Research opportunities for the 2026 CVM Summer Research Scholars Program

Dr. Cathleen Kovarik (cathleen.kovarik@usu.edu)

A number of studies have shown that SARS-CoV-2, the virus that causes COVID, can impact the neural pathway responsible for regulating reproductive events. The goal of the project is to determine if the receptor that binds SARS-CoV-2, known as ACE-2, is colocalized on gonadotropin-releasing hormone (GnRH) neurons. These neurons are the pathway through which the brain regulates reproduction. To answer this question, the Kovarik lab is using dual-labeling fluorescence immunohistochemistry on mouse brain slices. Preliminary data shows that ACE-2 is co-labeled with GnRH on multiple neurons in specific brain regions including the olfactory bulb and the hypothalamus. Studies performed in the Kovarik lab this summer will confirm and extend these preliminary findings.

Dr. Stephanie Martinez (stephanie.martinez@usu.edu)

The Comparative and Translational Veterinary Pharmacology Laboratory (Dr. Stephanie Martinez) investigates interindividual, breed, and species differences in drug disposition and therapeutic response across veterinary species. One way we approach this is through in vitro drug metabolism studies using liver microsomes (subcellular liver fractions) to examine drug breakdown and metabolic capacity. A potential summer project may focus on comparing the in vitro metabolism of antiparasitic drugs in ruminants, specifically bison versus cattle, since bison are typically dosed using cattle guidelines, and understanding metabolic similarities or differences could inform future species-appropriate dosing recommendations. Additional in vitro metabolism projects in other species or drug classes may also be available depending on student interest.

Dr. Rakesh Kaundal (rkaundal@usu.edu)

Kaundal Artificial Intelligence and Advanced Bioinformatics Laboratory;
https://kaabil.net/ or https://bioinfo.usu.edu/
Location: Center for Integrated BioSystems (CIB), Biotechnology Building, USU
Areas of Research: Artificial Intelligence, Machine Learning, High-Performance Computing, Bioinformatics, Computational Biology, OMICS Data Science; to advance agricultural and animal science research.
Examples of few projects available:
(i) AI-enabled Host-Pathogen interaction mapping for Livestock diseases (e.g. Predict protein–protein interactions (PPIs) between livestock hosts (poultry, cattle, swine) and pathogens; identify hub genes, etc.)
(ii) Agricultural Biosecurity Modeling for Zoonotic Pathogens
(iii) Natural Compound Discovery for Veterinary Antivirals and Antimicrobials (e.g. screen plant-derived compounds against livestock viral proteins; Predict antimicrobial and antiparasitic compounds using docking + ADMET prediction, etc.)
(iv) Microbiome Analysis for Animal Health and Nutrition
(v) Protein modeling, and multi-OMICS integration
(vi) Develop computational platforms and Databases.

Dr. Drew Swartz (drew.swartz@usu.edu)

Our research program focuses on improving hoof health and mobility in dairy cattle through both applied on-farm work and data-driven analysis. A veterinary student working with our team will gain hands-on experience performing locomotion scoring and recording hoof lesions during routine herd visits, while also assisting with data collection on farm management practices. This project additionally includes interacting with producers through survey methods and participating in focus groups to better understand decision-making around lameness management and technology adoption. Students interested in research communication and analytics can also contribute to project presentations and dataset analysis. This position offers a blend of animal handling, clinical observation, and real-world stakeholder engagement to support animal welfare advancements in the dairy industry.

Dr. Kevin Welch (kevin.welch@usda.gov)

The mission of the USDA Poisonous Plant Research laboratory (PPRL) is to investigate poisonous plants and their toxins, determine how the plants poison animals, develop diagnostic and prognostic procedures, identify the conditions under which poisoning occurs, and develop management strategies and treatments to reduce livestock losses. The results from research conducted at the PPRL is used by livestock producers, veterinarians, and extension personnel, as well as range and animal scientists to assess and mitigate the potential risk of poisoning livestock by plants.

Dr. Chris Davies (chris.davies@usu.edu)

Chris Davies is the Associate Dean for Research and Graduate Studies in the College of Veterinary Medicine. His laboratory studies interactions between the conceptus, endometrium, and maternal immune system in ruminants. Several years ago, a group of USU faculty including Dr. Davies, used genetic engineering to knock out one of the genes encoding the type I interferon receptor (IFNAR) in sheep. Dr. Davies has been using these sheep to study the mechanism of pregnancy recognition (establishment) in ruminants. For the last 35 years, the accepted paradigm for pregnancy recognition in sheep and other ruminants has been that interferon-tau (IFNT), which sheep trophoblast cells secrete between days 10 and 21 of pregnancy, is the signal for pregnancy recognition in ruminants. Since the response to IFNT is mediated by IFNAR, if the accepted paradigm were correct, IFNAR knockout ewes would be infertile. However, several years ago the Davies laboratory discovered that these ewes become pregnant and have completely normal pregnancies. This implies that there must be an alternative mechanism for pregnancy recognition. Dr. Davies research group is utilizing both in vivo and in vitro models, along with advanced molecular techniques including single cell sequencing and proteomics, to try to figure out the nature of the alternative signal. Summer research projects in Dr. Davies laboratory would investigate potential mechanisms of pregnancy recognition in ruminants.

Dr. Bettina Willie (bettina.willie@usu.edu)

Bettina Willie is a new Professor in the College of Veterinary Medicine at USU. Her research program uses multidisciplinary approaches, including high-resolution imaging, to study the causes, and improve the detection and treatment of skeletal fragility, especially in rare diseases. She is particularly interested in understanding mechanisms of bone adaptation and regeneration to mechanical stimuli to develop strategies to inhibit bone loss and enhance healing. To address these aims, she utilizes animal models in preclincal research, in silico (mathematical modeling), and performs clinical research in humans. For summer 2026 projects, she has several projects involving mice and chickens to study rare bone diseases and osteoporosis. For example:

Bone fragility in egg laying hens: Since the 1950s, egg laying hens have been housed in conventional cages and were under intense genetic selection to maximize egg production. These two factors are major contributors to the widespread osteoporosis and bone fractures observed in egg laying hens. In 2018, Canada and several US states implemented a ban on new conventional cage construction and a 20-year phase-in period of alternative housing. These different housing designs facilitate different types of activities (e.g. running, perching, climbing, flying). My ongoing research projects investigate how housing design, exercise, and nutrition (eg. pecking stones) can enhance bone mass in chickens during youth and minimize bone fractures during the egg laying phase. I am also examining how different lighting schedules influences in ovo movement and subsequent bone mass after hatch.

Mechanistic role that the circadian clock plays in mechanoadaptive bone (re)modeling Bone mass is strongly affected by mechanical loading, as emphasized by bone loss in paralyzed or bedridden patients. Exercise is the most efficient and cost-effective intervention to improve bone health. Night and rotating shift workers display an increased incidence of hip and wrist fractures and associations have been reported between circadian rhythmicity of rest and activity and bone mineral density. My work has shown that two important regulators of bone homeostasis (Wnt inhibitors Sost and Dkk1) have diurnal expression, meaning they are circadian clock controlled genes. In addition, my lab has shown that the time of day at which mechanical loading is administered impacts the bone formation response in mice, which is coincident with differential Sost and Dkk1 expression. These data suggest that circadian rhythms coordinate bone adaptation to physical forces.

My ongoing research projects involve examining how circadian rhythms affect mechanical unloading related bone loss, by tail-suspension experiments in mice with disrupted circadian clocks in their osteocytes (OcKO). These mice have a conditional deletion of Bmal1 in their osteocytes. Osteocytes are the bone cells that respond to mechanical loading.

Determining how the circadian clock regulates bone adaptation will allow us to identify novel molecular targets for serious problems caused by lack of physical activity in elderly and paralyzed individuals, or astronauts in microgravity as well as improve bone density in night and rotating shift workers.

Dr. Namhyeon Park (namhyeon.park@usu.edu)
I am with the NDFS department.
My lab focuses on general food chemistry, fermentation, and antimicrobials.

Dr. Young-Min Lee (YoungMin.Lee@usu.edu)
My lab has projects involving Porcine reproductive and respiratory syndrome virus (PRRSV). Summer projects may include generating specific gene knockout cell lines using CRISPR genome editing technology and investigating the functional role of particular cellular genes in PRRSV replication.

Dr. Mike McEntire (mike.mcentire@usu.edu)
I would love to potentially host a student next summer. When I participated in the summer research program when I was in school, I was able to partner with a clinician at the Fort Worth Zoo in addition to faculty at Texas A&M which really proved invaluable towards my career goals. I'd love to help find students with similar goals and potentially partner with the zoo, the aquarium, the aviary, or some of the zoological companion animal clinics in the area.

Dr. Heloisa Rutigliano (heloisa.rutigliano@usu.edu)
My lab has projects involving transgenic sheep models of implantation and extracellular vesicles and organoid culture.

Dr. Sara Weinstein (sara.weinstein@usu.edu)
My lab has projects on beaver, horse, and rodent parasites that might be of interest to DVM students.

Dr. Kara Thornton-Kurth (kara.thornton@usu.edu)
In the Thornton-Kurth Lab we study the interactions between nutrients and growth in livestock, with specific interest in skeletal muscle and adipose. Our research ranges from applied trials with cattle and sheep to more basic research involving culture of primary bovine satellite cells. Over the summer of 2026, we will be working on a few different project, but the projects include: 1. Traveling to Cedar City Utah to collect blood and fecal samples from range sheep monthly; 2. Analyze rumen microbial populations to determine impacts of dietary interventions; and 3. Determine proteomic, transcriptomic, and metabolomic differences in blood, skeletal muscle, and liver of beef stairs raised with different growth promoting technologies.