Current ANSC Undergraduates In Research

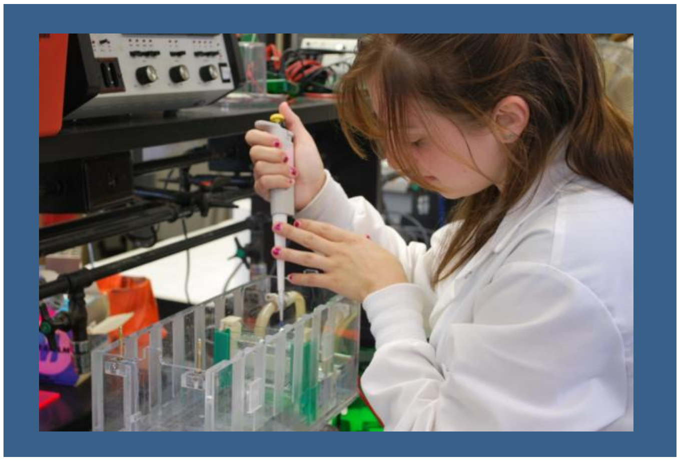
Animal Science students are currently investigating such topics as Antibiotic Resistance, Equine Bone Marrow, Meat Color, Lighting and Egg Production, Mastitis in Dairy Cows, and Endocrinology in Development in Steller Sea Lions.

The Department of Animal Science offers undergraduate students opportunities to participate in various research projects during their academic career at UConn. Students conduct research under the mentorship of an ANSC faculty member and/or graduate student so they can apply what they are currently learning in the classroom; prepare themselves for a career in science, receive an introduction to a new area of animal science; and gain empirical knowledge and critical thinking skills necessary to compete for future job opportunities or to strengthen their applications for veterinary school/graduate programs.

This semester we decided to highlight five of our undergraduates who are conducting undergraduate research. You will learn from the descriptions below what these students are studying as well as meet their faculty and graduate student mentors.

James Gaffney, an ANSC junior, conducts research in Dr. Venkitanarayanan's laboratory. Antibiotic resistance is a major public health concern for human and animal health worldwide. *Acinetobacter baumannii* is a multi-drug resistant, emerging pathogenic bacterium that has proven difficult to control with antibiotics alone. James investigates the potential of several plant-derived molecules, including trans-cinnamaldehyde, eugenol, and carvacrol to control *A. baumannii*. After determining the minimum inhibitory and minimum bactericidal concentrations of these molecules against the pathogen, James will evaluate the bactericidal kinetics of various concentrations of these molecules on *A. baumannii*.

Chelsea Mora, an ANSC junior, began her research in Dr. Govoni's laboratory in Spring 2010. She has worked closely with Elizabeth Ackell, a graduate student in the lab, to learn methods of isolation, culture and cryopreservation of equine bone marrow mesenchymal stem cells. The overall goal of this research is to identify optimal methods to culture and differentiate mesenchymal stem cells into osteoblasts for the purpose of healing equine fractures. Mesenchymal stem cells are multipotent cells that have the capacity to differentiate into several cell lineages. Equine bone marrow is collected from the sternum of the horse under standing sedation, and the mesenchymal cells are isolated and expanded on plastic cell culture dishes. It is possible to then expand these cells and introduce them to a fracture site in an injured animal. Chelsea's project focuses on characterizing the proliferation and differentiation potential of cells that demonstrate varying adherence rates. These findings will increase our knowledge of the optimal culture conditions of equine bone marrow stromal cells and improve the efficiency of this method for fracture healing in horses.



Katherine Hebert, an ANSC senior, started her research in Dr. Zinn's laboratory in fall 2009. She worked closely with Dr. Julie Richmond, a post-doc in the lab, and Amanda Parillo, the graduate student in the lab, to learn the methods of quantifying the hormones of the somatotropic axis in serum samples from marine mammals. The somatotropic axis includes those hormones, such as growth hormone (GH), insulin-like growth factor (IGF)-1, and IGF binding proteins (BP)-2 and -3, that are responsible for regulating growth and nutrient allocation. The project that Katherine is working on focuses on the concentrations of these hormones in serum from free-ranging juvenile Steller sea lions.

The overall goals of this research are to examine the age-related developmental changes in the somatotropic axis (GH, IGF-1, IGFBP-2 and 3) of juvenile Steller sea lions and determine if hormone concentrations are correlated with growth rate and body composition. The serum was collected from these animals upon capture in Prince William Sound, Alaska. Katherine spent the summer of 2010 quantifying the concentrations of GH and IGF-1 using radioimmunoassay (validated for use in Steller sea lions by Dr. Richmond and Dr. Zinn) and IGFBP-2 and 3 using Western ligand blots. The results of this project will link hormone concentrations of the somatotropic axis with nutrient status and growth rate in juvenile Steller sea lions and may contribute to the understanding of the decrease of juvenile survival in wild populations of Steller sea lions. Katherine will present her data at the Animal Science Conference held in July 2011 in New Orleans.

Erika Phillips, an ANSC junior, began her research in Dr. Mancini's laboratory in June 2010 under the guidance of Ranjith Ramanathan, a PhD student in Animal Science. Erika currently serves as an undergraduate teaching assistant for ANSC 3343 (Animal Food Products). After learning a variety of fundamental techniques used in meat science research, Erika participated in several projects that assess the role of tricarboxylic metabolites in meat color stability. More specifically, Erika's primary research focus included the effects of succinate-enhancement on beef longissimus raw and cooked color. The results suggest that the addition of succinate to beef can improve raw and cooked color. Results from other projects indicate that postmortem beef is biochemically active and the addition of substrates can influence meat color.
Erika has been offered the opportunity to study abroad in Australia in Spring 2011.

Alison Ritchie, an ANSC senior, is involved in a pilot study with Dr. Michael Darre to determine the effect of providing illumination within individual cages of caged laying hens vs. the traditional lighting method of lamps in the aisle between cage rows. Forty four Single Comb White Leghorns are being utilized for the study. The birds are housed two birds per cage providing ample spacing of 108 sq. inches per bird. The total group has been split into a control and an experimental group both containing twenty two birds.

One set of cages is illuminated with the standard 2700 K compact fluorescent lamps (CFL) hung from the ceiling, and the others with 3200 K light emitting diodes (LED), placed just above the individual cages. The purpose of the study is to determine the effect of the LED vs. CFL lamps on egg production and feed consumption. Eggs are collected and weighed twice daily and counted relative to each cage. Feed is weighed each week, and feed per dozen and feed per unit mass are calculated. After the study is complete, all forty-four hens will be returned to the general hen population at the UConn Poultry Farm. The findings of this pilot study will be beneficial to the poultry industry to help determine the effects of CFL vs. LED lighting on egg laying birds with regards to feed efficiency and egg production in terms of quantity and size of the eggs produced.

Natalie Santelli, an ANSC senior, began her research with Dr. Andrew in Fall 2010. She has worked with Dr. Andrew and Dr. Riesen in investigating mastitis in dairy cows. This research entails using ultrasound as a method to detect mastitis in dairy cows. The images captured during ultra sounding may be implemented for future use in diagnosing mastitis. Natalie has worked with Dr. Andrew using ultrasound and has learned to operate the machine, capture images and assist in organizing the images for each cow.

This research is very important to the dairy industry because mastitis reduces milk production in infected cows. Inflammation occurs in the mammary gland when it attempts to fight against infection caused by bacteria, chemical toxins and/or physical trauma to the mammary gland. In order to develop a method/ program that can help decrease mastitis in a dairy herd, that facility must understand what is causing mastitis in their herd. The research done at UConn by Dr. Andrew and Dr. Riesen hopefully can be used to help prevent future infections.