ENT Senior Design Projects 2021

MIAMI UNIVERSITY
REGIONALS

Hamilton Caster Powered Cart

Tyler Sargent, Kendall Purdy, James O'Brien, Greg Drew

Professor: Gary Drigel

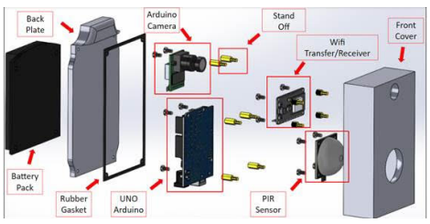
The student engineering team has developed an electrical drive system for an existing mobile cart for Hamilton Caster. The drive system includes gearmotor driven casters, a 24V battery system and an Arduino control system to operate the powered cart under the required conditions given by Hamilton Caster.

Infrared Motion Camera SCADA System

Garrison Barnhill, Eric Living, Brett Schnicker

Professor: Gary Drigel • Mentor: Hirenkumar Gami

Student engineers have designed, built, and wired a camera security system that will implement similar features to the Ring system. After this project is completed, the camera security system will detect any moving object within 25 feet, capture still image, and store them on a database.

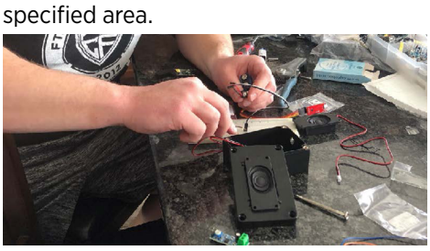


NCAS: Noise Complaint Avoidance System

Sam Uchtman, Michael Hoover

Professor: Gary Drigel • Advisor: Mert Bal

Our project is to create an Arduino based speaker that will automatically adjust volume based on the amount of light, decibel level, and current weather in a specified area.

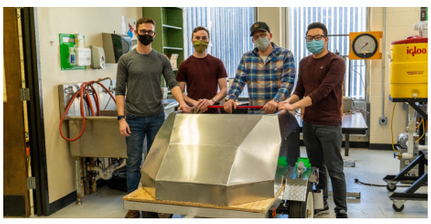


MPMT: Multi-Purpose Motorcycle Trailer

Logan Street, Tony Hester, William Dao, Kyle Guggenheim

Professor: Gary Drigel

Student engineers designed and built an aluminum enclosure to be attached to a trailer to safely haul pets behind a motorcycle. The enclosure has a lid to create dry storage for road trips, or can be removed from the trailer, and the trailer can be pulled behind a vehicle, to allow transportation of larger objects.

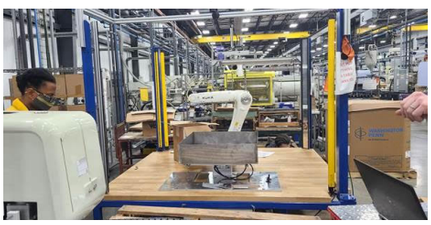


ASPM: Vision Guided Robot

Selorm Tettevi, Jarred Fultz, Ethan Parsons, Chris Adkins

Professor: Gary Drigel

This project utilizes a KUKA Industrial Robot, Siemens PLC, and Cognex Vision System to autonomously locate and capture components with varied positions. The system also allows for a sequence to correct the orientation of components with a pneumatic actuator.

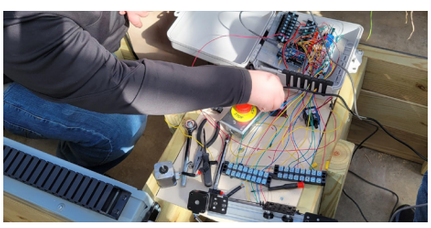


SAWSA: Structural Agriculture Water Saturation Assembly

Bryan Williams, Michael Jones, Nathan Lowry

Professor: Gary Drigel

Automated watering device. Our design will measure water saturation of the soil, dispense water accordingly, and repeat to all plants inside its growing area.

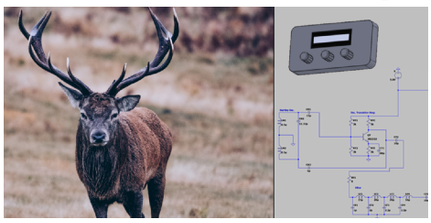


WGTS: Wild Game Tracking System

Clinton McElroy, Jeffrey Beery, Travis Ribby

Professor: Mert Bal

This project aims to design a mechanical carrier that attaches to the end of an arrow which is outfitted with a radio frequency transmitter placed inside a potted housing. Once the arrow is fired, the mechanical carrier will deliver the RF transmitter to the target and become detached upon impact. With the transmitter attached to the target, the user can then use the RF receiver to follow the beacon and locate the target.



SignaSpeak

Cameron Bailey, Victor Sellers, John Whited

Professor: Mert Bal

As a result of the work being done in the SignaSpeak project for ENT 497/498, a new product that will serve as a text-to-speech signaling device will be created. An Arduino will be used as the interface between an operator and the speaker. The operator can type any input string of text and it will then be spoken through the speaker system when an alarm condition occurs. One goal for the product will be to make it easier for companies to train employees. This product will also provide a device with limitless vocal instructions that can be tailored to any process an end-user may have. SignaSpeak will be unlike any other products on the market because these tend to only offer limited recordings that may not be the best option for a specific process. Having a device that will audibly state the issue in the process will subsequently decrease the downtime for the process when addressing issues. A SignaSpeak system will provide peace of mind and simplicity to any manufacturing process.

Automated Livestock Barn

Gabryella Law, Joshua Hashman, Michael Wengerd

Professor: Mert Bal

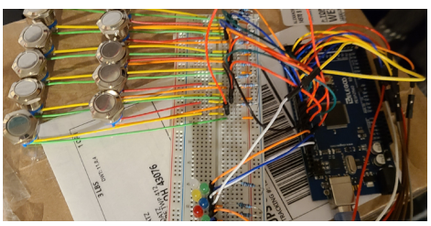
The team is developing a product to monitor and automatically care for livestock in small scale to large scale farming operations. The Automated Livestock Barn will fill the water trough automatically through liquid level sensors. Food will be dispensed on a timer or at a particular time of day. It will also allow for temperature control of a livestock barn using louvers. For basic needs, a dusk to dawn light will operate for the system, but it can be overridden by a manual light switch. For safety, the system will be equipped with fire detection and video monitoring that will be accessed through an external source, such as a GUI. All information gathered, regarding the system's operation and state, will be sent to the GUI through the Raspberry Pi microprocessor for the user to view.

Boat Microcontroller

Alexander Datz, Eric Valentine

Professor: Mert Bal

We are designing and creating a drop in microcontroller smart switch panel for a 2014 Skeeter FX20 bass boat. The microcontroller will add new features that correct water and oxygen levels in the livewell. The livewell is where fish are stored. It is crucial that there is enough water and oxygen to sustain life of the fish. Our system will take readings periodically to check water/oxygen levels and make necessary adjustments to the desired set point. This provides the fisherman more time to fish because in the competitive fishing world points are deducted for dead fish.



Sanitizing Drone

Weston Robinson, Drew Recker, Matt Bright

Professor: Mert Bal

The project is involved in designing and developing a sanitizing drone system. When finished, this system will allow the drone to fly autonomously on recorded flight paths where it will sanitize as it flies utilizing a drone, drone home base and a controls system.

Automated Cistern Transfer Pump

David Dunbar, Brian Gast

Professor: Reza Abrishambaf

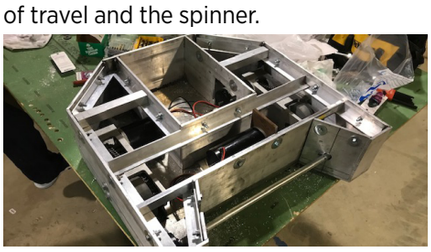
The purpose of this project is to implement a combination of automation and micro grid technology in order to develop a system capable of utilizing available natural resources and aid in sustainable farming practices. The inspiration for this design came from a local farmer who expressed a desire to find a way to take advantage of a remote cistern for livestock watering. This proposal adds a pump system to the cistern that would allow us to transfer the water to a storage tank located near the livestock containment area. The water source is in a remote location, so a renewable energy source was chosen to power the system.

Battlebot

Braden Bakenhaster, Nick Newton

Professor: Reza Abrishambaf

The objective of our project is to design and build an effective battlebot with a spinning weapon mechanism in accordance with the official Battlebots rules and regulations and to build it within a reasonable budget. Our battlebot is mostly constructed from aluminum due to its lightweight, reasonable strength, and affordability. The bot will run on a 12V system. The bot will be controlled through a radio transmitter controller which will allow us to control the direction of travel and the spinner.



Door Testing Machine

Francis Ziehm II, Elijah Bok, Kyle Nicely

Professor: Reza Abrishambaf

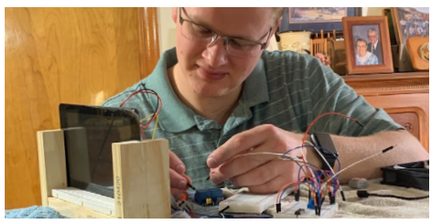
Sauder Woodworking Company (Archbold, OH) has provided a project in which an automated door testing machine is being created. This machine's purpose is to test cabinet doors they manufacture before being sold to the public. This machine will repeatedly open and close the door to test the hinges. The focus of this project is to design, manufacture, and test this machine to meet the requirements of Sauder Woodworking.

King of Kings TechBed

Jacob Klopfenstien, Chris Waidelich

Professor: Reza Abrishambaf

The project is the King of Kings TechBed, the king of all king size beds. It is designed to have a natural wooden appearance and construction that utilizes storage space under the bed, while implementing various technology systems, such as a sound system, lighting system, cooling system, toggled outlets from lamps and wireless chargers, and a minifridge. All these systems will be integrated with a Raspberry Pi for control and a touch screen for the GUI. The project teaches mechanical engineering skills through the design of the frame and assembly features of the bed, and electrical engineering for the wiring and programming of the electrical system. The project has proved to also be a great lesson in project management.

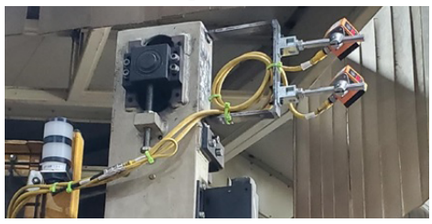


Mask Detection Stand

Adam Malone, Alex Mallett, Nathan Jaqua

Professor: Reza Abrishambaf

We were originally tasked with designing a stand for GM to detect the presence of 7 different masks used in the mold maintenance process. However, the project evolved into only requiring the detection of 2 masks. This problem-solving idea originated due to the operators occasionally leaving the masks in the mold causing damage to equipment and downtime. Develop an automated detection process that would not add cycle time or operator steps while preventing downtime and reducing cost due to damaged masks.

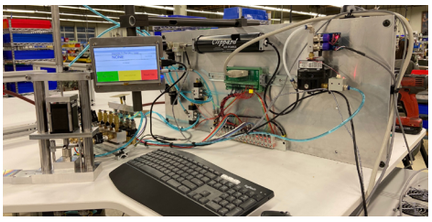


Precision Pressure Regulator Tester

Brian Kettering, Mick Lutz, Alex Werdman

Professor: Reza Abrishambaf

The objective of this project is to construct a testing machine to test precision miniature pressure regulators. The tester will test for leaks, pressure repeatability in the flowing and non-flowing usage to assure the customer of precision pressure control.



Trash Can Transporter

Steven Brown, Simon Miller

Professor: Reza Abrishambaf

The project idea is to create a remote controlled vehicle capable of transporting a standard sized trash can to and from the owner's house to the end of the driveway and back for trash pickup day. The vehicle will need to be able to load, carry and unload a trash can that weighs up to 200 pounds. Our plan is to have a steel framed vehicle equipped with 10 inch lugged tires. The vehicle will have four motors, one for each tire and will be able to produce plenty of torque. This will allow it to haul around the weight of the vehicle and the trash can through rough terrain. Lastly, there will be an "arm" made out of two actuators that will be able to extend and retract, making it able to load and unload the trash can with the push of a button on the controller.

Hartzell Overspeed Chamber

Andrew Young, Bailey Mullennix, Megan Myers

Professor: Rob Speckert, Zhiyuan Yu

Student engineers designed and constructed an improved overspeed chamber for Hartzell Air Movement in Piqua, OH. In 2011, a 66" fiberglass wheel with stainless steel stiffness was accelerated to the point of critical failure. This is what led to the re-engineering of the current overspeed chamber at Hartzell. The goal of this project is to create a new and improved chamber that is inexpensive but also keeping all fan parts inside the newly constructed overspeed chamber. This consisted of designing a new building that is constructed with a thicker barrier on the exterior walls from durable materials. That will be able to be replaced with ease in the event of another critical failure.

Prototype Vacuum Former

Mindy Bach,Danielle Gagliano

Professor: Rob Speckert, Zhiyuan Yu

Student engineers designed, built, and tested a machine that would manufacture prototype samples and service parts needed for prior automotive models using thin PE films and other materials of various thicknesses. It will do this by heating a sheet of plastic and forming it to the mold tool. This machine makes the process more efficient because it is designed to handle a lower volume of product and can be managed by one person. This reduces the manpower needed to operate the current machines and the number of days required to produce the parts using the existing machines, which are intended for larger volumes of product.

Triple Falling-Ball Viscometer and Small-Scale Pipeline System

Kyle Rufer, Ted Shirk, Thuc Nguyen

Professor: Rob Speckert, Zhiyuan Yu

Student engineers designed and built two lab components (The Flexible Triple Falling-Ball Viscometer and Small-Scale Pipeline) to replace existing equipment in the fluid mechanics classes at Miami University. The new components will give students an opportunity to apply concepts and principles learned within the classes. These components are being designed, built, and tested so they can be affordably reproduced for both Miami campuses and regional locations.

Solar Powered Clean Water System

Cameron McNair, Shannan McCracken

Professor: Rob Speckert, Zhiyuan Yu

Student engineers partnered with Lifestraw to develop a clean water solution for both underdeveloped communities and disaster relief zones. This project's operation includes a solar panel used to power a pump that collects and purifies 99.99% of impurities from the water for the end-user. All components are housed on a mobile cart to allow for easy transportation.

Skelex Torque Recorder – General Electric

John Buena, Uchenna Ngene-Igwe

Professor: Rob Speckert, Zhiyuan Yu

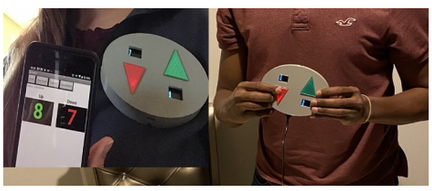
The passive exoskeleton is a robotic armor that covers the human body to restore human performance. The Skelex offers a weightless feeling in the arms, reducing fatigue in the shoulder joints. Since the Skelex does not have sensors that will read torque from the shoulders, student electrical engineers designed and programmed software that measured the force incorporated with working angles, and a fixed arm length to calculate torque.

Up-Down Vote Badge

Nicole Eisenbrandt, Liban Mohamed

Professor: Rob Speckert, Zhiyuan Yu

The objective is to create a battery-controlled vote tabulating device with count capabilities used for analytical and behavioral study use. The device will be capable of keeping count in a visual and code manner with two indicators representing up and down arrowheads that mimic the vote tabulating machines (Vote Badge) in the episode "Majority Rule" from the Fox series *The Orville*. The ultimate goal of keeping count would be to connect to the Internet of Things (IoT) through a created app, where those who wear this device can see their and other users' count.



Engineering Technology at Miami University Regionals

MiamiOH.edu/Regionals/ENT

PROGRAMS INCLUDE

- Electrical & Computer Engineering Technology
- Electro-Mechanical Engineering Technology
- Mechanical Engineering Technology
- Robotics Engineering Technology

QUESTIONS

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