

2025 Research Overview

Department of Animal and Food Sciences – Oklahoma State University



About Our Research

The Oklahoma State University Department of Animal and Food Sciences is committed to contributing to science through both basic and applied research. Our research disciplines consist mainly of animal health and well-being, breeding and genetics, food safety, meat science, nonruminant nutrition, reproduction, physiology, and ruminant nutrition.

Our faculty and students conduct various research projects throughout the year in the pursuit of new discoveries. Our researchers have had their work published in various scientific journals and have been recognized for their outstanding achievements. Our department also encourages undergraduate students to gain research experience and knowledge through its Undergraduate Research Scholar Program.

Please read this overview to learn more about the research currently being conducted in our department.

RESEARCH 2025

Disciplines

Animal Health/Well-Being
Breeding
Genetics
Food Safety
Meat Science
Non-Ruminant Nutrition
Physiology
Ruminant Nutrition
Reproduction

Overview



More than 4 million dollars in grant funded research projects.



65 graduate and 24 undergraduate students conducted research under faculty guidance.



Research findings were published in 68 peer-reviews.

50+

Faculty Research
Projects

The OSU Department of Animal and Food Sciences has 21 faculty and several staff members conducting various research projects.

Adel Pezeshki

Nutritional Physiology

Overview

Research focuses on nutritional biochemistry of proteins and amino acids. Interested in understanding the effect of individual amino acids and dietary proteins on energy balance and metabolism, identifying key molecules that regulate these changes and characterizing the pathways for their action. The long-term goal of my dual-purpose research is to develop novel strategies to improve the metabolic health and growth in both animals and humans.

Current Projects

1) Improving the growth of pigs fed with low protein diets through supplementing branched-chain amino acids, 2) Assessing the amino acids restriction and supplementation on metabolic health and metabolism during postnatal period in neonatal pigs, and 3) characterizing the mechanisms by which amino acids restriction or supplementation regulate growth and metabolism in young pigs.

Keywords

amino acids; proteins; energy balance; metabolism



Andrew Foote

Ruminant Nutritional Physiology

Overview

Research is focused on physiological mechanisms that contribute to feed efficiency of ruminants using techniques ranging from feeding trials, digestion/metabolism trials, endocrinology studies, RNA-seq, and phosphoproteomics.

Current Projects

(1) The role of glucose metabolism in contributing to nutrient utilization efficiency; (2) Repeatability of feed efficiency measurements across diets and stages of growth and production; (3) Identifying factors that contribute to appetite regulation in beef and dairy cattle; (4) The role of fatty acid metabolism in gut inflammation and nutrient utilization efficiency; (5) Understanding factors that contribute to a healthy and productive transition into lactation for dairy cows.

Keywords

metabolism; insulin signalling; gut-development; appetite regulation; phosphoproteomics



Blake Wilson

Nutrition/Animal Health

Overview

To understand the interactions between nutrition and health in high-risk receiving calves.

Current Projects

(1) Ancillary therapies and the supplementation of trace minerals in calves experiencing both natural and induced bovine respiratory disease (BRD) challenges; (2) Evaluation of currently accepted technologies and management and production practices, improving calf performance and health in the stocker and receiving phases, improving cattle efficiency and well-being during the finishing period, and utilizing nontraditional feeds and innovative management practices to improve overall beef production.

Keywords

BRD; animal health; stocker phase; trace minerals



Darren Hagen

Animal Genetics

Overview

Research focuses on animal genomics, including genome sequence analysis and functional annotation as well as the development of models and algorithms to better classify functional interactions.

Current Projects

My current research is broadly focused on the functional annotation of animal genomes. The genome consists of many non-protein coding elements that regulate expression, but we currently lack complete understanding of the complexity of these elements or how they interact. By identifying these interactions, we can advance our ultimate goals of genome to phenome prediction.

Keywords

computational genomics; bioinformatics; epigenetics; functional genomics



David Lalman

Animal Nutrition

Overview

Beef cattle nutrition and management with an emphasis on genetic environment interactions in beef production systems. Dr. Lalman's program goals are to provide producers with information and decision making tools to facilitate production system profitability, improve cow herd efficiency, and to improve product quality.

Current Projects

(1) Back to Basics: Expanding best management practice adoption in small and mid-sized beef enterprises; (2) Resilience and vulnerability of beef cattle production in the Southern Great Plains under changing climate, land use, and markets.

Keywords

beef production; energy efficiency; feed efficiency; cow/calf and stocker phase



Glenn Zhang

Immunology

Overview

Development of novel alternatives to antibiotics by modulating host defense peptide synthesis and intestinal microbiota for optimal health and production efficiency.

Current Projects

(1) Immune boosting dietary compounds for growth promotion and disease control and prevention; (2) Gut microbiota that are linked to animal health and growth performance.

Keywords

innate immunity; host defense peptides; microbiome; bioinformatics; alternative to antibiotics



Gretchen Mafi

Meat Science

Overview

Prediction of meat tenderness and palatability; development of value-added meat products; and use of new technology to predict quality.

Current Projects

(1) To evaluate the effects of production systems such as grass and grain-fed cattle; (2) To determine pork quality grade on tenderness and flavor; (3) Impact of oxygen scavengers on beef quality.

Keywords

tenderness; carcass characteristics; flavor; meat quality



Joao Moraes

Animal Reproduction

Overview

My research program is primarily focused on understanding biological processes governing reproductive efficiency and health in domestic animals.

Current Projects

(1) Single-cell and spatial transcriptomic analyses of the bovine uterus; (2) Microbiome of reproductive tissues; (3) Effect of uterine diseases on fertility; (4) preimplantation embryonic development.

Keywords

Animal reproduction; cattle; embryo; single-cell research; bioinformatics; omics



Kris Hiney

Communication/Extension/Nutrition

Overview

Effective way of communicating, teaching, and Extension.

Current Projects

(1) Gather industry input on the optimal learning objectives for equine laboratory classes, determine the differences in student's backgrounds on their perceptions of equine affective states, and the existing social capital between emergency managers and Extension educators relative to disasters and large animals; (2) Partner in a canine nutrition project comparing raw fed and kibble fed dogs; (3) Studying the effects of therapy dogs on wellness.

Keywords

equine/canine nutrition; disaster preparedness; therapy dogs



Khursheed Iqbal

Reproductive Biology

Overview

Our lab investigates the molecular mechanisms governing germ cell and placental development using genetic manipulation tools like genome editing and genomics in livestock and rodents models to pinpoint factors contributing to infertility and pregnancy failure.

Current Projects

(1) Elucidating the Epigenetic Landscape during Germ Cells development: We are deciphering the molecular pathways and epigenetic mechanisms involved in early germ cell development, the precursors to sperm and eggs. (2) Identifying the Key Molecular Players in Placental Formation and Function: We investigate the molecular factors that regulate placental development and function. (3) Impact of Environmental Stressors on Molecular Pathways involved in Germline and Placental Development

Keywords

Epigenetic reprogramming, DNA methylation, primordial germ cells, genome editing, environmental stress and trophoblasts.



Meaghan Meyer

Poultry Welfare & Behavior

Overview

Research aims are to advance assessment of broiler chicken welfare and behavior to modernize commercial audits and to improve broiler well-being and end-product quality through environmental enrichment, lighting, and management.

Current Projects

N/A

Keywords

Broilers, welfare, behavior, poultry production, environmental enrichment



Morgan Pfeiffer

Meat Science

Overview

To predict and evaluate sensory characteristics of meat products, determine the consumer preferences and ultimate impact the product has on their diet and health.

Current Projects

National Beef Quality Audit, Consumer purchasing preference of striploin steaks using novel computer vision

Keywords

Meat quality; consumer preference; sensory; flavor; carcass evaluation



Paul Beck

Nutrition

Overview

Dr. Beck's research and Extension programs focus on integrated systems for sustainable, economical, and environmentally sound stocker and feedlot production systems.

Current Projects

Current projects seek to improve efficiency of production in extensive grazing systems through targeted supplementation programs for grazing stocker calves across the state of Oklahoma in both range conditions in the west and introduced forage systems in the east. Finishing cattle research is investigating performance and digestibility responses to alternative feedstuffs and increasing roughage levels.

Keywords

feedlot; grazing system; finishing cattle; alternative feeds



Peter Muriana

Food Safety

Overview

Antimicrobial interventions of foodborne pathogens and spoilage organisms.

Current Projects

(1) What happens during the processing of dried beef (biltong): Antimicrobial interventions against Salmonella and microbiome analysis of the change in microbiota during the manufacture of dried beef (Biltong); (2) Application of sanitizers and enzymes to attack biofilms of Listeria, E. coli, and Salmonella in food processing plants; (3) Evaluation of 'natural nitrite' to inhibit Clostridium spore germination in cooked meats and isolation and characterization of bacterial strains for fermentation of vegetable nitrate into nitrite.

Keywords

food safety; interventions; microbiome; bacteriocins; listeria; validation studies



Ranjith Ramanathan

Meat Science

Overview

To understand the biochemical basis of meat discoloration. We utilize both applied and fundamental approaches to improve meat quality.

Current Projects

(1) Improving the value and appearance of dark-cutting beef; (2) Improving the color stability of aged beef, (3) Novel technologies to quantify beef discoloration, (4) Impact of meat waste on greenhouse formation. across the state of Oklahoma in both range conditions in the west and introduced forage systems in the east. Finishing cattle research is investigating performance and digestibility responses to alternative feedstuffs and increasing roughage levels.

Keywords

myoglobin; mitochondria; metabolomics; proteomics; sustainability, greenhouse emissions



Ravi Jadeja

Food Safety

Overview

Jadeja's applied food science research is focused on improving the quality and shelf life of various food products.

Current Projects

1) Improving shelf life and microbial safety of Hummus, 2) Investigate microbial safety of low sodium caviar products, 3) Developing novel antimicrobial interventions for pecan and walnuts.

Keywords

Shelf-life; Antimicrobials; Product development; antimicrobial; food safety



Riley Messman

Reproductive Physiology & Animal Health

Overview

Research investigates the influence of the maternal reproductive tract environment on calf morbidity and maternal fertility. Studies are centered on elucidating how metabolites produced by the maternal microbiome during gestation can alter dam physiology and contribute to programming effects in offspring.

Current Projects

(1) Assessing the microbial inoculating community in beef calves. (2) Investigating the effects of reproductive tract dysbiosis on maternal fertility and the post-partum interval. (3) Determining the programming effects of microbial inoculation on subsequent calf health.

Keywords

Reproductive physiology, Microbiome, Developmental Programming, Beef Reproduction



Ryan Reuter

Nutrition/Grazing Systems

Overview

Research focuses on precision management of grazing systems through the application of next-generation technology and data analytics.

Current Projects

(1) Forage-based beef cattle nutrition and management; effects of supplementation and grazing management on beef cattle production and sustainability; and incorporating technology into grazing systems; (2) Sustaining beef production in the Southern Plains through managing greenhouse gas emissions by grazing cattle.

Keywords

grazing system; precision technology; big data; data analysis; greenhouse gas emission



Sabrina Amorim

Quantitative Genetics and Genomics

Overview

My research program focuses on understanding the genotype-phenotype map in livestock species by exploring the genetic architecture of economically important traits and applying and developing statistical methods for prediction in the multi-omics era.

Current Projects

(1) Genomic Evaluation in Commercial Beef Cattle Populations Using Real and Simulated Data.

Keywords

Genomics, Beef Cattle, Statistical Genetics, Genetic Evaluation, Methods applied to Animal Breeding



Scott Carter

Swine Nutrition/Health

Overview

Impact of diet on nutrient excretion and gaseous emissions; effect of alternative feedstuffs on growth performance and carcass traits; and effects of feed additives on growth performance and carcass traits.

Current Projects

(1) Impact of mineral supplements on growth and health; (2) Determination of the efficacy of water-soluble zinc on growth performance and immune response of nursery pigs.

Keywords

nursery pig; vitamins; health; growth; feed conversion



Udaya DeSilva

Genetics

Overview

Genomic changes and animal production.

Current Projects

(1) Microbiomes of the canine and equine reproductive tracts; (2) The role of microbiomes in animal production and health.

Keywords

microbiome; big data; genomics

