



COLLEGE OF ENGINEERING
THE UNIVERSITY OF TOLEDO

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UNDERGRADUATE RESEARCH AND
SENIOR DESIGN ENGINEERING PROJECT EXPOSITION

THE UNIVERSITY OF TOLEDO
COLLEGE OF ENGINEERING
FRIDAY, DEC. 9, 2011





YOU ARE CORDIALLY INVITED
TO ATTEND THE SENIOR
DESIGN EXPOSITION:



COLLEGE OF ENGINEERING
THE UNIVERSITY OF TOLEDO

FRIDAY, DEC. 9, 2011
NITSCHKE HALL
DESIGN EXPO NOON-3 P.M.
ON THE MAIN CAMPUS OF
THE UNIVERSITY OF TOLEDO

The College of Engineering sponsors the exposition to showcase design projects created by graduating seniors from the departments of Bioengineering, Chemical and Environmental Engineering, Civil Engineering, Electrical Engineering and Computer Science, Engineering Technology and Mechanical, Industrial and Manufacturing Engineering. *(Please contact the individual departments regarding formal presentation times. Bioengineering projects displayed at the Spring Semester Exposition, April 27, 2012)*

As part of the required senior design/capstone project, students form business-consulting units to develop a solution for a client's technical/business challenge. Businesses, industries and federal agencies sponsor these projects.

The exposition is free and open to the public. No reservations are necessary. You are welcome to attend all or part of the day's events. High school and community college teachers are invited to bring their students to the exposition. Parking is available on the engineering complex and parking permits are not required on this day.

For more information on the exposition call 419.530.8014 or e-mail ssewart@eng.utoledo.edu

For more information on the academic programs offered in the college or to schedule a tour of the college, please call 419.530.8040 or email jpawleck@eng.utoledo.edu

THE UNIVERSITY OF TOLEDO
COLLEGE OF ENGINEERING

Nagi G. Naganathan, Ph.D.
Dean and Professor

DEPARTMENT OF BIOENGINEERING

Arunan Nadarajah, Ph.D.
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Associate Professor and Instructor of Senior Design

DEPARTMENT OF MECHANICAL, INDUSTRIAL AND MANUFACTURING ENGINEERING

Abdollah A. Afjeh, Ph.D., P.E.
Professor and Chairman

Matthew Franchetti, Ph.D., P.E.
Assistant Professor and Instructor of Senior Design

CHEMICAL AND ENVIRONMENTAL ENGINEERING

DR. CONNIE SCHALL

SENIOR DESIGN FACULTY COURSE COORDINATOR

Hydrogen Production

Faculty Adviser: Dr. Connie Schall

Client Advisers/Sponsors: Mr. John Repasky, Air Products

Names of Students: Chinonso Agubosim, Joshua Anders, Allison Baldi, Brett Edwards, Kriyan Gounden, Evan Graham, David Grouls, Nathaniel Gyorgak, Joshua Holtz, Daved Jajou, Brian Johnson, Trent Logan, Eric McDaniel, Hassan Moreer, Alison Moscarillo, Renae Noffsinger, Isha Patel, Catherine Pompeani, Kristopher Richardson, Daniel Runk, Clayton Salisbury, David Saric, Juli Smith, Megan Smith, Shawn Smith, John Szczucinski, Jeffrey Truman, Steve Vrabel, Scott Wedding, Jacob Welly, and Heather Wilk

Students designed a hydrogen production facility based on steam-methane reforming technology to supply 100 MMscfd of hydrogen annually. This large amount of hydrogen warrants a new facility. Teams synthesized and evaluated potential process options, then optimized a final choice to provide the highest return on investment. The final design included all the necessary process equipment within battery limits, with evaluation of capital and operating costs and revenues.

Process Design and Optimization of Agricultural Animal Wastes Conversion into Biofuels

Faculty Adviser: Drs. Dong-Shik Kim and Steven LeBlanc

Client Advisers/Sponsors: The U.S. Environmental Protection Agency

Names of Students: Robert Bartok, Daniel Biehle, Jim Burtnett-Grigsby, Joshua Eldridge, Alex Henry, Kelly Irving, Robert Jones, Rachael Lautzenheiser, Alison Moscarillo, Daniel Runk, Greg Samek and Melissa Seedorf.

Run-off and water seepage from agricultural and dairy animal wastes in lagoons and fields pose serious impacts on drinking water sources. Students designed a facility for conversion of animal wastes into manure-based bio-solids that can be used as a fuel in coal-fired power plants. Manure is combined with waste lime in an innovative process that uses the heat of chemical reaction to reduce the moisture content of the bio-solids. The design includes a process for effective drying, VOC (volatile organic compounds) removal for an odor-free process and heat integration. Economic analyses included capital costs, operating costs, revenue, maintenance cost and return period.

CIVIL ENGINEERING

DR. CYNDEE L. GRUDEN

SENIOR DESIGN FACULTY COURSE COORDINATOR

Academic Village Bridge Project

*Faculty Advisers: Dr. Brian W. Randolph P.E., and
Dr. Cyndee L. Gruden, P.E.*

Client Advisers/Sponsors: Dr. Thomas E. Barden

Students: Justin Bergman, Mitch Bohman, Jacob Cox, Ryan Lefeld,
Zane Salhi and Nathan Wuebker

The group designed a bridge to connect Sullivan Hall to the Academic House on UT's Main Campus to create a better living/learning environment for students by providing more lounge and study space, while maintaining the existing architectural beauty of this part of campus.

Engineers Without Borders Cable-Stayed Bridge

Faculty Adviser: Dr. Andrew Heydinger, P.E.

Client: Engineers Without Borders

Technical Adviser: Mr. Neo Hadjichalarambous, P.E., S.E.

Students: Greg Grajczyk, Ben Griffis, Kevin Opalach,
Adam Schumacher, Alex Sieler and Tyler Smith

The group designed a cable-suspended pedestrian bridge for the Village of Los Sanchez in Honduras so that the residents can have safe road access throughout the year.

Rainwater Harvesting at The University of Toledo

Faculty Adviser: Dr. Defne Apul

Client Advisers: Dr. Defne Apul and Mr. Michael Green

Students: Brian Bachler, Arron Barthelme, Erik Dickinson,
Derek Haury, Eric Koch and Craig Miller

The group worked on designing a solution for the existing rainwater collection tank at the Nitschke Technology Commercialization Complex. They also researched other buildings on campus for rainwater harvesting feasibility, including investigating innovative rainwater harvesting techniques and living walls.

Truss Bridge Pin Testing

*Faculty Adviser: Dr. Douglas K. Nims, P.E., and
Dr. Cyndee L. Gruden, P.E.*

Client Advisers/Sponsors: Mike Loeffler, ODOT

Students: Allan Domalski and Robert Duling

The team devised a procedure for non-destructive testing of truss bridge pins using phased array ultrasonic technology to increase the safety and accuracy of bridge inspection in Ohio.

UT Main Campus Storm Water East

Faculty Adviser: Dr. Cyndee L. Gruden, P.E.

Client Advisers/Sponsors: Dr. Patrick Lawrence

Students: Ashley Frey, Thomas Hasson, Brandon Heaney,
Tara Nemcik and Christopher Wancata

The group worked on short-term in-situ storm water treatment alternatives as well as long-term storm water reduction on the east side of the UT's Main Campus.

CIVIL ENGINEERING

DR. CYNDEE L. GRUDEN

SENIOR DESIGN FACULTY COURSE COORDINATOR

UT Main Campus Storm Water West

Faculty Adviser: Dr. Cyndee Gruden, P.E.

Client Advisers/Sponsors: Dr. Patrick Lawrence

Students: Brad Brocker, Giovanni Furio, Andrew Hodges, Clinton Kuenzli and Joseph Simeone

The team found a solution to eliminate a continuous discharge near the bridge by the UT Center for Performing Arts Bridge. They also have alternatives for storm water treatment and mitigation on the west side of UT's main campus.

Westwood Corridor Improvement Study

Faculty Advisers: Dr. Eddie Yein Juin Chou, P.E., Dr. Cyndee L. Gruden P.E., and Dr. Nicholas V. Kissoff, P.E.

Client Advisers/Sponsors: Mr. Don O'Connor, City of Toledo, and Mr. Doug Collins, The University of Toledo

Students: Rachel Beres, Natalie Czech, Jude DeLoye, Brad Kahn, Jad Rahal and Cassie Steinberger

The group evaluated upgrades to the Westwood Avenue corridor near the College of Engineering including pavement design, traffic calming solutions, complete street integration, drainage analyses, and an intersection modification study, which will be proposed to the City of Toledo to be implemented in a full reconstruction project next year.

ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

DR. WENG L. KANG AND DR. GURSEL SERPEN

SENIOR DESIGN FACULTY COURSE COORDINATORS

ARBD “Awesome Refreshable Braille Display”

Faculty Adviser: Prof. Brent Nowlin

Students: Miguel Dominguez, Heath Cazeau, Victor Gelaschi and Phillip Fraysier

The team developed a refreshable, tactile Braille display to allow a visually impaired computer user to successfully complete simple tasks such as navigation of a desktop environment using only the display for feedback. The architecture will be a pipeline with the computer sending feedback via software to a field-programmable gate array, where the data is converted into Braille format and pushed to the display.

Auto(nomous) - Bot

Faculty Adviser: Prof. Brent Nowlin

Students: Michael Bacskay, Ryan Kuchenmeister and Matthew Austin

Using the hardware and software knowledge they've acquired through their coursework, the group created a robot that can be controlled remotely or autonomously navigate through a maze.

Incorporating Green Energy into Exercise Equipment

Faculty Adviser: Dr. Roger King

Faculty Adviser: Dr. Roger King

Students: Darrin Buenger, Jacob Newcomer, Adam Schwab and Matthew Spies

The team constructed a stationary bicycle that sends power back onto the power grid to deduct from energy costs.

ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

DR. WENG L. KANG AND DR. GURSEL SERPEN
SENIOR DESIGN FACULTY COURSE COORDINATORS

UTTweet

Faculty Adviser: Dr. Jackson Carvalho

Client Advisers/Sponsors: Mr. Justin Ballard

Students: Adam Berger, Daniel Sexton and Cameron Sulfaro

The group created an application interfaced with Twitter to inform students and faculty when and where their classes are located on UT's campus. UTTweet will provide this functionality that users are looking for, as opposed the University's multi-step process of logging in and clicking through several portals to get this information displayed to them.

Modular Special Needs Mentor

Faculty Adviser: Dr. Gerald Heuring

Students: William Maul, Michelle Stewart and Anthony Woronec

The team created the Modular Special Needs Mentor, a Web-based application driven by an object-oriented database. Parents, teachers and therapists can upload a series of images with corresponding titles, so children can learn the objects' names. When a child enters the program, they will be able to choose what topic they wish to study and will be asked questions to aid learning according to the principles of Applied Behavior Analysis (ABA).

Decentralized Web Caching System

Faculty Adviser: Dr. Junghwan Kim

Client Advisers/Sponsors: Mr. Emmanuel Victor Helb

Students: Michael Grube, Dustin Buckenmeyer, Calvin Robinson, Sebastian Woodland and Michael Neu

This project enhances the ability of a network to make use of a limited Internet connection by allowing computers on that network to store and share popular material for future reference.

Solar Powered Battery Charger

Faculty Advisers: Dr. Roger King and Dr. Rashmi Jha

Students: Scott Gibbons, Jasmine Thombre, Eric Kiel, Suzane Saad

The team created a lead-acid battery charge controller for an off-grid solar system dedicated to providing reading light each night for several days of autonomous (zero sun) operation. The charge controller implements maximum power point tracking, three-mode charging and measures battery temperature to adjust charging voltages and improve battery life.

The USBiker

Faculty Advisers: Dr. Richard Molyet and Dr. Roger King

Students: Alexandria Caliguire, Ory Shoemaker, David Taveras and Daniel Wilczynski

The group constructed an attachment that converts a bike's movement into electrical energy, which will be used to charge a battery to power a local USB port and safety light system (even if the bike is no longer in motion).

Remotely Controlled Radar and IR Monitoring System for Avian Wildlife

Faculty Adviser: Dr. Mohsin M. Jamali

Students: Ahmad M. Ghannam, Joseph Pietrykowski, Tyler Rodwancy, Bradley Hemmelgarn and Ryan Schwieterman

The team redesigned an existing X-band radar and IR camera system so it can be used for avian wildlife research near in wind turbines and airport runways. A remotely controlled motor has been added to rotate the radar so it can get a full view of the sky. The IR camera subsystem has been developed to be remotely controlled and rotating in four directions (N, S, E, W) via joystick and under software control.

ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

DR. WENG L. KANG AND DR. GURSEL SERPEN
SENIOR DESIGN FACULTY COURSE COORDINATORS

Engine Control Unit/Engine Management System

Faculty Adviser: Dr. Richard Molyet

Client Advisers/Sponsors: Accelerant Technologies

Students: Eric Doucet, Phillip Henzler, Paul Hopkins and Chris Woggon

The group redesigned an engine control unit/engine management system for a Ford four-cylinder engine. They used an engine dyno to take initial readings on the existing ECU and final readings on the redesigned ECU and control system.

Solar-Powered Salt Water Purification

Faculty Adviser: Dr. Daniel Georgiev, Dr. Rick Molyet and Dr. Glenn Lipscomb

Students: Bill Heilman, Ian Jensen, David Goodrich and Alex Track

The group created a solar-powered device for purifying saltwater through electro-dialysis. The end product is a clean energy device for generating fresh water

Wireless Telemetry for a Race Car

Faculty Adviser: Dr. Devinder Kaur

Client Advisers/Sponsors: Rocket Motorsports

Students: Andrew Pasternak, Shazad Bakhsh and Ashraf Younes

The students designed a system to allow engineers to be wirelessly connected to their cars while they are being tested and raced. The wireless telemetry system will be built for and tested on UT's Formula SAE car, and it can be applied to other vehicles. The benefits of the system are to maximize the productivity of testing time and to take the job of monitoring gauges away from the driver, increasing driver consistency and safety.

Theft Phone App for the Ohio Bureau of Motor Vehicles

Faculty Adviser: Dr. Henry Ledgard

Client Advisers/Sponsors: Ohio Bureau of Motor Vehicles

Students: Alex Walch, Zachariah Whitesel, Douglas Hutson, Ammar Abu-Yasein and Junguo Li

The group designed a service/phone application to store information on various experts' specific skills/quality of service, to help them solve a task. There are four main types of members: a standard member, an administrator, an expert and an advertiser. Each member will have their own specific login interface and will then be able to search for a certain type of expert in order to find out how they are rated, contact information and their working location.

DEPARTMENT OF ENGINEERING TECHNOLOGY

PROFESSOR NORMAN KOENIGSEKER
SENIOR DESIGN FACULTY COURSE COORDINATOR

Solar Driven SSL (Solid State Lighting)

Client Advisers/Sponsors: Mr. Ed Yager, Polaris Career Center,
Green Rock Lighting

Students: Nick Purpera (EET) and Donald Vath (EET)

Using photovoltaic cells and high efficiency LED (light emitting diode) arrays, the team created an independent DC power grid for alternative energy lighting solutions. This stand-alone illumination system can be scaled to serve various types of commercial and residential structures to greatly reduce energy consumption and save money with a quick return on investment.

Server Surveillance

Faculty Adviser: Dr. William Acosta

Students: Sumit Patel (CSET), Tyler Robertson (CSET),
Rashad Sebai (IT) and Andrew Stelzer (CSET)

This Android and Web-based application allows users to monitor the status of their server(s) from any location, presents real-time data in a visual form, and displays alerts via e-mail/text messaging. If problems arise, alerts are displayed within the application, and an e-mail/text message is sent to IT personnel to address the issue.

Tire Grinding Crew Chief

Faculty Adviser: Professor Dale Simon

Client Advisers/Sponsors: Brown Industrial

Students: Jason Damschroder (MET), Jason Edwards (MET)
and Andrew Seger (MET)

The team developed an automated tire-grinding machine that resurfaces dirt race car tires.

Combined Wind and Solar System Application for Street Lights

*Faculty Adviser: Dr. Ahmad Farhoud, Dr. Ted Evans and
Professor Dale Simon*

Students: Nawwaf Althineyan (MET), Meida Chen (CET), Xing Huang (CET),
Knot Likitkumchorn (MET) and Simon Zhu (EET)

The group built a combined wind and solar power system to charge two 12-volt lead acid batteries that will then power a street light.

Automated Road Repair (ARR)

Faculty Adviser: Professor Dale Simon

Client Advisers/Sponsors: The Andersons Inc.

Students: Bryan Buck (MET), Nathan Frey (EET), Jeremy Geib (CET),
Ryan Ohneck (MET) and Chad Taylor (MET)

Students designed the ARR, a one-person machine that will quickly fill the potholes, reducing the costs of road repair and the amount of damage to vehicles. It also helps reduce the material wasted by accurately filling the pothole with asphalt and pressing the asphalt to conform to the road.

Medina County Bridge Project

Faculty Adviser: Professor Linda Beall

Client Advisers/Sponsors: Mr. Ryan Marthey, P.E.,
Medina County Engineer's Office

Students: Randy Blackmore (CET), Jim Goss (CET),
Matthew Kwiecien (CET) and Caleb Westfall (CET)

The team reevaluated the design and construction processes for the replacement of bridges in Medina County to be something that is affordable, efficient and environmentally friendly. The bridge chosen for this project is in Hinckley, Ohio, located south of the Hinckley Reservation on Bellus Road.

DEPARTMENT OF ENGINEERING TECHNOLOGY

PROFESSOR NORMAN KOENIGSEKER
SENIOR DESIGN FACULTY COURSE COORDINATOR

Portable Proximity Warning System

Client Advisers/Sponsors: Mr. Timothy Bolbach, P.E., Master Controls Engineer, SSOE Group; Mennel Milling Company

Students: Jordan Bolbach (CSET), Manaly Sheth (CSET) and Emily Wahl (EET)

This portable device utilizes an optical sensor to detect motion in an area and visually warns a pedestrian using high intensity LEDs. The purpose of this system is to eliminate pedestrian accidents caused by poor visual conditions, such as a blind corner or an obstructed view.

Door Width Adjustment System, Auto-Width Adjustment System for Machining Center

Client Advisers/Sponsors: Mr. Tim Morris (Electrical), Mr. Brad Hickman (CNC), Mr. Shaun Christ (Chemical), and Mr. Andrew Burns (Mechanical), Therma-Tru Doors

Students: Chad Montgomery (MET) and Hassan Yaghi (MET)

This team designed an automated system to adjust machining centers to the width of product coming into the product lines to reduce downtime and scrap costs and eliminate human interference from the assembly lines.

Movie Making Web Application Made Simple

Faculty Adviser: Dr. James Kamm, Dr. Hong Wang

Client Advisers/Sponsors: T. J. Irwin Photography

Students: Thomas Blazek (CSET), Adam Brubaker (CSET), Adam LaBrecque (CSET), Chimtein Patel (CSET) and Dhaval Patel (CSET)

This group created intuitive and simple movie-editing software for commercial and private use. Photography businesses can utilize this software on their Web sites or through a kiosk at their place of business. Privately, customers may use the service found on the Web site through the comfort of their home.

Light Emitting Diode Replacement Kit for High Intensity Discharge Lamps

Faculty Adviser: Dr. Ahmad Farhoud

Client Advisers/Sponsors: Mr. Michael Green, Mr. Christopher Hoy and Mr. John Jaegly, The University of Toledo

Students: Nathan Blodgett (EET) and Merl Creps (CSET)

The students made a cost-efficient, environmentally friendly light-emitting diode (LED) replacement kit for High Intensity Discharge (HID) halogen industrial lights. The LED replacement kit will contain the necessary components and wiring schematics to allow individuals to modify current HID units.

Recumbent Leaning Tricycle

Faculty Adviser: Professor Richard Springman

Client Advisers/Sponsors: Alro Steel, Opening Night

Students: Tim Dvorak (MET), Brian Loeffler (MET) and Santiago Valdivia (MET)

This team designed, built and tested a recumbent tricycle with the capabilities to lean while maneuvering. The tricycle has an ergonomic position to minimize stress and strain on the rider while incorporating the static stability of a three-wheeler with the mobility of a bicycle. The tricycle design accommodates people with disabilities that currently prevent them from riding traditional bicycles.

DEPARTMENT OF MECHANICAL, INDUSTRIAL AND MANUFACTURING ENGINEERING

DR. MATTHEW FRANCHETTI

SENIOR DESIGN FACULTY COURSE COORDINATOR

Gurney Mattress Redesign

Advisers: Dr. Mohamed Samir Hefzy and Dr. Mehdi Pourazady

**Client Adviser/Sponsor: Dr. Gregory Nemunaitis, MetroHealth;
National Science Foundation**

Students: Timothy Brakefield, Andrew Meehan
and Thomas Burkhardt

The purpose of this project was to redesign a transport gurney
mattress to reduce the likelihood of pressure ulcers.

Development of an Envelope Packaging Robot

Faculty Adviser: Dr. Hongyan Zhang

Client Adviser/Sponsor: Envelope Mart USA

Students: Nathan Gerber, Alexander Vasko, Jordan Schutt,
Andrew Foltz and Luke Fetterman (EE)

This team designed, tested and built an envelope-loading robot to
completely automate a specific multistep manufacturing process at an
envelope production facility. This design leveraged the integration of
a Programmable Logic Controller (PLC) network to control a machine
in the compressing, flipping and loading of a specific number of
envelopes into an existing container in the required orientation.

Development and Design of Brackets and Guards for Diamond Concrete Saws

Faculty Adviser: Dr. Lesley Berhan

**Faculty Adviser/Sponsor: Mr. Skip Aston, Concrete Sawing & Drilling
Association**

Student Names: Michael Schroeder, Kyle Kozinski and
Kyle Pfeffenberger

This team redesigned a concrete saw guard to decrease weight,
increase accessibility and retain current coolant fluid jetting.

Development of an Assistive Device for Golf Practice

*Faculty Advisers: Dr. Mohamed Samir Hefzy and
Dr. Mehdi Pourazady*

**Client Adviser/Sponsor: The Ability Center of Greater Toledo and National
Science Foundation**

Student Names: Craig Hornsby, Paul Long and Elena Brothers

The team designed a portable device to train golfers of all abilities to
swing a golf club correctly in order to drive a golf ball.

Modified Athletic Assistance Chair

Faculty Adviser: Dr. Mohamed Samir Hefzy and Dr. Mehdi Pourazady

**Client Adviser/Sponsor: The Ability Center of Greater Toledo and National
Science Foundation**

Student Names: Ryan Brickner, Kenneth Watson, Alexander Jacobs and
Nathan Overholt

The team made a modified athletic chair for a discus paralympian.
The chair can rise from a loading height of 22" to a throwing height
of 29".

Motorized Storage Shelf

*Faculty Advisers: Dr. Mohamed Samir Hefzy and
Dr. Mehdi Pourazady*

**Client Adviser/Sponsor: The Ability Center of Greater Toledo
and National Science Foundation**

Students: Ray Weidinger, Alan Pleiman (EE), Jarrad Hipsher (EE),
Youssef Botros and Shaun Voress

The group designed a motorized shelf unit to store kitchen items,
such as groceries and dinnerware, for a couple to be able to retrieve
needed items from the wheelchair position. This mobile concept
allows items to be stored at various heights and retrieved as needed
from the wheelchair position.

**DEPARTMENT OF MECHANICAL, INDUSTRIAL
AND MANUFACTURING ENGINEERING**

DR. MATTHEW FRANCHETTI

SENIOR DESIGN FACULTY COURSE COORDINATOR

Book Binding Removal Process

Faculty Adviser: Dr. Yong Gan

Client Adviser/Sponsor: Mr. Gary Floor, Lott Industries

Students: Andrew Balduf, John Fuller and Sam Rowley

This group automated the binding and cover removal process for book recycling and increased efficiency by 50 percent.

**Developing a Geothermal Heating System
for a Greenhouse**

Faculty Adviser: Dr. Douglas Oliver

Client Adviser/Sponsor: Dr. Julian Davies, University Church

Students: Jason Augsburger, Nicholas Salenbien and
Craig Carson

This group designed a low cost, environmentally friendly heating system for the University Church's two new greenhouses so that crops can be grown all year, even in the winter months.

**Development of a Test Rig to Measure the
Anti-icing Capabilities on a Wind Turbine
Generator**

Faculty Adviser: Dr. Cyril Masiulaniec

**Client Adviser/Sponsor: The University of Toledo, Department of Energy (DOE)
and Nordic Windpower**

Students: David Whitacre, Jeffrey Smith, Matt Hasseman (EE)
and Ryan Sunyak (EE)

The team developed a test rig to conduct feasibility studies on the effectiveness of different de-icing methods on wind turbines.

**Roller Redesign for the Jeep Wrangler
Paint Facility**

Faculty Adviser: Dr. Matthew Franchetti

Client Adviser/Sponsor: Mr. Glenn Cohoon, Chrysler

Students: Jessica Rachid, Justin Myers and Jake Simon

The team redesigned the conveyor roller system at the Jeep Wrangler Paint Facility to enhance productivity and reduce costs. The project involved redesigning the sprockets, which become worn and are difficult to replace. In addition, the bearing system was redesigned to prevent failure.

**Development of Productivity Enhancing
Devices for the Production Area at the
Chrysler Jeep Assembly Plant**

Faculty Adviser: Dr. Matthew Franchetti

Client Adviser/Sponsor: Mr. Zachary Leroux and Mr. Bill Leto Jr., Chrysler

Students: Brian Johnston, Jacob Swogger and Clyde Bruggers

The team designed a mechanical device that increases the productivity of the assembly line at the Chrysler Jeep Assembly Plant. The "limo" device increases assembly cell efficiency, aids logistics and improves worker ergonomics.

DEPARTMENT OF MECHANICAL, INDUSTRIAL AND MANUFACTURING ENGINEERING

DR. MATTHEW FRANCHETTI

SENIOR DESIGN FACULTY COURSE COORDINATOR

Alternative Energy Analysis and Design for Indian Reservations

Faculty Adviser: Dr. Sorin Cioc

**Client Adviser/Sponsor: Henry Red Cloud, Red Cloud Renewable Energy Center
in Pine Ridge, S.D.**

Student Names: Braeden Gilchrist, Greg Fletcher, Sean Miller
and Francis Campbell

This team designed a frame to hold a passive solar panel for the Red
Cloud Renewable Energy Center. This non-profit organization develops
and trains tribes on a number of energy-saving technologies, including
the assembly of a supplementary solar furnace. The end use of this unit
will be to assist in heating homes on Indian reservations in the West.

Redesign Spray Cleaner System on Square-transfer E-coat Line

Faculty Adviser: Yong Gan

Client Adviser/Sponsor: Mr. Jay Binder, MetoKote

Student Names: Justin Krendl, Bryan Dolan and Aaron Gibson

The team redesigned the spray cleaner system to more efficiently
clean the parts and decrease system maintenance.

Optimal Engineering Design for a University Entertainment Center

Faculty Adviser: Dr. Matthew Franchetti

Client Adviser/Sponsor: Mr. Singh Grewal, Gradkowski's Sports Bar

Student Names: Michael Rossi, Eric Maraczi (EE), Richard Reisner (EE),
Kory Siverd and Derick Romanko

The team designed the engineering aspects and material selection
for the Gradkowski's restaurant. The group finalized the layout of the
bar, which required approval from the city engineer. The group also
designed the coolers and selected the appropriate materials, lighting
and technology aspects to determine cost savings opportunities for
everyday operation.

HVAC Master Plan

Faculty Adviser: Dr. Cyril Masiulaniec

**Client Adviser/Sponsor: David Oz, JDI Group, and Alan Vaughn,
The University of Toledo**

Students: Jonathan Huffman, Matthew Maxwell, Kevin Kutscher (EE)
and Evan Clark

This team developed a master plan to replace the outdated units
of the HVAC system in the engineering complex, focusing on a low
initial investment, energy efficiency and return on investment.

Design of Marine Radar Cart with IR Camera Mounting System

Faculty Adviser: Dr. Mohsin M. Jamali

Client Adviser/Sponsor: The University of Toledo

Students: Craig Dapore, Jacob Heitkamp and John Thobe

This group designed and built a cart and mounting system for a
Marine X-Band radar that will rotate 0 - 180 degrees. The radar will
be used to monitor and study the effects of wind turbines on bat,
bird and raptor migration habits.

ToledoGrows

Faculty Adviser: Dr. Matthew Franchetti

Client Adviser/Sponsor: ToledoGrows

Students: Jonathon Burkhardt, Daniel Linger and Scott Kappus

ToledoGrows is a non-profit organization that provides a year-round
greenhouse for lower-income Toledo residents to grow their own
produce and tanks raise fish. The group designed a system to offset
heating costs for the facility during the winter months.

AFFILIATED COMPANIES AND SPONSORS

Accelerant Technologies

Mr. Larry Sanders, Owner –
Genoa, OH

Air Products

Mr. John Repasky

Alro Steel

Toledo, OH

Brown Industrial

Botkins, OH

Chrysler

Mr. Glenn Cohoon,
Maintenance Manager -
Detroit, MI

Chrysler

Mr. Zachary Leroux, Assembly
Center Manager -
Toledo, OH

Chrysler

Mr. Bill Leto Jr., PTC Manger -
Toledo, OH

Concrete Sawing & Drilling Assoc.,

Mr. Skip Aston - Sylvania, OH

Department of Energy

Envelope Mart USA

Mr. Norm Shapiro, President -
Toledo, OH

Gradkowski's Sports Bar

Mr. Singh Grewal, Owner -
Toledo, OH

Green Rock Lighting

Cleveland, OH

Liberian Literacy Foundation

Mr. E. Victor Helb – Detroit, MI

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MetoKote

Mr. Jay Binder

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Nordic Windpower

Nuclear Decon

Mr. David Oz

Nuclear Decon

Mr. Alan Vaughn

Ohio Bureau of Motor Vehicles

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Opening Night

Toledo, OH

Polaris Career Center

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Energy Center

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SSOE Group

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The Andersons, Inc.

Maumee, OH

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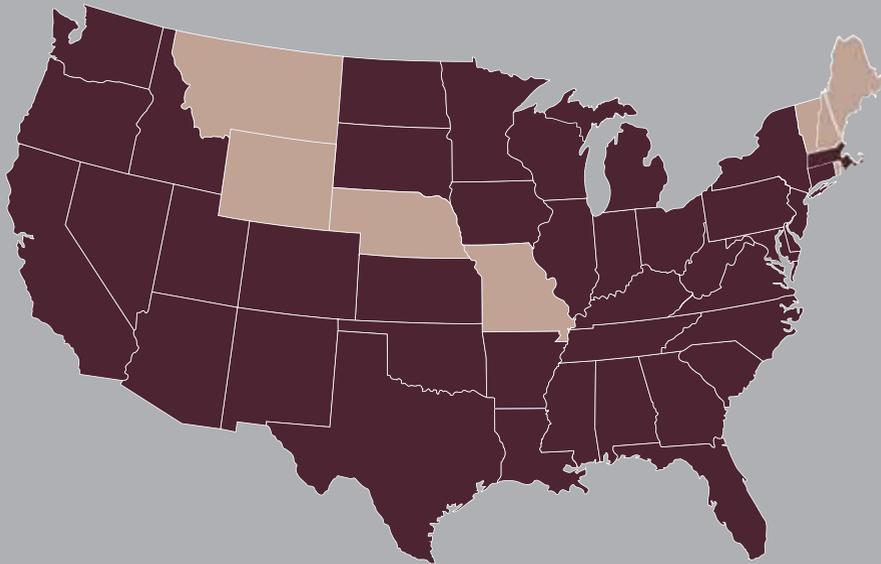
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UT-COLLEGE OF ENGINEERING

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Dubai UAE	Netherlands	
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The College of Engineering is one of eight mandatory engineering cooperative education programs in the United States. Since 1999, there have been over **11,300** engineering co-op placements. The college has received national recognition through inclusion in *The Best of CO-OP, A Guide to the Best CO-OP Colleges & Employers* by the National Commission for Cooperative Education.

For more information on our co-op program, contact Vickie L. Kuntz, Ph.D., at vickie.kuntz@utoledo.edu.

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For more information contact:

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COLLEGE OF ENGINEERING

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