Senior Design Projects

All Lake Superior State University senior engineering and engineering technology bachelor's students are required to complete a challenging senior design project. The students work in multi-disciplinary teams and use a composite of their technical and general education courses to successfully complete these projects. Many of the projects collaborate with industry to solve real world problems for companies.

2018-19 Senior Projects Faculty Board

This group serves as advisors, overseers, and helps to guide the teams through the overall process:

Joe Moening (Chair), David Baumann, Trevor Bryant, Jim Devaprasad, Robert Hildebrand, Jordan Huff, Jeff King, David Leach, Edo Sarda, and Masoud Zarepoor

Special thanks to Laura Bofinger

The School of Engineering & Technology comprises:

- Computer Engineering
- Mechanical Engineering
- Electrical Eng Technology
- Electrical Engineering
- Robotics Engineering
- Manufacturing Eng Technology

ROBOTICS ENGINEERING DEGREE

LAKE SUPERIOR STATE UNIVERSITY

LSSU.edu/Robotics

pngtree.com

Welcome to the School of Engineering & Technology

Presentation* / Demonstration Schedule

Team SMTS	*12:30* / 1:00 pm*	*CASET122*
Team CIRA	*1:00* / 1:30 pm*	*CASET124*
Team CRD	*1:30* / 2:00 pm*	*CASET125*
Team SOR	*2:00* / 2:30 pm*	*CASET124*
Team OTVS	*2:30* / 3:00 pm*	*CASET125*

****All presentations will be in CASET212***

Students will be available throughout the afternoon for questions and informal demonstrations.

For more information about LSSU's School of Engineering & Technology
www.lssu.edu/eng *or* 906-635-2207

LAKE SUPERIOR STATE UNIVERSITY

The School of Engineering & Technology

presents the

Class of 2019

Senior Design Project Presentations & Demonstrations

Friday • April 26, 2019
12:30 p.m. – 3:30 p.m.
in the
Center for Applied Science and Engineering Technology (CASET)

Superior Mobile Test Systems

Presentation: 12:30 pm | CASET212
Demonstration: 1:00 pm | CASET122

Team Members: Eric Farlow (MfgET), Luis F. de Valderrama (ME), Rick Miller (ME), Justin Portice (EET), Karl Schmidt (ME), Adam Shafer (ME), Jamis Shafer (ME)
Faculty Advisor: Dr. Masoud Zarepoor **Company:** Continental (Brimley, MI) **Industrial Contacts:** Dan Goodrich and Matt Tuhro

Project Description: SMTS has designed and built a vehicle development testing device for the Continental Air Supply unit (CAirS). CAirS is an integrated air suspension system that includes valve block, compressor, and control unit. The testing device uses real vehicle components with four air cylinders that replicate the vehicle's pneumatic spring system, to evaluate the functions of variable ride height and load compensation of CAirS, all while performing under real vehicle conditions of pressure, volume, and displacement. This testing device will allow Continental to develop and validate software and hardware for the CAirS without the need of a test vehicle.

Collaborative Industrial Robot Application

Presentation: 1:00 pm | CASET212
Demonstration: 1:30 pm | CASET124

Team Members: Alexander Elias (MfgET), Evan Reeves (ME), Trevor Simons (ME), Isaac Payne (MfgET), Reese Mayhew (EE), Brandon Niemi (EE)
Faculty Advisor: Jim Devaprasad **Sponsor:** LSSU (Sault Ste. Marie, MI) **Industrial Contacts:** Dr. Kimberly Muller and Dr. Joseph Moening

Project Description: Team Collaborative Industrial Robotic Applications (CIRA) utilized two collaborative robots to design and implement a robotics demonstration and training work cell. These FANUC CR-7iA/L robots offer new capabilities allowing human interaction with minimal safety precautions. The robots have been placed on a mobile cart that can either be used at LSSU for training purposes or transported to conventions. In addition to the mobile cart work cell design, Team CIRA has also completed the following: implementation of two end-of-arm tooling, mechanical and electrical assembly of the mobile cart, three labs, transportation requirements, user manuals, tutorials, and documentation. Two interactive demonstrations will be presented using a SCHUNK gripper and a Soft Robotics gripper.

Corning Robotic Development

Presentation: 1:30 pm | CASET212
Demonstration: 2:00 pm | CASET125

Team Members: Michael Pung (CE), Alec Leask(ME), Nathan Hudson(ME), Sarah Mathews (MfgET), Nathan Pim (MfgET) ,Jonathan Balogh (EE)
Faculty Advisor: Dr. Edoardo Sarda / Jeff King **Company:** Corning Inc. (Corning, NY) **Industrial Contacts:** Gail Dyer and Martin Ringelberg

Project Description: Working under the guidance of Lake Superior State University and Corning Inc. to design an automated solution for a quality control cell at the end of a catalytic converter filter line within Corning's facility. CRD's design concept will increase throughput, quality, and profitability, while reducing human interaction.

Superior Oscillation Research

Presentation: 2:00 pm | CASET212
Demonstration: 2:30 pm | CASET122

Team Members: Jacob Brendly (ME), Patrick Kelley (ME), Drake LaFleur (ME)
Faculty Advisors: Dr. Robert Hildebrand and Dr. David Baumann **Sponsor:** LSSU (Sault Ste. Marie, MI)

Project Description: Through new exploration and aging infrastructure, there is an ever increasing risk of oil spills or leaks into natural bodies of water, but presently there is no low-cost method to actively monitor for such events under ice cover. Therefore, a method of based on acoustic reverberation times under ice was investigated. Frequency bands below 90 kHz were being used in a scaled feasibility study of this method in a 6'x2'x2' tank with naturally-grown ice layers. Reflections from the walls were minimized via anechoic linings as to simulate natural expansive environments. Results of these experiments suggest the feasibility of using acoustic reverberation to detect both the ice layer from open water and oil under the ice.

Offline Tire Vision Systems

Presentation: 2:30 pm | CASET212
Demonstration: 3:00 pm | CASET125

Team Members: Jaron Rowe (ME), Kellan Korab (ME), Mateus Fonai (ME), Adam Palumbo (ME), Chandler Messer (EET), Trevor Trainor (EE)
Faculty Advisor: David Leach **Company:** Esys Automation (Auburn Hills, MI) **Industrial Contacts:** Mark Compton

Project Description: Team OTVS partnered with Esys Automation to develop an offline tire vision system. The system is capable of recording tire tread images used for product verification during automotive tire and rim assembly processes. The project required the team to develop a light weight, portable system that can record fully knit tire tread images using a line scan camera, while making the images available for upload to the Esys online tire inspection system. Images are obtained through synchronization of an integrated stepper motor and a line scan camera during tire rotation. The goal of the project is to strengthen Esys' tire inspection product line, while reducing assembly line downtime due to the development of master tire tread inspection images.