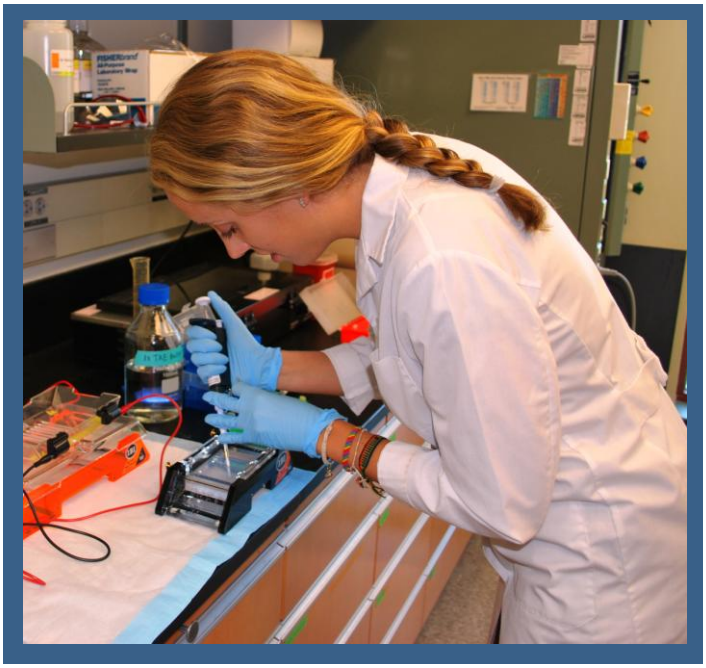
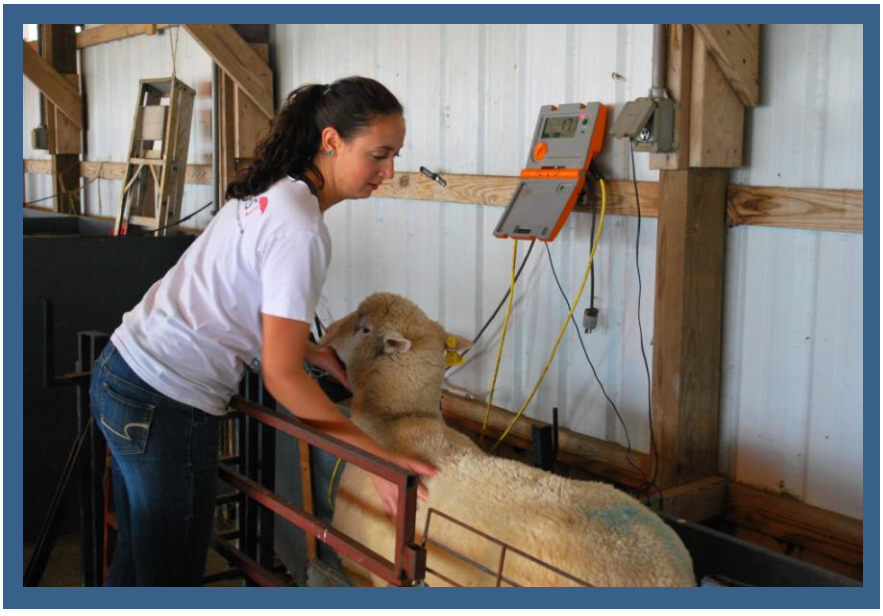
ANSC Undergraduates Participate In the Department's Research Programs

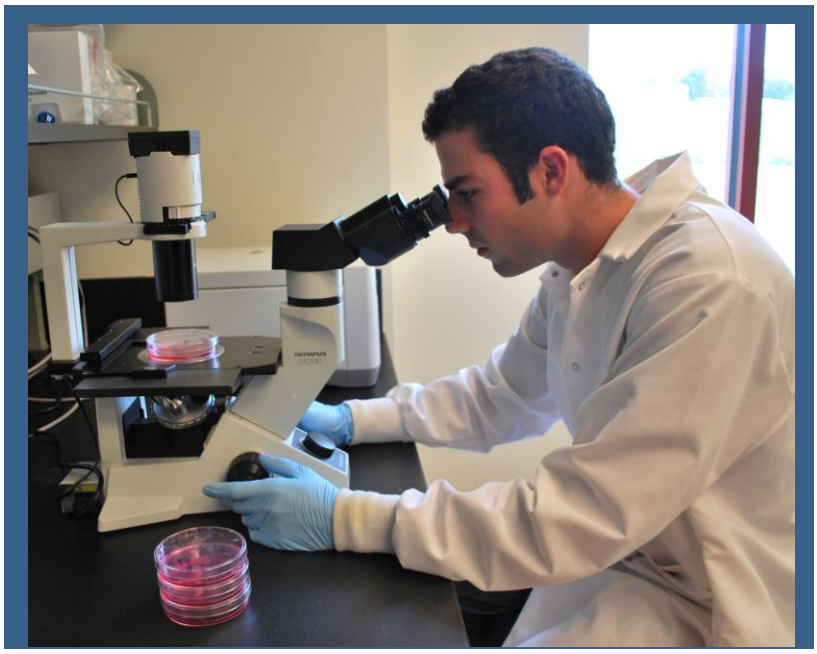
2012- 2013 Academic Year



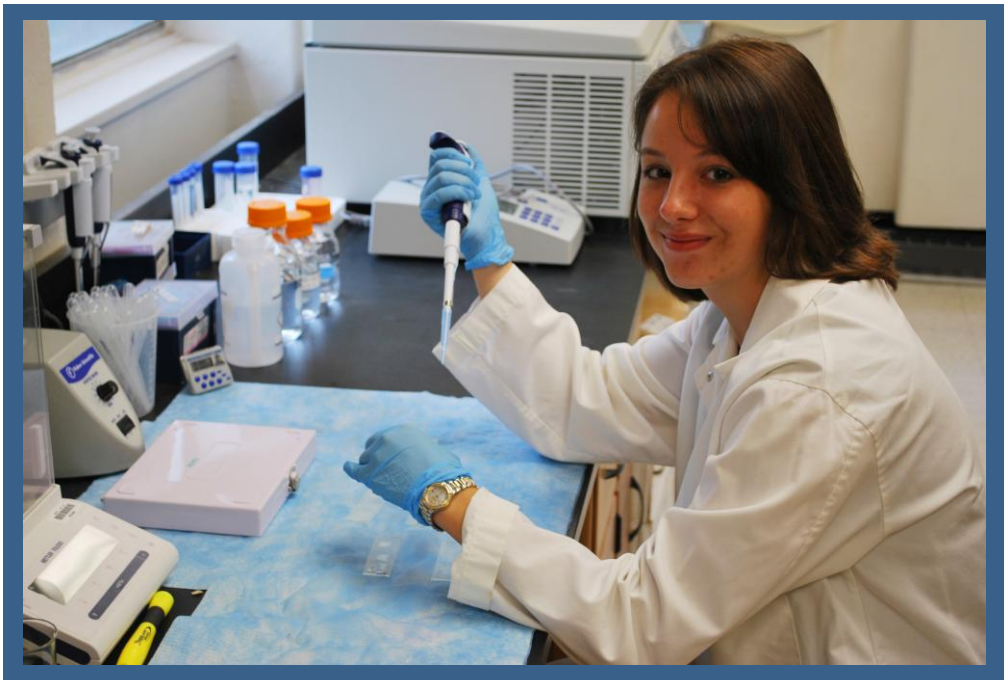
Molly Viner, an **ANSC senior** and member of the UConn Honors Program, began working in **Dr. Heather White's laboratory** in Fall 2011. For culmination into a senior thesis, she has been working on a research project identifying single nucleotide polymorphisms (SNPs) in the dairy cow genome and how they affect susceptibility to the onset and severity of fatty liver disease. Fatty liver disease is the accumulation of triglycerides in the liver that results from the negative energy balance associated with lactation. During the transition to lactation, 60% of dairy cows are affected by fatty liver disease—resulting in a significant negative impact on milk production and dairy cow health, profitability, and longevity. Molly has sequenced and confirmed the bovine adiponutrin gene using cDNA extracted from liver biopsy samples collected at the KDC. In individual cows, SNPs have been identified, which will be evaluated for correlation with fatty liver onset and severity. By further increasing our understanding and identification of factors that increase susceptibility of this disorder, improved managerial and nutritional interventions can be developed to more efficiently treat and prevent this metabolic disorder.



Michelle Forella, an **ANSC senior**, works in the laboratory of **Dr. Steven Zinn**. For the past two years, she has worked on a large collaborative project studying developmental programming using sheep as a model. Suboptimal maternal nutrition, which can be a result of under- or over-nutrition, can alter the intrauterine environment in a way that causes permanent developmental changes in the offspring. Several diseases, including obesity, cardiovascular disease, insulin resistance, and diabetes, have been linked to developmental programming, so an understanding of the mechanisms underlying this process will help to reduce its prevalence and thereby reduce the incidence of these diseases. Michelle is interested in evaluating the endocrine changes that occur in the body of the pregnant ewe that cause her developing fetus to program its body in response. To understand these changes within the ewe, she is quantifying the serum concentrations of several hormones, including insulin, insulin-like growth factor (IGF) I, IGF binding proteins (IGFBP) 2 and 3, growth hormone (GH), and leptin. Her findings will provide insight into the metabolic state of the ewe and the partitioning and use of nutrients, and this knowledge will be useful in determining the relationship between maternal nutrition and development of the offspring.



Cameron Smart is an **ANSC senior** and began working in **Dr. Kristen Govoni's laboratory** in the Spring of 2012. The goal of the research Cameron is involved with is to determine the molecular pathways by which two plant-derived molecules, trans-cinnamaldheyde and eugenol, reduce attachment and invasion of *Staphylococcus aureus* at the pathogen and host cell level. Recently, dairy farmers have observed increased pathogen resistance to current antibiotic treatments when treating mastitis. Using natural antimicrobials in place of current treatment methods could prove effective in killing specific mastitis pathogens such as *S. aureus*. Understanding the mechanisms by which S. aureus infects the mammary gland and plant-derived antimicrobials prevent attachment and invasion will enable us to better prevent and/or treat these infections. Working side-by-side with graduate students Devi Jaganathan and Maria Hoffman Cameron has learned several techniques including isolation of primary cells, cell culture, and real-time RT-PCR. He is currently working on isolating primary bovine mammary epithelial cells (MEC), expanding these in culture and characterizing the cells. Additional research will be conducted this semester to determine the attachment and invasion of *S. aureus* on our recently isolated cultures as well as identify key genes that are altered in infected MEC. In addition to working on this project, Cameron also assists with another project that focuses on determining the effects of poor maternal nutrition on development of the offspring using a sheep model. Cameron is involved in caring for the animals, data collection and blood sample collection.



Rachel Forbes, an **ANSC senior**, has been working in **Dr. Sarah Reed's lab** since the beginning of her junior year. Rachel spent the spring semester and summer working on a project studying the effects of poor maternal nutrition on offspring, using sheep as a model. Poor maternal nutrition leads to poor muscle development, metabolic disorders and reduced quantity and quality of products. Rachel quantified the number of satellite cells, which are stem cells found in muscle, in lambs from ewes with poor nutrition at birth and at three months of age. Rachel hopes to determine whether or not poor maternal nutrition has an effect on the both the number and the activation of satellite cells in lambs.