POULTRY GUT HEALTH

Location: Wooster, OH

SUPERVISOR INFORMATION:

Dr. Lisa Bielke, Assistant Professor  
Department of Animal Sciences  
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RESEARCH INTERESTS: Dr. Bielke began her research career at the University of Arkansas as a Research Scientist at the Poultry Health Laboratory in the Department of Poultry Science. In 2015, she joined the Ohio State University as Assistant Professor in the Department of Animal Sciences. 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 aims to produce poultry in a sustainable manner that promotes health and well-being while increasing profitability. As a result of research collaborations, recombinant vaccine and adjuvant technologies for control of multiple poultry diseases are currently under license for commercialization. Dr. Bielke has played a major role in the development of enteric inflammation models in order to better understand the effects of antibiotic growth promoters, probiotics, and other feed additives on the health and performance of poultry.

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 in Atlanta, GA at the International Production and Processing Expo.
MASTITIS & MAMMARY PHYSIOLOGY

Location: Wooster, OH

SUPERVISOR INFORMATION:

Dr. Benjamin Enger, Assistant Professor
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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
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Columbus, OH 43210

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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:

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 may require extended travel to outlying research stations and non-traditional work hours or weekends.

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, trans-rectal ultrasound, 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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RESEARCH INTERESTS: Research aims to identify nutritional programming 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 programming intestinal and metabolic health. You will gain experience in animal care, dietary treatments, laboratory techniques, statistical analysis, and interpretation of results.
RUMINANT NUTRITION & NUTRIENT MANAGEMENT

Location: Wooster, OH

SUPERVISOR INFORMATION:

Dr. Chanhee (Chan) Lee, Assistant Professor
Department of Animal Sciences
313 Gerlaugh Hall
1680 Madison Ave.
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Home page: https://oardcdairynutritionlab.osu.edu/home
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Email: Lee.7502@osu.edu

RESEARCH INTERESTS: Dr. Lee’s research interest include nutrition of dairy and beef cattle, in which he aims to improve dietary nitrogen utilization, understand amino acids metabolism, and explore mineral nutrition. Dr. Lee also studies the environmental impacts of ruminant operations with the end goals of reducing nutrient excretion from ruminant animals (nitrogen, phosphorus) and reducing gas emissions during animal production, with a focus on methane, ammonia, and hydrogen sulfide.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

• Understand the purposes of lab projects
• Assist with animal handling and sample collection at the barn
• Perform various sample assays according to the lab procedures
• Use Excel and Word to organize and summarize data
• Prepare a poster with research findings and present at CFAES Undergraduate Research Forum

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN: You will understand a series of processes of scientific research and better understand animal sciences (ruminant nutrition and environmental impacts of animal production systems). Standard lab experience will be obtained. You will have experience on presenting research findings at multiple conferences. Depending on the quality of research outcome, you may attend an international conference to present the outcome.
MOLECULAR & CELLULAR BIOLOGY

Location: Columbus, OH

SUPERVISOR INFORMATION:

Kichoon Lee, Professor
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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 27 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.
RUMINANT NUTRITION & METABOLISM

Location: Wooster, OH

SUPERVISOR INFORMATION:

Dr. Alejandro Relling, Assistant Professor
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RESEARCH INTERESTS: Dr. Relling’s research focuses on the effects of supplementation with fatty acids in 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 supplementation to the dams.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

- Collecting, processing, and analyzing feed samples
- Assisting in weight and 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 sources of fatty acids. 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.