OHIO TRANSPORTATION CONSORTIUM

Annual Report
2009-2010

www.otc.uakron.edu

Director's Message

In the past year, OTC participating universities' faculty and students continued to conduct applied research improving the performance of our transportation system. They have undertaken projects of various topics sponsored by USDOT, USDOD, ODOT, and other research centers, published in professional journals and conference proceedings, and continued to be featured in local, regional, national and international level conferences and workshops. The Center has just completed another round of proposal selection and several additional projects from our participating universities have been funded.

The OTC is committed to training tomorrow's transportation workforce and preparing students for the increasingly more difficult social, economic, and technical challenges of transportation tomorrow. Our faculty members have continued to promote transportation education through teaching, research, and outreaching activities. Last year, three new courses in transportation were developed by our faculty; additional students at graduate and undergraduate levels joined OTC sponsored research projects; students participated in the OTC annual student paper competition; one of our students won the ITE Daniel B. Fambro Student Paper Award; and the Student of the Year was selected and honored by RITA in Washington DC.

Economic pressures continued to challenge our transportation system with declined transportation revenue and increasing competition from other sectors. The federal government's recent initiatives in alternative energy and high-speed rail help address the above problems by promoting high system efficiency and low emission applications. While the big picture is where to find and how to use the necessary funds in the next transportation reauthorization legislation, we will continue to focus on accountability and coordination to measure the Center's effectiveness.

Ping Yi
Director, OTC

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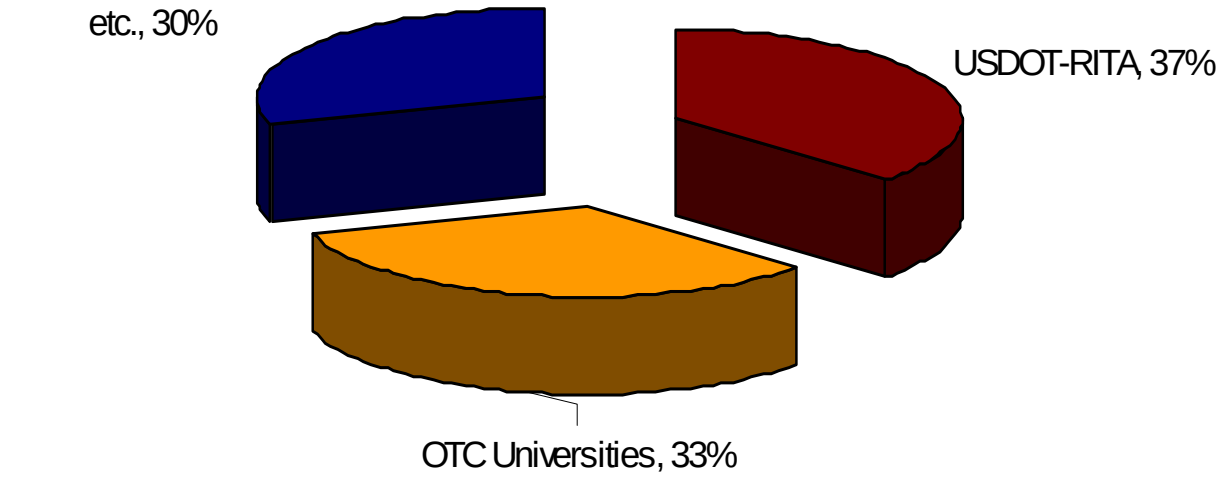
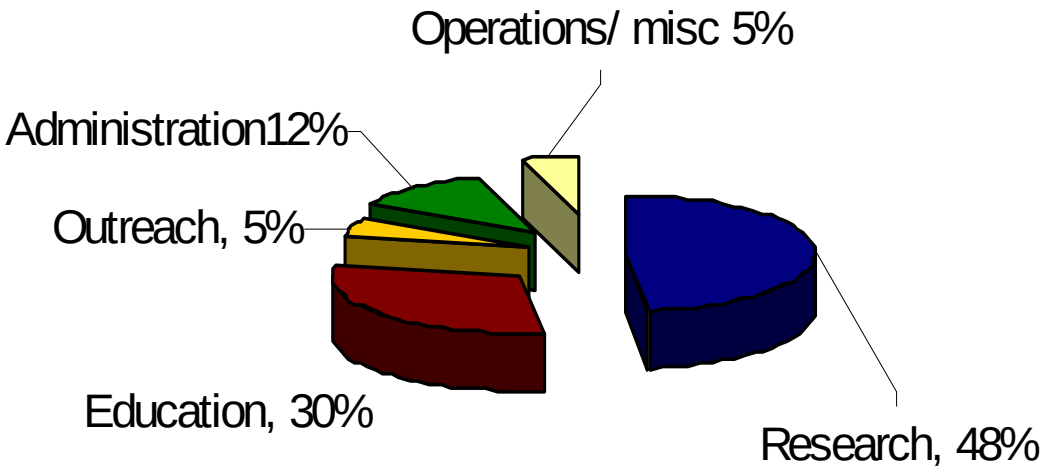
Financial Report

Funding Sources



Expenditures

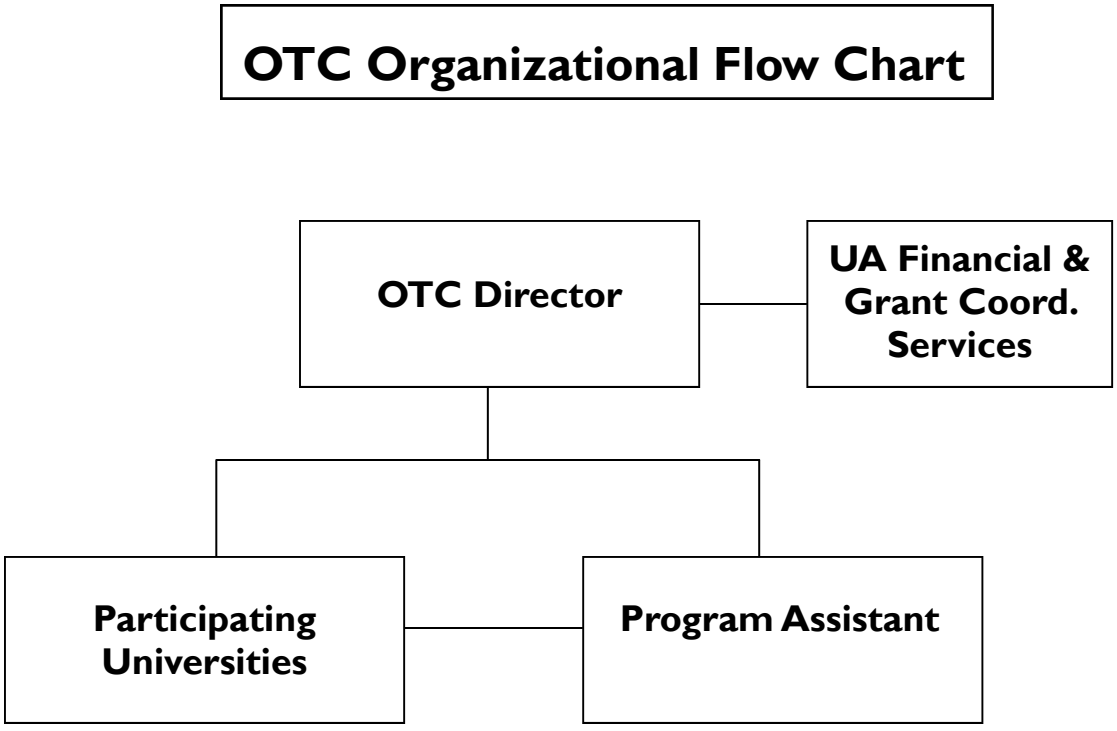


About the OTC

The Ohio Transportation Consortium (OTC), a Tier II University Transportation Center (UTC) established in 2006, operates under the theme of *Transportation Mobility and Infrastructure Management.* This theme allows the OTC to draw on the knowledge, expertise, and resources of its participating universities which encompass a vast area including but not limited to: traffic detection and surveillance systems, data mining and fusion, adaptive traffic signals and optimization, location based information system, parking management and traffic calming, sustainable transportation systems, crash data analysis, work zone planning and safety, environmental impacts of transportation systems, geotechnical assets and risk management, pavement and highway materials and design, pavement monitoring, monitoring and rehabilitation of bridge systems, nondestructive testing of bridge systems, and performance evaluations. What makes the OTC unique is that it not only draws on the resources of eight Ohio universities both public and private (Case Western Reserve University, Central State University, Kent State University, Ohio State University, Ohio University, University of Akron, University of Cincinnati, and University of Dayton) but that two of those universities do not have an established Transportation Engineering program. This allows the OTC to draw on those universities' unique assets while bringing diverse perspectives to the research conducted.

The OTC effectively functions with minimal staffing. Dr. Ping Yi, The University of Akron (UA), serves as the **OTC Director** and is responsible for implementing the OTC's Strategic Plan, ensuring compliance with all UTC program requirements, serving as liaison with USDOT, sponsors and other groups and convening technical and managerial meetings as well as attending UTC business meetings and annual meetings as required by USDOT RITA. As CEO, he oversees all of the administrative and financial operations of the OTC. A **Board of Directors**, comprised of one member from each participating university, is involved in selection of projects, monitoring implementation strategies, collaborating with other centers in the region, and performing various planning and administrative functions. Angela Brodie acts as the **Program Assistant** and aids the director in activity planning and management while providing general support to all aspects of the OTC including daily operations. She is responsible for initiating and coordinating activities, on-site conferences and meetings, and outreach events. She also ensures all federal

funding requirements such as publications and reports are processed in a timely manner. The OTC utilizes services from UA including **Grant and Budget Manager** Cynthia Boll and an assigned UA **Grants Coordinator.** Ms. Boll is responsible for coordinating grants management with UA's Office of Research and Development and the Office of Controllers as well as assisting the director in financial dealings. She coordinates all bookkeeping and ensures that financial budget reports and budget projections are updated to maintain the long-term financial sustainability of the OTC. The UA assigned Grants Coordinator manages all subcontract agreements and acts as liaison between UA's Research Services and Sponsored Programs and OTC partner universities' research offices.



Our Students

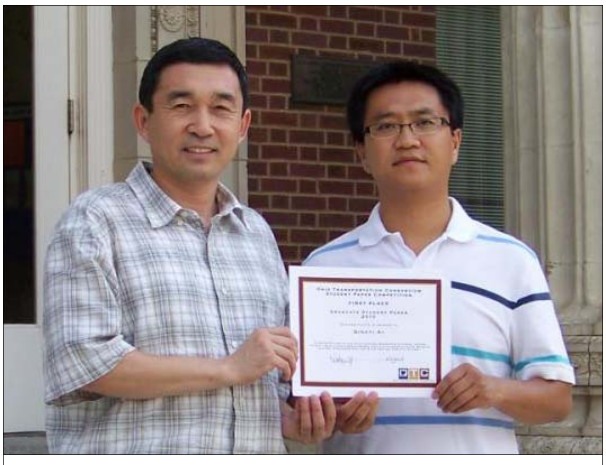
Student Paper Competition

The OTC held its second Annual Student Paper Competition this past spring. An impressive array of research papers was submitted by students from five of the eight participating universities. While all of the papers were well researched and written, two papers were chosen as contest winners.


Andre' Morton with advisor Dr. Ramani Kandiah

Mr. Andre' Morton, a senior student in the Department of Water Resources Management at Central State University, was chosen as the Undergraduate Student Paper Competition Winner for his paper titled, *Classification of Urban Districts based on Mobile Carbon Monoxide Exposure Using Self Organizing Maps.* His paper elaborates on the concepts of exploring Self Organizing Maps (SOM) as a tool for studying a few urban "air districts" in the USA with respect to the demography using a single mobile source air pollutant.

Before attending Central State University, Mr. Morton received his B.A. in Speech Communications from Miami University of Ohio in 2001 and M.A. in Communication Studies from Bowling Green State University in 2003. Since then, he has participated in the National Nuclear Security Administration Hyperspectral Workshop (2008) and Evaportranspiration in Southwestern USA Project of the United States Bureau of Reclamation (2008-2009) as an undergraduate research assistant. In 2009 he completed a summer co-op internship with the Northeast Ohio Regional Sewer District (NEORSD). The co-op experience consisted of analysis of bid contracts and requests for proposals for improvements to be made to NEORSD facilities as well as development of excel spreadsheets of cost saving measures implemented at three NEORSD facilities from 2003-2009. He is currently working with Dr. Ramani Kandiah on the OTC sponsored project *"On-Road Mobile Source Pollutant Emissions: Identifying Hotspots and Ranking Roads"* in ranking of roads based on on-line mobile pollutant emissions using neural network.


Qingyi Ai with advisor Dr. Heng Wei

Mr. Qingyi Ai, a Ph.D. candidate in the Transportation Engineering program in the College of Engineering and Applied

Science at the University of Cincinnati (UC), was awarded Graduate Student Paper Competition winner for his paper titled, *Dual-Loop Length-Based Vehicle Classification Models against Synchronized and Stop-and-Go Traffic Flows.* His paper presents an innovative approach to evaluate dual-loop length-based vehicle classification models against concurrent ground-truth video vehicle trajectory data at the selected dual-loop traffic monitoring stations.

Mr. Ai joined the Graduate School at UC in September of 2007 under the advisement of Dr. Heng Wei. His research interests include traffic congestion modeling and vehicle classification modeling using high resolution dual-loop data, emergency evacuation, traffic operational impact on emission, and GIS application in transportation system. He received his B.S. in Civil Engineering from Huazhong University of Science and Technology (China) in 1998 and M.S. in Transportation Engineering from Beijing University of Technology (China) in 2006. Before joining UC, he worked as a civil engineer in China for five years and worked on project management of transportation infrastructure and transit network planning of the city of Tianjin. Having completed his course work and passed his Ph.D. qualifying and proposal exams in May 2009 and June 2010, he is now under the supervision of Dr. Heng Wei. He is also a student member of ITE and NACOTA.

Student of the Year

Jonathon Fagert, Case Western Reserve University, was chosen as the OTC's 2009 Student of the Year (SOY). Jonathon is a graduate Civil Engineering student in pursuit of an M.S. in Structural Engineering. His outstanding academic performance, leadership skills, and great promise to advance the transportation profession led to his selection as SOY. Jonathon achieved a near perfect 4.0 as an undergraduate and a perfect 4.0 as a graduate student. Additionally, he was recognized with the Kenneth M. Haber award presented to an outstanding senior in Civil Engineering at Case Western Reserve University.

Outside of the classroom, Jonathon participated in a research project, under the supervision of Professor Xiong (Bill) Yu, monitoring the condition of highway bridges. Through this project, Jonathon developed and evaluated the potential of an innovative guided electromagnetic wave radar technology for real time monitoring of structural performances with very promising results.

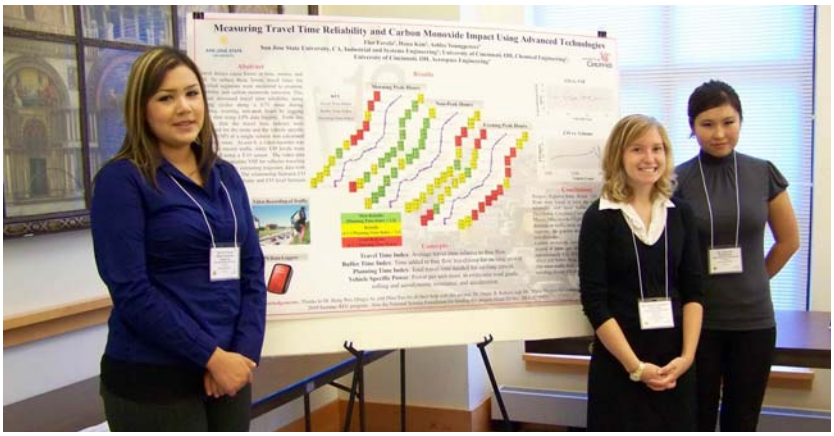
Following graduation, he plans to enter the industry as a Structural Engineering designer. His future plans also include pursuing a Ph.D. in Civil Engineering and embarking on educating the next generation of Civil Engineers.

Our Students

Incorporating OTC-Funded Research

The 2010 Summer NSF REU Program in "Engineering Tomorrow" was conducted by the College of Engineering and Applied Science at UC June 21st — August 13, 2010. The goal was to provide students with an eight-week full-time research experience. The transportation project *Measuring Travel Time Reliability and Carbon Monoxide Impact Using Advanced Technologies* mentored by Dr. Heng Wei and his Ph.D. students, Qingyi Ai and Zhuo Yao was one of four projects involved. This project was an effort to incorporate a recent OTC-funded project, *Integrating Traffic Operation with Emission Impact using Dual-loop Data* in which Dr. Heng Wei is the PI.

Three undergraduate students were involved in the project which explored the modeling method for integrating traffic flow operation with vehicle emissions by using the data obtained by advanced technologies. In this project, the participants collected the travel time data of a selected freeway segment in Cincinnati, Ohio. A Global Positioning System (GPS) Travel Recorder Data Logger was employed to record the travel data. The GPS Travel Data Loggers were mounted to probe cars and the REU participants drove the probe cars along the selected freeway segment in three different time periods (morning peak, noon, and evening peak). Meanwhile, vehicle trajectory data and the Carbon Monoxide (CO) level of vehicle emissions were collected. A video camera recorded traffic flows during peak hours and non-peak hours. A CO sensor was also used to collect the CO data. The vehicle trajectory data such as speeds, acceleration or deceleration rates, vehicle lengths, and traffic counts, were extracted by using the software VEVID in the ART-Engines transportation research laboratory at UC.

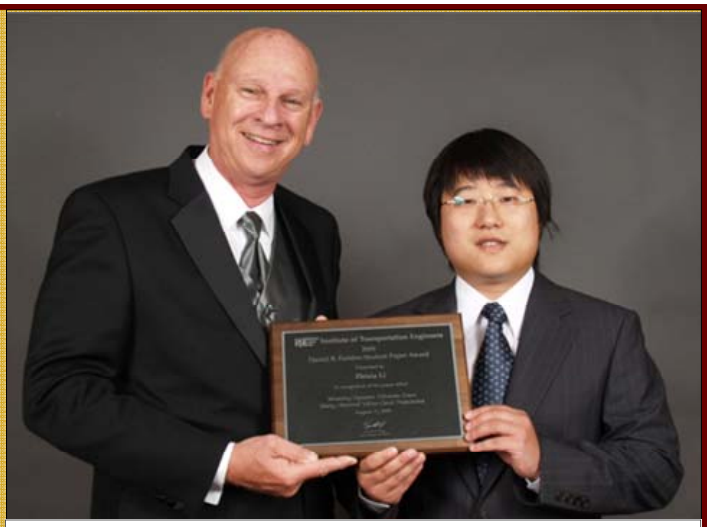


In the office, data analysis and modeling were conducted in several steps. The REU participants attempted to determine the relationship between the CO level and the single vehicle's VSP and the group vehicles' VSP.

The relationship between the CO level and the traffic counts at the study site were also analyzed.

This project helped the REU participants better understand the significance of transportation research and how a transportation research project is conducted in reality. The students were able to learn the skills used in data collection and modeling analysis for scientific research. Their results were presented at poster and presentation sessions.

Mr. Zhixia Li, Ph.D. candidate in Transportation Engineering, School of Advanced Structures at University of Cincinnati (UC), has had great success under the advisement of Dr. Heng Wei, Associate Professor at UC. Dr. Wei has encouraged Mr. Li, along with fellow Ph.D. candidate Qingyi Ai (2010 OTC Graduate Student Paper Award Winner), to participate in his OTC-funded research projects since 2008. As a result, Mr. Li has submitted several papers based on the research results and has won a variety of awards. Mr. Li won the Institute of Transportation Engineers (ITE) Daniel B. Fambro Student Paper Award (only one award nationwide per year) in recognition of his paper titled *Modeling Dynamic Dilemma Zones Using Observed Yellow-Onset Trajectories.* This paper has been published in *ITE Journal*, November 2009. Mr. Li also took 1st place in the ITE Great Lakes District Student Paper Competition (including the states of Indiana, Michigan, and Ohio) in May 2009. His awarded paper was titled *Modeling Dynamic Dilemma Zones and its Applications*.



Mr. Kenneth H. Voigt, ITE president, and Zhixia Li in San Antonio, Texas.

Additionally, Mr. Li, along with project PI Dr. Heng Wei, exhibited their poster at the American Society of Highway Engineers (ASHE) National Conference, June 9-13, 2010, Cincinnati. Ohio. Their poster, *Analysis of Drivers' Stopping Behaviors Associated with the Yellow Phase Dilemma Zone - An Empirical Study in Fairfield, OH,* was presented by Mr. Li. The poster was selected by the ASHE committee as the First Place Award Winner for Technical/Research Poster Category.

As a result of his outstanding achievements, Mr. Li has been selected as one of only six student project participants at UC that will be featured in a video project reflecting student achievements. This video project is promoted by Dr. Sandra Degen, Vice President at UC, and will be released by UC Public Relations.

Research

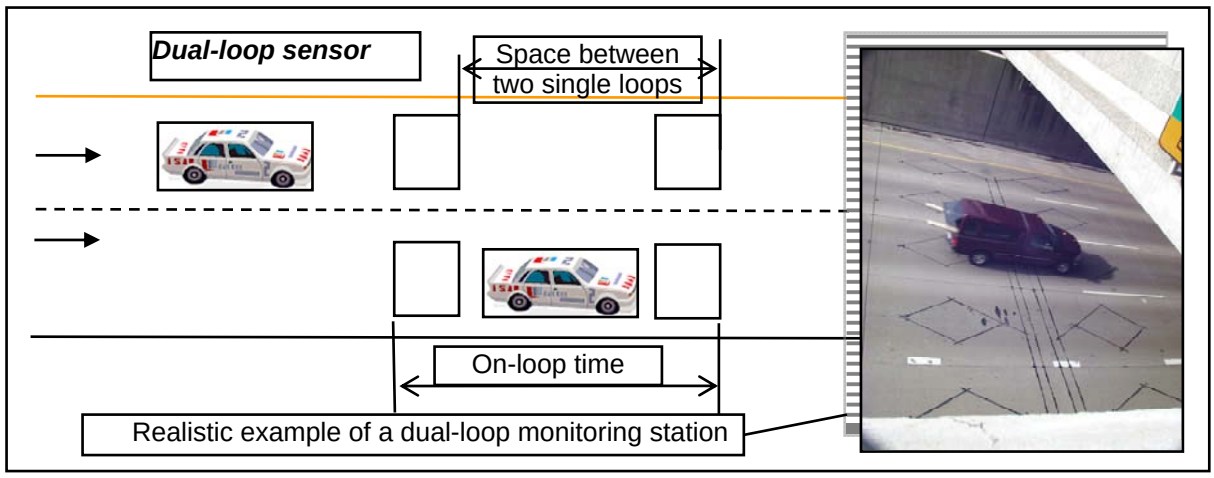
DriveSafety Research Simulator at Ohio University

Dr. Deborah McAvoy, Ohio University, has been awarded funding for her project, *Evaluation of Dynamic Speed Signs*. Speeding is a major increasing contributing factor in all traffic crashes including local and collector highways. This factor, in addition to restrictive law enforcement agencies' budgets and staff, poses an ever present need for effective, low-cost, speed mitigation measures. Studies have determined that Dynamic Speed Signs (DSS), when used in relation to roadway work zones, can reduce the traveled speed of vehicles. DSS display the approaching vehicle's speed to the driver in addition to the posted speed limit. This study will evaluate the effectiveness, both short-term and long-term, of DSS as a speed reduction measure for local and collector roadways. Different configurations and messages will be examined to determine the most effective DSS. The study will be conducted through the use of a driving simulator obtained through a National Science Foundation grant by the Principal Investigator. The results of this study will provide concepts that can be utilized in the development of Variable Speed Signs for interstates and highways during recurring or nonrecurring congestion in order to limit queuing and poor levels of service.

Dr. Heng Wei, University of Cincinnati, received funding for his project, *Integrating Traffic Operation with Emission Impact using Dual-loop Data.* This project will address the challenges in reducing carbon emissions brought on by transportation. Vehicle Specific Power (VSP) is the most advanced concept to reflect a vehicle operation impact on emission; however, data for calculating VSP is currently dependent upon the limited samples of testing vehicles equipped with on-board or portable emission measurement system. Dual loops (in-pavement sensors) are widely utilized in collecting continuous traffic data and their outputs could be utilized as a rich data source for calculating VSP. Most existing loop models for measuring speeds and vehicle classifications have been proved accurate against light traffic, but they are not reliable under other traffic conditions like synchronized or stop-and-go congestion. Fortunately, recent studies ("OTC vehicle classification" project) have resulted in positive solutions to ensure the accuracy of loop models leading to the technical promise for developing VSP-based models of estimating micro-level emissions under various traffic opera-

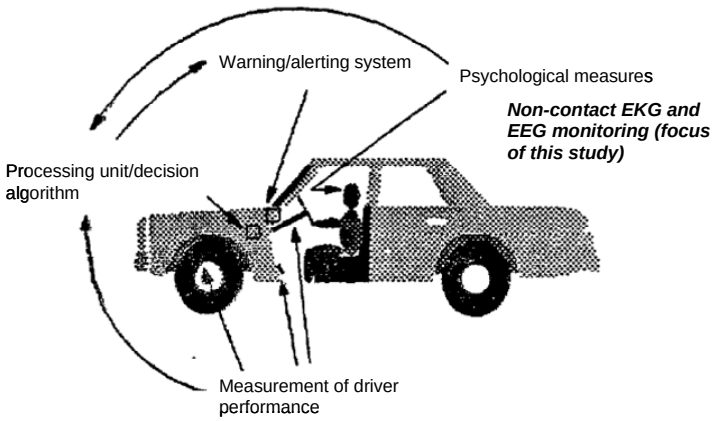
tions by using dual-loop data. This project will develop a framework to integrate the improved dual-loop models with VSP-based models into a procedure for estimating emission impact of traffic flow operation over dual-loop monitoring stations in highways. Remote sensing method will be used to monitor CO and CO2 at the "OTC vehicle classification" project site. Meanwhile, VEVID-based approach will be applied to calibrate dual-loop models for generating accurate fleet distributions. Global Positioning System (GPS) Travel Loggers will be employed to check the traffic patterns and relevant VSP profile along the selected section of the high-way. The results will be adapted for use in the classroom.

Illustration of a vehicle passing over a dual-loop monitoring station



Developing a Bike-Sharing Program at Kent State University and Kent, Ohio is the project focus for Dr. David Kaplan of Kent State University. Bicycling can provide tremendous mobility while also being environmentally friendly, less costly in terms of parking and roadway infrastructure, and an ideal way of introducing exercise into people's daily lives. However, bicycling for commuting purposes is used by relatively few individuals in American society. Since many people do not have access to working bikes, one of the most effective policies would provide increased access. Programs that put more bicycles on the streets would also work to increase awareness and make bicycling safer for all. Among the most useful interventions is a program that provides operating bicycles for short term usage meant solely for the purpose of getting from one place to another. This proposal builds on his previous OTC-funded projects and considers the feasibility of initiating a bike-sharing program at Kent State University, in coordination with the city of Kent, Ohio. Results from this study could be used by other universities interested in incorporating similar programs on their own campuses.

Research



Enhanced safety from drowsiness monitoring and countermeasures

Dr. Bill Yu, Case Western Reserve University, will use an interdisciplinary approach interfacing engineering and psychology to address the transportation safety factor of driver drowsiness in his OTC-funded project *An Innovative Non-contact Sensing Platform to Prevent Traffic Accident due to Driver Drowsiness.* A sensing platform to non-contact monitor the physiological signals of drivers such as the electrocardiography (EKG) and Electroencephalography (EEG) will be developed to study the influence of human factors on transportation under natural driving conditions. The sensing will be based on capacitive coupling of the neural electricity under the human skin. A high sensitivity sensor and electronics will be designed to detect such bioelectricity. A newly acquired high fidelity driving simulator will be used for sensor performance validation. The performance will be evaluated by installation of the sensing device behind the driver seat and on the ceiling. The final product of this project will be an accurate sensing platform to noncontact monitor the EKG and EEG signals of the driver. This signal can then be fused with performance signals from which efficient drowsiness detection and countermeasures will be implemented. With the integration of proper data fusion algorithm, effective countermeasures can be delivered to the driver for accident prevention.

Dr. Ping Yi and co-PI Dr. William Schneider, The University of Akron, have been awarded funding for their research project *Development of a Mobile Data Acquisition System using Multitouch Technology for Intersection Performance Measurement.* Due to the labor-intensive and time consuming nature of conventional methods of traffic data collection, it is important to investigate alternative methods. Manually transcribing traffic data and entering into a spreadsheet is not only ineffective but also error-prone. Automatic traffic data collection by detectors and other traffic sensors requires installation of expensive hardware equipment costly to maintain, yet some critical information, such as vehicle turning movements and intersection delay, is hard to obtain due to lack of vehicle tracking capability by the detectors/sensors and the limitations of data

processing algorithms. Some companies have contributed to improving the experience of manual data collection by developing hand-held devices that are easy to use; however, the ability of such devices to collect different types of traffic and system performance data is very limited. Recently, the development of touch screen technology, especially multi-touch technology after it was introduced, has led to many innovative applications in computer operation and cell phone use. Since the introduction of iPhone in 2007, multi-touch technology has been gradually accepted by the public and is becoming the industry standard for not only smartphones but also other portable devices. This technology can be applied in traffic data collection with versatile functions and at no additional cost. The objective of this project is to conduct a feasibility study that develops and demonstrates an innovative method of collecting and analyzing intersection data using a multi-touch enabled smartphone.

Dr. Heng Wei (PI) and Dr. Ping Yi (co-PI) have begun research on their ODOT funded project, *Optimum Loop Placement That Balances Operational Efficiency and Dilemma Zone Protection.* Current method for advance loop placement at high speed approaches (≥ 40 mph) in Ohio Department of Transportation (ODOT) are based on previous study results in which the dilemma zone was estimated assuming the constant values of the contributing factors such as maximum deceleration rate and perception-reaction time (PRT). In reality, those contributing factors are dynamic and then the dilemma zone is greatly dependent upon the dynamics of those factors. In other words, the computed range and location of the dilemma zones based on traditional method are barely reflective of the real location of the dilemma zone. As a consequence, neither proper dilemma zone protection nor good operational efficiency could be achieved based on inaccurate estimate of the dilemma zones. In order to appropriately address the balance issue between the operational efficiency and the performance of dilemma zone projection, an advancement in the modeling of the dilemma zones is needed. To address the above issues, the dynamics of dilemma zone in Ohio need to be investigated by using relevant vehicle trajectory data which is obtained through both observation method and advanced techniques. Such dynamics are anticipated to be quantitatively featured and modeled so as to enable the update of the current ODOT dilemma zone table to well reflect the dynamics. And, the optimum loop placement method needs to be developed to maximize its overall performance in terms of both dilemma zone protection and the operational efficiency.

Research

Dr. Ernian Pan and co-PI Dr. Ping Yi, The University of Akron, have been awarded OTC funding support for their ODOT project, *An Efficient and Accurate Genetic Algorithm for Backcalculation of Flexible Pavement Layer Moduli.* Mechanical properties of pavement materials have always played a primary role in pavement engineering. They are of importance in designing new pavement, estimating pavement remaining life, and helping decision-makers select the optimal reconstruction and/or rehabilitation strategy. Moreover, in the newly released Mechanistic Empirical Pavement Design Guide (MEPDG), material properties, i.e. modulus and Poisson's ratio, form the basic inputs in the forward calculation of pavement responses, i.e. displacement, strain and stress. Therefore, it is obvious that the accuracy of modulus input will directly influence the pavement performance, and thus the safety of travelers on the highway. Backcalculation has been a challenging and yet urgent topic and has gained much attention from engineers and researchers. Because of the large amount of computation tasks, the backcalculation programs based on genetic algorithm (GA) are currently still limited to theoretical investigation. Furthermore, most available programs are only able to analyze pavement with very few homogeneous layers, e.g. four layers in MODULUS and five layers in BACKGA-ANN. However, it is well-known that asphalt material is very sensitive to time and temperature, and the aging- and temperature-related functional graded moduli (FGM) need to be included in asphalt concrete. Such stiffness gradient will consequently affect pavement responses significantly, thus functionally graded stiffness should be considered in backcalulation. Stiffness gradient (FGM) profiles of pavements have been extensively reported in pavement engineering; however, no work has been conducted to investigate the influence of the FGM on pavement backcalculation. The objective of "An Efficient and Accurate Genetic Algorithm for Backcalculation of Flexible Pavement Layer Moduli" is to investigate how the stiffness gradient (FGM) affects backcalculation of flexible pavement.

OTEC Expecting OTC-funded Project Results

Dr. Heng Wei has been invited by the organization committee of the Ohio Traffic Engineering Conference (OTEC) to present his *Optimal Loop Placement and Models for Length-based Vehicle Classification and Stop-and-Go Traffic* project results at a special session of OTEC in October 2010 in Columbus, Ohio. Dr. Wei will address issues of the existing dual-loop length-based vehicle classification models that produce high and/or unstable errors under non-free traffic conditions. The study involved in the OTC-funded project explores the method for improving the models through evaluating dual-loop data with concurred video-based ground-truth vehicle trajectory data.

Dr. Benjamin Coifman, Ohio State University, has been awarded funding support for his project *LIDAR Based Vehicle Classification.* The proposed research will continue investigation into the use of LIDAR (Light Detection And Ranging) sensors to scan vehicles passing at speed and develop the necessary algorithms to classify the vehicles accurately. Both probe vehicle mounted LIDAR and wayside mounted LIDAR deployments will be considered. A van instrumented with a pair of LIDAR sensors that sweep vertically across the road in a "speed-trap" configuration will be employed (see fig. 1). The probe vehicle based classification data will be collected while the van is driving on pre-defined tours while the wayside mounted classification data will be collected while the van is parked at the study location to collect data over several hours. This proposal picks up where the earlier studies leave off advancing the work on the following fronts: shape based classification, developing the LIDAR classification over a wider range of Federal Highway Administration (FHWA) axle classes, improving occlusion reasoning, and axle detection and inference. LIDAR based classification is a promising alternative to supplement existing classification stations. Such an installation could be permanent or temporary, would cost significantly less than a comparable in-pavement system, and will require significantly less setup in the field. Compared to conventional sensors, the LIDAR collect much more information about the passing vehicles. The mobile, probe vehicle mounted LIDAR promises to provide lower resolution information on many more links than are currently available from the fixed classification stations. Such information will help detect problem spots earlier and validate assumptions of transferability of measurements from the fixed locations to other parts of the network.

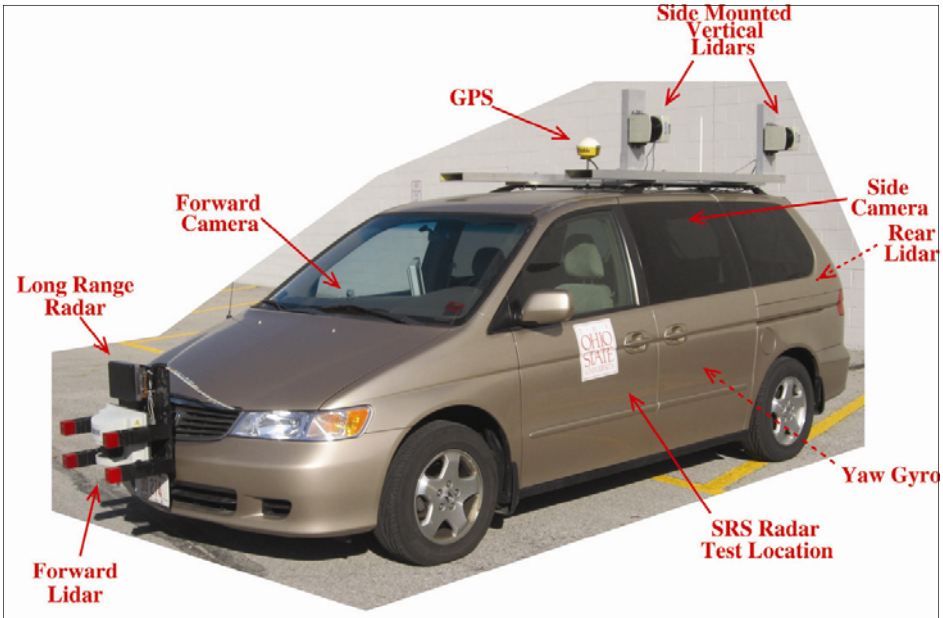


Fig. 1 View of the instrumented vehicle platform, showing several of the sensors, including the side LIDAR speed trap.

Outstanding Accomplishments

National-level presentations

Eustace, D. (2009). "Development of a Problem-Based and Cooperative Learning Course for Undergraduate Students." A Faculty Exchange Series (FES) presentation, LTC Forum, Roesch Library, University of Dayton, March 25, 2009.

Eustace, D. (2009). "Incorporating Problem-Based Learning and Cooperative Learning Components in an Undergraduate Transportation Engineering Course," A poster presentation at the Transportation Engineering Education Conference, Portland, OR, June 22-24, 2009.

Kaplan, David H. (2010). "Getting Around Town in a Sustainable Way: Facilities, Attitudes, and Behaviors" *Association of American Geographers*. Washington, DC, April 2010.

Li, Z. and Wei, H. (2010). "Analysis of Drivers' Stopping Behaviors Associated with the Yellow Phase Dilemma Zone -- An Empirical Study in Fairfield, OH." Winner of the First Place Award for Technical/Research Poster Category at the American Society of Highway Engineers (ASHE) National Conference, Cincinnati, OH, June 9-13, 2010.

Li, Z., and Wei, H. (2009). "Modeling Characteristics of Dilemma Zones using Vehicle Trajectory," Presented at the 12th Annual NACOTA/WCTA Technical Symposium on Sustainable Transportation Development in China, Washington, D.C., January 11, 2009.

Ping Yi, " Modeling Network Impact in AREA Surrounding Activity Center Due to Special Events", presented in the 88th Transportation Research Board Annual Meeting, Washington DC, January, 2010.

Ping Yi, "Enhancing Traffic Safety at high-speed Intersections Through Vehicle Tracking", presented in 10th ICCTP, Beijing, China, August, 2010

Ramanitharan, K. and Meade, Wilbert (2009). A Methodology to Estimate the Annual Average Daily On-Road Mobile Source Pollutant Emissions. 5th Annual Dayton Engineering Science Symposium, Dayton, OH, October 26, 2009.

Wei, H., and Li, Z. (2009). "Dilemma Zone Modeling using Yellow-Onset Vehicular Trajectory Data." Presented at the 9th International Conference of Chinese Transportation Professionals (ICCTP), Harbin, China. August 6, 2009.

Publications

Research Papers

Baoji Wang, Ping Yi (corresponding), "Enhancing Traffic Safety at High-speed Intersections Through Vehicle Tracking", Conference Proceedings of 10th ICCTP, Beijing China, 2010.

Chun Shao, Ping Yi (corresponding), Abdullah Alhomidan, "High and Low Deer-Vehicle Collision Roadway Sections – What Makes Them Different?", to appear in The Open Transportation Journal, 2010

Li, Z., Wei, H., Ai, Q., and Yao, Z. (2010). "Empirical Analysis of Drivers' Yellow Stopping Behaviors Associated with Dilemma Zones." Compendium of Papers CD-ROM for 88th Transportation Research Board Annual Meeting, Washington, D.C., January 10-14, 2010.

Wei, H. Li, Z., and Ai, Q. (2009). "Observation-based Study of Intersection Dilemma Zone Natures" *Journal of Transportation Safety & Security*, Vol. 4, No. 1, pp. 282 - 295.

Wei, H., and Li, Z. (2009). "Dilemma Zone Modeling using Yellow-Onset Vehicular Trajectory Data" *ASCE Proceedings of 9th International Conference of Chinese Transportation Professionals (ICCTP)*, Harbin, China. August 5-9, 2009.

Yucheng Zhang, Ping Yi (corresponding), Kevin L. Kreider, Chun Shao, Timothy S. Norfolk, " Modeling Network Impact in AREA Surrounding Activity Center Due to Special Events", to appear in Journal of Transportation Research Board 2010

Project Reports

McAvoy, Deborah (2010) "Determination of Traffic Control Device Selection for Nighttime Maintenance of Traffic".

Yi, Ping (2009) "Development and Testing of an Automated Turning Movement Identification System".

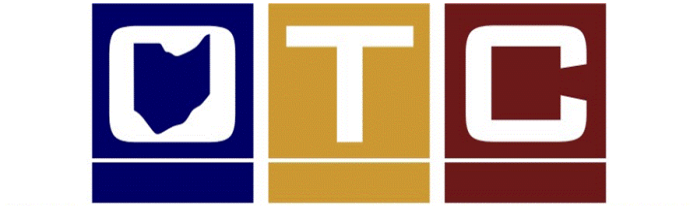
New Transportation-related Courses at OTC Universities

Traffic Safety (University of Dayton) provides an introduction of the planning, analysis, implementation and evaluation components of a strategic highway safety plan. Factors contributing to highway accidents, trends, and common countermeasures are covered. The course also introduces advanced traffic safety statistical analysis techniques of identifying hazardous locations and ranking.

Urban Public Transportation (University of Dayton) introduces students to the concepts of transit operations planning, analysis and evaluation of urban transportation systems and short and long range planning for alternative transit systems.

Travel Demand Modeling (University of Dayton) provides students with an understanding of the basic fundamental concepts and theories of travel demand modeling. The students will acquire skills pertaining to collection and analysis of travel demand data inputs. In addition, students will be introduced to current travel demand modeling techniques and how to apply them. Students will be introduced to one of the existing travel demand forecasting computer software packages.

Fundamentals of Air Quality Engineering (Central State University) will focus on the characterization and control of air pollution problems. Analysis of fundamental chemical and physical processes governing pollutant transport and dispersion in air will be discussed as well as combustion chemistry of hydrocarbon fuels. Air pollution control systems, pollution sources, control techniques with introduction to sensors, transformations, atmospheric transport, deposition and modeling will all be addressed.



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