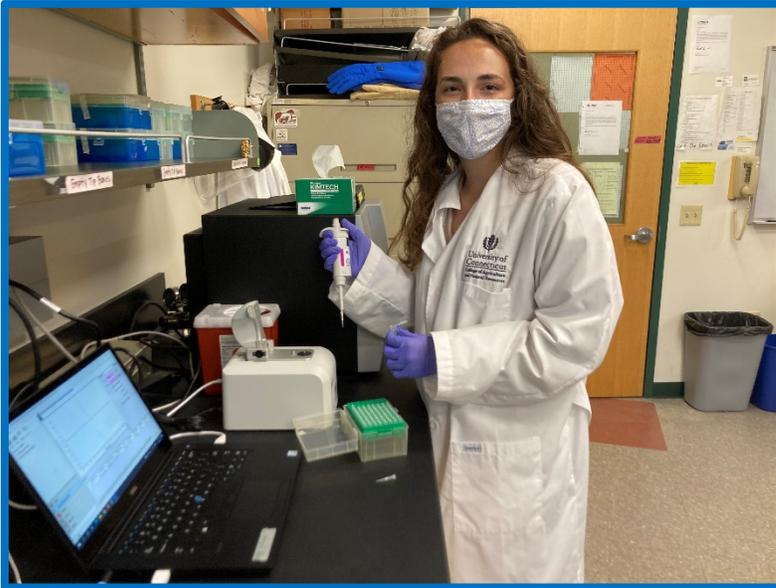


## ANSC Undergraduates Conducting Research



**Maddie Dupre**, a senior Animal Science and Pathobiology double major in the Honors Program, started getting involved in research at UConn in the fall of 2020. She joined Dr. Kristen Govoni's lab to gain valuable research experience both in a laboratory setting and hands-on with livestock animals. The focus of the lab's research is within a larger project involving Dr. Sarah Reed and Dr. Steven Zinn, which is studying the effects of poor maternal nutrition on the growth and metabolism of

offspring using a sheep model. Since becoming involved, Madelyn has been able to assist graduate students with several research activities including feeding and handling sheep, muscle, and liver biopsies, and LPS challenges. Beginning in the summer of 2021, she has also been able to help with the new beef x dairy cattle nutritional research project by bottle and pail feeding calves and helping with blood sample and muscle biopsy collections.

In the spring and summer of 2021, she was able to conduct her own research project, partially funded by an OUR Supply Grant, in the laboratory to study the potential effects of under- or overfeeding pregnant mothers during gestation on the mRNA expression of epigenetic factors in the liver of the offspring. With the help of graduate student Nicole Tillquist, she designed and optimized her own mRNA primers using an online program, isolated mRNA from liver samples of the offspring, and performed real-time PCR to determine the abundance of each target gene in each animal. She will work to analyze these data during her senior year to write her Honors thesis before she graduates.

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As she waits to hear back from veterinary schools, Madelyn is very grateful for all of the experiences she has been able to have through her involvement in animal science research. She hopes to use her new knowledge in livestock animal handling, laboratory techniques, and growth and metabolism during her future as a veterinarian.

**Julia Oudiz**, a junior Animal Science student in the Honors program, has been working in the laboratory of Dr. Young Tang since the spring of her sophomore year. She has been working with two graduate students: Yue Su and Jiaqi Zhu.

Julia joined Dr. Tang's lab to gain experience with lab techniques, such as PCR, gel electrophoresis, and RNA extraction, as well as to learn more about the process of creating bovine-induced pluripotent stem cells (biPSCs), which is currently the main focus of the lab. Julia has learned how to conduct her own PCR experiments, including the process of creating a master mix, pipetting different PCR components, running the PCR machine, and using gel electrophoresis to examine the DNA products. She has also learned how to use useful coding techniques using Galaxy and R to analyze data from RNA sequencing.



Last semester, Julia learned how to use a microscope with immersion oil, along with a computer system to capture images of cells and examine the karyotypes of bovine and mouse nuclear chromosomes. Throughout the semester, she worked in the Koons Hall microscope lab to evaluate the chromosome numbers of the cells.

This semester, Julia has been working with ANSC graduate student Yue Su to extract RNA components from cells cultured in varying media, in order to determine the best media suitable for culture of biPSCs. She has also begun to run more PCR experiments and to extract different samples of bovine cell RNAs to examine their gene expressions.

Working with Dr. Tang's lab has provoked Julia's interest in cell culturing and stem cell research. Julia is extremely grateful for the opportunity to work in the lab and to be able to be a part of the recently published paper, "Establishment of Bovine-Induced Pluripotent Stem Cells."

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**Morgan Dougherty**, a senior Animal Science student in the Honors Program, has been involved in the sheep research project with Drs. Reed, Zinn, and Govoni and graduate students Mia Kawaida, Amanda Reiter, and Nicole Tillquist, since the fall of her sophomore year. More recently, in the spring of her junior year, she started her own project under the supervision of Dr. Zinn. She spent the summer doing research for this project supported by the SURF award that she received from the Office of Undergraduate Research. Over her time on the project, she has learned about proper sheep handling, restraint, and feeding as well as laboratory techniques, scientific writing, and literature review.

The sheep project investigates the effects of poor maternal nutrition during gestation on the offspring over multiple generations. The ewes of the first generation were either overfed, underfed, or fed adequately to serve as a control and effects of this were observed in various areas in the offspring. This project interested Morgan because the effects from poor maternal nutrition can last throughout generations and have major implications on livestock management and production efficiency as well as human health. Her project that was designed with Dr. Zinn and Dr. Reed involves determining the reproductive capability of ewes that were born to mothers who were overfed or underfed during gestation. She hypothesized that the ewes born to overfed or underfed mothers would have reduced reproductive capability and efficiency.

The project consisted of breeding the F1 ewes from their ongoing maternal nutrition project. Blood samples were collected from the ewes before breeding when their estrous cycles were synchronized until approximately day 30 of pregnancy. Using the blood samples, Morgan will determine concentrations of the pregnancy hormones, follicle-stimulating hormone, luteinizing hormone, and progesterone to compare between nutritional groups. Additionally, the number of fetuses observed on ultrasound, days to confirmed pregnancy, and offspring measurements will be evaluated to determine if these reproductive factors differ between groups. This project will serve as the majority of her Honors project. Morgan has taken Reproductive Physiology and Dr. Zinn's Endocrinology of Farm Animals classes which sparked her interest in this project. She is interested particularly in endocrinology. Now, she is finishing up blood sample collection from the ewes as they are confirmed pregnant.

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Next, Morgan will determine hormone concentrations in the ewes, and will soon start using enzyme-linked immunoassays to determine progesterone, LH and FSH concentrations. After those determinations, she will be evaluating the results and write her honors thesis. In addition to her own thesis work, Morgan assists in weekly sheep weighing, blood sample collection, sheep feeding shifts, and other sheep research activities, and beef x dairy cross study with Drs. Reed, Govoni and Zinn.

Overall, Morgan has enjoyed the opportunity to work with the professors and graduate students to learn more about the research process overall. She is in the process of applying to veterinary school and hopes to pursue a DVM with a career in laboratory animal medicine. She believes that this experience will help her as a veterinary student and has appreciated the opportunity to work on a project that has many applications for animal and human health.