



## ROCK ROVER DESIGN & DEVELOPMENT

**Project:** Mars Land Rover

**Team Members:** Joe Betcher, Dale Burnham, Bob Hemeleski, Jonathan Lane, and Mark Stumpo

**Faculty Advisor:** Dr. Robert Hildebrand

**Project Sponsor:** Lake Superior State University

**Industrial Customer Contact:** Dr. Wael Mokhtar

**Presentation:** 2:30 p.m., CASET 212

**Demonstration:** 3:00 p.m., CASET 122

Team R2D2 designed, developed, fabricated, assembled and tested an omni-directional rover to compete at the 2009 American Society of Mechanical Engineers (ASME) Student Professional Development Conference for District B in Dayton, Ohio. Team R2D2 placed second overall in the Student Design Competition, advancing themselves to the international student design competition in Lake Buena Vista, Fla.

The competition consists of a course with three obstacles of varying height and width. The rover has four minutes to navigate the course, surmount or navigate the obstacles, retrieve seven strategically-positioned rock samples and place them in a designated target area. R2D2's rover design focuses on quick and accurate pick-up and placement of the rock samples.

It will be used to promote technical learning skills and unique design-and-development prototypes at Lake Superior State University in addition to the exposure the university will receive when the team competes at the International Mechanical Engineering Congress & Exposition's student design competition in November.

### 2008-09 Senior Projects Faculty Board Members

*This group serve as advisors, overseers, and guides to help the teams through their overall processes:*

Eric Becks, Jon Coullard, Ron DeLap,  
Jim Devaprasad (chair), Robert Hildebrand,  
Andrew Jones, Jeff King, David Leach,  
David McDonald, and Wael Mokhtar

*Special thanks to Cheri "Mom" Skinner*

## Welcome to the Engineering Senior Project Presentations & Demonstrations

*Presentations are held in CASET 212*

1:00 p.m. IMTD presents / demo 1:30 p.m., CASET 119  
1:30 p.m. FT presents / demo 2:00 p.m., CASET 125  
2:00 p.m. RTI presents / demo 2:30 p.m., CASET 122  
2:30 p.m. R2D2 presents / demo 3:00 p.m., CASET 122  
3:00 p.m. SPD presents / demo 3:30 p.m., CASET 119  
3:30 p.m. GLDS presents / demo 4:00 p.m., CASET 124  
4:00 p.m. ICE presents / demo 4:30 p.m., CASET 203

The Department of Engineering and Technology is comprised of the following disciplines:

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

All of the senior engineering and technology students at Lake Superior State University 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 the team members transition well 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.

Students work with timelines, monetary and management issues, communication, teamwork, paperwork, and logistics within their teams. In addition, they handle guidelines, design reviews, development and production issues, purchasing, changing project definitions, and lessons learned as they work with their faculty advisors and industrial customers.



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

*or visit us online at  
[engineering.lssu.edu](http://engineering.lssu.edu)*



## The Department of Engineering & Technology

*presents the*

## Class of 2009 Senior Design Project Presentations & Demonstrations



Friday • May 1, 2009

1:00 p.m. - 5:00 p.m.

in the

Center for Applied Science  
and Engineering Technology

## FLUID-TECH



### Project:

Process Measurement Device

**Team Members:** Kris Decker,

Peter MacNamara, Jonathan Pasiak, Aaron Wallace

**Faculty Advisor:** Dr. Ron DeLap

**Project Sponsor:** Lake Superior State University  
Prototype Development Center

**Industrial Customer Contact:** Mr. Don Stephanic

*Presentation:* 1:30 p.m., CASET 212

*Demonstration:* 2:00 p.m., CASET 125

The project focused on the design and build of an in-line prototype device to be used by industrial facilities to monitor the quality of cooling and lubricating fluids. Several properties of the fluid are measured such as temperature and contamination levels. The resulting data is collected, analyzed, and stored. The device incorporates a human interface using a liquid crystal display with push button inputs. Data is accessible through an Ethernet port, a USB connection or a secure digital card.



INNOVATIVE  
MEDICAL  
TRAINING  
DEVICES

**Project:** Dynamic Flow Phantom

**Team Members:** Jay Bergeron, Robert Camp,  
Natasha Flynn, Lance Rood, and Michael Zavislak

**Faculty Advisor:** Dr. Wael Mokhtar

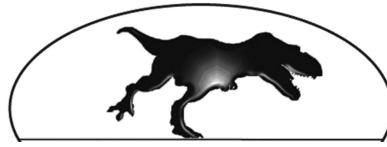
**Project Sponsor:** Cardiovascular Research Institute  
of Albuquerque

**Industrial Customer Contact:** Dr. George Chandran

*Presentation:* 1:00 p.m., CASET 212

*Demonstration:* 1:30 p.m., CASET 119

The team designed and built a prototype of an ultrasound scanable device, known as a dynamic flow phantom. The phantom will be used to aid in the training of future ultrasound technologists. It accurately simulates a variety of arterial blockages along with a range of flow characteristics. The system involves several different settings which closely imitate human blood flow and tissue characteristics. Team IMTD's prototype will be used to substantiate Dr. George Chandran's intellectual patent. Ms. Flynn recently attended the ASME Student Conference in Dayton, Ohio and took second place for IMTD's poster.



## GREAT LAKES DYNO SYSTEMS

**Project:** Vehicle Dynamometer Testing System

**Team Members:** Vaughn Alexander, Greg Edwards,  
Jon Konieczny, Roger Mathes, Dominic Moreau,  
and Dave Stiles

**Faculty Advisor:** Prof. David McDonald

**Project Sponsor:** Lake Superior State University

**Industrial Customer Contact:** Dr. Robert Hildebrand

**Donors & Technical Advisors:** Revolutionary  
Engineering, owned by LSSU Alums Dan ('92) and  
Allen White ('95), and engineer Matt Slaght ('07)

*Presentation:* 3:30 p.m., CASET 212

*Demonstration:* 4:00 p.m., CASET 124

The main objective was to create an instructional test cell for evaluating automobile performance to be used by the vehicle systems option students. The test cell controls a dynamometer via computer to record the torque, speed and horsepower of a vehicle. Team GLDS refurbished the system and restraints, and developed the safety systems. Additional instrumentation may be interfaced with the work cell to measure the vehicle's emissions and vibrations in a controlled environment. The dynamometer and test cell are unique to this region and can serve to benefit the community.



**Project:** Mini-Baja race vehicle

**Team Members:** William Carolan, Inna Chakarova,  
Jon Chibnall, Joel Diemer, and Greg Voeks

**Faculty Advisor:** Mr. Jon Coullard

**Project Sponsor:** Lake Superior State University

**Industrial Customer Contact:** Mr. Morrie Walworth

*Presentation:* 2:00 p.m., CASET 212

*Demonstration:* 2:30 p.m., CASET 122

Team RTI designed and built a vehicle to compete and survive the punishment and rough terrain at the 2009 Society of Automotive Engineers (SAE) mini Baja races. The team dealt with issues of design, fabrication and testing in addition to fund raising to be able to participate in the Portland, Ore. competition in early May.



## IRON-HORSE COUPLER ENGINEERING

**Project:** Remote Train Coupler System

**Team Members:** Andrew Athanasopoulos, Patrick Chin,  
Jacob Christensen, Erik McClain and Jordan Meyer

**Faculty Advisor:** Dr. Andrew Jones

**Project Sponsor:** Lake Superior State University

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

*Presentation:* 4:00 p.m., CASET 212

*Demonstration:* 4:30 p.m., CASET 203

Team ICE designed and built a remote-controlled train coupler system for 'O' scale model railroads with unique features not found in other systems. The design is closer to scale than current couplers and provides wireless control, computer connectivity via USB, and remote coupler activation at any track location. The innovation could revolutionize model railroading lead to procurement of patent rights for LSSU.



## SUPERIOR PROTOTYPE DEVELOPMENT

**Team Members:** Mark Morse, Adam Smith

**Faculty Advisors:** Dr. Ron DeLap

**Project Sponsor:** LSSU Prototype Development Center

**Industrial Customer Contacts:** Eric Becks & David Leach

*Presentation:* 3:00 p.m., CASET 212

*Demonstration:* 3:30 p.m., CASET 119

The team worked in a close relationship with Lake Superior State University's newly created Prototype Development Center in an effort to bring the ideas and concepts of area businesses and entrepreneurs to reality. Many of the projects within the PDC are either recently patented or under patent pending status. The team strove to accurately represent the visions of their customers and produce prototypes that were of high quality, technically sound, and practical in terms of potential future production. Each project had its own requirements, challenges and timelines that had to be met to satisfy the customer.