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. Each year, house members participate in an engineering project which they determine. This year's project was to design and build a rapid prototyping (RP) machine (more commonly known as a 3D printer). This RP machine will greatly benefit the Product Development Center (PDC) and the School of Engineering & Technology by increasing their capability to produce solid objects of almost any three dimensional shape on campus. The machine uses off-the-shelf components wherever possible to reduce initial, maintenance, and operational costs. The structure is primarily composed of machined aluminum components providing a more rigid structure than those constructed from non-metallic materials. This additional rigidity reduces vibrations within the machine allowing for more accurate printing.

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.

Those students whose names are marked with an asterisk (*) completed a co-operative project. They were members of a team in the fall semester to gain teamwork experience.

Welcome to the Engineering Senior Project Presentations & Demonstrations

Presentations are held in CASET 212.

New this year: a presentation and demonstration by the residents of the Engineering Living & Learning Community.

1:00 p.m.
Presentation: Team NVHM

1:30 p.m.
Presentation: Team AIM
Demonstration: Team NVHM in CASET 119

2:00 p.m.
Presentation: Team HT
Demonstration: Team AIM in CASET 125

2:30 p.m.
Presentation: Team SVT
Demonstration: Team HT in CASET 125

3:00 p.m.
Presentation: Engineering House
Demonstration: Team SVT in CASET 124

3:30 p.m.
Demonstration: Engineering House in CASET 125

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

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

2012-13 Senior Projects Faculty Board Members

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

Jim Devaprasad (chair), Jon Coullard, Robert Hildebrand, Jeff King, David McDonald, Joe Moening and Paul Weber

Special thanks to Laura Bofinger

LAKE SUPERIOR STATE UNIVERSITY

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

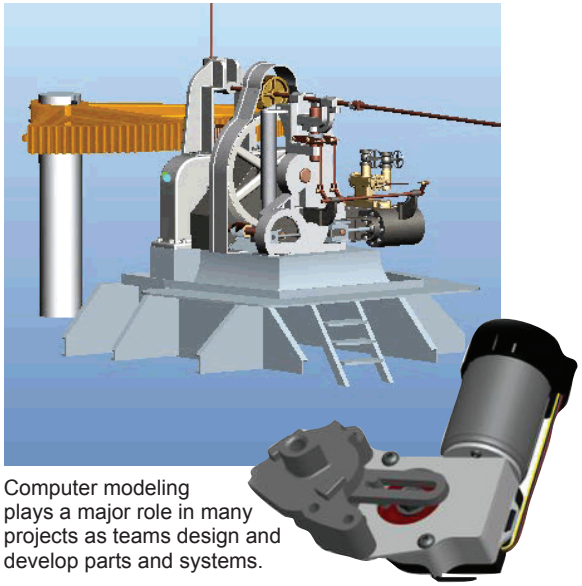
YouTube ***www.lssu.edu/eng***

LAKE SUPERIOR STATE UNIVERSITY

The School of Engineering & Technology

presents the

Class of 2013 Senior Design Project Presentations & Demonstrations



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

Friday • April 26, 2013
1:00 p.m. - 4:00 p.m.
in the
Center for Applied Science and Engineering Technology

Team: Automation in Motion (AIM)
Project: Robotics System Integration
Team Members: Joshua Bodell, Mike Brown, Erik Miller, and Jon Spencer*
Faculty Advisor: Prof. Jim Devaprasad
Project Sponsor: Applied Manufacturing Technology (AMT), Lake Orion, Mich. and LSSU Engineering
Engineering Support: Mr. Jason Markesino, AMT
Presentation: 1:30 p.m., CASET 212
Demonstration: 2:00 p.m., CASET 125

AUTOMATION IN MOTION

Team Automation in Motion (AIM) designed, constructed, and integrated a robotics workcell into the robotics lab of Lake Superior State University (LSSU), a leader in the training of undergraduate students in robotics engineering. The robotics workcell consists of four Fanuc Robots mounted on a rotary index table that is controlled by an Allen Bradley Programmable Logic Controller (PLC). The robotics workcell serves two purposes. First, the workcell is an educational platform that will be used to train future LSSU engineering students. Second, a solar array assembly demonstration was implemented, with the workcell, to showcase its operation. The different software used in the project included: RoboGuide, Karel Editor, Teach Pendant Programming, Creo, BootP/DHCP Server, RSLinx, Logix5000, and Factory Talk Studio Machine Edition.

Team: HelioTech (HT)
Project: Building Integrated Photovoltaic Window Module
Team Members: Benjamin Holbrook*, Brett Newill, Travis Pendell, Blaine Roushia, and Matthew Wagner
Faculty Advisors: Dr. Paul Weber and Dr. Joseph Moening
Project Sponsor: 3M, St. Paul, Minn.
Industrial Customer Contact: Mr. Tim Hebrink
Presentation: 2:00 p.m., CASET 212
Demonstration: 2:30 p.m., CASET 125

Team HelioTech

Team HelioTech (HT) designed, built, and tested a building integrated photovoltaic (BIPV) window module. BIPV refers to technology where solar cells are incorporated into the structure of a building. In this design, solar cells are placed between interior and exterior panes of glass, keeping the design compact and aesthetically pleasing. The BIPV window makes use of 3M Brand Prestige Window Film to reflect infrared (IR) light onto the solar cells while allowing visible light to pass through and into the building. This reflected IR light increases the amount of energy generated by the solar cells, thus increasing the solar cells' efficiency. At the same time, the reflected IR light does not enter the building, thus reducing the cost of air conditioning. The 3M Brand Prestige Window Film also absorbs ultraviolet light, thereby preventing it from entering the building where it can degrade materials.

Team: Noise Vibrations and Harshness Management (NVHM) Engineering
Project: Model Plant Noise & Design Noise Countermeasures
Team Members: Jacob Black, Joseph Douglas, and Jordan Verdelli
Faculty Advisor: Dr. Robert Hildebrand
Project Sponsor: Essar Steel Algoma, Sault Ste. Marie, Ont.
Industrial Customer Contact: Mr. Chris Janssen
Presentation: 1:00 p.m., CASET 212
Demonstration: 1:30 p.m., CASET 119

NVHM Engineering

Team Noise, Vibration, and Harshness Management (NVHM) developed alternative neighbourhood noise abatement concepts for the Essar Steel Algoma (ESA) plant in Sault Ste. Marie, Ont.

Presently, sound levels in certain residential areas near the plant are in excess of Provincial Ministry of Environment publication NPC-205 limits. NVHM undertook field measurements to identify and rank major sound contributors, and characterize their spectral content. NVHM then developed a ray-acoustics simulation model of the plant and surroundings in the LMS software, and used this to assess proposed noise reduction concepts. Based on the model, NVHM proposed a sound reducing edge treatment to enhance the plant boundary noise wall; this is projected to bring the external (residential) noise to within the Provincial limits. It also suggests the possibility of a new wall just outside of ESA's Gas Cleaning Plant, which will reduce on-site noise levels, and provide further reductions to the neighborhood noise levels

Team: Superior Vehicle Testing (SVT)
Project: Vehicle Dynamometer Testing Systems
Team Members: Tara Bioty, Christopher Dalpra, Kirk Harris, and Dennis Ross*
Faculty Advisor: Prof. David McDonald
Project Sponsor: LSSU Engineering
Industrial Customer Contact: Dr. Robert Hildebrand
Presentation: 2:30 p.m., CASET 212
Demonstration: 3:00 p.m., CASET 124

SVT

Vehicle Dynamometer Testing Systems are widely used in the design, building, and maintenance of all types of vehicles. Team SVT designed, and built a small scale, bench-top dynamometer system for use in LSSU's vehicle systems courses. The system operates in a similar manor as a full scale dynamometer, including torque and speed control and measurement via a computer-based data acquisition system.

Team SVT also made significant safety and functionality upgrades to the LSSU chassis dynamometer system. The upgrades focused on the redesign and implementation of several safety systems as well as significant upgrades to the real-time instrumentation, data-acquisition, and data analysis features.