FRIDAY, APRIL 26, 2013
NITSCHKE HALL
NOON – 3 P.M.

Featuring Undergraduate Research and Senior Design Projects from the departments of:
Bioengineering
Civil Engineering
Electrical Engineering & Computer Science
Engineering Technology
Mechanical, Industrial and Manufacturing Engineering

Please contact the individual departments regarding formal presentation times.
Chemical & Environmental Engineering projects will be displayed at the fall semester Exposition on December 6, 2013.
THE UNIVERSITY OF TOLEDO
COLLEGE OF ENGINEERING
Nagi G. Naganathan, Ph.D.
Dean and Professor

DEPARTMENT OF BIOENGINEERING
Arunan Nadarajah, Ph.D.
Professor and Chair

Ronald Fournier, Ph.D., P.E.
Professor and Instructor of Senior Design

DEPARTMENT OF CHEMICAL AND ENVIRONMENTAL ENGINEERING
Glenn Lipscomb, Ph.D.
Professor and Chair

Constance Schall, Ph.D.
Professor and Instructor of Senior Design

DEPARTMENT OF CIVIL ENGINEERING
Ashok Kumar, Ph.D., P.E.
Professor and Chair

Douglas K. Nims, Ph.D., P.E.
Associate Professor and Instructor of Senior Design

DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
Mansoor Alam, Ph.D.
Professor and Chair

Weng L. Kang, Ph.D.
Associate Professor and Instructor of Senior Design, LCCC

Richard Molyet, Ph.D.
Professor Emeritus, Associate Lecturer and Instructor of Senior Design

DEPARTMENT OF ENGINEERING TECHNOLOGY
Allen Rioux, M.S.
Associate Professor and Chair

Norman Koenigseker, M.Ed., P.E.
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

Mohamed Samir Hefzy, Ph.D., P.E.
Associate Dean and Instructor of Senior Design
YOU ARE CORDIALLY INVITED
TO ATTEND THE SENIOR DESIGN EXPOSITION:

You are cordially invited to attend the Senior Design Exposition on Friday, April 26, 2013 from noon to 3 p.m. The event will take place in the College of Engineering’s Nitschke Hall, 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.

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.

For more information on submitting a Senior Design Project for consideration contact Christine Smallman, director of Engineering Professional Education Programs, at 419.530.8249 or christine.smallman@utoledo.edu.

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 email sstewart@eng.utoledo.edu.

For more information on the academic programs offered in the college or to schedule a tour of the college, call 419.530.8040 or email jpawleck@eng.utoledo.edu.
InstaChill Cold Pack  
Faculty Adviser: Dr. Ronald L. Fournier  
Client Advisers/Sponsors: Mr. Tom Yogan and Monosol Inc.  
Design Team: Emily Breitner, Kristopher Rager, Matthew Rottinger and Frank Wagoner, Jr.  
We are developing a noel instant cold pack for use on minor injuries such as sprains and strains.

Aquameter  
Faculty Adviser: Dr. Ronald L. Fournier  
Client Advisers/Sponsors: The University of Toledo  
Design Team: Joel Gerber, Ke Kang, Kevin Pataki, Sarah Roelle  
Our team will be developing a device that will measure a person’s instantaneous velocity while swimming. This device attaches to the human body and sends the velocity data collected wirelessly to a mobile device. The user can review their velocity profiles and visually understand how they can improve their swimming.

Nause-a-way  
Faculty Adviser: Dr. Ronald L. Fournier  
Client Advisers/Sponsors: The University of Toledo  
Design Team: Jennifer Haupricht, Andrew Bruno, Carolyn Damo, Kurt Schilling  
Nause-a-way is a product that is capable of providing temporary relief for nausea. We have created an acupressure device that modulates pressure and stimulation to the pericardium 6 (P6) nerve, which research has shown to alleviate nausea.
Agogy Harvestable Nutrient Collector System  
*Faculty Adviser: Dr. Daryl Dwyer*

*Client Advisers/Sponsors: The University of Toledo*

Design Team: Nick McPherson, Zachary Reaver, Harpreet Singh, Joe Wahl

We are developing a mathematical model to optimize the design of a harvestable nutrient collector in the novel Agogy Harvestable Nutrient Collector System. This system has the potential to prevent harmful algal blooms through water purification, restore local economies, and create carbon neutral biofuel and nutrient-rich fertilizer.

TE-Seat  
*Faculty Adviser: Dr. Ronald L. Fournier*

*Client Advisers/Sponsors: The University of Toledo*

Design Team: Jonathan Fox, Rebecca Goudy, Laura Nedorezov, Brittany Seigneur Harris

We are creating a seat cushion with built-in thermoelectrics. The thermoelectrics will convert body heat to electricity, which can be used to charge any USB device.

TPS – Transdermal Predictability Software  
*Faculty Adviser: Dr. Ronald L. Fournier*

*Client Advisers/Sponsors: The University of Toledo*

Design Team: Sasha Aquino, Kelsey Eikens, Amber Hall, Tyler Moore

TPS is a computer program designed to model the feasibility of any drug to be delivered by the means of a transdermal patch.

Universal Jig for Knee Replacement Surgery  
*Faculty Adviser: Dr. Anand Agarwal*

*Client Advisers/Sponsors: Dr. Ajay Adhikari*

Design Team: Amanda Bollin, Kaitlyn Krock, Sarah Oram, Kimberly Tetuan

We are designing a universal jig for orthopedic knee replacement surgery. There will be multiple mechanisms to allow the jig to be adjusted to make all appropriate cuts.
Magbelt
Faculty Adviser: Dr. Brent Cameron
Client Advisers/Sponsors: The University of Toledo
Design Team: Blake Kalie, Erik Krzynowek, Nicholas Naymik, Matt Obrock, Cory Schleappi
The Magbelt is a unique change to the common seatbelt. Its design will provide for a quicker retraction and an easier release to allow law enforcement personnel to quickly and efficiently exit a vehicle, while allowing them to wear the seatbelt, providing them with much needed protection.

iPharm by KLOAK
Faculty Adviser: Dr. Ronald L. Fournier
Client Advisers/Sponsors: The University of Toledo
Design Team: Kelsie Moeller, Alton Phillips, Kelsey Ranly, Oreanna Thomas, Lorraine Thomas
iPharm is an iPhone application that will use the cell phone’s camera to identify a pill and provide medication information. The application will also feature a pill log to track your medication and an alarm reminder. Additionally, we are designing an iPhone case that will feature a built-in pillbox.

High Efficiency Automated Volumetric Integrated Processor
Faculty Adviser: Dr. Brent Cameron, Dr. Ronald L. Fournier
Client Advisers/Sponsors: Dr. Thomas Schwann, Phidgets Inc., Home Science Fools Inc.
Design Team: Jennifer Guilford, Marcus Sinewe, Matthew Stasa, Nathaniel Westphal
Due to patent pending, this project will not be available for exhibit.

Spinal Implant
Faculty Adviser: Dr. Vijay Goel & Dr. Anand Agarwal M.D
Client Advisers/Sponsors: The University of Toledo
Design Team: John D’Onofrio, Nathaniel DuBois, Jared Pack, David Taylor
Due to patent pending, this project will not be available for exhibit.
Mbakana Community Medical Center
Faculty Adviser: Dr. Douglas K. Nims, P.E.

Client Advisers/Sponsors: Antoine Kabwasa, UN Cultural Advisor; Louise Schlatter, SSOE Senior Associate; Karen Baker-Zepf, Rotary International; Laura Helminski, Architecture Student at University of Cincinnati

Design Team: Matthew Sakal, Derek Lynch, Daniel Summerhill, Ed Taqiuddin

The group conceptualized and designed all significant aspects of a medical community that has potential to be implemented in the Democratic Republic of Congo. Emphasis was placed on ensuring that the project was not only economically feasible, but also culturally stimulating. The goal of this project was to create a self-sustaining community that would serve as both a travel hub and center for healthier living.

Cedar Point National Wildlife Refuge Water Reclamation
Faculty Adviser: Dr. Douglas Nims, P.E., Bryan Ellis, P.E., P.S.

Client Advisers/Sponsors: Jason Lewis, Refuge Manager, Ottawa National Wildlife Refuge (United States Fish and Wildlife Service); Dennis McDonough, P.E., Ducks Unlimited Inc.

Design Team: Todd Bigler, Kyle Fintel, Vincent Ng, Matthew Shirey

With water levels in Lake Erie at historical lows, surrounding areas like the Cedar Point National Wildlife Refuge have become perched wetlands. The team designed a passive water management system to address this problem while incorporating migration of native wildlife. The three objectives were: to design a structure to control water flowing from Lake Erie to the Refuge, a reinforced shoreline along the coast that would address sand deposition, and culverts that distribute water to various parts of the refuge.
Bancroft Street Entrance

Faculty Adviser: Dr. Douglas Nims, P.E., Dr. Eddie Yein Juin Chou, P.E., Bryan Ellis, P.E., P.S, Dr. Nicholas Kissoff, P.E., Mr. Richard Martinko, P.E.

Client Advisers/Sponsors: Daniel P. Klett, UT Architect; Douglas Collins, UT Director Grounds and Off-Site Facilities; Donald O’Connor, P.E., City of Toledo

Design Team: Joe Brown, Martin Farkas, Danielle Jacoby, Hannah Renzhofer, Demar Watkins

The intersection of Bancroft Street and North Towerview Boulevard has been a major concern for The University of Toledo. The intersection is often congested, during sporting events and common class times. The goal of this project was to design several solutions that would decongest the intersection, allowing people to come and leave campus in a reasonable time. Cost estimates, aesthetics, and future development were considered when formulating solutions.

University of Toledo Green Roofs

Faculty Adviser: Dr. Douglas Nims, P.E.

Client Advisers/Sponsors: Daniel Klett; Mike Green, P.E.; Xiaoxhong Zhang; Mike Hurd

Design Team: Heath Brickner, Kristina Bruns, Corrinne Nauer, Drew Rodriguez, Ian Van Dootingh

The objective of this project was to evaluate which buildings at The University of Toledo that would meet the design criteria to install a green roof. Green roofs were designed for two of the selected buildings. To meet The University of Toledo’s green goals, the green roofs will be both economical and sustainable.
Portable EKG Device  
*Faculty Adviser: Prof. Brent Nowlin*  
Design Team: Adam Metzler, Nickolas Caley  
We are building a portable EKG device with two dry electrodes where a user can place their thumbs on to record the potential difference between the two electrodes. The potential difference signal will be amplified, digitally sampled, and sent to an android phone to be graphed and stored.

Automatic Mixed Drink Dispenser  
*Faculty Adviser: Dr. Vijay Devabhaktuni*  
Design Team: Shawn Scott, Anthony Margala, Dylan Peters and William Puesey  
In today’s world, time is money and restaurants are always looking for ways to improve the speed and efficiency of their service. Although mixing one drink does not take long, time becomes an issue when serving a large number of customers. With an automated mixed drink dispenser, bartenders will be able to prepare a mixed drink with the push of a button, thereby making the process more time efficient, as well as, producing a consistently uniform beverage.

Self-Driving Automobile  
*Faculty Adviser: Dr. Richard Molyet*  
Design Team: Joseph Almanza, Robert Perez, David Sherline and Shou Zhang  
This project focuses on building a self-driving automobile by designing a control system that follows a predefined, but modifiable path. The system is microcontroller based and uses inputs from optical, touch and sonar sensors to determine and automatically correct vehicle position. The overall goal of the project is to provide a scaled-model version of the concept of a self-driving commercial sized automobile.
Wireless Sensor and Automation Network

Faculty Adviser: Dr. Jackson Carvalho

Design Team: Ian Andrews, Ryan Ernst and Craig Pataki

Today, wireless technology is quickly replacing many applications that were previously performed by wired systems. One of the emerging trends is using wireless technology to implement a Wireless Sensor Network (WSN). Using a WSN not only significantly reduces the amount of copper wire that is needed, but it is also more scalable. More recently, the WSN has become a Wireless Sensor and Automation Network (WSAN). This project is concerned with the design of a WSAN that is not only cost-effective, but also simple enough that it can be used by anyone with a minimum of technical knowledge. The system is able to read and log sensor data while also being able to act upon that data using a simple event-driven programming interface. With a modular hardware interface, and flexible software design, this WSAN is well suited for a wide range of applications.
Scholarship Management System  
*Faculty Adviser: Professor Allen Rioux*

**Client Advisers/Sponsors: The University of Toledo College of Engineering**

Design Team: Joshua Jones (IT), Nick Reese (IT), Brandon Vance (IT), Dan Watson (IT), Chris Wenner (IT)

They have developed a web application for the College of Engineering that optimizes the scholarship application and administrative process. This system utilizes free and readily available technologies that present a dynamic, metric based form for the students and an intuitive administration panel for the faculty. This application has the potential to increase the number of scholarships awarded to students and save the college annual labor costs.

University of Toledo Ottawa River Library Bridge  
*Faculty Adviser: Professor Larry Loy*

**Client Advisers/Sponsors:** Matt McHugh, Crestline Paving and Excavating Co., Inc.

Design Team: Andrew Brock (CET), Jeremy Everhart (CET), Jeff Kusmits (CET), Brian Marks (CET), Andrew Seisel (CET)

The new bridge features an architecturally and aesthetically pleasing design while providing access to the library, student union, and Field House and alleviating pedestrian traffic on the David Leigh Root bridge. The bridge is located to the east of the existing pedestrian bridge used to access the library from Parking Area 10. This bridge can accommodate smaller UT maintenance vehicles. This bridge replaces the existing decaying bridge currently in use.

Speed Camera Warning  
*Faculty Adviser: Dr. Ted Evans*

Design Team: Ethan Brown (EET), Daniel Corado (EET), Joel Dollarhide (CSET), James Griffin (CSET), Zach Hershberger (CSET)

The Speed Camera Warning device will help motorists avoid reckless driving and traffic tickets from red light cameras. The device will notify the driver when approaching red light cameras, based on locations logged by the community.
Solar Heating System

Client Advisers/Sponsors: Michael Greene, The University of Toledo Facilities and Construction Department

Design Team: Devin Gray (MET), Brian Kesner (MET), Robert Nazarczuk (MET), Matt Reese (MET), Robert Wolfe (MET)

They have successfully analyzed a solar heating system for designated university buildings. The system utilizes evacuated solar collection tubes to heat water for use in many different scenarios. The system's overall goal is to convert the sun's radiant energy to thermal heat, which can be used in many different applications. They analyzed different scenarios and performed a cost/benefit analysis for each.

DC Blender Feasibility Study

Faculty Adviser: Professor Richard Springman

Client Advisers/Sponsors: Tom Harbart, Vitamix

Design Team: Austin Armstrong (MET), Jeremy Butler (MET), Kevin Shinaver (MET), Bradley Wilson (MET), Josh Zaborski (MET)

This project demonstrates the potential for a high-powered DC blender capable of producing the same output as an AC blender. Funds and resources were used from Vitamix, Inc. to replace the existing motor and control board in their commercial blender and make the conversion to battery power. The goal was to design a portable blender capable of achieving the same performance standards as countertop models currently being manufactured.

Resonant Wireless Power

Faculty Adviser: Professor Majid Wadood

Client Advisers/Sponsors: HM Wire International

Design Team: Aaron McDonald (EET), Sonny Nguyen (EET), Jed Neiman (EET), Brian Osgood (EET), Haroon Tariq (EET)

Students designed and built a wireless power source for consumer mobile devices using resonant induction technology. The purpose of the project was to provide the consumers the convenience to simultaneously use and charge their devices wirelessly without the need to plug any wires or placing their mobile devices on a charging pad recharge.
Cocktail Connection
Faculty Adviser: Dr. Ted Evans

Client Advisers/Sponsors: Bel-Kur, Inc., Rieck Services, TSE Restaurant Fixtures

Design Team: Melissa Brown (CSET), Alan Girard (EET), Sean Hotchkiss (EET), Thomas Meyers (MET)

Cocktail connection is a fully automated mixed drink dispenser intended for adult establishments and home bars. It is designed to serve all your favorite drinks. One button push on the easy to use touch screen permits the user access to more than 100 alcoholic and non-alcoholic drinks. With this system, time and money are saved, and precise, well-made drinks allow users more time to socialize while savoring the perfect drink.

The Community Enrichment Project at Goddard Park
Faculty Adviser: Dr. Nicholas Kissoff

Client Advisers/Sponsors: The University of Toledo

Design Team: Brad Arnold (CET), Robert Conner (CET), Clifford Dillon (CET), Jeremy Dunlap (CET), Bryant Kesler (CET)

The team developed concepts for an underground parking structure to be located at Goddard Park. The new parking structure keeps the beauty of the neighborhood while giving the university parking for the proposed move of the Undergraduate Admissions Office to Libbey Hall. The team’s concepts show that it is possible to incorporate a parking structure while keeping a green space for the neighborhood.

Micro Music Player
Faculty Adviser: Robert Langenderfer
Technical Adviser: Ryan Bick

Design Team: Jacob Cohen (IT), Derick Karolak (IT)

The Micro Music Player is a web based application hosted locally on a Wi-Fi network. This web application will enable users to connect via their mobile devices and select music to play. We added the ability for business owners to advertise and charge users. Users will be able to select songs and manipulate their songs on the playlist for a fee. We provided the system with a music collection and allow business owners to pay less money to maintain a more flexible music system.
Water Ahoy
Faculty Adviser: Professor Richard Springman
Design Team: Derek Deland (CSET), Eamon Kelly (MET), Jared Leffel (IT), David Lillibridge (MET), Andy Yang (IT)

This water safety project is designed to prevent water flooding in multiple ways. One application is to shut off water in a toilet when a float switch is activated. A second phase of this project involved a water sensor that can detect the presence of water, such as in a basement, and sound an alarm. Both systems are designed to sound a buzzer and send a notification via an Android application to the owner/renter.

These Green Houses
Faculty Adviser: Professor Linda Beall
Design Team: Todd Brown (CET), Jeremy Cook (EET), Robert Donelon (CET), Ryan Givler (CET), Jaron Rader (CET), Ryan Smith (CET)

These Green Houses project is all about taking a house and making it energy efficient and eco-friendly by using smart materials, technology and ingenuity. Three cases were evaluated: the first case consisted of an occupied house, the second case consisted of an uninhabited house and the third case was a new build. By using LEDs and solar tubes, programmable thermostats, home automation, gray water reclamation techniques, and solar water heating, we were able to reduce monthly utility bills while decreasing the home’s impact on the environment.

Residential Aquatic Power Supply System (R.A.P.S. System)
Faculty Adviser: Dr. James Kamm
Design Team: Kevin Cash (MET), Tyler Haase (MET), Kurtis Kuntz (IT), Donald Simonovich (MET), Matt Williams (MET)

The Residential Aquatic Power Supply System (R.A.P.S. System) will be an affordable, clean power generator. The R.A.P.S. System will use the current of any river or stream to spin a barrel that will turn a generator that will create a DC current. Batteries will be used to store the DC energy for available use whenever the user requires it. This system will serve as a sustainable replacement for gas-powered generators.
Heated Intersection at Central Avenue and McCord Road
*Faculty Adviser: Dr. Nicholas Kissoff*

Design Team: Aaron Thomas (CET), Patrick Wimberly (CET)

Northwest Ohio faces harsh and unsafe road conditions caused by ice and snow each winter. These road conditions are problematic for residents and those traveling through the area. This project tackled these issues by eliminating the threat that snow and ice present at intersections. This project developed a design that incorporates heating wire into the roadway at the intersection of Central Avenue (US Route 20) and McCord Road.

Small Modular Home Design Systems
*Faculty Adviser: Professor Linda Beall, Professor Don Flenner*

Design Team: Ericka Bilby (CET), Timothy Hacker (CET), Sean Riley (MET)

This project consists of the design of modular elements to transform shipping containers into homes. The focus was not to manufacture a prototype, but to design each module and element with detailed plans and bills of materials. Templates and shop drawings were created for construction standardization. The design emphasized functional multi-purpose pieces which arrangement would both utilize the available space of the container and provide for a unique and cost effective home.

Renovation of Fire Station #3
*Faculty Adviser: Professor Linda Beall*

*Client Advisers/Sponsors: City of Toledo, Toledo Fire Department*

Design Team: Kyle Griffith (CET), Ed Moore (CET), Jacob Musselman (CET), Tony Kyser (CET), Chris Sobczak (CET)

Fire Station #3 is located at the corner of Bush and Erie Streets in north Toledo. The station was abandoned by the Toledo Fire Department (TFD) in September 2012 due to stress cracks in the concrete floor slab that the fire rigs are parked on. Community input convinced TFD to repair the station and bring it back into service. Our project provided TFD with a design proposal that could be used to modernize this historical building.
University Church Water Management System
Faculty Adviser: Professor Linda Beall

Client Advisers/Sponsors: Bryan Ellis

Design Team: Vincent Basalla (CET), Scott Goedde (CET), Dyer Heyman (CET), Ben Mulhall (CET), Sean Parrot (CET), Bradley Tymiak (CET)

This team worked with the University Church to plan, research and design a water management system. The team designed a cost effective system that utilizes the church roof space to capture rainfall. Water was diverted from the gutter system to above ground holding tanks which, when reaching maximum capacity, would lead to an underground cistern. A duck pond was also designed to capture site runoff.

A Healthcare Information System with Improved Access
Faculty Adviser: Dr. Weiqing Sun

Design Team: Kyle Dannemiller (CSET), Kevin Gardner (CSET), Rob Harbaugh (CSET)

Hospitals and medical practices are converting all of their paper medical records into computer records that are stored in a database called EMR (Electronic Medical Records). These records can be accessed and modified by a variety of personnel including doctors, nurses and medical students. We have improved the current EMR system by adding functionality to improve access to this system.

Small Engine Easy Start
Faculty Adviser: Professor Dale Simon

Design Team: Bradley Fisher (EET), Mike Knott (MET), Brent Kuhlman (EET), James Magrum (MET)

This project designed and built a mechanism that reduces the human mechanical force required to get a pull-start engine running. The focus of the project was to develop a mechanical assist to start a simple pull-start lawn mower. The team had to learn the workings of an internal combustion engine and what is required to get it running.
**Digital Signage**

*Faculty Adviser: Dr. Hong Wang*

Design Team: Caleb Lemons (IT), Tom Nisch (IT), Jonathan Schnipke (CSET)

This project was aimed at small businesses to advertise their sales throughout the store by use of television screens. The system used to display the advertisements was a graphical interface that owners changed manually and weekly to keep up to date and was achieved through the use of the Internet. The system was useful to businesses because it lowered costs and represented a green alternative to paper advertising.

**Automated Remote Control Environmental System**

*Faculty Adviser: Dr. Ted Evans*

**Client Advisers/Sponsors: Joseph Sparks, Hot Yoga with Joe**

Design Team: Cameron Harper (EET), Nick Henderson (CSET), Brandon Humes (CSET), Kellen Link (CSET), Jacob Olmstead (EET)

This system is designed to monitor/adjust humidity and temperature automatically within a hot yoga studio. The system utilizes humidifiers and heaters to maintain an optimal environment for hot yoga. An android application is used to communicate with this system to allow for remote access using Internet communications.

**A Construction Waste Solution**

*Faculty Adviser: Professor Don Flenner*

Design Team: Ryan Alsharaiha (MET), Joe Capicccioni (CET), Abraham Cooper (MET), Sofia Eich (CET), Victor Walker (CET)

This project used cardboard and wood waste from construction sites to produce fire logs. These logs are cost effective and beneficial to the environment by reducing landfill waste. This was done by modifying the waste, adding an adhesive and applying compression. Testing was done to find the optimum method of producing these logs and then an industrial sized machine was designed to manufacture them. The process of waste from construction sites to the end product was also analyzed to examine cost.
Multi-Platform Home Controller
Faculty Adviser: Dr. William Acosta

Design Team: Austin Barth (CSET), Chris Lau (EET), Ankit Patel (CSET), Jennifer Taormina (IT)

This team developed a multi-device multi-platform approach to remotely control devices in the home. Everything from light bulbs to garage doors can be controlled with the press of a button from an android device or the web. To differentiate our project from the competition, our platform puts the choice of device in the users’ hands, thus allowing the users to choose what controller they wish to use rather than forcing them to purchase a proprietary device.
Development of a Device to Assist a Client in Loading/Unloading a Walker from a Vehicle
Faculty Adviser: Dr. Mohamed Samir Hefzy & Dr. Mehdi Pourazady
Client Advisers/Sponsors: Angie Hiser, The Ability Center of Greater Toledo
Design Team: Jesse Hontz, Zheyu Liu, Chad Schroeder, and Jordan Schroeder
This project team designed a device to assist someone in loading/unloading a walker from a vehicle without the assistant of another person. The design fits inside a car without interrupting the operation of the vehicle.

Development of a Motorized Therapy Swing for a Child
Faculty Adviser: Dr. Mehdi Pourazady
Client Advisers/Sponsors: Angie Hiser, The Ability Center of Greater Toledo
Design Team: Meghan Chrzan, David Mynderse, Josh Augsburger, and Patrich Nwokolo
This team designed a motorized swing to be used by a 10-year-old with muscular dystrophy, cognitive delays, and epilepsy. The design allows for swinging in multiple directions and will be used in the client’s therapy room.

Development of a Test Rig to Study Liquid Atomization by Slinger Atomizers
Faculty Adviser: Dr. Abdollah Afjeh
Client Advisers/Sponsors: UT, MIME Department
Design Team: Adreian Davis, Christopher Phillips, Taurean Young, and Randall Lavoy
This team designed and built a test rig to evaluate the liquid atomization provided by slinger atomizers used in small turbine engines. This rig is capable of testing up to 100,000 rpm.
Development of a Lightweight Bicycle Trailer
Faculty Adviser: Dr. Mohamed Samir Hefzy, P.E.
& Dr. Mehdi Pourazady
Client Advisers/Sponsors: Angie Hiser, The Ability Center of Greater Toledo
Design Team: John Leis, Garrett Rayman, Alex Ritzenthaler, David Schroeder, and Revillo Stevens
This design team developed a lightweight bicycle trailer for someone who has Cerebral Palsy. The brakes and gearing are operable via the user’s chin or face.

Development of a Therapy Bicycle
Faculty Adviser: Dr. Mohamed Samir Hefzy, P.E.
& Dr. Mehdi Pourazady
Client Advisers/Sponsors: Angie Hiser, The Ability Center of Greater Toledo
Design Team: David Ogunnoiki, Miracle Ugwumba, Mohammed Alali, and Long Zhao
This team modified a standard tricycle to meet its client’s specifications. The new design will enable the client to use the tricycle for physical therapy.

Adaptation of a Racing Tricycle
Faculty Adviser: Dr. Mohamed Samir Hefzy, P.E.
& Dr. Mehdi Pourazady
Client Advisers/Sponsors: Angie Hiser, The Ability Center of Greater Toledo
Design Team: Alex Gardner, Matina Garrison, Maiomaio Zhang, Nathan Boyer, and Shane Smith
This team developed a lightweight racing tricycle for an individual with limited dexterity. Modifications to the exiting tricycle design included the elimination of hand controls for braking and shifting, ergonomic developments for comfort, and modifications to allow for greater accessibility.
Development of an Adjustable Travel Bed

*Faculty Adviser: Dr. Lesley Berhan*

*Client Advisers/Sponsors: Angie Hiser, The Ability Center of Greater Toledo*

Design Team: Zachary Hofelich, Yousuf Al-Khalifin, Hao (Jason) Liu, Zhenyu (Sam) Zhang, and C.J. Majors

The team designed and built an adjustable and portable wedge a client with disabilities can use when traveling to make sleeping in hotel beds more comfortable.

Development of a Dog Feeding Device

*Faculty Adviser: Dr. Phil White*

*Client Advisers/Sponsors: Angie Hiser, The Ability Center of Greater Toledo*

Design Team: Ethan Schwartz, Scotland Thygerson, John Penrod, Mike Koludrovich, and Bryan Armour

This design team created a dog treat dispenser that attaches to an electric wheelchair and can be used by someone with limited to no use of their hands.

Development of a Post-Consumer Plastic Sorting System

*Faculty Adviser: Dr. Matthew Franchetti, P.E.*

*Client Advisers/Sponsors: UT, MIME*

Design Team: John Hart, Alec Broyles, Aaron Panning, Jacob West, and David Levanduski

This team developed and tested a small-scale, plastic sorting system that uses an application of an emerging technology. The new system uses Ferro fluid and electromagnet waves to sort plastic particles suspended in the Ferro fluid. The results of the experimentation were compared to the cost and performance of existing recycling systems.
Optimization of a Motorcycle for Long Distance Travel (engine group)

Faculty Adviser: Dr. Ray Hixon

Sponsor: Dr. Ray Hixon

Design Team: Lucas Kizer, Nick Eschhofen, Aaron Heitbrink, and Mark Rottinger

This design team will convert a carbureted engine to a fuel injection engine. Other optimization changes include the fuel tank, headlights, and oil tank reservoir.

Optimization of a Motorcycle for Long Distance Travel

Faculty Adviser: Dr. Ray Hixon

Sponsor: Dr. Ray Hixon

Design Team: Benjamin Vittore, Steven Giveins, and Burton Johnson

This team modified the aerodynamics and the rider position of an Aprilia Rs50 motorcycle.
AFFILIATED COMPANIES AND SPONSORS

Ability Center of Greater Toledo
Angie Hiser, Director of Information & Outreach — Sylvania, Ohio
Dr. Ajay Adhikari, Consultant — United Kingdom

Bel-Kur, Inc.
Mr. Ryan Bick — Temperance, Michigan

City of Toledo
Donald O’Conner, Professional Engineer — Toledo, Ohio

City of Toledo
Gary Stookey, Senior Professional Engineer — Toledo, Ohio

City of Toledo
Karl Huss, Senior Professional Engineer — Toledo, Ohio

Crestline Paving and Excavating Co., Inc.
Matt McHugh — Toledo, Ohio

Ducks Unlimited
Dennis McDonough, Director of Conservation Services — Ann Arbor, Michigan

Ducks Unlimited
Dennis McDonough, Director of Conservation Services — Ann Arbor, Michigan

Ducks Unlimited
Dennis McDonough, Director of Conservation Services — Ann Arbor, Michigan

University of Cincinnati
Laura Helminski, Graduate Student — Cincinnati, Ohio

University of Toledo
Daniel Klett, Architect — Toledo, Ohio

University of Toledo
Douglas Collins, Director of Grounds and Off-site facilities, — Toledo, Ohio

Vitamix
Tom Harbart — Cleveland, Ohio

AFFILIATED FACULTY AND STAFF

Dr. William Acosta
Assistant Professor, Department of Engineering Technology

Dr. Abdy Afjeh
Professor and Chairman, Department of Mechanical, Industrial & Manufacturing Engineering

Dr. Anand Agarwal, M.D.
Research Professor, Department of Bioengineering

Dr. Mansoor Alam
Professor and Chair, Department of Electrical Engineering and Computer Science

Prof. Linda Beall
Associate Lecturer, Department of Engineering Technology

Dr. Lesley Berhan
Associate Professor, Department of Mechanical, Industrial & Manufacturing Engineering

Dr. Brent Cameron
Associate Professor, Department of Bioengineering

Dr. Jackson Carvalho
Assistant Professor, Department of Electrical Engineering and Computer Science

Dr. Douglas Collins
Director, Grounds and Off-site facilities, Facilities and Construction

Dr. Vijay Devabhaktuni
Associate Professor, Department of Electrical Engineering and Computer Science

Dr. Daryl Dwyer
Associate Professor, Environmental Sciences

Dr. Bryan Ellis
Adjunct Professor, Department of Civil Engineering

Dr. Ted Evan
Professor, Department of Engineering Technology

Prof. Don Flenner
Part-Time Instructor, Department of Engineering Technology

Dr. Ronald Fournier
Professor, Department of Bioengineering

Mark Fox
Patent Technology Associate, Technology Transfer

Dr. Matthew Franchetti
Assistant Professor & Undergraduate Program Director, Department of Mechanical, Industrial & Manufacturing Engineering

Thomas Garey
Manager Facilities Information Systems, Facilities and Construction
Dr. Vijay Goel  
Distinguished University Professor, Department of Bioengineering

Michael Green  
Director of Energy Management, Plant Operations

Tim Grivanos  
Instrumentation Specialist, Department of Mechanical, Industrial & Manufacturing Engineering

Dr. Cyndee Gruden  
Associate Professor, Department of Civil Engineering

Dr. Mohamed Samir Hefzy  
Professor & Associate Dean of Graduate Studies and Research Administration, Department of Mechanical, Industrial & Manufacturing Engineering

Christie Hennen  
Associate Director, Department Student Services, Department of Electrical Engineering and Computer Science

Dr. Ray Hixon  
Professor, Department of Mechanical, Industrial & Manufacturing Engineering

Michael Hurd  
Interim Manager, Mechanical/General Maintenance, Facilities and Construction

Tom Jacob  
Electronic Tech II, Department of Electrical Engineering and Computer Science

John Jaegly  
Engineering Laboratory Supervisor, Department of Mechanical, Industrial & Manufacturing Engineering

Dr. James Kamm  
Professor, Department of Engineering Technology

Dr. Weng Kang  
Associate Professor, Department of Electrical Engineering and Computer Science

Dr. Nicholas Kissoff  
Associate Professor, Department of Engineering Technology

Daniel Klett  
University Architect, Facilities and Construction

Prof. Norman Koenigseker  
Associate Professor, Department of Engineering Technology

Alan Kossow  
Computing Specialist, Department of Engineering Technology

Prof. Robert Langenderfer  
Part-Time Instructor, Department of Engineering Technology

Emily Lewandowski  
Academic Resource Analyst, Department of Mechanical, Industrial & Manufacturing Engineering

Prof. Larry Loy  
Part-Time Instructor, Department of Engineering Technology

Dr. Richard Molyet  
Associate Lecturer, Department of Electrical Engineering and Computer Science

Patricia Mowery  
Administrative Manager/Executive Secretary, Engineering Office of the Dean

Dr. Nagi Naganathan  
Professor and Dean of Engineering

Dr. Douglass K. Nims  
Associate Professor, Department of Civil Engineering

Prof. Brent Nowlin  
Adjunct Assistant Prof., Department of Electrical Engineering and Computer Science

Lindsey Patrisso  
Assistant Director of Department Student Services, Department of Bioengineering

Tamara Phares  
Instructional Laboratory Coordinator, Department of Bioengineering

Dr. Mark Pickett  
Professor Emeritus, Department of Civil Engineering

Dr. Mehdi Pourazady  
Associate Professor, Department of Mechanical, Industrial & Manufacturing Engineering

Prof. Allen Rioux  
Associate Professor and Chair, Department of Engineering Technology

Myrna Rudder  
Assistant Director of Engineering Office of the Dean

Prof. Dale Simon  
Assistant Professor, Department of Engineering Technology

Ms. Christine Smallman  
Director of Engineering Professional Education Programs

Prof. Richard Springman  
Assistant Professor, Department of Engineering Technology

Sandy Stewart  
Assistant Resource Manager, Engineering Office of the Dean

Sandra Stockard  
Secretary, Department of Electrical Engineering and Computer Science

Dr. Weiqing Sun  
Assistant Professor, Department of Engineering Technology

Diana VanWinkle  
Quality Assurance Specialist, Engineering Office of the Dean

Prof. Majid Wadood  
Part-Time Instructor, Department of Engineering Technology

Dr. Hong Wang  
Assistant Professor, Department of Engineering Technology

Dr. Phil White  
Professor, Department of Mechanical, Industrial & Manufacturing Engineering

Xiaozhong Zhang  
GIS Database Analyst, Facilities Information Systems, Facilities and Construction
The College of Engineering is one of eight mandatory engineering cooperative education programs in the United States. Since 1999, there have been over 13,300 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.
Engineering Professional Education Programs

The College of Engineering, Office of Engineering Professional Education Programs (EPEP) specializes in engineering seminars, trainings and workshops as well as continuing professional education credits for licensed professional engineers and the engineering community as a whole. Programs, presented by engineering faculty or industrial experts, can be created discipline specific or general topics can be presented such as patent law, ethics, trouble shooting and project management. Currently the college has more than 80 programs in place and is available to conduct these programs at the college or on-site. Should there be a workshop, seminar or training we currently do not offer we will be happy to work with your company to create a program specific to your needs.

Additionally, the Office of Engineering Professional Education Programs serves as a contact for the practice oriented on-line master’s degree program and would be pleased to visit your company to present master’s level educational opportunities to your employees.

Lastly, if you have a senior design or consulting project in mind, our office can match your needs with our faculty experts and the engineering department that can work with you, and your company, toward successful completion of your project.

For more information contact:

**Christine M. Smallman, MLS, Ph.D. (c)**
College of Engineering
Mail Stop 310
The University of Toledo
2801 W. Bancroft St.
Toledo, OH  43606
**Phone: 419.530.8249**
**Fax: 419.530.3139**
**Cell: 419.290.7031**
christine.smallman@utoledo.edu