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

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Email: bohrer.13@osu.edu

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
1680 Madison Ave
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
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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.
Department of Animal Sciences Undergraduate Research Experiences

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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RESEARCH INTERESTS: Research aims to identify nutritional programming of the piglet intestinal health and immune function. Gut health is an area of research with significant impact to swine nutrition because without a healthy intestinal tract there are severe impacts from poor nutrient digestion and absorption and slow growth to increased intestinal pathogens which can result in death. The stresses of production, growth, and changing nutrition over the growth period often present a challenge to optimum intestinal health, and therefore, efficient growth for optimal least cost swine production. The animal livestock has utilized antimicrobial growth promotants to mitigate some on the challenges of gut health and to optimize efficient growth. However, with pressure to reduce the feeding of antimicrobial growth promotants in livestock production has forced the industry to look at alternative ways to optimize growth performance while minimizing use of antimicrobials. The development of new/different management and feeding strategies to stimulate gut development and a healthy microbiome in the baby pigs are necessary and understanding how nutritional bioactive compounds promote gut and microbiome development in early life is necessary for optimizing gut health and immune function throughout production.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

- Assist in execution of experiment and data collection
- Analyze and interpret results involving swine 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 nutrient’s role in programming intestinal and metabolic health. You will gain experience in some of the following techniques: in vitro pig intestinal cell culture models, dietary treatments, microbial cultures, laboratory techniques (RNA and protein analysis), animal care, statistical analysis, and interpretation of results.
ANIMAL MODELS OF HUMAN AND EMERGING INFECTIOUS 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
168 CFAH Building
1680 Madison Ave
Wooster, OH 44691

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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.
Poultry Mucosal Immunology

Location: Wooster, OH

SUPERVISOR INFORMATION:

Dr. Ali Nazmi, Assistant Professor
Department of Poultry Sciences
210 Gerlaugh Hall
1680 Madison Ave.
Wooster, OH 44691

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RESEARCH INTERESTS:
Dr. Nazmi’s research focuses on characterization and understanding the poultry immune response to enteric diseases to improve gut health. Current research projects include host immune responses against coccidiosis, necrotic enteritis, and pathogenic Escherichia coli.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

• Assist with poultry trails and general animal care
• Assist with animal tissue and sample collection and processing for laboratory analysis.
• Become proficient in basic and advanced laboratory techniques, including but not limited to cell isolation and staining, flow cytometry, FlowJo analysis, qRT-PCR, and ELISA
• Assist other graduate students with experiments
• Attend lab meetings and present your research progress
• Prepare and present research findings at the CFAES Undergraduate Research Forum in the Spring term

KNOWLEDGE & EXPERIENCE STUDENT WILL GAIN:

You will gain experience in poultry immunology, gut health and host resistance to enteric diseases. You will develop critical analysis/thinking skills and become proficient in general laboratory practices as well as specific laboratory techniques.
FETAL PROGRAMMING IN RUMINANTS

Location: Wooster, OH

SUPERVISOR INFORMATION:
Dr. Alejandro Relling, Associate Professor
114 Gerlaugh Hall
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Dr. Braden Campbell, Assistant Professor
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RESEARCH INTERESTS: 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

Location: Wooster, OH

SUPERVISOR INFORMATION:

Dr. Qiuhong Wang, Associate Professor
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RESEARCH INTERESTS:
I received extensive training in human and veterinary preventive medicine, virology, and cell biology. Since 1994, I have acquired diverse research experiences studying RNA viruses, including poliovirus, rotavirus, astrovirus, calicivirus and coronavirus (CoV), including SARS-CoV-2 causing the current COVID-19 pandemic. My current research focus is on enteric caliciviruses and coronaviruses, including diagnosis of viral infections, molecular epidemiology, adaptation of enteric viruses in cell culture, mechanisms of virus attenuation, interspecies transmission of viruses, the mechanisms of enteric virus transmission through leafy greens, and the development of vaccines using conventional and reverse genetics technologies.

DETAILED SUMMARY OF DUTIES & RESPONSIBILITIES:

• Become proficient in basic and advanced laboratory techniques, such as cell culture, virus isolation and culture, titration of infectious virus, detection of virus-specific antibodies, RNA extraction, reverse transcription (RT)-PCR, real-time RT-PCR, agarose electrophoresis, cloning, plasmid extraction, basic sequence analysis, protein expression, sodium dodecyl sulfate–polyacrylamide gel electrophoresis (SDS-PAGE) and Western blotting, ELISA, immunofluorescence, and immunohistochemistry.
• Assist lab members with experiments and general lab management to help broaden the learning experience.
• Attend lab meetings and present research progress while also participating in laboratory discussions.
• Present research results 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. You will gain experience in working with enteric and respiratory viral diseases and will learn about viral pathogenesis, antiviral immune responses, and therapeutic/vaccine development. You will develop critical analysis/thinking skills, literature analysis, bioethics, and preparation of scientific reports and presentations, necessary for self-study and your future graduate study. Students will complete a short research study, typically as part of a broader project, in partnership with a current graduate student or post-doc and may potentially present completed research at scientific meetings.