

ANIMAL SCIENCES

Spring 2017

The Inside Scoop



WASHINGTON STATE UNIVERSITY



APPLIED RESEARCH • EXTENSION & OUTREACH • INNOVATION & TECHNOLOGY • TEACHING

ANIMAL SCIENCES:

Moving Forward

Thank you for picking up a copy of *The Inside Scoop*, the annual Department of Animal Sciences newsletter. As you read the following pages, I think you will find that once again, Animal Sciences has had a successful year. We are proud of our undergraduate and graduate students and you will see a small taste of what several of them have accomplished. The faculty and staff continue to make tremendous contributions in education, Extension, and research and their dedication to our mission is unmatched in the college and university.

Last year, I reported on the retirements of Dr. Mike Dodson and Dr. John McNamara and mentioned the

impending retirement of Dr. Margaret Benson. Time goes by quickly and Margaret will really be leaving our ranks. Her departure will leave a large hole in our teaching and research faculty. We thank her for her years of service. The decisions and improvements she made as Chair improved our department and we are forever grateful. Over the past year, she has been working on finishing some projects. One of these is a new agreement with the University of Glasgow that will allow some of our students to study a year abroad in Scotland and then enter veterinary school at Glasgow. This exciting opportunity will benefit our undergraduates in many ways.

There are several great things that have happened this year that you will read about. One is the addition of Dr. Nancy Irlbeck, our newest faculty member. Dr. Irlbeck, who you will meet in this issue, is an outstanding educator, and her teaching contributions are especially needed now. Her enthusiasm and passion for cultivating the next

generation of animal scientists will serve our students well. Another is the Functional Genomics Initiative (FGI), an exciting multidisciplinary collaboration among several WSU colleges that will bring four new faculty members to the department in the next five years. These new people will strengthen our existing research programs by bringing the newest genetics technologies to WSU. They will also strengthen our graduate and undergraduate teaching programs and can help keep Washington's livestock industries competitive and well-positioned for future success.

We hope you enjoy this issue of *The Inside Scoop*. Thank you for all you do in support of the Department of Animal Sciences. Please keep in touch.

Dr. Kristen A. Johnson

Professor and Interim Chair,
Department of
Animal Sciences

Go Cougs!



ANIMAL SCIENCES

The Inside Scoop

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ALTERNATIVE FEEDSTUFFS

Ariel Chapman tests feeding value of local by-products



Ariel Chapman has a lot of balls in the air and is an expert juggler! Not only does she work at the Cattle Lab, but she also has a full class load and is conducting a research project for her honors thesis, a partial requirement of the dual honors seven-year veterinary program. She is incredibly busy but wouldn't have it any other way. "I'd be bored if I weren't part of this program," she explained.

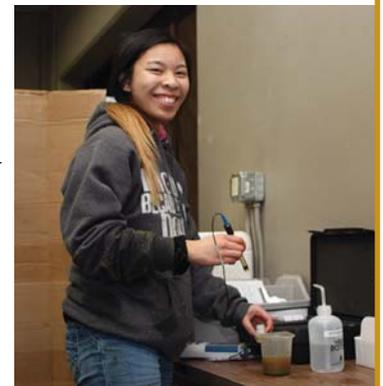
Chapman was notified in the fall semester of her sophomore year that she was accepted into the seven-year program. "The pressure of worrying about getting into vet school was gone and I could just focus on my undergraduate classes," she said. After three years of undergraduate coursework, the Bonney Lake native will begin vet school in the fall.

With guidance from Dr. Kristen Johnson, Chapman is looking for a way to cost-effectively enhance the feeding value of bluegrass straw, a residue of Kentucky bluegrass seed production that is abundant in the Pacific Northwest. When fed alone, either unprocessed or pelleted, this low-protein, high-fiber feedstuff does not provide adequate nutrition for growing cattle. Adding an ingredient with high levels of protein and energy to the bluegrass straw is an easy way to improve the nutritional value of the pellets. Unfortunately, many of these types of ingredients are expensive and may not be readily available in Washington.

Expeller-pressed canola meal is another by-product feed available locally. This type of meal is produced when canola oil is extracted by a mechanical pressing method, rather than conventional solvent extraction. Expeller-pressed canola meal contains the same amount of protein, but is higher in fat than conventionally produced canola meal or other oilseed meals.

Although expeller-pressed canola meal is routinely included in dairy cow diets and would be an excellent source of additional protein and energy in growing beef cattle diets, there is limited information regarding its actual nutrient digestibility by cattle. Therefore, undergraduate Ignite scholarship recipients Noreide Aguilar, Abby Cate, Gracie

Dickerson, K.J. Fitzgerald, Britney Kirkpatrick, Roseanne Mier, and Heather Rogers, working under the direction of Dr. Johnson and Jennifer Michal, recently determined the digestibility of expeller-pressed canola meal, which was kindly donated by Pacific Coast Canola in Warden. They found that ruminal disappearance of the meal was similar to distiller's dried grains, a feedstuff commonly included as a protein and energy supplement in dairy and feedlot cattle diets.



Undergraduate Ignite student Roseanne Mier tests pH of rumen fluid

Next, Chapman examined effects of adding different levels of expeller-pressed canola meal on ruminal digestibility of bluegrass straw pellets. Pellets containing 30 or 50 percent meal were generously manufactured by Seeds, Incorporated in Tekoa. She found that canola meal undeniably increased pellet digestibility, regardless of inclusion level and concluded at least 30 percent expeller-pressed canola meal could be added to bluegrass straw pellets to improve ruminal digestibility.

Chapman is currently conducting a feeding trial to test the performance of steers fed bluegrass straw pellets containing 30 percent expeller-pressed canola meal. Growing steers, housed in several pens at the Cattle Lab, are being fed timothy hay. Half of the steers are also getting pellets. She is collecting body weights every 30 days to assess growth performance. She expects steers fed pellets with expeller-pressed canola meal will gain more efficiently than those fed only hay. Her study will conclude soon and she will present the results at her honors thesis defense seminar this spring.

Current Genomics Programs...



The era of using gene-editing technology to improve health and production of farm animals is in its infancy. However, new techniques have the capability to revolutionize food animal production. The scope of one such method, known as the CRISPR/Cas9 targeted gene-editing system, is far-reaching. This method is relatively simple, reliable, and inexpensive to implement and use. The Department of Animal Sciences already has a firm foundation in genomics research and is ready to enter this new arena.

The use of such technology to produce genetically modified livestock will improve our understanding of biology and medicine, enhance animal production efficiency, and develop animals with disease resistance. Scientists in Minnesota have already produced hornless Holstein cattle using these techniques. This is an exciting example of how gene-editing methods can be used to improve animal well-being. Several other studies have been reported in which gene-editing techniques were used to enlarge muscle mass in lambs and produce pigs and cattle resistant to viruses. Results from these studies are very promising, but additional research is needed to fully implement the technology and address safety, ethical, and societal concerns.

What is the FGI?

The Function Genomics Initiative (FGI) at WSU is a multidisciplinary collaboration among the Department of Animal Sciences, the Center for Reproductive Biology, the School of Molecular Biosciences, the Department of Veterinary Microbiology and Pathology, and the School of Politics, Philosophy, and Public Affairs. The FGI proposes to use gene-editing technologies, such as CRISPR/Cas9, and advanced reproductive techniques to generate traits

in livestock that will economically enhance food production to help feed a burgeoning global population, enhance disease resistance, and reduce the use of antibiotics.

WSU awarded almost \$5 million to participants in the FGI. Over the next five years, these funds will be used to hire a cluster of new faculty members who will use gene-editing technologies, conduct basic and applied genomics research, and address ethical and societal issues related to gene-edited food animals. It will also support creation of a gene-editing molecular biology and animal husbandry core, which will serve and support all life sciences research at WSU.

We are very excited to participate in the FGI and will hire several new faculty members whose research will serve as springboards into new gene-editing technologies and augment the expertise of our current faculty. Dr. Holly Neibergs and Dr. Zhihua Jiang are two of the department's existing faculty who have established strong genetics research programs and will benefit from this initiative.

Gene identification is key

Before gene-editing technologies are used, the genes that control desirable traits must first be identified. Powered by large, multi-year grants from the USDA-NIFA and a USDA-funded Coordinated Agricultural Project (CAP), researchers in Dr. Neibergs' laboratory have focused on identifying the master control genes that regulate metabolic pathways and disease resistance in cattle. These genes may eventually become targets for editing by participants of the FGI.

Dr. Neibergs and Dr. Kristen Johnson have been integral participants in the USDA-NIFA funded National Program

...have prepared us for the FUTURE!

for Genetic Improvement of Feed Efficiency in Beef Cattle in which individual DNA samples, feed intakes, and growth and carcass data have been collected for more than 8,000 cattle. Subsets of Angus, Hereford, and Simmental cattle with different feed efficiencies were genotyped. Genes associated with the trait were then identified using these genotypes. This information aids in understanding how genes interact and control growth, body composition, and finishing in cattle. It will lead to development of strategies to select or genetically modify animals that are more efficient and to tailor management practices to ensure they perform to their full genetic potential. Genetic improvement of feed efficiency will not only improve animal production efficiency and U.S. beef competitiveness in the national and global market, but it will also ensure cost-effective production of a high-quality protein source.

Prevention of disease through genomic identification of less susceptible animals is a tremendously promising way to reduce the number of sick animals, enhance animal well-being, improve production and profitability, and decrease antibiotic usage. Dr. Neiberger heads the research component of the Bovine Respiratory Disease Complex CAP, a five-year collaborative project involving WSU and other educational, government, and commercial institutions. The project's objective is to identify genes involved in susceptibility of cattle to bovine respiratory disease (BRD), the leading natural cause of death in beef and dairy cattle. The

group collected DNA and diagnostic nasal swabs from approximately 2,800 dairy calves and 2,000 feedlot cattle. Several key genes and genomic regions associated with susceptibility to BRD were identified using genomic analyses. Markers may soon be available for commercial genotyping tests that can be used to select cattle less susceptible to BRD. The use of genomic selection to reduce the prevalence of BRD infection in the beef and dairy industries would sustainably reduce disease without antibiotics and positively affect animal well-being. The financial ramifications of BRD-resistant cattle in feedlots is huge. A 1 percent decrease in infected animals would increase production and save the industry more than \$1 billion each year.

Understanding gene activity

The focus of Dr. Jiang's research program has shifted in recent years from comparative genomics to comparative RNA biology. His long-term goal is to develop sophisticated methods that can be used to accurately profile the gene sequences that are decoded into RNA molecules. Using these methods, he will be able to measure the activity of a gene in a cell or tissue and enhance the understanding of how genes control complex traits and diseases.

As part of an NIH-funded project, Jiang's research group recently developed a new method that focuses on uncovering the sequence of a specific part of an RNA molecule. He has used this new method to profile this RNA region in genes of frog embryos at

different stages of development to understand gene activities during critical stages. This information will be invaluable to the FGI because it may eventually lead to a better understanding of how congenital defects form and how gene-editing techniques may be used to correct the problems.

Dr. Jiang is now applying his technique to better understand how and why gene functions differ by cell and tissue type, and how gene activities change due to physiological state and disease status. He and three other animal sciences faculty members, Dr. Min Du, Dr. Larry Fox and Dr. Martin Maquivar, were recently awarded a grant from the USDA. They will use the funding to employ Dr. Jiang's method to examine how genes control growth and response to pathogens that cause infections like mastitis and metritis in cattle. Successful completion of this project may advance genetic selection and gene-editing technologies to improve beef quality and reduce severity and incidence of diseases, enhancing animal well-being and improving the sustainability and competitiveness of the U.S. dairy and beef industries.

The future of farm animal production is changing. Melding the strategies of genomics research already in place with the exciting new technologies that will be implemented through the FGI will propel the Department of Animal Sciences and WSU to the forefront of gene-edited livestock production and enhance the sustainability of the livestock industries in Washington and beyond.





L to R: Jessica Sears, Sarah Davidson, and Alex Phillipson

GOING THE DISTANCE

Recent grads introduced to the sport of kings

Horses, the Thoroughbred horse industry and Kentucky are synonymous. The beating heart of this industry is in the Bluegrass region, pulsing with more than 41,000 Thoroughbreds worth almost \$5 billion (equine.ca.uky.edu/kyequinesurvey). This is heaven for anyone who wants to work in the equine industry!

Opening the door to employment in the equine industry can be difficult. Practical, on-the-job experiences gained through an internship program can help open doors.

Getting a foot in the door

Alex Phillipson, Jessica Sears, and Sarah Davidson, three recent animal sciences graduates highly interested in working in some part of the horse industry, recently partook in the Kentucky Equine Management Internship (KEMI) program (kemi.org). KEMI is designed to open the door to the Thoroughbred industry for college students or recent graduates by providing on-farm experience, classroom-type lectures and laboratories, and other opportunities.

The sense of community built with other interns in the program was a plus for Sears. “Rather than just move across the country to find a job on a farm by yourself, KEMI interns are taught to a certain standard and are given more opportunities to get out into the industry than someone going it alone,” she said.

After a week-long group orientation, interns are sent to host farms where they work and learn full time. Host farms are assigned by the KEMI panel of reviewers. Hours are long and hard; interns work 48 hours or more, six days a week. “It’s not all ponies and rainbows,” Phillipson said of the work, which was physically, mentally, and emotionally draining.

“Be ready to work hard!” Sears said. “Don’t expect to come to the internship and be ‘running the farm’ or immediately placed in a management position.”

Davidson, Phillipson and Sears participated in the 22-week fall KEMI session, from July to December, during which labor demands focus on preparation of horses for sales such as the September Yearling and November Breeding Stock Sales at Keeneland in Lexington, Kentucky. The best-selling horses are conformationally correct, have exceptional pedigrees, athletic physiques, and gleaming coats.

Prepping horses so they peak at sale time starts months in advance. Energy content of the young horses’ diets is increased dramatically to support growth and bloom. Horses are intensely groomed and washed daily and are only turned out at night so their coats are short, smooth, and glossy. Yearlings are hand-walked on varying terrain to build fitness. Handlers bring the young horses into practice show rings every day so they learn cues to set up properly for a show and become accustomed to the show ring. “In the last month of sales prep, we had daily shows for the consignors and owners of the horses,” Davidson said. “This allowed them to see the yearlings before they arrived at the sale and helped owners decide at the last minute if they would rather keep the horses.”

The KEMI program isn’t for anyone who isn’t willing to work harder than ever before. Although the session focus was the same for each of the participants from WSU, they had unique and invaluable experiences at their host farms and words of advice for anyone who might be interested in KEMI.

What are they doing now?

All were offered positions at their host farms at the completion of their internships. Davidson and Phillipson decided to go home but are keeping their options open for future employment in the horse industry. Sears accepted her job offer and is currently working at Silver Springs Stud as an office assistant. She recently won the 2017 Kentucky Thoroughbred Farm Managers Club Management Award.



Sarah Davidson
BS AnSci '16

Davidson went to Three Chimneys Farm, home to some of the greatest horses in racing history including Triple Crown winner Seattle Slew, Genuine Risk, and Big Brown.

"The farm was gorgeous, the horses were incredible, and the people I worked with were some of the most hardworking and caring people I've ever met," she said. "I learned a lot and even though every day wasn't easy, I wouldn't have wanted to be on any other farm."

"The most memorable experience I had through KEMI was seeing the yearlings and weanlings I prepped for the Keeneland sales sell for hundreds of thousands, even millions of dollars! It was very rewarding to see that my literal blood, sweat and tears paid off. Now, I am excited to see where their race careers go, as they are currently in training."

Hometown: Duvall

WinStar Farms, one of the largest Thoroughbred farms in the world, hosted Phillipson for her KEMI experience. WinStar has a large broodmare herd, close to 140 weanlings and yearlings, and stand many notable stallions including Super Saver, the 2010 Kentucky Derby winner, and Pioneer of the Nile, sire of American Pharoah, the 2015 Triple Crown Winner.

"My host farm became my family. I loved my host farm so much. They truly made my experience!" Phillipson said.

Phillipson recommends participation in the KEMI program to anyone interested in working in the equine industry because the experiences gained there are unique: "It's more than just the equine industry, it's the Thoroughbred industry. I came from an equine background, riding and competing since I was six, but the Thoroughbred industry is a whole different ball game."

Hometown: Spokane



Alex Phillipson
BS AnSci '16



Jessica Sears
BS AnSci '15

Sears was assigned to Silver Springs Stud, a smaller, family-owned farm. She also worked for Denali Stud, a large Thoroughbred consignor, grooming and showing horses for the fall sales. "While exhausting, I loved working the sales because of all the new friends I made," Sears said. "Before I came here, I had no idea what the sales were, but now I can see how big a part they play in the Thoroughbred industry."

When she had the chance, Sears shadowed a sport-horse veterinarian. "My most memorable experience had nothing to do with the racing industry, but when I was working with the veterinarian on gorgeous warm-bloods competing in prestigious hunter/jumper shows at the Kentucky Horse Park," Sears said as she reflected on her KEMI experience. "After working a full day, we were watching the grand-prix jumper rounds and getting text updates of the head-to-head stretch run between Beholder and Songbird in the Breeder's Cup Distaff. That's when I realized how everyone 'gets horses' in Kentucky."

Hometown: Olympia

CHOCOLATE MILK & GRILLED CHEESE SANDWICHES

Chance meeting changes Maite Muse's career path

A few years ago, Maite Muse would not have guessed that in October 2016 she would be at the 50th World Dairy Expo in Madison, Wisconsin, eating grilled cheese sandwiches, drinking chocolate milk, watching dairy cattle shows, and educating potential customers about hairy hoof wart treatments. A career in the dairy industry wasn't even on Muse's radar until she was recruited for membership in CUDS as a freshman. She had grown up riding horses and raising and showing market lambs. Muse thought she wanted to be a veterinarian due to her prior experiences. Surprisingly, her

"I can't wait to use my education in animal sciences!"

involvement in



CUDS fostered a love for all things dairy and changed her career focus. Muse increased her knowledge and practical experience as a student employee at the university's Knott Dairy Center, knowing she was interested in working in the dairy industry after graduation.

Muse's career path came into focus after a chance meeting with a product representative while she was working at the dairy. Muse impressed the gentleman as she chatted and helped him evaluate hooves for Dr. Amber Adams Progar's research project. Soon thereafter, he contacted Muse and offered her the opportunity to participate in an internship with Vantage Dairy Supply, a company that markets hoof care products, barn chemicals, and teat dip, among other things. Muse happily accepted the internship and, after spending the summer in Tulare, California, was offered a job with the company.

After graduation in the spring, Muse will pack her bags, move to California, and work full-time as a hoof specialist and sales representative for the supply company. In the meantime, during school breaks and on some weekends, she is working locally to expand the company's network with dairy producers in Washington. Muse is representing a copper-based foot-bath product with lower environmental impact to treat and reduce incidence of digital dermatitis, more commonly known as hairy hoof warts, in dairy cows. Lesions on the hooves caused by digital dermatitis frequently lead to lameness and decreased milk production. Current treatment regimens for this highly contagious infection commonly seen in U.S. dairies can be expensive, labor intensive, and environmentally unfriendly.

Muse's excitement about her future was evident as she exclaimed, "I love California and the dairy industry! I can't wait to use my education in animal sciences to solve problems for my future customers!"

NEW OPPORTUNITY!!

*Animal Sciences Students
are you interested in vet school
and study abroad?*



University
of Glasgow

School of
Veterinary Medicine

WSU and the AVMA-accredited veterinary school at the University of Glasgow in Scotland, UK have established an agreement in which WSU students can earn both BS and DVM degrees.

- Complete 3 years of curriculum in animal sciences at WSU
- Complete 4th year at the University of Glasgow, while participating in early entry to vet school program
- Earn a BS degree in Animal Sciences from WSU upon successful completion of year 1 in Glasgow
- Complete an additional 4 years of veterinary school in Glasgow and earn a DVM degree

For more information about this program contact Val Fisher at 509.335.5274 or fishervk@wsu.edu

WALKING WITH ELEPHANTS

Maranda Clark's experience in Thailand



Logging was banned in Thailand in 1989 due to extensive deforestation in the country. Thousands of the nation's Asian elephants, which were used as draft animals in the logging industry, along with their mahouts, or handlers, suddenly became unemployed. Many elephants were put to work in the Thai tourism industry or illegal logging activities, which heightened their risk of injury, exhaustion and malnutrition.

The Wildlife Friends Foundation of Thailand (WFFT) Elephant Refuge was created to rescue and rehabilitate injured, neglected, and abused elephants and to educate the public about the endangered species. The sanctuary depends on volunteers to care for the elephants year-round.

Most students in animal sciences get involved in extracurricular activities related to livestock or companion animals. This wasn't the case for Maranda Clark. "I wanted to experience something unique," said the senior animal sciences student from Post Falls, Idaho, of her decision to volunteer at the WFFT Elephant Refuge.

During her two-week tenure at the refuge about 100 miles southwest of Bangkok, Clark soon discovered that feeding and caring for animals that are at least seven feet tall, weigh more than three tons and live 50 years or more

takes serious commitment! It isn't surprising that most of her day was devoted to collecting and preparing feed for these behemoths.

"I worked from 6:30 a.m. to 5 p.m. six days a week," she said. "The elephant's main food source is banana tree trunks. We harvested a huge truckload of banana trees every other day. They also ate fruits available at the local market—watermelon and pineapple were the most common—as well as corn. We also made banana ball treats by mashing bananas together with a pelleted supplement."

An elephant's skin does not contain sweat glands so it must be cooled another way. Clark participated in a daily ritual at the sanctuary, walking the elephants to the lake for a swim and a scrub. "Bathing and walking the elephants, especially the baby, were my favorite activities!" said Clark. "I had so much fun!"

Clark aspires to become a small-animal veterinarian and while she has no immediate plans to utilize her new knowledge of elephants, she would like to go back to Thailand someday and volunteer to provide veterinary care for the elephants and other wildlife at the sanctuary.



Cooling off in the lake



Bathing



Going for a walk



COUGAR CATTLE FEEDERS

Practical experience in feedlot management

Cougar Cattle Feeders (CCF) was founded almost 20 years ago by undergraduate students who wanted hands-on, practical experience managing a custom feedlot. Current members have a similar goal and learn how to set up and run a feedlot with guidance from advisor Dr. Mark Nelson and beef cattle operations manager Brent McCann. Participation in CCF and previous or concurrent classroom instruction in AS 274, Beef Feedlot Systems, teaches members how to formulate diets, handle cattle, score feed bunks, interpret cattle behavior and recognize sick animals, implement and follow a health protocol, clean and maintain pens, manage waste, and market cattle.

This year the nine-person CCF team includes Tyler Jenks (president), Grace Marchesseault (vice president), Shelby English (feedlot manager), Austin Reed (secretary), Lindsey Dearmin (treasurer), Randa Boler (public relations), Jacklyn Armstrong (herdsman), Lindsey Miller (herdsman), and Colton Bunyard (herdsman). They are currently finishing two donated and eight purchased steers, as well as feeding 17 crossbred Wagyu calves for the Beef Center.

Diet formulation and management

To keep feed costs down, members learn to incorporate ingredients that are locally available into their diet

formulations. “We are feeding a diet based on timothy hay, potato by-products, and steam- or dry-rolled barley,” Jenks said.

Members work together to feed their steers twice daily. First, they score feed bunks, which aids in detection of potential problems with feed ingredients and feed intake. Next, they make any necessary adjustments to the diet composition and amount of feed offered. Last, components are added, mixed, and delivered to the feed bunks with the Cattle Lab’s new feed truck and conveyor.

Pens are cleaned and bedded weekly on Saturdays and animals are weighed monthly to track performance. Finished steers should be

STUDENT CLUBS & COOPERATIVES

CLUBS

Block & Bridle

Goal: Foster close relationships among all students pursuing animal agriculture as a profession.

Dairy Club

Goal: Connect students enthusiastic about dairy foods, dairy animals, and the dairy industry.

Collegiate Horsemen's Association

Goal: Unite collegiate horsemen of all levels and disciplines through education, leadership, and service.

Companion Animal Club

Goal: Learn more about companion animals and their management. Members are devoted to volunteering and giving back to the community.

COOPERATIVES

Cooperative University Dairy Students (CUDS)

Goal: Provide practical experience in all management phases of a working dairy herd. Members manage a working dairy herd of about 35 Holstein cows, plus young stock and dry cows.

Cougar Cattle Feeders (CCF)

See story at left.

Student Swine Cooperative (SSC)

Goal: Educate members about the swine industry through hands-on, practical learning experiences. Members own and manage a small herd of pigs, and are responsible for all management, financial, and marketing decisions.



Front row (L to R): Austin Reed, Jacklyn Armstrong, Lindsey Miller, Shelby English, Randa Boler, Grace Marchesseault
Back row (L to R): Lindsey Dearmin, Tyler Jenks, Dr. Mark Nelson, Colton Bunyard



CCF members distribute beef for the Washington Beef Commission at the Beef Counts event in Spokane



Saturday morning pen cleaning chores

ready for harvest in mid- to late April. In the past, CCF members marketed their cattle, arranging harvest and selling beef. This year they have a different avenue to disperse their fat cattle. "We have a forward contract with WSU Meat Science Laboratory," Colton Bunyard explained. "They have agreed to buy all of our cattle at a predetermined price."

In addition to managing the feedlot, CCF members also go on industry tours, attend county meetings, and volunteer at activities such as the Evergreen Exclusive Angus sale, the Washington Cattlemen's Association (WCA) Bull Test sale, the WCA Convention, and the Whitman County Cattlemen's Associa-

tion banquet. This year CCF members also distributed beef for Beef Counts, an event sponsored by the Washington Beef Commission to provide beef to families in need.

How to join the Co-op

Undergraduate students interested in joining CCF can contact Dr. Mark Nelson (nelsonm@wsu.edu) for more information. New-member applications are generally solicited in the spring. However, incoming students can talk to current members the first week of fall semester at the Department of Animal Science Welcome Barbecue or at the CAHNRS Fall Fest in September. Members also host informal information nights in fall and spring semesters.

IN THE LAB WITH...

Approximately 12 percent of women have trouble getting pregnant. Andrea Smith's work in Dr. Jim Pru's lab with mice and human uterine cells may help answer why 75 percent of infertility cases in women occur prior to development of the placenta during early pregnancy.

Smith found that the expression levels of transcription factors called TCF3 and TCF12 increased dramatically in the mouse uterus in early pregnancy. These transcription factors control about 900 genes in the uterus, including several essential for hemoglobin biosynthesis. Hemoglobin, a protein previously thought to be expressed only in red blood cells, functions to transport oxygen. Smith then conducted novel studies with human uterine cells and discovered that TCF3 is responsible for regulating hemoglobin synthesis in the human uterus. She concluded the uter-

us synthesizes hemoglobin during early pregnancy, regulating oxygen transport to the embryo prior to development of the placenta.

Functional studies demonstrated the fundamental requirement of these two proteins for successful pregnancy. When TCF3 and TCF12 were conditionally deleted from the female mouse reproductive system, they were completely infertile. These transcription factors also regulate decidualization, an essential process occurring in early pregnancy that prepares the uterus for embryo implantation.

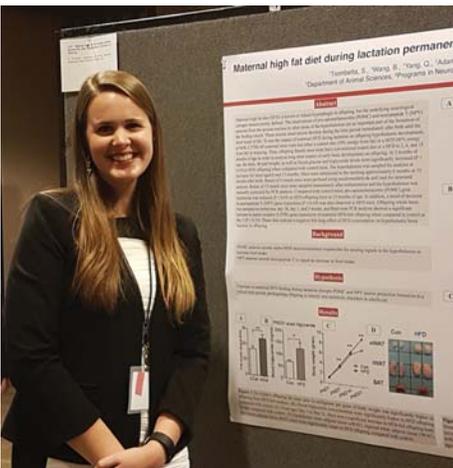
Smith's studies using mice as a biomedical model for human infertility problems and human uterine cells document a previously unappreciated role for the uterus in regulating oxygen transport to the embryo during early pregnancy prior to development of the placenta.

Andrea Smith



She is excited to share her data with everyone at the defense seminar for her master's degree later this spring. After graduation, the Kennewick native will study for the MCAT and hopes to be admitted to medical school where she can meld her science background with clinical experiences.

Sophie Trombetta



Everyone has heard the "you are what you eat" mantra. Recent scientific evidence now suggests that you might be what your mother ate when she was pregnant, too! To put it simply, you might have been "programmed" in utero to become overweight later in life if your mother was obese during pregnancy.

Maternal programming affects many aspects of fetal development. Sophie

Trombetta is seeking to understand how maternal obesity affects fetal brain development using mice as a model organism. Under the guidance of Dr. Min Du, Trombetta has focused her efforts on uncovering how the hormone leptin affects fetal brain development and the neurobiological pathways it regulates in mice. Long known as the satiety hormone, leptin is produced primarily by fat cells. When an animal becomes obese, fat cells increase in size and number. As a result, leptin levels surge and interact with receptors in the hypothalamus in the brain. When everything is working correctly, this interaction sends out a signal that decreases appetite and food intake.

Emerging research indicates the level of leptin in fetal circulation, which is directly influenced by the amount of leptin produced by the mother, critically affects brain development. To better understand this phenomenon, Trombetta fed a high-fat diet to female

mice during pregnancy and throughout lactation. As expected, the mother mice became obese and their blood leptin levels increased. Examination of pups' brains showed they were not as responsive to leptin and had impaired neuron growth. Trombetta's studies with mice will add to the repertoire of information human nutritionists use to understand how maternal programming affects risk of birth defects in infants and incidence of chronic conditions in adulthood. Because maternal programming also occurs in livestock, Trombetta's data may also be extrapolated to maternal management practices that enhance offspring performance efficiency.

Trombetta recently presented some of her research data at the Perinatal Biology Symposium in Snowmass, Colorado. She expects to graduate with a Master of Science in animal sciences this May. Originally from Plano, Texas, she hopes to obtain a teaching job somewhere in the Pacific Northwest.

ANIMAL SCIENCES GRADUATE STUDENTS



Front row (L to R): Meagan Stotts, Elizabeth Keuter, Maria Donnay, Xiaoyu Wen, Shuwen Zhang; Second row (L to R): Tyler Caskin, Andrea Smith, Katherine Hilt, Natasha Moffitt, Jessica Lowe, Bo Wang, Noe Gomez; Third row (L to R): Yanting Chen, Logan Hulst, Katriana Jorgensen-Muga, Liang Zhou, Qiyu Tian, Mahesh Neupane; Last row (L to R): Sophie Trombetta, Hannah Chiapetta, Jacob Mutch, Corrine Harris

RESEARCH AREA

Behavior & Well-Being

Research is focused on identifying environmental and genetic contributions to the health and well-being of animals.

Environmental Sustainability/Nutrition

Air, land, and water quality are examined to understand how they are affected by animal agriculture and to develop management strategies for sustainable production. Basic and applied research in nutrition is conducted with beef and dairy cattle. This work includes animal metabolism, energy nutrition, and utilization of by-product feedstuffs.

Genetics/Genomics

Research projects focus on the use of mammalian comparative and functional genomics in the search for genes of economic significance. Transcriptome analyses are also employed to understand the biochemical, cellular, physiological and environmental systems involved in complex phenotypes.

Growth/Muscle/Meat Science

Projects span the continuum from basic to applied research and include defining the molecular mechanisms of muscle development, physiological responses to growth regulators, and meat quality improvement.

Reproductive Biology/Physiology

Research in reproductive biology/physiology includes endocrinology and embryo development that is both basic and applied, using cattle, sheep, swine, and rodent models.

STUDENTS (DEGREE, ADVISOR)

Tyler Caskin (MS, Adams Progar), Jessica Lowe (MS, Fox), Xiaoyu Wen (MS, Adams Progar)

Yanting Chen (PhD, Harrison), Hannah Chiapetta (MS, Harrison), Maria Donnay (MS, Johnson), Corrine Harris (MS, Nelson), Katherine Hilt (MS, Harrison), Ely Walker (MS, Llewellyn)

Logan Hulst (MS, Neibergs), Elizabeth Keuter (MS, Neibergs), Jacob Mutch (MS, Johnson), Mahesh Neupane (PhD, Neibergs), Shuwen Zhang (PhD, Jiang)

Noe Gomez (PhD, Du), Natasha Moffitt (MS, Busboom), Qiyu Tian (PhD, Du), Sophie Trombetta (MS, Du), Bo Wang, (PhD, Du), Liang Zhao (PhD, Du)

Katriana Jorgensen-Muga (MS, Pru), Andrea Smith (MS, Pru), Meagan Stotts (MS, Maquivar)

TRUE TO HER HEART

Dr. Nancy Irlbeck recently retired from her role as an administrator in the College of Agriculture at Colorado State University. Rather than ride off into the sunset, Irlbeck journeyed back to a classroom in the Palouse and began working as an instructor for the Department of Animal Sciences at WSU. Last fall she taught AS 205 (Companion Animal Nutrition) and AS 464 (Companion Animal Management) remotely from Colorado. She has since moved to the Pullman area and is a physical presence in the classroom this spring, teaching two of the department's core animal nutrition classes. "We are excited to have such a highly experienced and talented teacher," said Dr. Kris Johnson, Interim Chair. "Dr. Irlbeck's dedication to her students is unsurpassed. CSU's loss is truly WSU's gain!"

Why didn't Dr. Irlbeck retire?

"I wanted to get back to my passion and be true to my heart," Irlbeck said of her return to the classroom. "I love teaching! I love the students and their enthusiasm for learning! I am so excited to be here!"

Prior to assuming administrative duties, Dr. Irlbeck was an accomplished teacher and faculty member in the Department of Animal Sciences at CSU. She taught many core nutrition courses, including, but not limited to, feeds and feeding, feed formulation, zoo nutrition, pet nutrition, applied non-ruminant nutrition, and applied comparative nutrition. She received numerous awards recognizing her teaching excellence as well as her commitment to academic advising.

Formally trained as a ruminant nutritionist, Dr. Irlbeck's interests evolved into comparative nutrition. In 1992, she became one of the first consulting zoo animal nutritionists in the country. She continued in this capacity at the Denver



Zoo until 2014 when she handed the reins over to a former student. She still provides pro bono nutrition advice to the Pueblo Zoo in Colorado.

Future plans

In addition to teaching, Dr. Irlbeck plans to partner with a colleague in South Africa and update the *Comparative Nutrition of Exotic South African Herbivores* textbook. She will also continue her work on the Forager's Source Database, a catalogue of the nutritive compositions of multiple browse species fed to exotic herbivores at zoological institutions.

Dr. Irlbeck's passion for animals, especially sheep, extends well beyond the classroom. She is a proud co-owner of the ANIROONZ Sheep Company, which specializes in rare-wool sheep breeds. The company not only produces award-winning fleeces, but also provides an internship program for anyone interested in learning more about wool sheep production. Irlbeck's sheep and the rest of her menagerie still live in northern Colorado, but she is hoping to soon find the perfect home for them somewhere in the Palouse. After the sheep are moved and settled here, she and her husband would like to re-establish their internship program and share their love and knowledge of wool sheep.

Meet our new vivarium manager - Elizabeth Willems



Management of the Experimental Animal Laboratory Building (EALB) vivarium is now in the capable hands of **Elizabeth Willems**. She ensures that the research animals in the facility are housed, fed, and cared for according to protocols approved by the university's Institutional Animal Care and Use Committee (IACUC),

which meet standards required by the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC).

Prior to moving to the Animal Sciences Department, Willems cared for laboratory animals in vivariums located in the WSU College of Veterinary Medicine and the WSU Department of Psychology.

Willems graduated from California State University – Fresno in 2010 with a bachelor's degree in animal sciences with an emphasis in equine science.

In her free time, Willems enjoys the company of Jasmine, her red Holland Lop rabbit, reading, horseback riding and participating in events at her church.

NOTEWORTHY ITEMS

Faculty

Min Du traveled to Indonesia in November and December as a visiting Fulbright Specialist. This program builds links between U.S. scholars and their counterparts through short-term collaborative projects in over 140 countries.

Kris Johnson received the Distinguished Teaching Award from the American Society of Animal Science (ASAS) in July. This award recognizes outstanding teachers of undergraduate or graduate courses in animal sciences.

Kris Johnson was elected to the ASAS Board of Directors, where she serves as the treasurer.

John McNamara was the recipient of the Jane Parker Advising Award in recognition of his contributions to WSU student advising.

John McNamara was named a Teaching Fellow by the ASAS at the ASAS-ADSA Joint Annual Meeting in Salt Lake City, Utah in July.

Xiang Zhou, visiting faculty from China, was granted a

bursary by the International Society of Animal Genetics for travel to the annual conference held in Salt Lake City, Utah in July.

Staff

Kathy Wang earned her Assistant Laboratory Animal Technician (ALAT) Certification from the American Association of Laboratory Animal Science (AALAS).

Elizabeth Willems received her Laboratory Animal Technologist (LATG) Certification from AALAS.

Graduate students

Elizabeth Keuter won first place in the American Dairy Science Association (ADSA) Graduate Student Poster Competition for Master of Science Students at the ASAS-ADSA Joint Annual Meeting in Salt Lake City, Utah in July.

Sophie Trombetta received an award from the USDA-AFRI for travel to the Perinatal Biology Symposium in Aspen, Colorado.

Noe Gomez was a recipient of an Achievement Award for College Scientists (ARCS) Founda-

tion scholarship.

Shuwen Zhang is a member of a group of students from WSU that has made it to the final event of the Holloman Health Innovation Challenge.

Undergraduate students

Courtney Pierce, a 2016 graduate, placed first out of 21 competitors from across the U.S. and Canada in the ASAS Undergraduate Student Poster Competition at the ASAS-ADSA Joint Annual Meeting in Salt Lake City, Utah in July.

Heather Young won Honorable Mention at 2016 SURCA and is also a 2016-17 Auvil Scholars Fellow.

Other news

Liné Estergreen died March 30, 2016. Dr. Estergreen had an active research program in dairy reproduction and lactation physiology from 1961 to 1988.

Apple Cup Crisp ice cream was voted best ice cream at the ASAS-ADSA Joint Annual Meeting in Salt Lake City, Utah and the department was presented with the **Big Scoop Award** for the second straight year.

...and the new assistant manager of the dairy - Amber Merk

Amber Merk's route to assistant manager of the Knott Dairy Center was not a direct one. After graduating from Colton High School, she entered beauty school and practiced cosmetology for several years. Later, Merk decided to go a different direction. She heard the WSU dairy was looking for some help with a feeding trial and decided to give that a try. Merk loved working with cows and resolved to go back to school to learn more. She graduated in 2009 from the University of Idaho with a Bachelor of Science in animal sciences.

After graduating, Merk went to work for BioTracking, the company in Moscow, Idaho that designed and markets the BioPRYN pregnancy test. Merk began her career at BioTracking as a laboratory technician, but quickly moved up the ranks to become director of laboratory service and sales.

Merk is thrilled to be back outside working with the cows at the WSU dairy and looks forward to working with faculty, staff, and students. When she isn't at work, she enjoys spending time with her son and husband.



DEPARTMENT OF ANIMAL SCIENCES

32nd Annual Recognition Program

*Join us as we celebrate the accomplishments
of students, staff, faculty, and alumni.*

Dr. Thomas Geary will be honored as the Distinguished Graduate in Science, Education, and Technology.

Sarah Smith will receive the Outstanding Alumnus Award.

The Distinguished Service Award will be presented to **William (Jay) Gordon**.

Doors open at 4:30 p.m.

Program begins at 5:00 p.m.

For additional information

call 509-335-5523

April 7, 2017 · Ensminger Pavilion



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Often, life-changing opportunities happen because of a single gift. A student gains from an experience or succeeds because of a scholarship. A faculty member makes a ground-breaking discovery because of generous contributions. A simple thing, really. Making a gift. Changing a life. If you would like to help us achieve our goals, please consider making a gift to the Department of Animal Sciences.

For more information or to find out how you can help, please contact:

Kristen Johnson, Interim Chair
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