




# Hewitt-Trussville

## Engineering Academy

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On Saturday March 6th, the Engineering Senior Design students virtually presented their projects at the Central Alabama Science & Engineering Fair. Our students began the school year by brainstorming hundreds of problems in order to create live-improving solutions. The students did an incredible job this year of creating their final working prototypes. I have attached a table with pictures and descriptions of the students' problems and solutions. When you read through these design descriptions, you may wonder why these solutions have not already been invented. These students have worked extremely hard, spending countless hours researching, designing, 3D modeling, programming, building, and troubleshooting their solutions. We are extremely proud of the hard work and dedication of this group in their effort to improve the lives of others.

Project Team	Project Description
 <p><b>Eli Muncher and Drew McDowell</b> <b>Tail Light Failure Alert System</b></p> <p>Eli and Drew received CARSEF Top Honors Senior Division and 1st Place in the Energy and Transportation category. Eli and Drew automatically advance to the Regeneron International Science and Engineering Fair.</p>	<p>How do you know if your tail light, brake light, or reverse lights are out in your car? Eli and Drew designed a system that attaches to your car tail lights to indicate if they are working properly. They utilized a system of photosensors to detect the intensity of the lights. The system includes a dash mounted indicator system that notifies the driver that the lights are working correctly. Their system can alert you if one of your brake lights, tail lights, or back-up lights is not working.</p>



**Morgan Dotson and Kenny Nguyen  
PATH ADHD Detection Game**

Morgan and Kenny received 1st Place in the Behavioral and Social Science category at the Central Alabama and Regional Science Fair. They will advance to compete in the Alabama State Science Fair.

Morgan and Kenny are driven to assist young students who have ADHD. They developed a game for young students to play, and the program analyzes their answers and time. They utilize the data collected by the game to help with early detection for young students. This early detection will help to ensure students get early support from parents, teachers, and doctors. Morgan and Kenny want to continue to expand their system to help with early detection of other concerns such as dyslexia and other reading disorders.



**Will Diggs, Hayley Page, and Ryne McGuyer  
Firefighter Heat Alert System**

Will, Hayley, and Ryne received 1st Place in the Physical Science category for their fireman alert system at the Central Alabama and Regional Science Fair. They will advance to compete in the Alabama State Science Fair.

Will, Hayley, and Ryne set out to design a product to help firemen. In their research, they discovered that the firemen's gear works so well that the firemen will enter spaces that are too hot for them. The first indication is when a face shield begins to melt due to the heat of the room. They designed a device that mounts onto the fireman's helmet and reads object temperature and the room temperature. The temperature is displayed to the fireman via an LCD screen mounted on the face shield. The system also includes a green, yellow, red LED warning system.



**Jacob Jones, Noah Renda, and Kellen Rutherford  
Auto Ears – Driver Notification System**

Jacob, Noah, and Kellen received 3rd Place in the Energy and Transportation category for their deaf driver notification system at the Central Alabama and Regional Science Fair. They will advance to compete in the Alabama State Science Fair.

Have you ever had a police car, ambulance, or fire truck just suddenly appear behind you in your car? Jacob, Noah, and Kellen have a friend who is deaf. He conveyed to him the difficulty of not being able to hear while he is driving. They designed an electronic system that will do the listening for the driver. With a microphone mounted on the bumper and an LED notification light mounted on the dash – their system will alert drivers to emergency vehicles and car horns. The LED indicator lights up, notifying the driver that the microphone is hearing a sound with the frequency of a car horn or emergency siren.



**Reagan Felts and Kaylee Rivas  
Hot Paws – Sidewalk temperature dog leash**

Reagan and Kaylee received 3rd Place in the Engineering category for their pet leash that reads the asphalt and sidewalk temperature at the Central Alabama and Regional Science Fair. They will advance to compete in the Alabama State Science Fair.

Have you ever walked barefoot on hot asphalt, concrete, or sand? Reagan and Kaylee were concerned about people walking their dogs in the summer and having their paws burned. Reagan and Kaylee have designed a pet leash that reads the temperature of the ground. Their system alerts the owner with LED indicators and a ground temperature read out.



**Grayson Davis and Zac Butterworth  
Approaching Car Alert System for Cyclists**

Grayson and Zac received honorable mention in the Energy and Transportation category at the Central Alabama and Regional Science Fair for their cyclist alert system.

Grayson and Zac designed a system to help cyclists. Their system can be added to a bicycle that will notify the cyclist of approaching cars. Their system utilizes a lidar system to detect approaching vehicles and alert the cyclist to the approaching vehicle with an LED and a notification message with the distance in feet.



**Luke Chamberlain and David Davis  
Design a Better Face Mask**

Luke and David received honorable mention in the Engineering category at the Central Alabama and Regional Science Fair for their improved face mask designs.

Are you tired of your face mask fogging up your glasses? Are you tired of not being able to hear people talking with their face mask on? David and Luke designed two custom facemasks to solve this problem. One mask has a built-in fan and filter system that provides constant air flow through the mask. This mask provides fresh air and prevents your glasses from fogging up. Their other mask design has a built-in microphone and scrolling LED screen that listens to what you say and converts it into a scrolling text message on the front of the mask.





**Caleb Hickman and Dandrell Johnson**  
**3E-Wheel: Bicycle for the Elderly**

Caleb and Dandrell received honorable mention in the Energy and Transportation Category at the Central Alabama and Regional Science Fair for their bicycle conversion system.

Dandrell and Caleb designed a retrofit to convert a two-wheel bicycle to a three wheeled bicycle. Their goal was to design a bicycle that could be easily used by the elderly so that they could ride with their grandkids. Their design includes an electric motor assist to help with the pedaling.



**Richard Harris, Jr.**  
**Find Your Remote**

R.J. received honorable mention in the Engineering category at the Central Alabama and Regional Science Fair for his remote control locator.

How often do you lose that television remote control? R.J. designed a detection system that you install on your remote, and whenever you need to find that remote – just press a button and the remote will alert you to its location.



**Daniel Cosby, Colton Hollingsworth, and Sam Lovin  
Disc Golf Tracking System**

Daniel, Colton, and Sam received honorable mention in the Engineering category at the Central Alabama and Regional Science Fair for their disc golf tracking system.

Daniel, Colton, and Sam enjoy playing disc golf. One of their complaints is the time required to find lost discs. They designed a custom disc golf disc that houses a removable GPS system. Their disc utilizes an app on your phone that can track and locate your disc; also, it can tell you the distance of your throw. With the press of a button on your phone, the buzzer on the disc will alert players of the disc's location. They want to continue to develop their app to help keep score while playing.