

The Inside Scoop

Animal Sciences | Spring 2023



WASHINGTON STATE
UNIVERSITY

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



Notes from the Chair

One more trip around the sun, and I am still amazed by the passion and knowledge of the AS faculty, staff and students. Our clubs have been re-invigorated post-COVID and even revived after a long dormancy; such as the case with our Meats Judging team. A true luxury while serving as Chair, is the fact that I have had the privilege of meeting industry leaders, producers, and stakeholders and as always learn a great deal from them. I believe that as you take the opportunity to peruse the contents of our Inside Scoop issue that you will share my optimism relating to

the great things that we are currently achieving and the future that lies ahead. Animal Sciences has had the luxury to add new faculty and staff this year, including the new Dean - Dr. Wendy Powers-Schilling - a distinguished animal scientist by training and career accomplishments. Please know that I appreciate your support, your guidance, and your wisdom as it pertains to the Animal Sciences Department and together we will continue to provide great value to our students, state, and nation.

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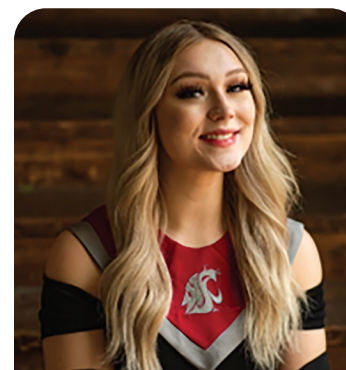
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WELCOME

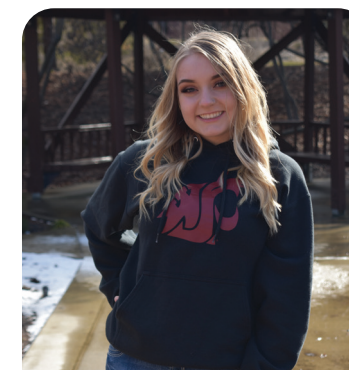


Dr. Wendy Powers

Dr. Powers joined WSU in August 2022. She currently serves as the dean of the College of Agricultural, Human, and Natural Resource Sciences with a faculty appointment in the Department of Animal Sciences. She earned a Bachelor of Science degree from Cornell University before moving to Florida to work on a dairy farm. While in Florida, Powers completed graduate work at the University of Florida. Following completion of a PhD program, she started her career as an assistant professor/extension specialist in the Animal Science Department at Iowa State University working in environmental issues related to livestock production. After 10 years, Dr. Powers moved to Michigan State University for another 10 years as a full professor/extension specialist and director of environmental stewardship for animal agriculture (College of Agriculture, Animal Science and Biosystems & Agriculture Engineering) during which time she spent four years as the first director of the Agriculture and Agribusiness Institute for MSU Extension. In 2016, Powers became the Associate Vice President, Agriculture and Natural Resources (ANR) at the University of California overseeing county-based Cooperative Extension, twelve statewide programs and institutes, and nine Research and Extension Centers for the University of California system.



Amelia Johnson



Kaitlyn Wright



David Varvel



Damon Burke

Amelia Johnson joined the department in May 2022 as a personnel/fiscal specialist. She is dedicated to helping behind-the-scenes processes go smoothly so that the Animal Sciences Department can continue to succeed and strive for excellence. She graduated with an AA at Grays Harbor College in Aberdeen, Washington before transferring to WSU to finish her BA in finance. She is currently enrolled in WSU's online MBA program and is concentrating on marketing.

Kaitlyn Wright graduated with a BS in animal sciences and began working for the department in March 2022. She became a recruiter and advisor in August 2022. As an undergraduate in animal sciences, she worked at the Knott Dairy Center as well as in the barns at the WSU Veterinary Teaching Hospital and served as president of Dairy Club. She draws upon her experiences as an animal sciences major to provide the best information and support to current and future students. When she is not working with students you can find her skiing, hiking, fishing, camping, and hanging out with animals.

David Varvel began working as a maintenance mechanic at Farm Shop in the summer of 2022. He worked at the WSU Steam Plant prior to his employment with the department. He and Damon Burke work together to keep our animal facilities operational.

Damon Burke was recently promoted to agriculture and maintenance manager at Farm Shop, replacing long-time manager Jerry Weber. He has been a WSU employee for 16 years.

The Inside Scoop

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On the cover: Gelbvieh steer at the WSU Cattle Feeding Laboratory

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Courtesy Kathleen Sullivan

Halver Lecture in Comparative Nutrition Dr. Kathleen Sullivan

The 2023 Halver lecture in comparative nutrition, funded by late WSU alumnus Dr. John E. Halver III (1922-2012) and his family, featured Dr. Kathleen Sullivan, a comparative animal nutritionist who is an expert in mineral metabolism and a leading authority in black rhinoceros nutrition from the Animal Nutrition Center at Disney’s Animal Kingdom near Orlando, Florida. She has a PhD in nutritional biochemistry from the University of Florida, an MS in animal science and nutrition from North Carolina State University, and a BS in animal science from Cornell University.

More than 150 people attended Sullivan’s presentation, “Working Outside of Normal. Using Practical Nutrition Research for Exotic Animal Health: Comparative Mysteries.” Attendees learned that Disney is an accredited institution with the Association of Zoos and Aquariums and is part of a larger community that is leading initiatives to improve the standards of care across disciplines whose goals include the conservation of endangered species. The Disney animal nutrition team includes over 30 cast members and four working nutritionists. They work daily year-round to provide more than 800 diets for over 2000 animals.

“We have a mind for nutrition as preventive medicine,” said Sullivan who has been helping to care for and conserve animal species with Disney for the past 15 years. “We look at the impact of diet on health. We use what we know from our own experience with these species, as well as utilizing our colleagues in domestic industry and academia, to clinically assess and manage animals, balance diets, and optimize nutritional welfare.”

Nutrition impacts animal health and well-being, from susceptibility to illness and disease to reproduction. Sullivan’s presentation highlighted several challenging case studies where nutrition was used to solve problems in exotic animal species from stingrays to toads to rhinoceros.



A white rhinoceros cow and her calf. Courtesy Disney’s Animals, Science, and Environment

In the first case study, Sullivan described a Southern white rhinoceros, Jao, who had not yet had a calf at 24 years old. Experts from multiple departments at Disney worked together to solve the problem. They looked at the rhino’s social interactions and behavior, measured her circulating reproductive hormones, reevaluated

her diet, and compared her body weight to other female white rhinos who were reproductively successful. One of their approaches was to lower her elevated body weight, as she was larger than the adult male white rhinoceros at the facility. Much is known about the potential negative impact of obesity on fertility in women and across many animal species. The Disney researchers surmised the same may be true in rhinos and worked to better control Jao’s diet.

“We had to monitor her consumption,” said Sullivan. “Controlling her intake and getting over 400 pounds off her happened over seven years. But soon after it got there, we had a very welcome surprise – baby Mylo!”

Another case study involved the “toad who could not come to dinner.” Sullivan described the toads in question as lethargic and losing weight. The Disney team took blood from the toads and discovered that all of them had hypovitaminosis A, or low levels of vitamin A. Amphibians with vitamin A deficiency develop a condition called lingual squamous metaplasia or short tongue syndrome. The cells in the mouth and tongue of these animals do not produce the sticky mucous required to capture prey. This condition can be reversed if treated early. After a series of experiments to determine the most effective route and frequency of administration, the team discovered that a once weekly topical dose of vitamin A was most effective at preventing vitamin A deficiency.

Sullivan discussed Iron Overload Disorder, a condition that is common in black rhinoceroses under human care. Iron overload is caused by a chronic imbalance of iron metabolism in which iron accumulates and damages tissues and organs, leading to inflammation, infection, liver damage, skin lesions, and a shorter lifespan. Sullivan and the team at Disney’s Animal Kingdom evaluated the black rhinoceroses’ diet and determined that the pelleted feed typically fed under human care contained very high amounts of iron. To limit iron, they worked with Mazuri feeds to develop a low iron form of the high fiber low starch pelleted diet, removed alfalfa hay which had high bioavailable iron levels, and limited produce with high vitamin C, as the vitamin increases iron absorption. These dietary changes should help prevent iron overload. But how to treat the existing condition? Removing large volumes of blood by phlebotomy is commonly used to treat the similar condition in humans and can be used in black rhinoceroses. While Disney’s rhinos have been trained using positive reinforcement and voluntary participation as up to four liters of blood are removed, this process may not be practical at all black rhino holding institutions. Therefore, Sullivan and her team examined the effectiveness of an oral iron chelator called HBED on preventing iron accumulation. After determin-

Continued on p. 3

Farrahn (O’Hara) Olson (BS ‘18)

Graduate of University of Glasgow School of Veterinary Medicine



Farrahn (O’Hara) Olson graduated on July 1, 2022, with a Bachelor of Veterinary Medicine and Surgery from the AVMA Accredited University of Glasgow, School of Veterinary Medicine in Scotland. She was the first WSU student accepted into FEEPASS (Facilitated Early Entry Program for Animal Science Students), a partnership between the University of Glasgow and WSU, one of several universities with animal science programs in the U.S. Exemplary animal science students like Olson who are accepted into FEEPASS enter the program at the beginning of the final year of their animal science degree as a study abroad option. She earned her BS degree in animal sciences at WSU in 2018 after successfully completing her first year at the University of Glasgow and began the four-year BVMS curriculum.

Olson thoroughly enjoyed her five-year educational experience at the University of Glasgow. The program was somewhat different from similar veterinary medicine degree programs in the U.S. All students are expected to work one-on-one with veterinarians and learn practical, clinical, personal, and professional skills to prepare for a career in veterinary medicine. Olson said the curriculum also included traditional lectures and lab classes. However, rather than multiple exams throughout the year, there is one big exam at the end of each year.

In addition to regular coursework, the degree program at the University of Glasgow required Olson to participate in extramural studies during her vacations. Normally, students must undertake 26 weeks of clinical extramural practical experience, which can be anywhere in the world. However, the COVID-19 pandemic complicated Olson’s educational experience.

“I was told to fly home at the beginning of the pandemic and for the next nine months I attended online classes,” she said. “Our extramural studies requirements were also reduced from 26 weeks to 13 weeks because of the pandemic.”

Despite the hiatus, Olson later found time to travel the surrounding Scottish Highlands and explore other European countries like Poland and Hungary.

Originally from Nine Mile Falls, Washington, Olson recently married her husband, Tanner, and together they bought their first home. She has been working at a mixed-animal veterinary practice in Creswell, Oregon since July

11 and loves her job. She appreciates her mentors at the clinic and is grateful for the educational foundation she received in animal sciences at WSU.

“My education in animal sciences was very helpful, especially classes like Nutrition, Feeds and Feeding, Ruminant Nutrition, and Reproduction. All the classes I took at WSU were better than similar courses in vet school because I got more support going through the material. I’m grateful to have a background in animal science that I built on in vet school,” she said. “I especially loved being a member of the Student Swine Cooperative! There are not a lot of pigs in Scotland, so I appreciated the hands-on experience SSC provided. I also enjoyed learning about the business and marketing aspect of the swine industry.”



Farrahn and Tanner Olson enjoy the Scottish Highlands. Courtesy Farrahn Olson

Continued from p. 2

ing that the synthetic chelator could be safely fed to horses, a model animal for rhinos because of their similar digestive system, the team fed it to the black rhinos. While the chelator removed iron, health complications that were resolved in one animal taught the team to be cautious and that chelation must be further studied. The black rhinos at Disney currently have healthy iron levels similar to wild rhinos in Africa thanks to diet and phlebotomy.

Sullivan’s last case showed applied use of the HBED chelator to successfully treat iron overload in dolphins. Due to a negative reaction to phlebotomy in the dolphins, who can carry loads of iron even higher than black rhinos, HBED was fed to promote iron binding and re-

moval. When carefully monitored, HBED treatment decreased iron to levels equivalent in wild dolphins, improved liver size, and lowered inflammation. The treated dolphins displayed positive behavioral changes, including increased energy.

Sullivan wrapped up her presentation by saying, “Nutrition is awesome!” Understanding how nutrition impacts the body is critical to the health and welfare of our animals. Advice for students who might be interested in a career in comparative animal nutrition she said, “Never say no – always say YES to opportunities. Don’t be afraid to ask questions, as well as trying to make connections! Ask yourself what makes you happy. Is it a challenge?”



Blake Foraker

Washington's new meat scientist

A very warm welcome to Dr. Blake Foraker who joined the Department of Animal Sciences faculty as an assistant professor in July 2022. He was hired to revive and refresh the department's meat science undergraduate and graduate level courses and help fulfill Extension needs in the state for meat science education. He is off to an impressive start during his first year at WSU!

Foraker grew up in south central Kansas, northwest of Wichita, where his family owns a small farm. He began competing in meat judging contests as a high school student. During his undergraduate program in animal science at Kansas State University, Foraker excelled at meat and livestock judging. He was named to the All-American Meat Judging Team in 2015 and the All-American Livestock Judging Team in 2016. In addition, Foraker was overall high individual and a member of the KSU livestock judging team that earned reserve national championship honors at the North American International Livestock Exposition in 2016. He was honored by the American Meat Science Association with an undergraduate achievement award in 2017 and today is a professional member of the AMSA.

After graduating from KSU in 2016 with a BS in animal science, Foraker continued his education at Colorado State University where he received an MS in meat science in 2018 and at Texas Tech University where he earned a PhD in meat science in 2022. His early research efforts focused on meat animal growth, carcass composition, and eating quality. His most recent research addressed carcass and meat characteristics of crossbred beef x dairy cattle, a rapidly growing breeding practice in the U.S.

As a graduate student at CSU and TTU, Foraker coached several champion meat judging and meat animal evaluation teams. Since joining WSU, he recruited a group of students who formed the WSU meat judging team, which had not existed in over 50 years. After hundreds of hours of practice, the WSU team won the first two contests they entered against teams with much more experience and placed fifth in the National Meat Animal Evaluation Contest held at West Texas A&M University in Canyon, Texas, in March.

In addition to his dedication to and enthusiasm for coaching, Foraker is also committed to educating undergraduate students in the classroom and laboratory. He is currently teaching an introduction to meat science course and a livestock and carcass evaluation class and will be teaching an advanced meat evaluation course in fall semester. He is working on preparing an independent study practicum in meat marketing and hopes to add an advanced meat science course in the future.

Foraker's Extension program is also off to a good start. His Extension activities are geared toward educating youth and their mentors about meat evaluation. In mid-March, Foraker launched his Extension activities by hosting the Cougar Invitational Meat Judging Clinic & Contest for 150 high school aged-students and their parents and coaches. He also plans on interacting with the state's youth at county fairs and providing them with learning opportunities that entice them to seek a college degree in the Department of Animal Sciences at WSU. Future Extension programs will expand to educating livestock producers and working with the industry in the state of Washington.

When Foraker has free time he enjoys fishing, running, and judging livestock shows. We wish him the best of luck catching his first salmon!



Judging team members evaluate meat for a contest. Courtesy Blake Foraker

We are pleased to name Dr. Tammy Bray as the 2023 Distinguished Graduate in Science, Education, and Technology. She is a professor in Nutrition and Global Health and Dean Emeritus of the College of Public Health and Human Sciences (2002 to 2016) at Oregon State University in Corvallis.

BACKGROUND

A native of Taiwan, Bray graduated from Fu Jen University in Taipei, Taiwan with a BS in nutrition. She came to WSU to continue her education and earned a MS degree in human nutrition in 1971. Bray enjoys learning about how things work and discovered a passion for nutritional biochemistry during her MS degree program. While taking a class in energy metabolism, taught by Dr. James Carlson in the Department of Animal Sciences, she was enthralled and immediately approached him and asked if there were any opportunities to get involved in his lab. He said he needed someone to wash lab dishes and Bray jumped at the chance even though she was still working toward her master's degree. In addition to keeping the lab clean and tidy, Bray was also responsible for helping with lab work such as column chromatography by putting new tubes on a collection device at the end of each day. One evening she forgot to add tubes and did not realize her mistake until after bedtime. She was horrified, put a robe on over her pajamas, and ran to the lab where she found there were only three empty tubes left. She arrived in time to prevent a disaster! As she was adding fresh tubes to the device, Dr. Carlson walked in the lab. He was working late on a grant. Bray was so embarrassed – she was wearing a bathrobe! He did not comment on her garb but quietly recognized her dedication several days later with a pay raise and her own research project. She later joined his research team as a PhD student, earning her degree in 1974, and later as a postdoctoral researcher. Her research in Dr. Carlson's lab provided foundational data in understanding the role of 3-methylindole in lung disease in livestock.

CAREER AND LEADERSHIP

Bray moved to Ontario, Canada, in 1978 and moved up the ranks in the Department of Nutritional Sciences at the University of Guelph, eventually serving as interim chair of the department and then interim vice president of academic affairs from 1991 to 1995. She later moved her research program to The Ohio State University, where she stayed from 1995 to 2002 as department chair and associate dean for research before moving back to the Pacific Northwest as the Dean of the College of Health and Human Sciences at Oregon State University.

Under Bray's leadership, the college was transformed significantly. It achieved national accreditation in 2014, becoming Oregon's first accredited college of public health and renaming it to the College of Public Health and Human Sciences. In addition, she led the effort to raise more than \$40 million from donors to construct the building of the Hallie E. Ford Center for Healthy Children and Families, established the Moore Family Center for Whole Grain Foods, Nutrition, and Preventative Health, and Center for Global Health, celebrated the 10-year anniversary of the Center for Healthy Aging Research, and supported 11 endowed faculty positions. During her tenure, the College's research funding from grants and contracts increased from \$3 million to more than \$18 million.

RESEARCH AND HONORS

Bray's research focuses on eradicating global malnutrition in children and understanding how free radicals and antioxidants affect genes that influence susceptibility to chronic diseases. She has published more than 110 papers in peer-reviewed journals, two books and 100 abstracts, and conference proceedings. Throughout her career, Bray has received nu-



Tammy Bray

Distinguished Graduate

merous awards and honors recognizing her visionary leadership, her pioneering research linking diet and health, and her teaching and mentoring excellence. In 2018, Bray received OSU's International Service Award and was also appointed as a Fulbright Specialist by the U.S. Department of State's Bureau of Educational and Cultural Affairs and World Learning.

Dr. Tammy Bray has had a successful career and credits most of her mentoring style and research philosophy to Dr. James Carlson and the intellectual collaborative environment of WSU. She and her late husband, John Bray, a WSU alumnus who received his PhD from the Department of Physics, have three grown children and six grandchildren.

GOOD: Genetically optimized organic dairy

Jiang and Maquivar look for genetic reasons why some dairy cows are resistant to diseases

Faculty members **Zhihua Jiang** and **Martin Maquivar** have joined forces to address a key issue facing certified organic dairy farmers – how to decrease the prevalence of uterine diseases in organically managed dairy cows to improve fertility and productivity without hormones or antibiotics. The USDA/AFRI Organic Agriculture Research & Extension Initiative recently awarded them \$1.5 million for their grant proposal entitled “Genomically optimized organic dairy (GOOD): genome selection against uterine diseases to improve fertility and longevity in cattle.” Dr. Jiang will blend his expertise in genetics and genomics with Dr. Maquivar’s knowledge of animal reproduction and they will engage an advisory panel of scientists, industry partners, and organic dairy producers to investigate underlying reasons for uterine diseases and determine methods that may ultimately lead to the identification of cows that are genetically resistant to metritis and endometritis, for example.

This research is important because the demand for organic dairy products in the United States continues to grow. Retail sales of fluid organic milk in 2021 were more than 2.9 billion pounds, which is a 12.7% increase from 2016 according to the U.S. Department of Agriculture Agricultural Marketing Service (www.ams.usda.gov/sites/default/files/media/EstimatedFluidProductsMilkSales.pdf). In 2021, sales of organic milk exceeded \$1.6 billion (www.nass.usda.gov/Publications/Highlights/2022/2022_Organic_Highlights.pdf). Organic dairy producers are under increasing pressure to keep their cows productive and infection- and disease-free.

The U.S. Department of Agriculture organic regulations (7 CFR §205) have detailed requirements for certified organic dairies regarding pasture management, feed sources, cow origin, healthcare practices, and housing conditions. Because of these regulations, organic dairy producers must overcome obstacles not necessarily encountered by their conventional counterparts. More

specifically, conception rates may be impaired because artificial hormones cannot be used on organic dairies, eliminating conventional reproductive husbandry practices such as estrus or ovulation synchronization protocols. Furthermore, except in extreme cases where a cow is suffering or at risk of dying, antibiotics cannot be used to treat illness, infection, or disease.

The period from late pregnancy through early lactation is a challenging time for a cow and many factors influence milk production, health, and reproductive performance. The cow’s reproductive tract may be damaged during calving and bacteria may contaminate the uterine lumen, leading to infection and uterine disease. The risk of uterine infections is also greater if the placenta is not expelled within the first six hours after birth. Furthermore, energy requirements for late-term fetal growth and lactation are huge and confounded by the fact that cows eat less during this period. Therefore, most dairy cows enter a state of negative energy balance (NEB) in which body fat stores are mobilized to attempt to meet the high energy demands for maintenance and milk production. Alterations in a cow’s metabolic status during NEB delays uterine involution and ovulation, both of which negatively affect subsequent conception. Negative energy balance also adversely affects the cow’s immune system and makes the cow more susceptible to postpartum uterine infections such as metritis and endometritis, both of which have detrimental effects on fertility.

Metritis and clinical and subclinical endometritis are postpartum uterine diseases of lactating dairy cows commonly seen in the first seven weeks after calving that negatively affect fertility and milk yield, causing substantial economic losses on dairy farms. Persistent inflammation of the endometrial lining of the uterus causes endometritis. Clinical endometritis is characterized by purulent (pus) or mucopurulent (mucous and pus) vaginal discharge. In contrast, cows with subclinical endometritis are often not identified and treated because there are no clinical

signs of the condition; however, cytological samples of the endometrium of these cows exhibit elevated numbers of polymorphonuclear neutrophils. These innate immune cells provide the first line of defense against infection and are a classical sign of inflammation.

Conventional dairy management tools to combat uterine diseases include antibiotic therapies and hormone treatments, both of which are banned on certified organic dairies. Therefore, organic dairies have implemented alternative strategies, such as an intrauterine infusion of a 50% dextrose solution, to treat clinical endometritis with varied levels of success.

In a preliminary study, Jiang and Maquivar collected endometrial samples at 7 and 21 days after calving from a small number of certified organic dairy cows with and without endometritis. They used cutting-edge technologies to profile RNA variants in the cells. They specifically focused on a mechanism known as alternative polyadenylation or APA, which has recently gained attention as a major player in gene regulation. Polyadenylation is a biological process that occurs in a series of steps. An immature RNA is first cleaved at a specific location called a poly(A) site and then a poly(A) tail, or a long chain of adenine nucleotides, is added to produce a mature RNA. The mature RNA is ultimately encoded into a protein that contributes to traits such as disease resistance and milk production in animals. Many genes contain multiple poly(A) sites, which produce RNA variants when they use APA. Conditions such as growth or infection often alter the use of the poly(A) sites. The altered transcript or RNA variant often affects its stability in cells so that it changes the coding region of a gene, leading to production of a functionally different protein. What triggers the use of alternate poly(A) sites remains largely unknown at this time, but alterations in polyadenylation have been associated with cancer and endocrine, metabolic, and immunological diseases in humans.

Jiang and Maquivar discovered that cow’s endometrial cells also use APA in response to uterine disease. In fact, 65% of protein coding genes in the cow’s endometrial cells had two or more poly(A) sites. Many of the genes in endometrial cells of healthy cows that used APA were related to cilium organization. Cilia are microscopic hair-like projections found in large numbers on the surface of cells that produce a beating motion that propels contaminants from organs or tissues by moving fluid over the cells. It is possible that the healthy cows did not develop endometritis because the poly(A) sites triggered formation of cilia that were more effective at moving bacteria out of the uterus than their infected counterparts. Conversely, cells from cows with endometritis used APA in genes related to small proteins called cytokines that control the growth and function of cells integral to the immune system. Dysregulation of APA in these genes may be linked to development of endometritis in dairy cows.

Results from Jiang’s and Maquivar’s preliminary study are promising but do not provide convincing evidence because only a few cows were screened. Funds granted from the USDA/AFRI Organic Agriculture Research & Extension Initiative are earmarked to collect samples from 1000 certified organic dairy cows at 7 and 21 days postpartum, critical time points for diagnosis of uterine diseases. They hope to decipher the complex interactions between genes and environment and link DNA to RNA to infertility triggered by reproductive diseases in dairy cows. They will accomplish this goal by detecting DNA variants from cows that are resistant or susceptible to metritis or endometritis, profiling APA in RNA and use that information to identify signaling pathways that are related to uterine disease severity, and detecting important biomarkers that can be used to select endometritis-resistant cows and develop alternative non-antibiotic treatment protocols to optimize reproductive health in dairy cows.



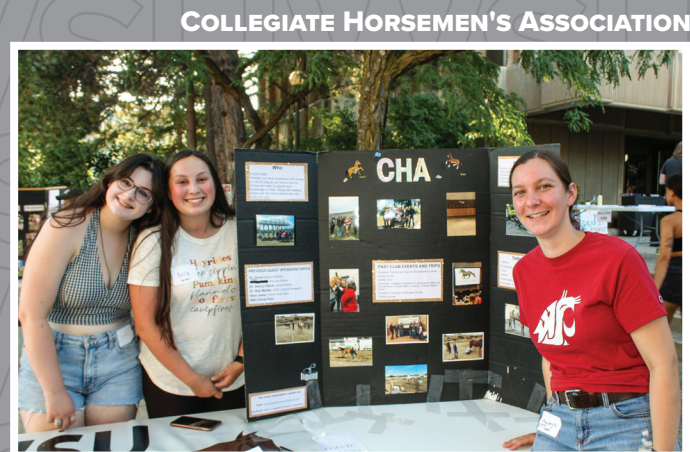
CLUBS

There are several clubs that meet the needs and interests of students in animal sciences. The Collegiate Horsemen's Association is for students who are interested in all things horse-related. Dairy Club has social and educational activities for its members. They discuss important issues facing the dairy industry with faculty members or invited guest speakers. All clubs welcome students from any major regardless of experience.

FOR MORE INFORMATION, CONTACT:

Collegiate Horsemen's Association
Email - wsucollegiatehorsemens@gmail.com

Dairy Club
Email - martin.maquivar@wsu.edu



DAIRY CLUB



COOPERATIVES

The best way to learn about the livestock industry is to get involved. The department has several student-run cooperatives in which students own, operate, and manage their own animals. Student Swine Cooperative (SSC) members purchase 10 feeder pigs each semester, feed and harvest them when they reach market weight, and sell the pork to the public. Cougar Cattle Feeder (CCF) members solicit donations of live cattle each year and work in consultation with advisors to feed, doctor, manage health and finances, collect performance data, and harvest and market beef. Cooperative University Dairy Students (CUDS) members manage a 35-cow milking herd, plus young stock and dry cows. Milk is marketed to the WSU Creamery where it is used to make award-winning Cougar Gold Cheese and Ferdinand's ice cream.



COOPERATIVE UNIVERSITY DAIRY STUDENTS (CUDS)
Advisor: Dr. Amber Adams Progar
Email: amber.adams-progar@wsu.edu

TEAMS

MEATS JUDGING TEAM

Coach: Blake Foraker

Not since the early 1970s has WSU had a meats judging team. Members joined with no experience and practiced long, hard hours. They won championship honors at the first two contests they entered - the National Western and the Fort Worth Stock Show and Rodeo. In late March, the team placed fifth at the National Meat Animal Evaluation Contest.



DAIRY CHALLENGE TEAM

Coach: Marcos Marcondes

The goal of the North American Intercollegiate Dairy Challenge is to provide educational, professional growth, and networking opportunities for students, dairy producers, agribusiness, and academia to develop future dairy industry leaders. The Dairy Challenge competition tests the student's knowledge of the dairy industry and helps develop teamwork and leadership skills. Two students from the current group placed on winning teams at the Western Regional Dairy Challenge contest in California in February.



COUGAR CATTLE FEEDERS (CCF)
Advisor: Dr. John Unruh
Email: john.unruh@wsu.edu



STUDENT SWINE COOPERATIVE (SSC)
Advisor: Dr. Kristen Johnson
Email: johnsoka@wsu.edu



Animal Sciences Graduate Students



First row (L to R): Sabrina Haney, Emaly Suarez, Giulia Berzoini Costa Leite, Emma Wheeler, Yao Gao, Md Nazmul Hossain. Second row (L to R): Victoria Kelson, Makenzie Melby, Callan Lichtenwalter, Kassie Stadler, Shane Carrion, Tholen Blasko, Max Butensky. Not pictured: Isabela Carrari, Allison Herrick, Jera Monaghan, Nafise Noroozi.

GIULIA BERZOINI COSTA LEITE

MS student, Marcondes Lab
Hometown: Juiz de Fora, Brazil
Research focus: Use of rBST as an alternative strategy to overcome constraints on the mammary gland development of dairy heifers subjected to high feeding levels and early breeding practices

THOLEN BLASKO

MS student, Phelps Lab
Hometown: Sultan, Washington
Research focus: Applying CRISPR technology to salmonid monitoring strategies

MAX BUTENSKY

PhD student, Phelps Lab
Hometown: Los Altos, California
Research focus: Maturation process in Pacific salmon

ISABELA CARRARI

PhD student, Marcondes Lab
Hometown: Curitiba, Parana, Brazil
Research focus: Use of seaweed to decrease enteric methane production by dairy cows and its effects on health, digestion, and production

SHANE CARRION

PhD student, Jiang Lab
Hometown: Jackson, Mississippi
Research focus: The link between APA site use and phenomics

YAO GAO

PhD student, Du Lab
Hometown: Shenmu, China
Research focus: Maternal metabolism and embryonic myogenesis

SABRINA HANEY

PhD student, Phelps Lab
Hometown: Ogden, Utah
Research focus: Understanding the evolution of viviparity in sharks using comparative genomics

ALLISON HERRICK

PhD student, Neibergs Lab
Hometown: Bliss, New York
Research focus: Utilizing genomic selection as a risk management tool for commercial dairies

MD NAZMUL HOSSAIN

PhD student, Du Lab
Hometown: Magura, Bangladesh
Research focus: Effect of obesity on epigenetic reprogramming of germ cells and embryonic organogenesis

VICTORIA KELSON

MS student, Neibergs Lab
Hometown: Molino, Florida
Research focus: Identify genes associated with embryonic loss in high-production Holstein dairy cows

CALLAN LICHTENWALTER

PhD student, Adams Progar Lab
Hometown: Conway, Arkansas
Research focus: Pest bird impacts on dairy cattle behavior and welfare. Sustainable reduction of pest birds on dairies

MAKENZIE MELBY

MS student, Adams Progar Lab
Hometown: Pleasanton, California
Research focus: Determining what characteristics of cows, such as health

status, affect handler safety in human-dairy cow interactions

JERA MONAGHAN

MS student, Johnson Lab
Hometown: Burlington, Wisconsin
Research focus: Use of seaweed in composting cattle manure and worm-powered manure management to reduce emissions

NAFISE NOROOZI

PhD student, Du Lab
Hometown: Tehran, Iran
Research focus: Impacts of maternal obesity on offspring development

KASSIE STADLER

PhD candidate, Law Lab
Hometown: Yakima, Washington
Research focus: How the transcription factor RUNX3 is a driver of fate in the male germline

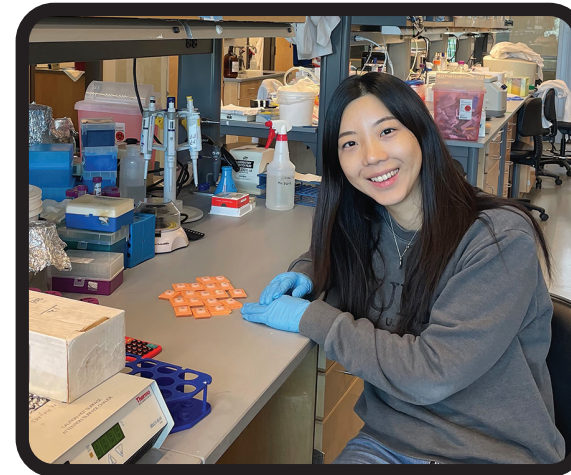
EMALY SUAREZ

MS student, Neibergs Lab
Hometown: Yakima, Washington
Research focus: Identification of single nucleotide polymorphisms (SNP) and candidate genes associated with fetal loss in dairy cattle

EMMA WHEELER

PhD candidate, Jiang Lab
Hometown: Emporia, Kansas
Research focus: Neuroscience and genomics of chronic cannabis use in rodents

Outstanding Graduate Students



SONGAH CHAE
Outstanding PhD student



JERA MONAGHAN
Outstanding MS student

Outstanding Undergraduate Students



CHELAYA MOSBY
AnSci Outstanding Sophomore
Home town: Silverdale, Washington



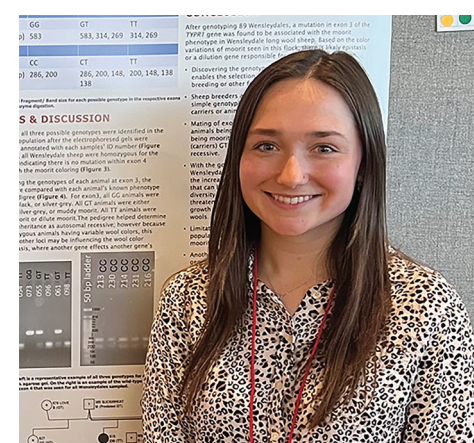
JOSEPH KOENIG
AnSci Outstanding Junior
Home town: Tulare, California



CHASE WINKLER
AnSci Outstanding Senior
Home town: Lake Stevens, Washington



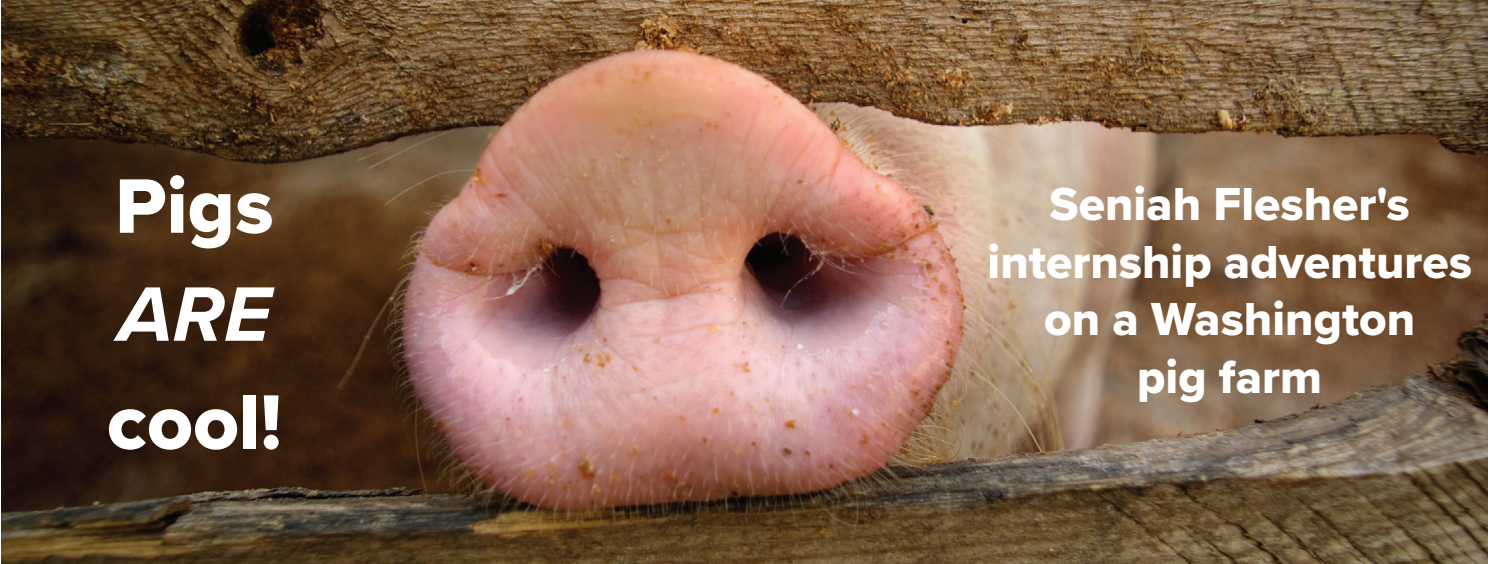
ERICK VERGARA BARRIOS
CAHNRS Emerging Leader in Agricultural Sciences nominee
Home town: Sunnyside, Washington



BROOK MAC
CAHNRS Graduating Agricultural & Natural Resource Sciences Research award winner
Home town: Leona Valley, California



ANDREW BARTELHEIMER
CAHNRS Cashup Davis Merit in Agricultural & Natural Resource Sciences award winner
Home town: Snohomish, Washington



Seniah Fleisher loves being around animals and has always thought she wanted to be a veterinarian. The sophomore animal sciences student grew up about 20 miles east of Tacoma in Lake Tapps, Washington, and did not have much experience with animals before attending high school. She volunteered to walk dogs at a local humane society and finally got her own dog when she was a high school senior. She took animal and veterinary science classes at Sumner High School but an introduction to swine production in FFA opened her eyes to the possibility of a career with animals that did not involve veterinary medicine.

Fleisher said she discovered that pigs were cool and unique animals because of her experiences in high school. Wanting to learn more about pig production, she joined the Student Swine Cooperative (SSC) as a first-year WSU student. The SSC is a group of undergraduate students who immerse themselves in swine production by managing a small herd of finishing hogs each semester. They work closely with advisors and members of the Washington pork industry and run a profitable business. In her first year as an SSC member, Fleisher was a pork sales associate and learned about marketing and customer service.

With a year of experience in SSC under her belt, Fleisher spread her wings and applied for an internship position that Dr. Kristen Johnson told her about at Alluvial Farms in Western Washington. Founded in 2015, Alluvial Farms is a first-generation family farm operating on 45 acres in Everson, WA. The farm's mission is to provide high quality pork to consumers in Puget Sound, and high-quality lard and hemp-based wellness products for



Seniah Fleisher with a piglet at Alluvial Farms. Courtesy Alluvial Farms

national distribution. They host farm experiences that inspire ecological stewardship and resilient local food sheds.

Farm owners Katie Pencke and Matthew McDermott were looking for an undergraduate animal sciences student who was interested in a seasonal swine technician and marketing assistant position. The farm is licensed to employ agricultural interns by the state of Washington. This means they have developed a curriculum in pastured pork management, farm and tractor safety, and small-scale regional meat systems.

Fleisher met all their qualifications – she was an animal sciences student, had some experience working with pigs, and as a bonus, experience in retail and customer service – and was accepted as an intern for summer 2022. For three months, she lived in a yurt on the farm's property and plunged into the day-to-day management of a farrow-to-fork pastured pig farm. She was a farrowing attendant and watched for problems as sows gave birth. She observed castration and vaccinations of 5-to-7-day old piglets and participated in daily and weekly feeding chores. In addition, Fleisher gained a unique perspective about how important it is to properly string electric fences and helped move pigs amongst rotational pastures during the growing season.

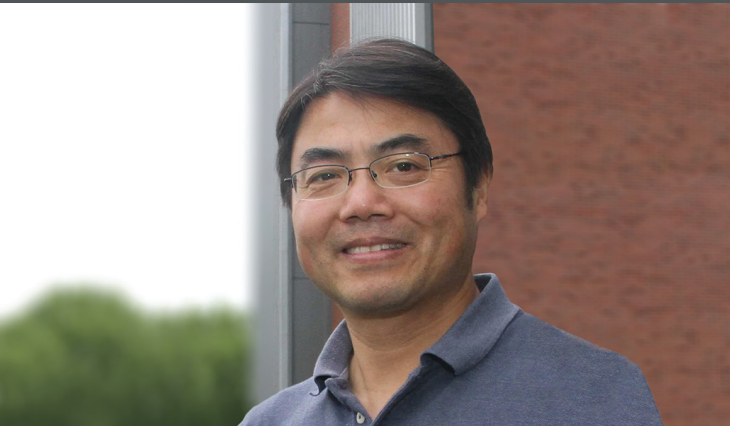
Reflecting on her experiences at Alluvial Farms, Fleisher said, "I learned a lot during my internship! I really loved that every single morning I would get up, go to the barn, and feed pigs. Sometimes the piglets would get out and I would find them running around the barn. They were funny!"

In addition to helping with animal chores, Fleisher also got involved with maintenance jobs on the farm. To make her work easier, she was trained to operate farm equipment and especially loved using the skid steer. She also learned about the farm's humane harvesting practices and got involved in post-processing marketing by delivering orders to customers, staffing a booth at a local farmers market on Saturdays, and helping with farm-to-fork dinners at the farm.

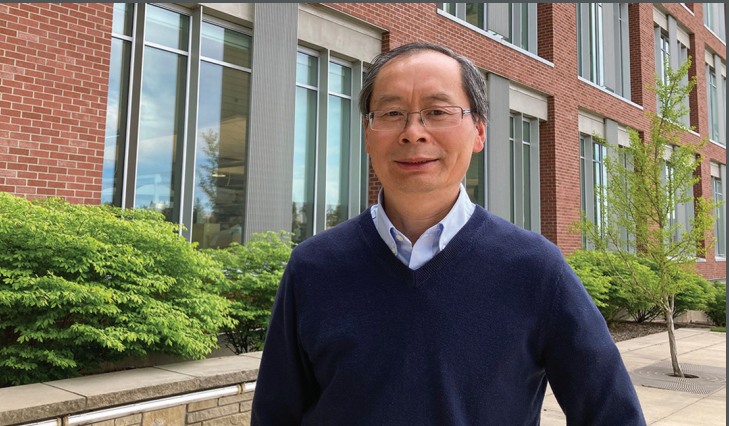
Fleisher is still a member of SSC and is now one of the herd managers, sharing responsibilities for oversight of the barn and pigs. Although she aims to be a veterinarian someday, her experiences with pigs in SSC and at Alluvial Farms have made her consider other career options in the swine industry.

"We were thrilled with the professionalism and work ethic that Seniah brought to the position," said Katie Pencke. Alluvial Farms hopes to continue their internship program. Students can learn more about the farm at www.alluvialfarms.com.

KUDOS AND ANNOUNCEMENTS



DR. MIN DU was promoted to the rank of regents professor. This is the highest faculty honor and recognizes faculty members who have made ground-breaking contributions in their area of expertise, obtained competitive research awards, achieved national and international recognition for their accomplishments, provide substantial service to WSU, and contribute to graduate and undergraduate student education.



DR. ZHIHUA JIANG recently received a Fulbright U.S. Scholar Program award. Jiang conducted his research at the University of New England in Armidale, Australia, where he joined a world-recognized team of scientists to create new tools and resources to improve identification and location of animal genes, understand their functions, and use this knowledge to benefit animals and society.

CONGRATULATIONS TO HOLLY NEIBERGS who was appointed as the Assistant Director of the CAHNRS Office of Research

GRADUATE STUDENTS

Callan Lichtenwalter, PhD (May '23) Jera Monaghan (Aug '23)

UNDERGRADUATE STUDENTS

DECEMBER 2022

Sydney Ames
Madison Austin
Ashlyne Berkner-Olson
Camille Campbell
Hailey Couture
Aaron Field-Patton
Garrett Ford
Caitlyn Greiser
Hailey Jensen
Yuquan Ji
Alissa Jilk
Andrew Jimenez
Samantha Jones
Audrey Kristofferson
Jade McRae
Brianna Meulman
Skyler Olson
Kayla Perez
Karsen Sahleen
Lauren Sandoval
Grace Stargell
Jordan Tell
Anna Willing
Darien Wilson

MAY 2023

Valerie Achziger
Anahil Alcaraz-Garcia
Isabella Arriaga
Rian Baggot
Andrew Bartelheimer
Katie Beckner
Whitney Bjornberg
Hannah Blackmon
Ashley Blakemore
Jessica Boos
Alyssa Bothwell
Mary Brougher
Makenna Buhl
Usha Caldwell
Madeline Casto
Kyla Christianson
Emily Davenport
Alea Dews
Alexandria Enache
Samantha Eng
Madison Escobar
Hannah Evans
Madison Fleek
Natalie Fogarty
Kelli Gagne
Ryley Griffiths
Teddy Grogan

Ashley Gunning
Alynn Harder
Milo Harris
McKenna Harvill
Ashley Haskett
Abby Hayden
Taylor Heimbigner
Jennifer Hernandez-Ramos
Hieu Doan Hoang
Jenna Holt
Alexys Hufnagel
Lyssa Killgo
Joshua Kittay
Kenan Kontaratos
Lyndsey Kuhlman
Makaela Lambert
Lucian Leveille
Grace Lieuallen
Xinyue Ling
Andrea Lively
Miranda Lynam
Morgan Manwill
Desirae Marion
Katie Martin
Brisa McAuliffe
Anna McMurphy
Nikey Mellick
Kayleigh Moore

Lilian Moore
Victoria Moreno
Abby-Lyn Orman
Ayesha Patel
Luke Pietsch
Emily Rahman
Alejandro Ramirez
Sierra Ramsey-Ortiz
Julia Rea
Olivia Renn
Kayla Richardson
Audrey Snedecor
Kendal Solis
Morgan Stahl
Michee Van Rooyen
Grace Whipple
Lina Winiski
Chase Winkler
Anne Wood
Benjamin Wycoff
Adriana Zaragoza

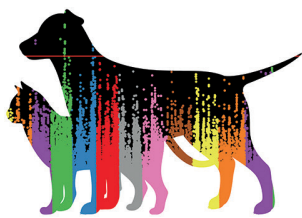
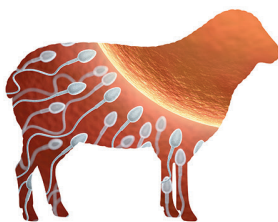
AUGUST 2023

Rachael Berger
Blythe Clanton
Emilee Keppelmann
Siena Mandy
Sydney Ross



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Department of Animal Sciences

ANIMAL SCIENCES



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For more information or to find out how you can support Animal Sciences, please contact:

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gordon.murdoch@wsu.edu
(509) 335-5523