POULTRY GUT HEALTH

Location: Wooster, OH

SUPERVISOR INFORMATION:

Dr. Lisa Bielke, Associate Professor
Department of Animal Sciences
202 Gerlaugh Hall
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Wooster, OH 44691

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RESEARCH INTERESTS: Dr. Bielke’s research focuses on poultry health with emphasis on enteric diseases and control of food pathogens, which includes projects developing recombinant vaccine technologies, probiotics selection, and development of tools and assays for assessment of gastrointestinal inflammation. Dr. Bielke’s lab aims to produce poultry in a sustainable manner that promotes health and well-being while increasing profitability. Current research projects include studying non-antibiotic control of necrotic enteritis, coccidiosis, enterococcal spondylitis, and methods for measuring enteric inflammation. This type of research offers great experience opportunities students interested in veterinary school or other disease-related post-graduate education.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

- General animal (poultry) care during research experiments, sample collection and analysis, data input, general lab cleaning and media preparation.
- Assist other students with experiments to help broaden the learning experience
- Prepare and present a poster at the CFAES Undergraduate Research Forum in the Spring Term.

Duties may require non-traditional work hours or weekends.

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN: This research experience will provide you an opportunity to implement scientific processes from hypothesis to conclusion and learn basic laboratory techniques related to microbiology. Emphasis of research will be poultry gut health, especially in reference to impact of gut microbiome on development and homeostasis, or specific diseases that affect the gut. Students will complete a short research study, typically as part of a broader project, in partnership with a current graduate student and may potentially present completed research at the International Poultry Scientific Forum at the International Production and Processing Expo.
MEAT SCIENCE & MUSCLE BIOLOGY

Location: Columbus, OH

SUPERVISOR INFORMATION:

Dr. Benjamin M. Bohrer, Assistant Professor
Department of Animal Sciences
110 D Animal Science Building
2029 Fyffe Road
Columbus, OH 43210-1095

Phone:  614-247-4951
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RESEARCH INTERESTS: Dr. Bohrer’s research group focuses on several research themes within the meat science and muscle biology disciplines. Current and past research themes include live animal growth and development with an emphasis on muscle growth and fat deposition; carcass fabrication and fresh meat evaluation (including instrumental analysis and sensory analysis); manufacture and evaluation of further processed meat products; and evaluation of value-added protein foods.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES: The below list is a tentative list of duties and responsibilities. You will meet with Dr. Bohrer on an ongoing basis during the work term in order to modify expectations, as needed.

- Assist in the execution of ongoing, and new, experiments and data collection (**this will include working in the university’s federally inspected meat lab facility**).
- Assist with data entry, analysis of data, and interpretation of results.
- Preparation of results for publication in a scientific journal.
- Presentation of research findings at the CFAES Undergraduate Research Forum in the Spring Term.

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN: You will gain an understanding of basic laboratory techniques and applied meat processing techniques, including exposure to the university’s federally inspected meat lab facility. You will work in a team environment and be provided with support from a team of graduate students. Additionally, you will gain exposure to research techniques and the value of communicating research findings.
MASTITIS & MAMMARY PHYSIOLOGY

Location: Wooster, OH

SUPervisor INFORMATION:

Dr. Benjamin Enger, Assistant Professor
Department of Animal Sciences
143 Gerlaugh Hall
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Wooster, OH 44691

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Email: enger.5@osu.edu

RESEARCH INTERESTS: Dr. Enger’s laboratory investigates mammary growth and development and mastitis in dairy cows. Mammary growth and development is important as this directly affects milk production and mastitis is the most common and costly disease in the dairy industry.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

- Assist with animal trials and general animal care.
- Assist with animal harvest along with tissue collection and processing for laboratory analysis.
- Attend lab meetings and present research progress while also participating in laboratory discussions.
- Become proficient in basic and advanced laboratory techniques, including but not limited to: microbiology, immunohistochemistry, Western blotting, and image analysis.
- Integrate research project results into established literature results.
- Present research results at the CFAES Undergraduate Research Forum in the Spring term.

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN: You will gain experience in working in mammary physiology and gain knowledge in mastitis’ impacts in dairy cows. You will develop critical analysis/thinking skills and become proficient in general laboratory practices as well as specific laboratory techniques that will be assigned based on the laboratory’s needs and your interest.
RUMINANT NUTRITION & MICROBIOLOGY

Location: Columbus, OH

SUPERVISOR INFORMATION:

Dr. Jeff Firkins, Professor
Department of Animal Sciences
223 Animal Sciences
2029 Fyffe Rd.
Columbus, OH 43210

Phone: 614-688-3089
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RESEARCH INTERESTS: Dr. Firkins conducts applied research to address concerns of the dairy industry with a focus on applied rumen microbiology and protein nutrition. His three main areas of study include: 1) the interface between nutrition and microbiology to enhance the conversion of dietary protein into microbial protein and reduce enteric methane production; 2) the interactions of physical, chemical, and microbiological processes related to fiber and starch degradation, passage, and biohydrogenation; and 3) improving the prediction of protein and carbohydrate digestion and microbial protein production in dairy cattle.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

• General lab work in ruminant nutrition and microbiology
• Independent study on ruminal fermentation, protozoal culture, and microbial growth
• Data analysis and presentation at the CFAES Undergraduate Research Forum in the Spring term.

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN: You will gain critical thinking and interpretation skills as you integrate concepts of ruminal microbiology and nutrition. You learn how to work effectively in a team as you collaborate with graduate students. You will appreciate the scientific method, experimental design, and statistical analyses and develop your written and oral communication skills.
CATTLE REPRODUCTION

Location: Columbus, OH

SUPERVISOR INFORMATION:

Dr. Alvaro Garcia Guerra, Assistant Professor
Department of Animal Sciences
323 Plumb Hall
2027 Coffey Road
Columbus, OH 43210-1095

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RESEARCH INTERESTS: Dr. Garcia Guerra’s research interests focus on two main areas regarding cattle reproduction. The first area focuses on investigating strategies that improve reproductive efficiency, primarily in beef cattle. The study of follicle dynamics and the selection mechanisms that play a key role in the development of more efficient reproductive management techniques are emphasized. The second area of research is focused on furthering our understanding on the causes and mechanisms involved in pregnancy loss in cattle. This area combines both basic and applied research and utilizes recipients of in vitro produced embryos as a model.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

• Conduct general husbandry and management practices during breeding experiments in both beef and dairy cattle.
• Learn proper data entry, analysis, interpretation and reporting methods.
• Collect and analyze data to understand the effect of treatments on the reproductive physiology of cattle.
• Learn general laboratory maintenance procedures and reagent preparation.
• Attend laboratory meetings and provide updates on research status.
• Present research findings at the CFAES Undergraduate Research Forum in the Spring Term.

Duties require extended travel to outlying research stations and non-traditional work hours or weekends. This position is not compatible with summer semester classes.

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN: You will gain knowledge and experience in cattle reproductive physiology. You will learn and implement the scientific method and develop critical thinking abilities. The precise objective of the research experience will be planned to meet the needs of the lab and match your interests. You will acquire experience in synchronization programs for fixed time artificial insemination and embryo transfer, transrectal ultrasonography, pregnancy diagnosis, and hormone determinations.
NUTRITIONAL IMMUNOLOGY & DEVELOPMENTAL NUTRITION

Location: Columbus, OH

SUPERVISOR INFORMATION:

Dr. Sheila Jacobi, Assistant Professor
122 D Animal Science Bldg.
2029 Fyffe Ct.
Columbus, OH 43210

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Email: jacobi.1@osu.edu

RESEARCH INTERESTS: Research aims to identify nutritional programing of the piglet intestinal health and immune function, or nutritional regulation of metabolic disease and immune function in broilers.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

- Assist in execution of experiment and data collection
- Analyze and interpret results involving swine or poultry nutrition and intestinal health for presentation of the results
- Present research findings at the CFAES Undergraduate Research Forum in the Spring Term.

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN: Basic techniques in molecular biology and immunology will be learned to evaluate the role bioactive nutrients role in programing intestinal and metabolic health. You will gain experience in animal care, dietary treatments, laboratory techniques, statistical analysis, and interpretation of results.
ANIMAL MODELS OF HUMAN AND EMERGING INFECTIONOUS DISEASES

Location: Wooster, OH

SUPERVISOR INFORMATION:

Scott Kenney, PhD, Assistant Professor
Center for Food Animal Health
Department of Animal Sciences
Department of Veterinary Preventive Medicine
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Wooster, OH 44691

Phone: 330-263-3747
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RESEARCH INTERESTS: Dr. Kenney has a BSc in Animal Biosciences from the Pennsylvania State University and a PhD in Microbiology & Immunology from the Pennsylvania State University College of Medicine. His research focus is on molecular virology with emphasis on emerging infectious diseases of swine and poultry and those viruses posing a zoonotic risk of transmission to humans. The lab has ongoing projects in hepatitis E virus, porcine deltacoronavirus, SARS-CoV-2, African swine fever virus, and flaviviruses. The lab utilizes tissue culture to whole animal models to understand and treat viral diseases. The development of new diagnostic assays, creation and testing of nanoparticle vaccines, high throughput genetic screens, and better animal models to mimic human diseases are all ongoing in the Kenney lab.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

- General animal (swine, poultry, small animal) care during research experiments, sample collection and analysis, data input, general lab upkeep.
- Assist other students with experiments to help broaden the learning experience
- Prepare and present a poster at the CFAES Undergraduate Research Forum in the Spring Term.

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN:

This research experience will provide opportunities to implement scientific processes from hypothesis to conclusion and learn basic laboratory techniques related to virology. Emphasis of research will be animal models for virology, especially in reference to the impacts of immunosuppression on gut microbiome with emphasis on virus uptake and emergence of ribavirin resistance hepatitis E virus strains. Students will complete a short research study, typically as part of a broader project, in partnership with a current graduate student and may potentially present completed research at scientific meetings.
MOLECULAR & CELLULAR BIOLOGY

Location: Columbus, OH

SUPERVISOR INFORMATION:

Dr. Kichoon Lee, Professor
Department of Animal Sciences
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2029 Fyffe Court
Columbus, OH 43210-1095

Email: lee.2626@osu.edu

RESEARCH INTERESTS: Dr. Lee’s research interests are to identify and define genetic and metabolic networks that regulate adipose development. His research interests focus on: 1) Discovery of genes or proteins that are involved in adipose development using microarray and RNAseq technologies, 2) Functional genomics approaches to study the functions and roles of genes using in vitro and in vivo systems, including cell cultures and transgenic or knockout animal models, and 3) Extended research of genes in a comparative aspect to evaluate target genes for new interventions to treat human metabolic diseases and for applications to reduce subcutaneous fat and to increase marbling in food animals. Dr. Lee has conducted numerous research trials in the area of adipocyte and muscle biology over the past 29 years. He values and recognizes the benefit of collaborative team efforts and will foster a team approach while leading research projects. Moreover, he is experienced in and enjoys training graduate and undergraduate students, and postdocs.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

- Assist with the collection of data during poultry and swine research trials in the area of Nutrition and Molecular Biology.
- Assist with data analysis and interpretation of results.
- Prepare a poster for the CFAES Undergraduate Research Forum during the Spring term.

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN: You will gain an understanding of basic laboratory techniques, the research process, and the value of communicating research. A basic understanding of molecular genetics with regard to the developmental biology of adipose and muscle tissues will be a focus.
ANIMAL WELFARE AND BEHAVIOR

LOCATION: Columbus, OH

SUPERVISOR INFORMATION:

Dr. Jessica Pempek, Assistant Professor and Animal Welfare Specialist
Department of Animal Sciences
205 Plumb Hall
2027 Coffey Road
Columbus, OH 43210

Phone: 614-292-6099
Email: pempek.4@osu.edu

RESEARCH INTERESTS: Dr. Pempek has expertise in calf production systems, and her research program broadly focuses on understanding the relationship between housing and management practices and calf welfare and behavior. Her main areas of study include: 1) investigating strategies to improve newborn calf care; 2) evaluating the impact of producer-focused training materials to promote early disease diagnosis, animal welfare, and antimicrobial stewardship in calf production systems; and 3) utilizing precision technology to monitor calf behavior to help inform management practices that influence calf welfare outcomes on-farm.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

• Assist with on-farm data collection, including clinical health examinations, blood collection, behavioral observation, during calf research trials in the field of animal welfare and behavior
• Assist with laboratory processing and analysis of biological samples
• Assist with data entry, analysis, and interpretation of results
• Attend weekly lab meetings and present research progress, while participating in laboratory discussions
• Prepare and present research findings at the CFAES Undergraduate Research Forum in the Spring term

Duties may require travel to farms with research staff to farms and non-traditional work hours or weekends.

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN: This research experience will provide opportunity to gain knowledge and hands-on experience in applied animal welfare and behavior research. You will develop critical thinking/interpretation skills as you implement the scientific method. This experience will also enhance your written and oral communication abilities.
FETAL PROGRAMMING IN RUMINANTS

Location: Wooster, OH

SUPERVISOR INFORMATION:

Dr. Alejandro Relling, Assistant Professor
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Wooster, OH 44691

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RESEARCH INTERESTS:

Dr. Relling’s research focuses on the effects of supplementation during gestation and its impact in growth, metabolism, and behavior of the offspring. The objectives of the studies are to evaluate fetal programming in sheep and beef. Specifically, the studies aim to improve animal performance in lambs and cattle by evaluating the effects of omega 3 fatty acid and fiber supplementation to the dams.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

• Collecting, processing, and analyzing feed samples
• Assisting in weight and blood/plasma collections
• Performing metabolic assays to determine plasma glucose and free fatty acids
• Participating in and presenting to lab meetings
• Prepare a poster for the CFAES Undergraduate Research Forum during the Spring term.

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN:

You will be working on a finishing project of lambs or calves born from ewes or cows, respectively, supplemented with different diets during gestation. You will gain an appreciation for and understanding of the importance of the scientific method. The methods of determining feed quality and accuracy of laboratory analyses will be gained. You will gain an understanding of the physiology of fetal programming, metabolism, and the impact in production and health. By writing abstracts and participating in oral presentations, you will improve your communication skills.
EMERGING AND RE-EMERGING VIRAL DISEASES OF LIVESTOCK ANIMALS WITH ZOONOTIC POTENTIAL

Location: Wooster, OH

SUPERVISOR INFORMATION:
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RESEARCH INTERESTS: Dr. Vlasova’s laboratory investigates epidemiology, pathogenesis, immunity and interspecies transmission of several animal and human rota- and coronaviruses including SARS-CoV-2. These viruses are known to cause diseases of significant impact to agriculture and public health. Because we lack efficacious vaccines, antivirals or other universal means to control and limit their spread, development of preventative and therapeutic approaches remains a high priority.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:
- Assist with animal work (conventional and gnotobiotic pigs): animal inoculation, sampling, necropsies, etc.
- Assist with animal tissue and sample processing for laboratory analysis.
- Attend lab meetings and present research progress while also participating in laboratory discussions.
- Become proficient in basic and advanced laboratory techniques, including but not limited to: RT-PCR, qRT-PCR, ELISA, Flow cytometry, immunofluorescence, immunohistochemistry, PAAG, Western blotting, and imaging.
- Integrate research project results into established literature results.
- Present research results at the CFAES Undergraduate Research Forum in the Spring term.

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN: You will gain experience in working with enteric and respiratory viral diseases and will learn about antiviral immune responses and therapeutic/vaccine development. You will develop critical analysis/thinking skills necessary for manuscript writing. You will also become proficient in general laboratory and animal practices. Finally, you will learn how to prepare scientific reports and presentations.