

Katie Greiner
Spring 2017

Honors Enrichment Award Report

The Honors Program gave my group a financial award of \$400.00 to help fund our Mech 307 (Mechatronics) project this past spring. To begin with, here is a quick overview of the project. Each lab group is responsible for creating a mechanical-electrical device that satisfies the following six categories: output display, audio output device, manual user input, automatic sensors, actuators, mechanisms and hardware, logic, processing, and control. Following brainstorming on February 3rd, the group officially elected our project design on February 10th: the "Fuseball Table". The Fuseball Table is an automated foosball table designed for single-player interface. The individual player first selects a difficulty level - easy, medium or hard - and proceeds to play traditional-style foosball versus the table. Difficulty level is chosen on an LCD touch screen display and indicated by flashing LED lights of the corresponding color - green for easy, yellow for medium, or red for hard - mounted on the board. The table opponent consists of 7 players divided into two groups of three and one goalie. The two groups of three are hidden below the board and activate once an infrared (IR) beam is broken by the foosball ball crossing its plane, and the goalie resembles a traditional foosball player and rotates back and forth across the goal on a rotating arm. The different difficulty levels determine how quickly the two rows of hidden players respond once the IR beam is broken as well as how fast the goalie rotates in front of the opponent's goal. If either the individual player or the table scores a goal, the corresponding 7-segment display will increase their score. A photocell-controlled counter that is triggered when the ball goes through the ball-return system controls the value shown by the 7-segment displays. Each time a goal is scored, a sound system plays a victory song. Once either the individual player or the table reaches nine points, the game concludes and a victory song is played. Tackling such a fun and challenging project was only made possible through this financial award, as the project is student-funded.

Funding from the Honors Enrichment Award directly correlated to the success of this project. With additional money the group was able to recover costs lost early on in the project from ordering insufficient components and unexpected component failure, alongside purchasing better products to improve our project. A few of these notable products include Arduino Unos, high torque stepper motors, and IR beams. At the beginning of the semester, each team is given one microprocessor. Unfortunately, this microprocessor could not handle some of the diverse aspects of the Fuseball Table and consequently the group needed an alternative. Arduino Unos are a different type of microprocessor that is easy to adapt with different brand components, which is exactly what we needed. The group was able to purchase two Arduino Unos. Additionally, high torque motors were required to rotate the combined weight of the rods and 3-D printed opponent players. This was difficult, as high torque motors are relatively expensive compared to motors required for other students' projects, however the Honors Enrichment Award enabled us to purchase three high torque stepper motors. Lastly, this financial award provided funds for the group to purchase quality IR sensors that are durable enough to be installed within the playing board and sensitive enough to register the foosball quickly going by. These three components, alongside many others, would not have been possible without funding through the Honors Enrichment Award. My group thanks you all for your belief and support in our project and abilities!

