 2p.m. by the OSU Alumni Association. You must preregister to attend.

View all tour options at <https://admissions.okstate.edu/visit>.

## How To Apply

Want to be an OSU Cowboy? To apply, please go to <https://admissions.okstate.edu/apply>.

## Oklahoma State University Department of Animal Science

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