



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

INDUSTRIAL SOLUTIONS LABORATORY SENIOR DESIGN

SAVE THE DATE!

FALL EXPO

Friday, December 11, 2015

Barnhardt Student Activity Center (SAC)

Open to Public at 11 AM

The Spring Expo was a Huge Success!

More than 420 students participated in the Spring Expo and 72 completed projects were showcased. Awards were based on judging by industry project supporters, project mentors, and selected faculty. In addition, there were 30 posters for preliminary designs that were completed in the first semester of the capstone course sequence. The top three projects were chosen from nine finalists by a panel of 12 independent judges.

1st Place Bill Heybruck Award

Combat Heat Stress Prevention Kit



The Combat Heat Stress Prevention Kit project was supported by the US Air Force Research Lab. The project goal was to design and build a system to safely, rapidly, and effectively remove undesired heat away from body exteriors during special operations in hot and humid environments.

Team members included Justin Beach, Benjamin Fischer, Nicholas Kolk, Noah Robertson, Todd Robes, and Madison Traynham.

What's inside? Senior Design provides results to industry!



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2nd Place Award

Distribution Management System and Automatic Reconfigurable Scheme and Load Management System



This project was supported by Duke Energy and Schweitzer Engineering Labs. It

consisted of the design and test of a distribution management system (DMS) comprising a supervisory control and data acquisition (SCADA) system for the University's Charlotte Research Institute (CRI) campus and the design and test of a protection and control system for the electrical grid on the campus power distribution network.

Team members included Cara Decoste, Brandon Madden, Jason McCall, Ajay Scaria, Dustin McKenzie, Robert Sherretts, and Sean Zilberdrut.

3rd Place Award

Quad Copter for Non-Destructive Evaluation

This EPRI project included the creation of hardware, software, and processes to improve the efficiency and safety of overall automated inspection tasks of major components and structures in power plants.

Team members included Staton Apple, Louis Brooks, Derek Roberts, Bradley Stiles, and Kaitlin Zarcone.



2015 EVENTS – Mark Your Calendar Now!

Look for new projects starting in the fall semester!
Project descriptions will be posted in early August.

<https://srdesign.uncc.edu/senior-design-program/projects/2015-fall-projects>

- September 4, 2015 Kickoff breakfast for industry supporters, project mentors, and student teams (this date is tentative)
- December 11, 2015 Fall Expo, Student Activity Center, OPEN TO PUBLIC at 11 AM

THANK YOU SPRING 2015 INDUSTRY SUPPORTERS!

The success of our program depends on you!



Senior Design Provides Results to Industry

A project supported by **Chiron** was recently completed that developed part handling automation for the assembly of pliers for **Channellock**. The goal of the project was to automate the current production line and eliminate direct human labor. The project required four plier forgings to be loaded into a **Chiron** CNC machine in 28 seconds with a two-year payback.

The final design includes an elevator feeder to sort the 3D plier forgings onto a conveyor belt. From the conveyor belt a Fanuc iR vision machine with line tracking recognizes the orientation of the forgings on the belt and picks up the forgings in motion.

The iR camera takes a picture of every part of the conveyor belt since each part has a different orientation. Once the orientation is identified, a Fanuc robotic arm transports the forgings from the conveyor belt to a pallet and then to the CNC machine.

Each forging has a dimple at the pivot, which is used to properly align it in the pallet. The pallet locates the dimple using a cone set screw. The forgings are picked up and placed using pneumatic magnets, capable of handling up to four forgings simultaneously.

The team successfully designed and prototyped the end-of-arm tooling and pallet. A video of the project is available at

<https://www.youtube.com/watch?v=HUdZ8OxtrX0>. This fall a different team will redesign the fixture inside the CNC machine including how to unload each piece.

Haskell Corporation is designing and installing several small independent power plants for **IMG Midstream**. These facilities use GE Jenbacher internal combustion engines operating on natural gas. Each facility has five engines housed in a common building, generating a net output of 20 MW at each site. Construction recently started at the first site.

Haskell was concerned that the engine air cooling requirements imposed by Jenbacher were too restrictive. A senior design team completed a CFD analysis of the engine building ventilation air based on the current **Haskell** design. Their results verified that the design requirements imposed by Jenbacher are conservative.

Since the ventilation fans use VFD drives the fan speed will be reduced based on the CFD analysis. This change will significantly reduce fan noise and potentially save both **Haskell** and **IMG Midstream** from implementing sound mitigation measures for the ventilation fans. The total cost savings for the five **Haskell** power plant sites is expected to be substantial.

Contact Us

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