Michigan Ohio
University Transportation Center

Alternate energy and system mobility to stimulate economic development

Volume 1, Issue 1 **May 2007**

U.S. Department of Transportation funds new University Transportation Center: MIOH UTC

The Michigan-Ohio (MIOH) University Transportation Center (UTC) is a coalition of five regional universities exploring transportation issues. The MIOH UTC partner institutions are the University of Detroit Mercy (UDM), Bowling Green State University (BGSU), Grand Valley State University (GVSU), The University of Toledo (UT), and Wayne State University (WSU).

The coalition will address the transportation capabilities and competitive position of the region and the nation. An environmental stewardship focus will promote reduction of pollutants and other adverse effects not only by decreasing fossil-fuel dependence but also by developing congestion avoidance systems. UDM will lead the efforts, with Leo Hanifin, dean of the College of Engineering & Science, serving as the MIOH UTC director.

The MIOH is part of a nationwide academic network of UTCs funded by the U.S. Department of Transportation to address issues of a nation on the move in a global economy. It will work toward:

- improving efficiency and use of existing transportation infrastructures, including solutions to bottlenecks, safety and security, and maintenance and repair.
- reducing energy dependence through alternative fuels and alternative energy-powered vehicles.
- enhancing supply chain performance via methods including Intelligent Transportation Systems.

In addition to the U.S. DOT, which made a four-year commitment, funds also are coming from the Michigan DOT, partner universities and corporations, for a total of approximately $1 million per year.

The UTC also will reach into the K-12 educational system to build student interest in transportation. It will conduct Technology Transfer programs to share both current research and innovative methods with practicing professions.

"Overall, the MIOH UTC will contribute important knowledge and develop future transportation professionals," says Dean Hanifin. "It will improve the Michigan-Ohio region and the nation in ways that affect everyone by decreasing congestion, improving supply chain effectiveness, reducing pollutants and reducing fossil-fuel dependence."

MIOH UTC

a University Transportation Center funded by: the U.S. Dept. of Transportation, the Michigan Dept. of Transportation, 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

Representatives from Wayne State University, Grand Valley State University, University of Toledo, Bowling Green University and UDM form the Michigan-Ohio University Transportation Center team.

DIRECTOR'S VISION

The MIOH UTC will serve the needs of the nation and region by completing specific educational, research, outreach and technology transfer projects that do just that, serve the needs of both the region and the nation. It will identify and select such projects through processes that directly involve leaders from the U.S. DOT, MDOT, ODOT, regional agencies and a variety of leaders from industry, academia and the community.

MIOH will be much more than a consortium of five universities. Rather, it will be a full partnership of industry, government and academia. In fact, no "advisory committee" will exist because industry and government leaders will be full partners in the MIOH Operating Committee and three "Interest Groups" that focus on alternative energy, transportation system efficiency and supply chains. This partnership has already involved over 100 leaders from industry, government and academia. These agendas have included "focused forums" in our three areas and many separate meetings with MDOT, ODOT, FHWA, NEXT Energy, and other organizations to focus our program and develop collaborative efforts.

As a result of all of these activities, MIOH has honed its focal areas that provide a framework for identifying projects addressing critical challenges. This framework guides an inclusive process to define and select projects. Together these will assure that the projects are not only the highest quality, but also well focused to meet a variety of important objectives, including:

- national impact,
- regional economic development,
- professional education,
- attraction of a larger and more diverse cohort of transportation professionals and
- direct impact on the congestion, the environment, energy efficiency, the competitive position and overall transportation system efficiencies in our region.

One additional aspect of MIOH that may be different than many other UTCs is the real, substantive outreach into the K-12 educational system to directly influence pre-college students' awareness, interest and preparation for careers as professionals in transportation. This program will involve a partnership between faculty at the University of Detroit Mercy, high school teachers, the Ford Motor Company and the Educational Development Corporation. This partnership will yield content, courseware and methods that will be disseminated to over 80 high schools nationally.

By the end of this four-year grant period, the MIOH UTC will be:

- a partnership of academia, government and industry marked by uniquely open and active dialogues on challenges and opportunities leading to substantive collaborations in response to them;
- a widely recognized source of knowledge and expertise in the three MIOH focal areas;
- a pipeline providing a large, diverse supply of transportation professionals who, by studying at the five MIOH universities (or in joint programs provided by multiple universities) possess exceptional competencies related to transportation systems, supply chains and alternative fuels;
- highly regarded source of continuing education for working professionals; and
- a catalyst for the generation of new products, services and systems that improve the economies of the MIOH region and its companies to partner and compete in the global marketplace.

If this vision is achieved, the MIOH University Transportation Center will be sustainable through continued government and foundation grants, corporate investment, tuition and fee income, and sale of intellectual property.

I am personally excited and immensely pleased at the development of this enterprise and its promise to achieve the objectives of DOT and our many partners in Michigan and Ohio. Together we can and will create new knowledge and impact the efficiencies and effectiveness of our transportation system, thereby creating a positive economic impact…we can and will attract and educate a cadre of transportation professionals who are better able to address the opportunities of our region and our nation than their predecessors…and in doing so, we can and will support the sustained and increased strength of our region and our nation.

Dr. Leo E. Hanifin
Director
MIOH University Transportation Center

Ford PAS Alternative Fuel Education for high school students

Building student interest in transportation is a MIOH initiative. In the first K-12 project, UDM faculty will partner with high school teachers, Ford Motor Company and the Educational Development Corporation to develop experiential curriculum in the area of alternative fuels. Mechanical Engineering Professor, Mark Schumack will lead this project with several other UDM faculty participating in module development.

Students aid MIOH UTC's researchers at Partner Universities in quest for "new knowledge, technology and managements systems"

Jason Gallivan, a MBA student at Grand Valley State University (GVSU), has a vision and a purpose. His entrepreneurial vision involves creating, inventing and innovating. He has noted that our culture tends to promote specialization and narrow fields of study but he has found that in order to follow his dreams, his vision and his potential, broadening his studies and experiences has been necessary. Education, like people, can't always be categorized and doesn't necessarily end with a degree or a career in a specific field. Gallivan has found it necessary to expand his education in order to utilize skills to the greatest potential. He wants to help improve what currently exists and also bring to light his own ideas.

Gallivan finds the hands-on learning enjoyable and the business education applicable to everyday life. He also earned a Bachelor's degree in Computer Science from GVSU. He is of the first generation in his family to attend college and the first member to pursue a master's degree.

Gallivan foresees pursuing further education in mechanical and electrical engineering. He also realizes that plans may change as time goes on.

Currently, he is working on the *Congestion Relief by Travel Time Minimization in Real Time* research project, utilizing his computer background. He is responsible for the data integration and analysis.

Gallivan serves as the president and former public relations officer of Upsilon Pi Epsilon, Gamma chapter. UPE is an invitation-only honor society and the only national society of computer science and information systems. This chapter is involved in the community and holds camps for kids introducing them to the fun and applicable computer science concepts. He is also a member of the Student Advisory Board for the graduate business school.

In his free time, Gallivan is building a house and barn in Grant, Mich.

Interview by Christine Howson, UDM post-degree English major

Sathish Padi, a graduate student in Chemistry at University of Detroit Mercy, conducts research on Ethanol from Cellulosic Peat under the direction of Mark Benvenuto, Professor of Chemistry/Bio-chemistry.

Ali Riza Guner came from Turkey to the U.S. in 2006 to work on a PhD. Program in Industrial Engineering at Wayne State University. He was working as a teaching assistant this past fall when he first learned about the MIOH-UTC. After speaking with the Investigators of the project and explaining his interest and research background, he was invited to join the team as a contributing researcher.

Guner holds B.S. and M.S. degrees in Industrial Engineering from Yildez Technical University and Fatih University, both located in Turkey. His past experience and education made him a strong candidate for the transportation research project involving trouble spots in traffic and their affect on delivery systems.

In his master's thesis from Fatih University, Guner developed a new optimization technique to solve uncapacitated location problems. He used the Particle Swarm Optimization technique to solve this combinatorial optimization problem and demonstrated its effectiveness compared with many efficient meta-heuristic algorithms. Guner's current research involves optimization techniques.

He noted that although he specifically worked with particle swarm in his master's research, the optimization techniques all have a similar foundation.

Guner has joined the *Enabling Congestion Avoidance and Reduction in the Michigan-Ohio Transportation Network to Improve Supply Chain Efficiency: Freight ATIS* research project, which aims to improve the efficiency of supply chains in the Michigan-Ohio region. Together with other researchers of the project, he is looking into the benefits of advanced traveler information systems to avoid traffic congestion as it affects Just-in-Time deliveries. JIT is being used by many U.S. companies. Within this structure, the companies rely heavily on the transportation system.

Guner used Ford Motor Co. as an example of a company that produces only the goods which it is prepared to sell immediately. Transportation plays a vital role in this arrangement because the company production lines depend upon receipt of supplies on a timely basis in order to fill quotas. A delay of time, however minimal, costs time and money for the company, and ultimately the consumer. Currently, Guner is investigating where traffic congestion occurs and why.

He is confident that efficient algorithms, which are calibrated and validated with real data, will help truck drivers avoid traffic trouble and reduce capacity buffers from logistics operations. This research aims to address not only today's traffic problems but also to prepare for the future of efficient transportation.

Guner shared that he has made a relatively successful transition to the U.S. and is busy working on his degree and research. He finds the U.S. to have many similarities to his homeland of Turkey and other European countries.

Interview by Christine Howson, UDM post-degree English major

Cont'd on page 4

K-12 outreach is alive and well at MIOH UTC

Photos above and below: In the class, "Powering the Car of Tomorrow," 9th, 10th and 11th graders in the Detroit Area Pre-College Engineering Program make biodiesel from vegetable oil and test its properties. Through hands-on activities, high school students in the Saturday DAPCEP class, learn about the fundamentals of propulsion systems, fuel origination and production, performance characteristics of alternative fuels, energy flow analysis, technological issues, and sustainability of the alternatives. The pros and cons of ethanol, biodiesel, natural gas, hydrogen and electricity as automotive energy sources are highlighted.

MIOH UTC'S Mission

MIOH will work to significantly improve transportation efficiency, safety and security in Michigan and Ohio and across the nation by increasing the effective capacity of existing transportation infrastructure, reducing transportation energy dependence thorough alternative fuels, and enhancing supply chain performance.

- This will be accomplished through the development and organization of new knowledge, technology and management systems;
- the effective transfer of new and existing knowledge to commercial enterprises and educational communities; and
- the development of cadre of transportation professionals that is larger, more diverse and better prepared to address the challenges and opportunities of 21st century transportation systems.

Students aid researchers (cont'd)

Maryam Salehabadi (center) coordinates the Advisory Board meeting for principal investigator Dr. Shahram Taj (right).

As the graduate assistant to UDM Business Professor Shahram Taj, Executive Master's of Business Administration (EMBA) student **Maryam Salehabadi,** is helping to develop a new master's degree and certificate program at UDM focused on supply chain management and network congestion. With researchers from University of Toledo, the team is currently benchmarking existing curriculums around the country. As project manager, Salehabadi assigns tasks and timelines to everyone involved. After completing a Bachelor's degree in Computer Science at York University in Toronto and six years of IT experience, Salehabadi began her EMBA program in 2006. Even though she had become a business student, Salehabadi also desired to continue to work in the sciences. When applying for the assistantship in supply chain management, Salehabadi did not know much about the area. "After doing some research and working with Dr. Taj, I am very interested in it," she says. "I want to apply for Project Manager positions in the IT field so I can use my IT background combined with the business and management experiences I have from the projects at UDM." Salehabadi plans to graduate with her EMBA in 2007.

Interview by Courtney Olson, UDM Liberal Arts senior

DAPCEP students engage in "hands on" activities

Alternative Fuel Research

Ethanol from Peat

UDM Professor and Chair of Chemistry/Biochemistry Mark Benvenuto will lead research involving the production of ethanol from peat and other cellulosic materials found in native-Michigan plants. Dr. Charles Winter of WSU is partnering on this research.

Biodiesel Stability

Dr. Steven Salley, Chemical Engineering at WSU, with support from Dr. K.Y.Simon Ng and Dr. Martin Abraham of The University of Toledo will examine biodiesel fuels relative to improved oxidative stability.

Educate Future Transportation Professionals

Transportation/Supply Chain Graduate Program

UDM Professor of Business Administration Shahram Taj will lead a project to develop graduate-level curricula in transportation network congestion and supply chain efficiency. Co-Principal Investigator on this project will be Dr. Subba Rao and other faculty from The University of Toledo.

Hydraulic Hybrid Education

Dr. Mohammad Elahinia, Dept. of Mechanical, Industrial, and Manufacturing Engineering at the University of Toledo, will be involved in an educational project to develop a computer simulation of hydraulic hybrid vehicles. Collaborating on this research is UDM Professor of Mechanical Engineering Mark Schumack.

Untangle Our Cities

Traffic Congestion Relief

Dr. Charles Standridge, School of Engineering at Grand Valley State University, will lead a project developed at GVSU with contributions from Dr. Shabbir Choudhuri, GVSU, and Dr. Snehamey Khasnabis, Wayne State University, for a proposed integrated software system to address traffic-congestion relief.

Evaluation of Intelligent Transportation System in Oakland County

UDM Professor and Chair of Civil Engineering Utpal Dutta will focus on evaluating a currently existing Intelligent Transportation System known as SCATS. The focus of this research will measure the impact of the system as installed versus a comparable major roadway without the benefit of SCATS.

Congestion Avoidance for Supply Chain Improvement

Dr. Ratna Babu Chinnam and Dr. Alper Murat, both of WSU's Indudustrial and Manufacturing Engineering Department, and UDM Professor of Business Administration Gregory Ulferts will initiate research in congestion avoidance and reduction to improve transportation supply chain efficiency in our region.

Alternate energy and system mobility to stimulate economic development.

MIOH UTC issues RFP for research year 2007-2008
Submission deadline June 15, 2007.
For an electronic copy contact Pat Martinico at martinpa@udmercy.edu or 313-993-1510 or visit the MIOH UTC web site at http://mioh-utc.udmercy.edu.

Register now for TransIT camp

Camp Dates: July 16-20, 2007
For: 9th-11th grades in 2006-07
Registration deadline: June 1.

TransIT is a one-week commuter program exploring the world of transportation. It is open to any high school student currently in the 9th through 11th graders. A Minimum 2.75 GPA is required. Enrollment is limited to 20. TransIT will run July 16-20, 2007, 9:00 a.m. to 2:30 p.m. daily. Please inquire about scholarships. For more information or to request a brochure/application, please contact Director of Pre-College Programs
Dan Maggio at maggiodd@udmercy.edu.

Inside this issue…

MIOH UTC
E126
University of Detroit Mercy
4001 W. McNichols Road
Detroit, MI 48221-3038