

Michigan Ohio University Transportation Center

Alternate energy and system mobility to stimulate economic development

Volume 2, Issue 2

Summer 2008

SHARING PROGRESS -- Invited Corporate and Government Partners join MIOH UTC members in visiting Projects at Partner Universities

On March 19, Michigan Ohio University Transportation Center (MIOH UTC) Operating Committee members and invited transportation professionals received updates on projects in the "Alternative Fuels" focal area at Wayne State University's



Above: Dr. Utpal Dutta, UDM, and Master of Civil Engineering degree candidate Lauren VandePutte, UDM, present an update of the project: "Evaluation of SCATS Control System" during the Technology Visit at the University of Detroit Mercy.

research site at NextEnergy. A subsequent visit to the University of Detroit Mercy on March 28, 2008 focused on congestion mitigation related projects in the focal areas of "Transportation System Efficiency" and "Supply Chain". Some highlights of both visits follow:

Dr. Steve Salley, WSU, along with his colleague Dr. Simon Ng, WSU, presented results to date of the project "Improved Oxidative Stability of Biodiesel Fuels: Antioxidant Research and Development". An extensive discussion of the effect of various natural and synthetic antioxidants, as well as, commercial antioxidant blends on different types of biodiesel was presented. Biodiesel is comprised of mono-alkyl esters of long chain fatty acids (FAME) derived from vegetable oils or animal fats; high levels of unsaturated FAME in biodiesel make biodiesel susceptible to oxidation.

This project is investigating the effect of antioxidants on the stability of different types of biodiesel; additionally, it is studying the long-term stability of biodiesel with synthetic/natural antioxidants. Results indicate that the effect of different antioxidants on biodiesel varies significantly depending on biodiesel feedstock and content of minor components. A goal is to develop/evaluate commercial antioxidants to improve the oxidative stability of biodiesel and thus make it a viable alternative fuel.

MIOH UTC

a University Transportation Center funded by: the U.S. Dept. of Transportation, the Michigan Dept. of Transportation and partner Universities and Corporations

Engineering Bldg.126 University of Detroit Mercy 4001 W. McNichols Road Detroit, MI 48221 Office: (313) 993-1510 Fax: (313) 993-1187 martinpa@udmercy.edu http://mioh-utc.udmercy.edu

Director: Dr. Leo E. Hanifin Asst. Director: Patricia A. Martinico



WSU post-doc researcher, Haiying Tang, explains biodiesel antioxidant testing process during the Technology Tour on March 19 at NextEnergy.



MIOH is spelled T-E-A-M

As the Michigan Ohio UTC moves through its second year, it is clear that the standard operating procedure is to collaborate . . . and the collaboration goes far beyond the five university partners of our UTC.

During the first two years, MIOH has funded 19 different projects: twelve are research projects and the other seven focus on education, K12 outreach and technology transfer. Every one of these projects involves multiple partners that include:

- all five MIOH universities, plus
- state and regional transportation organizations (such as Michigan DOT, the Road Commission for Oakland County, the Toledo Area Rapid Transit Authority, and the Southeastern Michigan Council of Governments),
- companies (such as GM, Deloitte, Spalding Decker, UPS, IBM and Ford),
- community organizations (such as the Detroit Area Pre-College Engineering Program) and
- other R&D organizations (such as

NextEnergy and the Center for Automotive Research).

Such collaboration has many benefits. It assures that MIOH projects focus on the greatest regional and national needs and capitalize on existing knowledge and expertise outside of the lead university. It also multiplies the support from the US DOT. During year two, MIOH was able to match each dollar of US DOT support with two dollars of matching support!

Another benefit of this collaboration is that it enriches the development of the next generation of transportation professionals. In the first year alone, over 80 students have been involved in MIOH research, education and K12 outreach (39 graduate students, 17 undergrads and over 40 high school students).

You can get involved in MIOH by contacting me at 313-993-1216 or at HANIFINL@UDMERCY.EDU.

Dr. Leo E. Hanifin, Director MIOH University Transportation Center

Technology Tour

cont'd from pg 1

Following the presentation was a tour of the laboratory facility housing the biodiesel project.

Projects presented during the visit at the University of Detroit Mercy were equally impressive. Drs. Ratna Babu Chinnam and Alper Murat, WSU, partnering with Dr. Greg Ulferts, UDM, presented accomplishments from "Enabling Congestion Avoidance and Reduction in the Michigan-Ohio Transportation Network to Improve Supply Chain Efficiency: Freight ATIS". This project is developing efficient dynamic routing algorithms to react to both recurring and non-recurring incidents by using real-time ITS traffic information and non-recurrent congestion modeling for reactive and anticipatory routing decisions based on networks of alternative routes for freight. One of the key aspects of this work is that its scalability enables implementation in real highway systems for dynamic rerouting of freight.

In automotive plants 80% of all parts are delivered to assembly plants JIT (just in time) with only 3 hours of inventory on site. Targets for supply chain efficiencies are becoming even more aggressive. As such, these plants' operations have become susceptible to traffic congestion delaying delivery trucks causing part shortages and shutdowns of assembly operation. In the future the routing methods will be field tested with real data for a complex system.

The project "Supply Chain/Transportation Efficiency Systems Graduate Degree Program" presented by Dr. Shahram Taj, UDM Business, and partnered by a UT team lead by Dr. Subba Rao, developed a collaborative interdisciplinary graduate degree. A curriculum of 10 courses was developed based on input from a Board of Advisors and by benchmarking of similar programs at other universities. The BOA included leaders from three universities and both users and providers of supply chain services, such as, Chrysler, Ford, Ryder, UPS, Cambridge Systematics.

Presentations were also made related to projects to investigate the feasibility of cold weather operation of hovercraft on the Detroit River (Dr. Alan Hoback, UDM) and on the creation of education modules that focus on hydraulic hybrids (Dr. Mark Schumack, UDM).



Left: Dr. Leo E. Hanifin, Director of the Michigan Ohio University Transportation Center, discusses the impact of the MIOH UTC with Lydia E. Mercado, University Program Specialist, RITA, US DOT during the site visit.

Right: Dr. Steve Sally, WSU, discusses the biodiesel degradation issues being examined in his lab at corporate partner, NextEnergy. Pictured are (left to right) Niles Annelin, MDOT, Tom Marchessault, US DOT Lydia Mercado, US DOT and Dr. Steve Salley, WSU.





Jim Saber, representative of corporate partner NextEnergy on the MIOH UTC Operating Committee, shares the role of NextEnergy in supporting research in alternative fuels.

Site Visit by US DOT and Innovative Technology Research Transportation Centers Program Administration's University composed of researchers, as well as

The Michigan Ohio UTC had the pleasure of hosting a Site Visit by representatives of the US DOT, Research and Innovative Technology Administration's University Transportation Centers Program. On May 14, 2008, Lydia Mercado, University Program Specialist, and Tom Marchessault, UTC Outreach Liaison and former Acting Director of US DOT's UTC Program, visited the Metropolitan Detroit area to hear about projects and activities undertaken by the MIOH UTC since its inception in the fall of 2006.

Fr. Gerard Stockhausen, President of the University of Detroit Mercy which is the lead institution of the MIOH UTC, provided opening remarks to a group composed of researchers, as well as, representatives of partner corporations and government. Over the course of a full day, selected research and educational projects were highlighted:

- SCATS Analysis, UDM
- Congestion Avoidance, WSU-UDM
- Congestion Relief, GVSU-WSU
 - Image Database Analysis System for Maintenance of Transportation Facility, UT
 - Educational Modules to Teach Hydraulic
 - Hybrid Vehicle Technologies, UT-UDMK-12 TRANSIT Summer Camp, UDM
 - K-12 Ford PAS Alternate Fuels Teaching Modules, UDM
 - Oxidative Stability of Biodiesel, WSU
- Woodward Transit Catalyst, UDM

A Graduate Student's Perspective on the MIOH UTC Research Experience

By Evan Peterson

Since November 2007, I have had the privilege of working on the "Enabling Congestion Avoidance and Reduction in the Michigan-Ohio Transportation Network to Improve Supply Chain Efficiency: Freight ATIS" project with University of Detroit Mercy and Wayne State University faculty members. I assisted with several aspects of the project, including background research and formulation of the business case. In addition, I participated in developing a presentation for the MIOH Operating Committee and invited guests in March 2008. One of the highlights of my experience came when I learned that a few of my suggestions were used in the presentation made to the visiting US DOT representatives the following May. I found attending that presentation beneficial, as it provided insight as to how my contributions fit into the "big picture". I am grateful for the opportunity to be a part of this project. I have been able to utilize concepts learned during my studies while working alongside individuals whom I respect and admire.

Evan Peterson is a UDM graduate student pursuing a joint JD/MBA curriculum. Evan indicates he is considering pursuing a doctoral degree in business and that the experience working on the MIOH UTC project has helped focus "a possible route for my doctoral work."



Alternate energy and system mobility to stimulate economic development

Proposals for Year 3, 2008-2009 funding are arriving at the MIOH UTC following an RFP to partner universities. Focus Area Interest Groups will review in June to provide recommendations to the MIOH UTC Operating Committee meeting in July. For information contact Pat Martinico at <u>martinpa@udmercy.edu</u> or 313-993-1510 Visit the website <u>http://mioh-utc.udmercy.edu</u>.







WAYNE STATE UNIVERSITY

Summer Opportunities for 9th-11th Graders



Students in the Saturday DAPCEP class, Spring 2008 convert light into electricity to provide hydrogen to power a fuel cell under the supervision of Dr. Mark Schumack, UDM Mechanical Engineering Dept, and Beth Dalrymple, Master of Mechanical Engineering degree candidate and University Valedictorian 2008.

TRANSIT is a one-week summer camp for students who want to learn about the world of transportation, a field of study within Civil Engineering. The TRANSIT camp is made up of labs and discussions led by University professors and high school science teachers, presentations by MDOT, Ford Motor Company and SEMCOG, and activities from MDOT's TRAC program. July 21-25, 2008.

The STEPS Camp is an annual five-day residential program for girls designed to introduce young women to manufacturing, engineering, science, math and robotics, as well as, to improve their perception of engineering as a career. The camp integrates a variety of activities for the campers – academic, social and personal reflection. The main project focuses on robotics and autonomous vehicles. June 15-20 and 22-27, 2008.

For more information or to request a brochure or application, please contact Director of Pre-College Programs, Dan Maggio at maggiodd@udmercy.edu.

Inside this issue...

Technology Tour of Partner UniversitiesPage 1
Director's LetterPage 2
US DOT Site VisitPage 3
Student PerspectivePage 3
Yr3 Proposal ReviewPage 3
Camp Information TRANSIT & STEPSPage 4

MIOH UTC Engineering Bldg. 126 University of Detroit Mercy 4001 W. McNichols Road Detroit, MI 48221-3038