Robot dogs and their impact on society are becoming more and more investigated by scientific research facilities because they can do tasks that are deemed unsafe for humans to do. Some examples of these tasks include search and rescue in hazardous environments, surveillance in high-risk areas, and handling hazardous materials. To ensure that these robotic systems are as effective as possible, Professor Nguyen and his lab decided to conduct research and experiments regarding a robotic arm that would sit and extend from the robot dog's back.

Although it may seem simple and intuitive, multiple considerations need to be taken account for such as the strength of the gripper of the robotic arm as well as the potential length and weight of the arm. These potential issues were addressed in the research we conducted over the summer in Professor Nguyen's lab. Specifically, we focused on how gear ratio affects the torque strength in a heavy way. Because of this, I researched about different mechanisms that could have been possible to gain the 3:1 gear ratio that we desired. Between a mechanism with pulleys and timing belts, and a planetary gear box, we decided to go with the planetary gear box as it provides a better design aesthetically. When producing the design of the planetary gear box using SOLIDWORKS, I learned about multiple different necessary components such as the module, clearance, and teeth of the gears.

Because of the laboratory’s goal of engineering a robotic arm to be mounted on the back of the Aliengo robot dog, I first learned about machining and different techniques such as tapping and the construction of physical mechanisms.

Our research also investigated the rotation of the gripper of the robotic arm, so I was tasked with learning about Arduino program and produce a way of rotating the upper gripper using a servo motor.

Most of the the laboratory’s research over the summer was spent researching the best gear ratio possible for the gripper to optimize strength and rotational force without the expense of strength in a heavy way. Because of this, I researched about different mechanisms that could have been possible to gain the 3:1 gear ratio that we desired. Between a mechanism with pulleys and timing belts, and a planetary gear box, we decided to go with the planetary gear box as it provides a better design aesthetically. When producing the design of the planetary gear box through SOLIDWORKS, I learned about multiple different necessary components such as the module, clearance, and teeth of the gears.