



## Engineering House Living & Learning Community

The Engineering House (Chippewa Hall) is one of several row houses on LSSU's campus which make up the

Living & Learning Communities. The Living Learning Communities provide students within the same academic goals with additional support and resources including faculty and opportunities to collaborate and learn with their peers. Each year, house members participate in an engineering project which they determine.

This year's group designed and built a 3D printer at a significantly lower cost than the currently owned 3D printer. The new machine will be used to print souvenirs for Robotics Summer Camps. Many avenues were explored to reduce the component and operating costs. Off-the-shelf components were used where possible, with the remainder machined by the students.

**Presentation:** 3:30 p.m., CASET 123

**Demonstration:** 4:00 p.m., CASET 310A

**The School of Engineering and Technology** comprises the following disciplines:

- Computer Engineering
- Electrical Engineering
- Electrical Engineering Technology
- Industrial Technology
- Manufacturing Engineering Technology
- Mechanical Engineering

All of the 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 multidisciplinary teams and use a composite of their technical and general education courses to successfully complete these projects.

The intention of the senior design project is to provide valuable engineering experience that will help students transition from academia to industry or graduate school. Each project requires a detailed technical engineering analysis, development and follow-through to provide a realistic experience for our graduates.

## Welcome to the Engineering Senior Project Presentations & Demonstrations

Presentations are held in CASET 123.

*Includes presentation and demonstration by the residents of the Engineering Living & Learning Community.*

### 1:30 p.m.

Presentation: Team RED

### 2:00 p.m.

Presentation: Team LAPD  
Demonstration: Team RED in CASET 122

### 2:30 p.m.

Presentation: Team ASE  
Demonstration: Team LAPD in CASET 124

### 3:00 p.m.

Presentation: Team LSTE  
Demonstration: Team ASE in CASET 125

### 3:30 p.m.

Presentation: Engineering House  
Demonstration: Team LSTE in CAS 124

### 4:00 p.m.

Demonstration: Engineering House in CASET 310A

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

*The Engineering House (Chippewa Hall) will be open for tours.*

### 2014-15 Senior Projects Faculty Board Members

This group serves as advisors, overseers, and guides to help the teams through their overall process:

David Baumann (chair), Robert Hildebrand, Jeff King, Jim Devaprasad, David McDonald, and Jon Coullard.

*Special thanks to  
Laura Bofinger and Jeanne Shibley*

*For more information about LSSU's School of Engineering & Technology, contact the office at 906-635-2207.*

## The School of Engineering & Technology

*presents the*

## Class of 2015 Senior Design Project Presentations & Demonstrations



Computer modeling plays a major role in many projects as teams design and develop parts and systems.

**Friday • May 1, 2015**

**1:30 p.m. - 4:00 p.m.**

**in the**

**Center for Applied Science  
and Engineering Technology**



AUTOMATED SIMULATION  
ENGINEERING (ASE)

**Project: Developing Advanced Robotics Simulation Processes Using ROBOGUIDE**

**Team Members:** Paul Fedirko, Jonathon Kelsey, Chris Maurer, Shell Stacey, and Miccah Szucs

**Faculty Advisor:** Prof. Jim Devaprasad

**Project Sponsor:** HIROTEC America  
Auburn Hills, Mich.

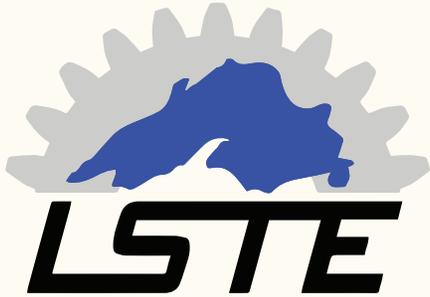
**Industrial Customer Contact:** Mr. Justin Hester

*Presentation:* 2:30 p.m., CASET 123

*Demonstration:* 3:00 p.m., CASET 125

Team ASE has designed a multipurpose robot hand and tutorial guides for the application of advanced program features in an industry-standard robotics simulation software called ROBOGUIDE. The robot hand is capable of picking up two types of automotive components from a bin. The features and applications explored in ROBOGUIDE for the tutorials includes machine vision capabilities, calibration, robotic path generation, and 3D bin picking. Simulation studies allows for the verification of robotics applications in the virtual world. Team ASE will demonstrate some of the advanced features in ROBOGUIDE using a FANUC LR Mate robot in the robotics lab at LSSU.

LAKE SUPERIOR TEST EQUIPMENT (LSTE)



**Project: Design and construct an impact test stand for prototype steering systems**

**Team Members:** Nathan Fishel, Kyle Gantz, Nick Letts, and Tim VerStrate

**Faculty Advisor:** Dr. Robert Hildebrand

**Project Sponsor:** Bosch Automotive Steering  
Northville, Mich.  
(formerly ZF Lenksysteme)

**Industrial Customer Contacts:** Mr. Rob Birbeck  
and Mr. Christian Karch

*Presentation:* 3:00 p.m., CASET 123

*Demonstration:* 3:30 p.m., CASET 124

Team LSTE developed an impact test stand for Bosch Automotive Steering (Bosch AS), which will be used in design validation of prototype steering systems. Bosch AS currently outsources this impact testing; the test stand will allow them to perform it in-house. The test stand can deliver a range of impact magnitudes to the steering system, hitting either the tie rod or the steering rack directly in either tensile or compressive modes. The test stand allows for the adjustment of tie rod angles to comply with various test requirements.



LASER ALIGNMENT AND POSITIONING DEVICES



LASER ALIGNMENT AND  
POSITIONING DEVICES (LAPD)

**Project: Design and build a laser measuring system**

**Team Members:** Patrick Davis, Ethan Hesselschwerdt, Andrew Jackson, and Timothy Sharum

**Faculty Advisor:** Prof. David McDonald

**Project Sponsor:** Mactech, Inc.  
Red Wing, Minn.

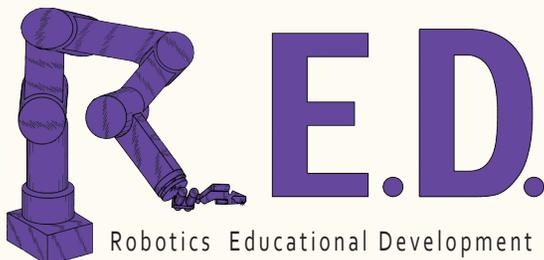
**Industrial Customer Contact:** Mr. Paul Ruhlach

*Presentation:* 2:00 p.m., CASET 123

*Demonstration:* 2:30 p.m., CASET 124

Team LAPD designed and built a laser measuring system for Mactech, Inc., that has a vision of incorporating precision measurement tools alongside its on-site services. It will be used to replace traditional dial indicators during the alignment process. The system will overcome several obstacles frequently encountered with traditional mechanical indicators, such as visibility, physical manipulation, and size constraints. The device will also be modular and wireless so that it can be attached to any machine desired by the operator, its linear adjustability will make it compatible with cylindrical objects of a given diametrical range, and will allow Mactech to observe surface quality before and after machining.

ROBOTICS EDUCATIONAL  
DEVELOPMENT (RED)



Robotics Educational Development

**Project: Fusing industrial robots with primary education**

**Team Members:** Brock Bigelow, Steven Essenberg, Thomas E. Doyle, Samantha Lies, and Walter Kurjiaka II

**Faculty Advisor:** Mr. Jeff King

**Project Sponsor:** QComp Technologies  
Appleton, Wisc.

**Industrial Customer Contacts:** Greg Whitney and  
John Schwan

*Presentation:* 1:30 p.m., CASET 123

*Demonstration:* 2:00 p.m., CASET 122

Team RED designed and built two robotic workcells using delta type robots suitable for use in an educational environment. The major goals of the project included design and build of the electrical and safety circuitry, programming of the robot, constructing the curriculum for a high school level, and completion of manuals.