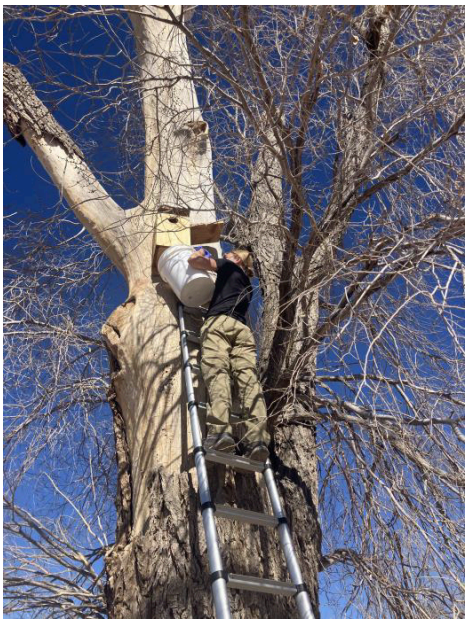
Migration Trends of American Kestrels in Mesilla Valley
Student Researcher: Ellary Battle
Faculty Mentor: Dr. Martha Desmond

The goal of this research is to help direct conservation efforts, deepen the current research on American Kestrels at NMSU, and gain public attention. While populations of the American Kestrel are decreasing nationwide, my research shows that, in my study area, populations during migration season are actually increasing. This knowledge may indicate that American Kestrels are changing their migration patterns. Additionally, the results of this study can enrich the ongoing American Kestrel project at NMSU by providing information on migration populations and give insight on the species in the winter months. Finally, my hope is that this study will encourage community involvement in local wildlife conservation efforts. The data for my project completely depended upon reports from community members, and I hope this research can encourage them to continue their contribution, as utilizing citizen science is becoming very relevant in this age. Additionally, while it isn't the focus of my project, I hope to use my results to illustrate the importance of bird boxes for kestrels and inspire residents to put up their own. Not only will this involvement enrich future research studies, it will also demand public attention and action towards declining species, such as the American Kestrel.



Effects of Repeated Low-Dose Endotoxin Exposure on Immune Cell and Hematological Parameters in Multiparous Ewes
Student Researcher: Nicolette Blair
Faculty Mentor: Dr. Hernandez Gifford

Reproductive success is crucial for maintaining sustainable livestock systems, but bacterial infections can negatively impact fertility by triggering immune responses. This study examines how repeated exposure to lipopolysaccharide (LPS), a component of Gram-negative bacterial cell walls, affects immune cell activity and blood parameters in mature ewes. By analyzing changes in immune response over time, this research provides valuable insights into how chronic bacterial exposure could influence livestock reproductive health. The findings may help producers develop management strategies to mitigate the effects of bacterial infections on breeding efficiency.

How Ice Cream Responds to Storage at Different Temperatures
Student Researcher: Johanna Gebbia
Faculty Mentor: Sergio Martinez-Monteagudo

The goal of this research is to evaluate how ice cream behaves in storage at different temperatures. In other words, to see how the temperature changes the quality of the product. However, the main goal of this project is to achieve sustainability to reduce energy consumption and environmental impact. As is known, frozen foods are stored at -18° C, but with this research, we aim to increase storage temperatures to -15°C. However, this slight temperature change can impact the quality of the ice cream due to the freeze-thaw cycles that cause ice crystal growth, leading to changes in texture. It is focused on meltdown behavior, ice crystal size, shape retention, fat aggregates, hardness, and percentage of frozen water. The results obtained will benefit the food industry and consumers. It will be determined if increasing storage temperature can maintain the quality of ice cream while reducing energy costs.

Shell Disease, Pathogen Prevalence, and Body Condition of Turtles in Rural and Urban Settings Across New Mexico
Student Researcher: Alyssa Girard
Faculty Mentor: Dr. Obed Hernandez-Gomez

This research aims to understand turtle populations and diseases prevalent in three species of turtles: Western Painted Turtles, Red Eared Sliders, and Spiny Softshell Turtles. As turtle disease surveys have been rare in the state of New Mexico, our research can help adapt management methods in the event that novel diseases are documented. The assessment of new fungi species causing turtle shell disease can aid in the mapping of pathogen prevalence along the country and the generation of policy to limit the spread. In addition, sampling along an urban-to-rural gradient can help many people in wildlife, environmental, and ecology fields understand the effect of urbanization on the body composition and health of distinct species. The effects of human land development are known to affect many animals, and while assessing species of turtles is just a small piece of urbanization's effects on wildlife, it is crucial to developing a larger body of knowledge. Freshwater turtles are beneficial to environmental research because of their amphibious natural history, inhabiting bodies of water and land, exposing them to multidimensional effects of urbanization.

Effects of Source and Level of Ruminal Undegradable Protein on Glucose, Insulin, and Urinea Nitrogen in Beef Heifers Grazing Native Rangeland

Student Researcher: Ashton Henington
Faculty Mentor: Eric Scholljegerdes

This research aims to improve beef cattle reproduction by understanding how different dietary supplements affect metabolic markers and follicular development in developing heifers. Specifically, the study looks at the effects of two sources (plant and animal) and two levels (36% and 50%) of ruminal undegradable protein (RUP) in heifer diets. It is important to improve heifer nutrition for successful reproduction in the beef industry. Identifying how different protein sources and levels influence metabolic markers and follicular development can provide valuable insights for cattle producers to improve heifer development and reproductive outcomes. The results of this study will contribute to improving breeding efficiency and reducing economic losses from reproductive failures.

Developing Zero-Waste Patterns to Innovate and Preserve Traditional Vietnamese Culture

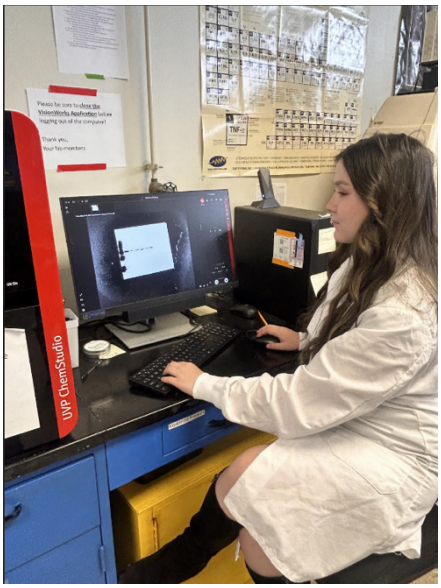
Student Researcher: Hai Chan Le
Faculty Mentor: Dr. Insook Ahn

The main objective of the study is to assess the positiveness of sustainable fashion development. Through changes in the construction of flat patterns, designs can reduce excess waste in mass production. With the feasibility from the results of the study, I strongly believe the fashion industry is completely capable of overcoming the consequences that it causes the environment. The amount of waste during production will be reduced. The study is also aimed at readers and fashion consumers to raise awareness about sustainable consumption. Finally, the result is to honor the beauty of Vietnamese culture and the preservation of traditional values in modern life. With what zero waste fashion brings, they all contribute to social values and guide people to a more beautiful, greener, more connected, and more sustainable lifestyle.

The Impact of Manipulating the CXCL12/CXCR4 Chemokine Axis on Amino Acid and Glucose Transporters in the Placenta

Student Researcher: Makayla Mullins
Faculty Mentor: Dr. Ryan Ashley

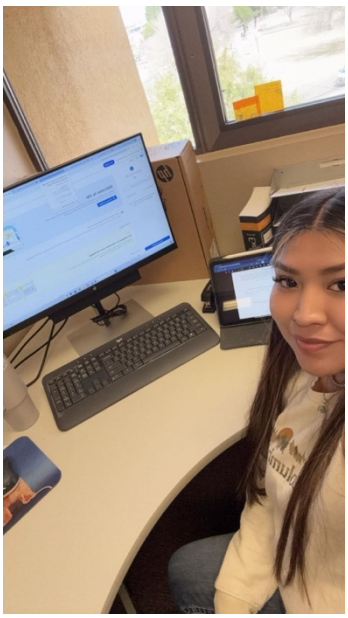
The objective of this study is to see how activating or suppressing the CXCL12/CXCR4 axis affects placental development. Osmotic pumps are placed surgically implanted and delivered into the uterus either AMD, which inhibits CXCL12/CXCR4, or CXCL12, which activates this axis. Tissues were collected on day 20 of gestation and tested for gene and protein expression of amino acid and glucose transporters at the fetal membrane interface. The importance of understanding the influences of the CXCL12/CXCR4 axis could help both humans and agricultural needs to improve pregnancy and overall improve the health of the fetus. The transporter is responsible for binding to specific solutes and molecules making it responsible for the facilitated diffusion of sugar, amino acids, and nucleosides. Amino Acid transporters in the placenta help regulate the transfer of amino acids from the mother to the fetus. Glucose transporters aid in fetal development by facilitating the transfer of glucose from the mother to the fetus through the placenta. Glucose is the key nutrient and main
source of energy for the fetus and placenta, making it essential for growth and development.



Assessing and Understanding the Challenges of Meat Consumption Among the Elderly Population in Las Cruces, New Mexico

Student Researcher: Savannah Napie
Faculty Mentor: Dr. Francine Mezzomo Giotto

As a Land Grant institution, we serve everyone's needs within various communities. Our targeted group of elders (65+) and disabled individuals are prone to less consumption of proteins. Factors that may lead to this issue are low financial income, decreased or limited transportation, living conditions, hindering health concerns, travel time to the nearest grocery store, or other specific dietary preferences. The study should define the main causes of decreased consumption, as well as identify communities in Las Cruces, NM, that have limited resources and need more support from the university as well as federal and state programs.



Leptin Receptor Densities in Bat Placentas
Student Researcher: Alana Pedersen-Kamaka
Faculty Mentor: Dr. Terri Orr

This research will be the first to use immunohistochemistry to stain for bat placental leptin. If this protocol works, this will have an impact on reproductive studies in bats, as there will be a new technique to image leptin in placentas.
The second aim of this research is to determine the difference in the densities of leptin receptors from short vs. long pregnancies. Leptin is a hormone that regulates energy levels and immunology. Understanding how bats regulate their leptin levels during gestation will give us insight on how they are able to maintain energy while also developing healthy offsprings. Bats also carry many diseases but rarely get sick, which could be due to the immunological benefits that leptin provides. Having a healthy pregnancy is a large concern in women's health, as there are many complications that could result in a miscarriage or even death of the mother or child. This research can have implications on how leptin regulations may affect healthy pregnancies.

Using Crassphage as an Indicator for Human Fecal Contamination in Irrigation Water
Student Researcher: Adriana Rivas
Faculty Mentor: Willis Fedio

The overall goal for this experiment is to determine if the procedure can detect contamination of irrigation water by human fecal matter. The data collected will be used for the development of testing procedures for agricultural water by the US FDA and will ultimately be used in national and local evaluations of irrigation water. Advancements in microbial detection methods and sample collection systems have improved our ability to identify foodborne pathogens and illness outbreaks. These have led to an increased awareness of food safety risks related to agricultural water sources. Dead-End Ultrafiltration (DEUF) can concentrate surface water samples and improve the detection limit for pathogenic microorganisms. The current study examines the use of DEUF for concentration of CrAssphage from artificially contaminated irrigation water. CrAssphage is being evaluated as an indicator organism for human fecal contamination of water. We also believe the chile growers from the state of New Mexico will benefit from this research to ensure the safety of their produce.

Determination of Ruminal Degradation of Red Chile by Products In-Vitro
Student Researcher: Kiana Rivera
Faculty Mentor: Dr. Clint Loest

This research focuses on using food waste to create affordable and sustainable feed for cattle. Every year, about 30% of the country's food supply, or 60 million tons, is wasted (FDA, 2024). In the southwestern United States, leftover parts of chile plants—such as pods, peels, leaves, and stalks—are often discarded. However, these byproducts may be a valuable feed option for cattle because they provide similar energy to that of corn silage (Hill and Loëst, 2003). This study will investigate whether chile byproducts can be effectively used in cattle diets. If chile byproducts are shown to be an effective feeding method, this could reduce food waste, provide a high source of roughage to cattle diets while lowering feed costs for farmers, and increase profits for chile producers. This approach could also help the environment by reducing the amount of organic waste in landfills. The study will determine if chile byproducts are nutritionally effective in cattle diets and broaden the selection of feedstuff that may be more easily available and economically cost-efficient for cattle producers. Additionally, it may encourage the agricultural industry to explore more ways to repurpose food waste, promoting a more sustainable and cost-effective approach to livestock production.

Effects of CXCL12 Axis Suppression on Growth Factor Expression
Student Researcher: Shaylie Salopek
Faculty Mentor: Dr. Ryan Ashley

The goal of this research project is to understand the impact of CXCL12/CXCR4 axis suppression and supplementation on growth factor expression. Understanding this axis and how to control it could improve pregnancy outcomes in both livestock and humans. Improving pregnancy outcomes means increasing pregnancy retention, placental attachment, and fetal outcomes. By developing an understanding of the CXCL12/CXCR4 interface, it is possible this interface can be utilized to help supplement pregnancy outcomes. Improving outcomes can save producers money as it limits the number of breeding attempts necessary to produce healthy offspring. Creating more positive pregnancy outcomes also helps in human reproduction as it can help couples trying to conceive to create better placental attachment and theoretically could allow for reduction of pregnancy risks associated with poor placental attachment such as intrauterine growth restriction and pre-eclampsia. Overall, understanding the CXCL12/CXCR4 interface could lead to a better understanding and possible means of improving placental attachment and, therefore pregnancy outcomes.

Effects of Suppressing CXCL12 on Expression of Vascularization Factors
Student Researcher: Kyla Saucedo
Faculty Mentor: Dr. Ryan Ashley

The significance of understanding the influence of the chemokine axis of CXCL12/CXCR4 extends beyond basic cellular biology, as it plays a critical role in various physiological processes, including vascularization and fetal development. The chemokine signaling pathway regulates crucial cellular behaviors such as migration, differentiation, and survival, which are vital for the formation of blood vessels and proper development of fetal tissues. By investigating how CXCL12/CXCR4 axis contributes to these processes, individuals can see how the blood vessels form and remodel during pregnancy, ensuring adequate nutrient and oxygen supply to the growing fetus. Proper vascularization is crucial for the fetus to receive optimal nourishment and oxygen throughout gestation, which can have long-term effects on fetal development and vitality. Disruptions of this signaling pathway may lead to conditions such as fetal growth restrictions or other complications that can jeopardize the health and survival of the fetus. This work could benefit

How Ice Cream Responds to Storage at Different Temperatures
Student Researcher: Alejandro Schutte
Faculty Mentor: Sergio Martinez-Monteagudo

The purpose of this research project is to examine how a 3-degree change in storage temperature affects the overall quality and sensory properties of ice cream. Given that temperature fluctuations can impact the texture, taste, and appearance of ice cream, this study aims to evaluate these changes using a structured sensory analysis. The research will provide valuable insights into the role of temperature control in maintaining optimal ice cream quality during storage as well as provide the industry with data that may be relevant to energy saving and reduction of the carbon footprint without affecting the quality of the products.

Evaluation of a Rapid Immunity Test for Morbidity and Mortality in Newly Received Feedlot Cattle

Student Researcher: Cassie Smithyman
Faculty Mentor: Dr. Clint Loest

Bovine Respiratory Disease (BRD) is the leading cause of illness in feedlot cattle, accounting for 75% of feedlot morbidity and causing approximately $900 million in losses annually. These losses are caused by medical treatments, labor, and decreased animal performance, creating a need for improvement to manage BRD's impact on the beef industry. This study evaluates the effectiveness and accuracy of the D2Dx nanotechnology-based immunity test to see if producers can predict the morbidity and mortality of newly received feedlot calves upon feedlot arrival and take the necessary measures to treat them prior to an animal becoming chronically morbid and creating loss. Results show that cattle treated for BRD had lower D2Dx values upon arrival compared to healthy cattle, with glucose levels decreasing as morbidity increased. These findings suggest that the D2Dx test can accurately identify calves at risk for BRD.

By validating the D2Dx immunity test, this research provides producers with a practical tool to identify and treat at-risk calves earlier, preventing chronic illness and reducing economic losses. Implementing D2Dx testing could improve animal health, reduce mortality, and improve animal performance. This tool benefits producers by improving animal welfare and increasing animal performance within the beef industry.

Repeated Low-Dose Endotoxin Exposure on Hematological and Febrile Response in Nulliparous Rambouillet Ewes

Student Researcher: Jonathan Valencia
Faculty Mentor: Dr. Jennifer Hernandez Gifford

This research project led by Dr. Jennifer Hernandez Gifford and PhD student Sara Gurule is focused on evaluating the impact of repeated administration of low-dose LPS in nulliparous ewes during key stages of folliculogenesis on febrile and hematologic immune response. The goal of this study is to better understand how low-grade infections in livestock alter their immune profile, which could have greater impacts on reproductive success. Due to the nature of reproduction being a delicate process that even the smallest disruption can have negative impacts, it is crucial for ranchers to understand how to work through acute infections so that they can increase the productivity and profitability of their flock. The overall hypothesis stems from PhD student Sara Gurule's doctoral research, which suggests low-dose LPS as a result of gram-negative bacteria may alter and possibly cause a delay in the LH surge, necessary for ovulation. If this window of time is missed due to a delay caused by an acute infection, this could result in unsuccessful fertilization and cost producers severe financial loss. This makes understanding these infections and their effects important to better understand.

The Effects of CXCL12l12 Inhibition/Activation on Cytokine Expression in Reproductive Tissue
Student Researcher: Kassandra Valdez
Faculty Mentor: Dr. Ryan Ashley

Dr. Ashley's research highlights the importance that placental development has on fetal development. The goal of this project is to understand how manipulating the CXCL12 and CXCR4 axis affects chemokine and cytokine expression in reproductive tissue, which are very important during the process of placental development. By understanding how the manipulation of this axis affects successful pregnancies, farmers and ranchers who make a living by selling livestock may be able to positively influence reproduction within their herds, generate more product, and earn more profit. This research may also be beneficial to the health of pregnant women and their children by providing insight to cases involving preeclampsia, gestational diabetes, miscarriage, and more. Regarding my field of study (fish, wildlife, and conservation ecology), this research could aid in conserving mammalian species that are endangered, threatened, or at risk by utilizing the CXCL12-CXCR4 axis to create higher rates of successful pregnancy and produce offspring with higher fitness rates.

Rooting for Success
Student Researcher: Summer Vasquez
Faculty Mentor: Dr. Magda Garbowski

Plant establishment in arid environments depends on the soil's composition, which directly influences water availability and root development. At the same time, plant species with specific traits, such as dense roots, may be well suited to survive under drought because their tissues are able to withstand low moisture conditions. However, how interactions between soil texture, drought, and plant traits affect seedling survival remains understudied, making species selection for restoration based on functional traits quite challenging. Soils with higher clay content can retain moisture but simultaneously restrict root penetration, while sandy soils drain quickly but allow deeper root growth. Plants must adjust their root systems accordingly to maximize survival in our ever-changing climatic conditions. Understanding how different grass species navigate these challenges will provide valuable insights for restoration ecologists. By identifying the root traits best suited for specific soil textures and by linking those traits to plant performance, this study will help improve species selection for ecological restoration. These findings will enable land managers to make more informed decisions, increasing the success of ecological restoration projects in arid regions. With climate change intensifying our present drought conditions, aligning plant traits with soil properties is crucial for restoring resilient ecosystems and promoting long-term sustainability.