2nd Summer Conference on Livable Communities

July 23-24, 2015

College of Engineering and Applied Sciences
Western Michigan University • Kalamazoo, MI

US DOT Tier 1 University Transportation Center

Transportation Research Center
for Livable Communities

Western Michigan University • University of Texas at Arlington
Utah State University • Wayne State University • Tennessee State University

www.wmich.edu/transportationcenter
www.facebook.com/TRCLC

Contents

Welcoming Remark - Dr. Jun-Seok Oh

It is my pleasure to have many participants, not only from academia but also from government agencies, in the Second Annual Summer Conference on Livable Communities. It has already been almost two years since we formed our Transportation Research Center for Livable Communities (TRCLC) at Western Michigan University. I believe that this conference will provide a unique opportunity to discuss about non-motorized transportation services and safety together with researchers, practitioners and administrators. Poorly balanced transportation systems in the United States have led to auto-dependent communities. Over the past several decades our communities have become less walkable, less bikeable and less accessible to public transit. Now, it is time to shift our paradigm from auto-dependent transportation to people-oriented transportation. I truly hope this conference becomes a venue to discuss current issues and limitations.

Dr. Jun-Seok Oh is the Director of Transportation Research Center for Livable Communities and Professor of Civil and Construction Engineering at Western Michigan University. His research focuses on sustainable transportation systems that incorporate advanced technologies for non-motorized transportation, and big data analysis for improving traffic safety and real-time traffic operations.

Congratulatory Remark – Dr. Dan Litynski, Western Michigan University

Western Michigan University is a public national research university with nearly 24,000 students from across the United States and over 100 countries. It is learner-centered, discovery-driven, and globally engaged. WMU has both a medical school and a law school under its aegis. Its seven degree-granting colleges offer 251 distinct degree programs including 147 undergraduate programs. The University sponsors more than 50 specialized institutes and centers. One of the great examples is the Transportation Research Center for Livable Communities (TRCLC), and during these two days we will all have an opportunity to understand and celebrate the impact it is having on the state and the nation.

Dr. Dan Litynski is Vice President for Research for Western Michigan University and Professor of Electrical and Computer Engineering. He has served as Dean of the College of Engineering and Applied Sciences, Provost and Vice President for Academic Affairs, and President (interim) of WMU. Dr. Litynski has done research and teaching in electrical engineering, optics, physics, and educational pedagogy for over forty-five years.

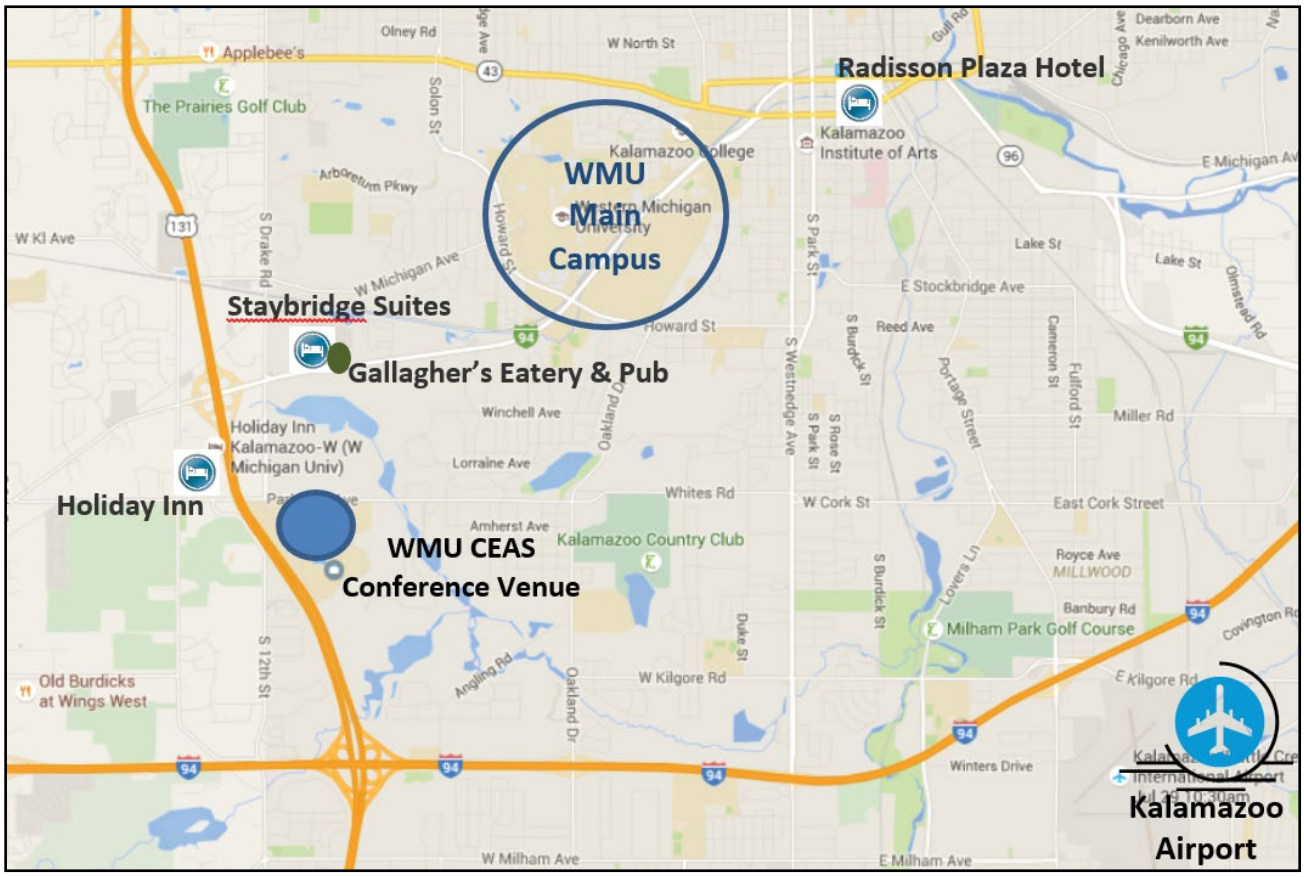
Keynote Speaker - Dr. Jennifer Dill

Livability on Two Wheels: How to Increase Bicycles for Everyday Transportation

Cities throughout the US have expanded bicycling infrastructure and numbers are increasing. Yet, mode shares are still in the single digits in most cities, far behind many European cities. Moreover, men outnumber women on bikes by about two to one. This talk will highlight findings from recent research on factors that influence people's decisions to bicycle for transportation, with a focus on expanding bicycling among women and children.

Dr. Jennifer Dill is a professor of Urban Studies and Planning at Portland State University and Director of TREC, the Transportation Research and Education Center at PSU. TREC houses the National Institute for Transportation & Communities, the US DOT's national UTC for livable communities. Dr. Dill's research focuses on the relationships between transportation, health, and the built environment, focusing on bicycling and walking.

Conference Venue and Hotels



Conference Venue:

Western Michigan University, Parkview Campus
College of Engineering and Applied Sciences (CEAS)

Networking Dinner:

Gallagher's Eatery & Pub
4210 Stadium Drive
Kalamazoo, MI 49008
(269) 372-7177

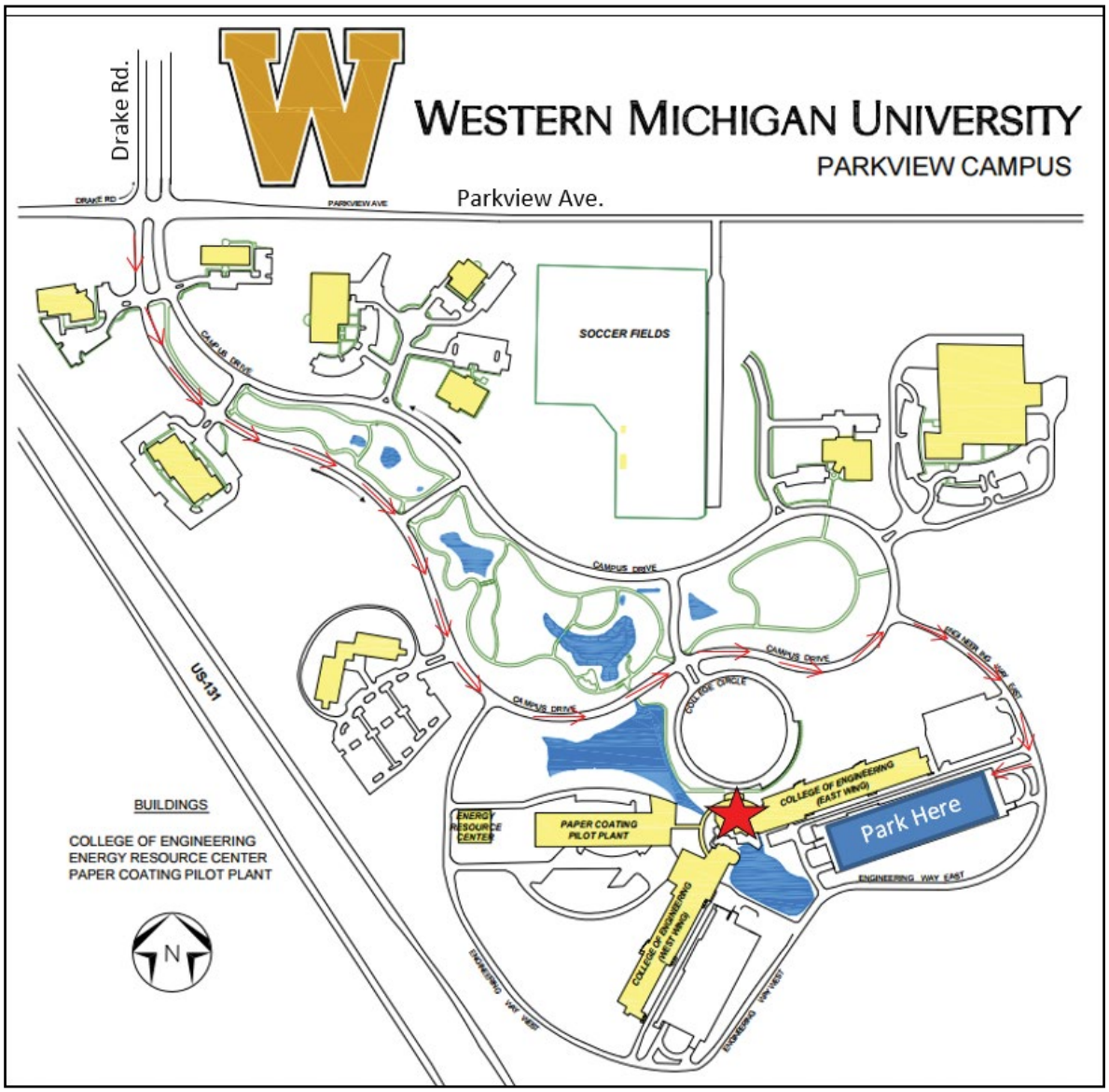
Recommended Hotels:

Staybridge Suites Kalamazoo
2001 Seneca Ln
Kalamazoo, MI 49003
(269) 372-8000

Holiday Inn Kalamazoo-W (W Michigan Univ)
2747 South Eleventh Street
Kalamazoo, MI 49009
(269) 375-6000

Radisson Plaza Hotel at Kalamazoo Center
100 W Michigan Ave
Kalamazoo, MI 49007
(269) 343-3333

Parking Information



Parking: East Parking Deck is free for all conference attendees on July 23 -24.

Registration: 1st Floor of the central area

Conference Presentations: Room D-109 (1st Floor)

Overall Schedule

Day 1: July 23, 2015

1. Registration (9:30 – 10:00)
2. Opening (10:00 – 10:20)
   Jun-Seok Oh, Director of Transportation Research Center for Livable Communities
   Dan Litynski, Vice President for Research, Western Michigan University
3. Session 1 (10:20 - 11:50) – People with Disability and Transportation Services
   Moderator: Dr. Richard Long, Western Michigan University
4. Lunch and Poster Session (11:50 - 1:20)
- Poster Session (12:20 – 1:20) Coordinator: Dr. Zhanbo Sun, Western Michigan University
5. Keynote Speech (1:20 – 2:20) Livability on Two Wheels: How to Increase Bicycling for Everyday Transportation - Jennifer Dill, Director of National Institute for Transportation and Communities and Director of Oregon Transportation Research & Education Consortium, Portland State University
6. Break (2:20 – 2:30)
7. Session 2 (2:30 – 4:30) – Traffic Safety in Livable Communities
   Moderator: Valerian Kwigizile, Western Michigan University
8. Networking Dinner (5:30 - 8:00) Optional, with own expense

Day 2: July 24, 2015

9. Breakfast (7:30 – 8:15)
10. Welcoming Remark (8:15 – 8:20) Houssam Toutanji, Dean, College of Engineering and Applied Sciences, Western Michigan University
11. Session 3 (8:20 – 9:50) – Health and Transportation
    Moderator: Stephen Mattingly, University of Texas at Arlington
12. Break (9:50 – 10:00)
13. Session 4 (10:00 – 11:50) – Bicycle as an Alternative Transportation Mode
    Moderator: Scott Smith, Western Michigan University
14. Closing and Best Poster Awards (11:50 – 12:00)

Detailed Program

Day 1: July 23, 2015

Session	Title	Speaker
9:00 – 10:00	Registration	
Opening 10:00 – 10:20	Welcoming Remarks	Jun-Seok Oh, Director of TRCLC Dan Litynski, Vice President for Research, WMU
Session 1: 10:20 – 11:50 *People with Disability and Transportation Services*	[1-1] Travel in Adverse Winter Weather Conditions by Blind Pedestrians: Effect of Cane Tip Design on Travel on Snow	Dae Kim, Associate Professor, Blind and Low Vision Studies, WMU
	[1-2] Impact of pedestrian gaze on yielding rates for pedestrians who are blind	Robert Wall Emersion, Professor, Blind and Low Vision Studies, WMU
	[1-3] Capacity analysis of pedestrian facilities involving individuals with disabilities	Keith Christensen, Associate Professor, Landscape Architecture and Environmental Planning, Utah State University
	[1-4] Kalamazoo County Public Transit	Sean McBride, Executive Director, Kalamazoo County Transportation Authority
11:50 – 1:20	Lunch and Poster Session	
1:20 – 2:20	Keynote Speech	Jennifer Dill, Director of National Institute for Transportation and Communities, Portland State University
2:20 – 2:30	Break	
Session 2: 2:30 – 4:30	[2-1] Big Data visual analysis in transportation	Li Yang, WMU
	[2-2] Spatial Analysis of Child Pedestrian and Bicycle Crashes in Areas Adjacent to K-8 Schools	Timothy Gates, Associate Professor, Civil Engineering, Wayne State University
	[2-3] Factors Influencing the Efficacy of the Gateway Configuration of the R1-6 Sign: An Experimental Analysis	Ron Van Houten, Professor, Psychology, WMU
	[2-4] Non-motorized Crashes and Countermeasures in Michigan	Valerian Kwigizile, Assistant Professor, Civil Engineering, WMU
	[2-5] Going zero to 70: Grand Rapids Bike Safety Education	Chris Zull, Traffic Safety Manager, City of Grand Rapids

5:30 – 8:00	Networking Dinner	Gallagher's Eatery & Pub

Detailed Program

Day 2: July 24, 2015

Session	Title	Speaker
7:30 – 8:15	Breakfast	
8:15 – 8:20	Welcoming Remarks	Houssam Toutanji, Dean, College of Engineering and Applied Sciences, WMU
Session 3: 8:20 – 9:50	[3-1] Project Based Learning for Active Transportation	Colleen Casey, Assistant Professor, Public Policy and Public Administration, University of Texas at Arlington
	[3-2] Communities, Schools and Students Succeeding via Safe Routes to School	Meg Thomas Ackerman, Director of Safe Routes to School at Michigan Fitness Foundation
	[3-3] Community Engagement with a Twist	Michelle Snitgen, Active Communities Coordinator at the Michigan Fitness Foundation
	[3-4] Developing Public Health Performance Measures for Active Transportation Infrastructure	Stephen Mattingly, Associate Professor, Civil Engineering, University of Texas at Arlington
9:50 – 10:00	Break	
Session 4: 10:00 – 11:50	[4-1] Kalamazoo River Valley Trail Demonstration Bikeway	Rebekah Kik and Matt Johnson, City Planner and Engineer, City of Kalamazoo
	[4-2] Alternatives for Providing a Safe Passage for Non-motorized Traffic across an Existing Highway Bridge	Upul Attanayake, Associate Professor, and Lizmert Lopez, Graduate Student, Civil Engineering, WMU
	[4-3] Integrated Crowdsourcing Platform to Investigate Non-motorized Behavior and Risk Factors on Walking, Running and Cycling Routes	Ala Al-Fuqaha, Professor in Computer Science, WMU
	[4-4] Confronting Equity in Bike-Sharing Systems	Scott Smith, Research Professor, TRCLC, WMU
11:50 – 12:00	Closing Remark and Best Poster Awards	Jun-Seok Oh, WMU

If you need Professional Development Hours (PDH) for PE license, please sign up at the registration desk. 4.5 credits for day 1 and 3 credits for day 2 will be given. These credits do not apply to those states requiring preapprovals.

Graduate Student Poster Presentations

P-1. Ali Alzuhairi & Mustafa Aldhaheri, Civil Engineering, Western Michigan University, Analysis of Emission and Its Impact on Human Health

P-2. Brenda Hodgell & Ahmed Alzubaidi, Civil Engineering, Western Michigan University, An Analysis of Countermeasures for Pedestrian and Bicycle: the Michigan Case

P-3. Emmanuel Kidando & Abram Musinguzi, Civil Engineering, Tennessee State University, Bayesian hierarchical analysis of Pedestrian crashes and sociodemographic factors

P-4. Gentjan Heqimi, Civil Engineering, Wayne State University, Implementation of a Decision Framework for Planning of Non-Traditional Developments within the Roadside Right-of-Way

P-5. Jonathan Mark Hochmuth, Psychology, Western Michigan University, A Comparison of Wide vs Narrow Gateway, and Other Configurations, of In-Street Signs on Driver Yielding

P-6. Keneth Morgan Kwayu, Civil Engineering, Western Michigan University, Investigating the correlation of factors contributing to pedestrian involved crashes and its impact on crash severity

P-7. Lusanni Mercedes Acosta Rodriguez, Civil Engineering, Western Michigan University, Evaluation of Safety Effectiveness of Clearview font and Fluorescent Yellow Sheeting in Michigan

P-8. Mohammad Sadra Sharifi, Civil Engineering, Utah State University, Capacity analysis of pedestrian facilities involving individuals with disabilities

P-9. Richard Boateng, Civil Engineering, Western Michigan University, Evaluating the Effectiveness of Countdown Pedestrian Signals on the Safety of Older Drivers in the State of Michigan

P-10. Richard Boateng, Civil Engineering, Western Michigan University, Evaluating the Effectiveness of Countdown Pedestrian Signals on the Safety of Older Pedestrians in the State of Michigan

P-11. Trevor Kirsch, Civil Engineering, Wayne State University, Longitudinal Analysis of Traffic Fatalities Considering Socioeconomic and Demographic Factors

P-12. Xiaokun Wang, Computer Science, Western Michigan University - Traffic data preparation and mining

P-13. Yashodhya Dhanapala, Civil Engineering, Western Michigan University, Infrastructure and Technology for Sustainable Livable Cities

Presentation Abstracts

[1-1] Travel in Adverse Winter Weather Conditions by Blind Pedestrians: Effect of Cane Tip Design on Travel on Snow

Dae Kim, Associate Professor
Blindness and Low Vision Studies, Western Michigan University

Introduction: Winter weather creates many orientation and mobility (O&M) challenges for people who are visually impaired. Getting the cane tip stuck is one of the noticeable challenges when traveling in snow, particularly when the walking surface is covered in deep snow.
Methods: A repeated-measures design with Latin Square counter-balancing was used for the study. Recruitment criteria included legal blindness with no other disabilities, familiarity with basic cane techniques, regular travel in winter. We compared four different cane tips: 1) metal glide, 2) marshmallow roller, 3) roller ball, and 4) bundu bahser.
Results: There was a statistically significant difference in frequency of sticking among the different cane tips ($p < .001$). Post hoc analyses revealed that the sticking frequency for the metal glide tip ($M = 28.3$, $SD = 16.6$) was significantly higher than that for the roller ball tip ($M = 8.2$, $SD = 13.2$), $p < .001$, $d = 1.34$, for the bundu basher tip ($M = 10.7$, $SD = 8.8$), $p < .001$, $d = 1.33$, and for the marshmallow roller tip ($M = 17.4$, $SD = 14.1$), $p = .001$, $d = .71$. In addition, there was a statistically significant difference in sticking frequency between the marshmallow roller tip and the roller ball tip, $p = .003$, $d = .67$.
Discussion: Cane tip shape appears to have contributed to differences in sticking frequency. For example, the metal glide tip, being the smallest and more sharply angled among the four cane tips, tended to get stuck on snow more often than more rounded and larger cane tips. Differences in sticking frequency among the cane tips observed in this study appear to be large enough to be practically significant for cane users and practitioners.

[1-2] Impact of pedestrian gaze on yielding rates for pedestrians who are blind

Robert Wall Emerson, Professor
Blindness and Low Vision Studies, Western Michigan University

There are few studies on how pedestrians who are blind might positively influence driver yielding in different travel situations. Being able to minimize risk in street crossings by maximizing driver yields is especially important for pedestrians who are deaf and blind, who cannot reliably tell when vehicles are present or present a threat. This project continued previous work on pedestrian behaviors that might increase yielding behavior of drivers. Assessed pedestrian behaviors included turning the head to look toward oncoming traffic, holding a cane, taking a step, holding up a hand, exaggerated cane movement, and standing without a cane. These behaviors were assessed for their impact on yielding rates for right turning traffic at lighted intersections as well as at entry and exit lanes at roundabouts. Not all behaviors were assessed at each intersections type. Results indicate that turning to look at traffic, either well before the light turns green or just as the light turns green does not significantly impact yielding rates. Yielding rates at the roundabout for a pedestrian without a cane and a pedestrian with a cane were similar to previous work at lighted intersections. Adding pedestrian gazing behaviors did not significantly impact yielding rates. The most effective strategies at lighted intersections and roundabouts continues to be holding up a hand or taking a reversible step into the crosswalk. These outcomes will have major implications for O&M instruction. Orientation and mobility instructors will have definitive suggestions for blind pedestrians in how they can behave to reduce risk in some of the most risky travel situations. There is also a huge potential benefit for pedestrians who are both deaf and blind. These pedestrians often cannot reliably see or hear traffic and so must rely on their behavior to consistently impact traffic in a set manner. Further, if a pedestrian wants to include looking toward traffic as a strategy, it does not appear to decrease yielding rates.

[1-3] Capacity analysis of pedestrian facilities involving individuals with disabilities

Keith Christensen, Mohammad Sadra Sharifi and Anthony Chen
Utah State University

To plan and design livable urban environments, it is imperative that walking facilities be designed to meet the needs of all pedestrians, including individuals with disabilities. The design of pedestrian infrastructure is an important process usually achieved by means of supply/demand analysis. Critical to this process is correctly estimating infrastructure supply levels or capacities. In order to accomplish the research goals, a controlled large-scaled walking experiment was conducted at Utah State University (USU). A temporary circuit was constructed at USU's Motion Laboratory with the necessary walking facilities (e.g., level passageway, right angle, oblique angle, and bottleneck) using eight foot self-standing walls. Twelve video cameras coupled with unique automated tracking technology were hung on 8-meter high ceilings to provide full coverage of the study area. In total, 202 individuals were recruited to participate in the experiments and they were asked to pass through the circuit repeatedly. Participants were a mixture of people without disabilities and people with mobility-related physical, sensory, or other types of disabilities, including hearing, intellectual, and other impairments related to mobility disability. Individuals were tracked using the camera system and trajectory data extraction was accomplished using a software platform suite.

This talk will present a framework to analyze capacity of various walking environments considering heterogeneous pedestrian populations, including individuals with disabilities. The findings are expected to improve the estimating of facility capacity required to meet a preferred level-of-service for heterogeneous populations. Further, the results of the research may be used to improve best practices for the design of new built environments and inform public policy development activities.

[1-4] Public Transit: Trends, Innovations and Issues in Serving Small Urban Areas

Sean McBride, Executive Director
Kalamazoo County Transportation Authority and Kalamazoo Metro Transit

Public transit use is growing, with the highest ridership levels in the United States since 1956. The presentation will focus on how a small urban public transit in Kalamazoo County, Michigan is working to address increasing demand both by riders and the community. Communities, including Kalamazoo County, are appreciating the importance of public transit as an option for meeting transportation needs to access employment, education, services and commerce. Kalamazoo Metro Transit has been active in using technology to shape service and to enhance the rider experience. Kalamazoo County is working to transition the system from ownership of the City of Kalamazoo to an independent regional authority. How will this transition shape future services? Finally, the impact of local, State of Michigan and Federal Transit Administration (FTA) funding is important to examine in looking at future trends in public transit.

[2-1] Big data visual analysis in transportation

Li Yang, Professor
Computer Science, Western Michigan University

Big data pose fundamental challenges to both data analysis and data visualization. This is especially true in transportation where traffic data from numerous number of sensors constantly fly in. One promising solution to deal with large-scale data is distributed processing across a cluster of commodity PCs using Hadoop/MapReduce software framework. The framework puts a straightjacket to data analysis, where the only operations allowed are map, group by, aggregation, or a sequence of them. This talk discusses Hadoop/MapReduce and their limitations. For big data analysis and visualization, this talk introduces a strategy of using multiresolution data aggregation on Hadoop cluster as an efficient representation of large-scale data. Data aggregated at multiple resolutions are stored in internal nodes of a partition-based high dimensional tree index. Such a piggyback ride of aggregated data efficiently supports resolution-based data access patterns incurred by visual operations such as overview-and-drill-down. Existing visualization techniques are extended to make use of this data representation. We demonstrate the feasibility and effectiveness of this approach using real world data sets.

[2-2] Spatial Analysis of Child Pedestrian and Bicycle Crashes in Areas Adjacent to K-8 Schools

Adam McArthur, Peter T. Savolainen, Timothy J. Gates
Wayne State University

Pedestrian and bicycle safety are particular concerns among school aged children as traffic crashes continue to be among the leading causes of death for children ages 5 to 14. To address this concern, Safe Routes to School (SRTS) programs have been implemented in communities across the country, with one of the primary objectives of such programs being to provide for safe and convenient routes for children to walk or bike to school. Unfortunately, SRTS programs allow for the allocation of a very limited pool of funds for such projects. Consequently, it is imperative that programs are implemented at locations where they are likely to result in the greatest impact. The primary focus of this study was to develop a safety performance function (SPF) for use in prioritizing candidate schools for SRTS programs. Traffic crashes over a five-year analysis period were examined with respect to school enrollment, roadway classification, socioeconomic, and demographic data for each school. Schools on local roads experienced more crashes than schools located on other, higher class road facilities. Crashes also varied with average family size, the number of parents per household, population density, and median family income. Interestingly, crashes were less frequent in school districts that exhibited greater ethnic diversity. The SPF developed as a part of this research can be used for prioritization of candidate schools, as well as to assess the efficacy of SRTS programs on a longitudinal basis, providing a valuable tool for K-8 schools.

[2-3] Factors Influencing the Efficacy of the Gateway Configuration of the R1-6 Sign: An Experimental Analysis

Ron Van Houten, Professor
Psychology, Western Michigan University

The gateway configuration of the R1-6, In-Street sign, has proven to be a low cost way to increase driver yielding right-of-way to pedestrians using crosswalks on multilane roads This study examines the effects of several variables influencing the effectiveness of the Gateway configuration of the In-Street sign and various In-Street sign configurations. Experiment 1 and 2 compared the effects of the Gateway configuration using R1-6 signs to blank fluorescent yellow-green signs without the message or symbols
arranged in the Gateway configuration on driver yielding behavior to pedestrians in crosswalks. The results showed that the yellow-green blank signs produced an average increase in yielding from 7% to 33%, while the addition of the message and symbols increased yielding to 78%. Experiment 1, 2, and 4 examined the effects of different configurations of the In-Street sign on driver yielding behavior. The results showed the full Gateway, R1-6 signs placed in the gutterpan, and on all lane lines was the most effective configuration, placement of the edge signs in the gutter pan was slightly more effective than placement of the edge signs on the curb face, partial installation of the Gateway was less effective than the full Gateway, and the substitution of a durable City Post delineator for the white lane line produced 60% yielding to pedestrians in crosswalks. Experiment 3 demonstrated that the full Gateway and Gateway with City Post on the lane lines are effective at night. Experiment 5 demonstrated that the Gateway increased yielding at two single lane roundabouts.

[2-4] Non-motorized Crashes and Countermeasures in Michigan

Valerian Kwigizile, Assistant Professor
Civil and Construction Engineering, Western Michigan University

With global increase in the focus on alternative active transportation modes, bicycling and walking modes are increasingly being used for commuting and recreational trips. In Michigan, walking, running, and biking continues to grow in popularity every year. Unfortunately, bicyclists and pedestrians are prone to more severe injuries when involved in a crash with a motor vehicle. Actions of both motor vehicle drivers and pedestrians and bicyclists have been reported to be potential causes of crashes. Understanding the root causes of pedestrian and bicycle crashes is very critical to identification and implementation of countermeasures. To that end, this research is aimed at conducting a comprehensive analysis of recent data to identify causes and risk behaviors for pedestrian and bicyclist crashes in Michigan. To successfully reduce the number of crashes involving pedestrians and bicyclists, engineering countermeasures should be combined with appropriate outreach and education and enforcement intervention. This research will identify potential countermeasures for pertinent causes of crashes identified through analysis of crashes.

[2-5] Going zero to 70: Grand Rapids Bike Safety Education

Chris Zull, Traffic Safety Manager
City of Grand Rapids

During the last five years the City of Grand Rapids has been making significant gains in implementing bikeways. The first on-street bike lanes were constructed on Lake Dr. between Diamond Ave. and Carlton Ave in the summer of 2010. Since then, over 70 miles of new bikeways have been installed in conjunction with street reconstructions, street resurfacing projects, and by pavement marking modifications on existing streets. When fully developed, the network is projected to consist of 182 miles of bikeways, of which 150 miles will be on-street bikeways (bike lanes, marked shared lanes, and neighborhood routes/boulevards) and 32 miles will be shared use paths (trails) and side paths. Many of these bike related devices are new to the Grand Rapids community and some are new to the State of Michigan. An example of this is a recently completed cycle track along Riverside Park on Monroe Avenue. We believe this to be the first cycle track in Michigan.

Crash history for the years 2008-2012 shows that MDOT Grand Region has the highest ratio of bike fatal crashes of 4.2%, which is 50% more than the state average. The ratio for bike incapacitating injury crashes of 4.0 % is the second highest in the state and 14% more than the state average. Grand Rapids (including East Grand Rapids) has the ratio of fatal bike crashes at 8.2% and it is the second highest among Michigan large cities. The goal of becoming a true bicycle friendly community cannot be achieved without mitigating disproportionally high number of biking related crashes. Therefore, the City of Grand Rapids is excited to have received approximately $485,000 in Federal grant funds over a three year period to fund a project estimated at over $600,000 in total cost. The purpose of this project is to provide safety education and training on the operation of people cycling in traffic, increasing the knowledge of the responsibilities of people cycling and driving, as well as promoting a share the road culture. This effort is consistent with the FHWA national safety goal of towards zero traffic related deaths."

[3-1] Project Based Learning for Active Transportation

Ziaur Rahman, Sunil Madanu, Stephen Mattingly, and Colleen Casey
University of Texas at Arlington

Experiential learning can be an effective pedagogical strategy to facilitate student learning. The assumption is that by engaging students in real world applications of complex engineering terms and concepts higher levels of learning will occur. One complex engineering task is the design of infrastructure to support active transportation modes (e.g. walking, biking, skating and use of a wheel chair), which are defined as the transportation modes powered by human energy. Students are often more exposed to engineering concepts that relate to vehicular travel, and less exposed to those that apply to active transportation. The purpose of this paper is to present the results of one experiential intervention incorporated in a junior-level transportation engineering course focused on active transportation facilities. This paper includes a discussion of the design of the intervention, methods of evaluation and analysis, and the results.

The project requires pairs of students to conduct infrastructure inventories related to bikeability and walkability. After completing the inventory, students conduct a second data collection phase where they investigate the use of active transportation modes in the field. The research team uses learning objectives to assess the student learning outcomes and efficacy of the project in preparing the students to consider active transportation in the future. This research adopts a single group pretest-posttest design to compare the degree of change resulting from the learning intervention. In addition to taking the post-test, students submit a qualitative project report highlighting the pros and cons of the project sites and recommending measures of improvement. This report is graded based on the students' field work performance, discussions and recommendations for improving transportation facilities for active modes of transportation. It is then coded along several dimensions compatible with the test scores.

The research team assesses learning along four dimensions: Objective-based improvement, question-based improvement, expected level of learning and Bloom's Taxonomy. Specifically, four hypotheses are established for each of the dimensions and t-tests and additional coded data are used to analyze the data. The data are also analyzed by type of fieldwork assignment. Overall, few (6 of 28) individual questions show significant improvement; however, the aggregate performance on learning at the objective level appears somewhat stronger (13 of 23) show improvement. When assessing student learning using Bloom's Taxonomy, the students show more improvement related to physical activity for the remembering and understanding objectives, which link to the initial inventory. For safety, the students show improvement in higher levels of Taxonomy, which appear to link more closely to the second phase of the project. Overall, the results appear to indicate the students have more improvement on application and analysis objectives than lower level knowledge and comprehension objectives.
The project-based learning approach appears to support these findings because the students' safety based activities focus on application and analysis while the physical activity field work focuses on definitions through the initial inventory. While the overall impact of the project remains unclear, its support of problem solving and critical thinking increases the potential impact on the students because problem solving and critical thinking remain more challenging to "teach." However, future research directions include the incorporation of a controlled-uncontrolled group research design and additional data collection in order to increase the significance of the study.

[3-2] Communities, Schools, and Students Succeeding via Safe Routes to School

Meg Thomas Ackerman
Director of Safe Routes to School at the Michigan Fitness Foundation

While setting up students for success each day is a common goal, the role and view of transportation in helping to achieve this is often overlooked. The Safe Routes to School program at the Michigan Fitness Foundation (MFF) works with schools, communities, and now entire school districts throughout the state to reimagine student transportation planning and practices that reduce traffic around schools, increase safety, and improve student outcomes. This session will highlight some of the strategies and successes along with potential funding to implement improvements that can help get students off on the right foot each day.

[3-3] Community Engagement with a Twist

Michelle Snitgen
Active Communities Coordinator at the Michigan Fitness Foundation

To ensure the people most impacted by lack of transportation options are meaningfully included in transportation planning, the Michigan Fitness Foundation (MFF), in conjunction with the Southeast Michigan Council of Governments, is partnering with seven local organizations to coordinate community conversations with transit-dependent people they serve in southeast Michigan. MFF has encouraged the use of creative placemaking strategies to develop community conversations to achieve broad participation from community members. Join the discussion and learn how to use inventive strategies with a focus on arts and culture to gather input from multiple perspectives and weave community input into the planning process.

[3-4] Developing Public Health Performance Measures for Active Transportation Infrastructure

Sunil Madanu, Ziaur Rahman, Colleen Casey, Stephen Mattingly
University of Texas at Arlington

Increasingly, federal transportation and public health agencies are encouraging active forms of commuting. Investments in transportation infrastructure represent one method to utilize transportation to improve public health outcomes. The ideal transportation investment is one that not only provides safe access for pedestrians, bicyclists, motorists and transit riders, but it also promotes more utilitarian or recreational trips for walking and biking in an environment of safe air quality. However, public health objectives can be at conflict when designing transportation infrastructure to support active commuting. For example, infrastructure investments may be made that promote physical activity through utilitarian commuting, yet at the same time, the investment may be made in an area that is characterized by poor air quality or lacks overall network connectivity. The purpose of the research is to identify potential performance measures that can foster improved decision making around these investments. The key research contribution is the development of user friendly tools that empower policy makers to evaluate the multiple public health concerns in transportation infrastructure investment. Secondly, it advances strategies to effectively capture the dimension of safety and physical activity in a manner important to promote transportation investments that facilitate active utilitarian commuting.

In this research, the level of analysis for performance measure development is the transportation infrastructure investment. The study area is defined as a corridor or intersection near a school or other similar attractor with one or more segments. The specific focus is on characteristics of infrastructure investments that encourage utilitarian forms of active commuting. Utilitarian commuting is defined as that which is purposeful and may replace or reduce dependency on automotive usage. Active is defined as mode choices focused on walking or biking. Different transportation infrastructure elements can enhance the walkable/bikeable environment in many ways that impact public health. The public health objectives under consideration include safety, air quality and physical activity.

Potential performance measures for safety include measuring conflicts on a qualitative ordinal scale, which advances current measures that typically rely upon crash data only. This includes vehicle-pedestrian, pedestrian-bike, vehicle-bike conflict analysis. The research team considers both intersecting movements and overtaking movements for bike-pedestrian and vehicle-bike conflict analysis. Vehicle-pedestrian conflicts consider separation distance and evasive action taken. Measures for air quality primarily focus on pollutant levels at intersections or other critical locations such as hospitals and schools as well as along corridors and active transportation infrastructure. Measures for physical activity focus on elements of the physical characteristics of the infrastructure correlated with active utilitarian commuting: broadly defined as connectivity and measured by links, nodes, density and land use purpose or functionality. In this presentation, the research team will provide an overview on the status of the project and future directions. To date, the research team has inventoried 11 different school locations to gather pilot data.

[4-1] Kalamazoo River Valley Trail Demonstration Bikeway

Rebekah Kik & Matt Johnson
City Planner & Engineer, City of Kalamazoo

To gain better understanding of the public's desire for non-motorized transportation in the downtown, the city held a 3-day charrette to seek community input. During the charrette we worked to solidify a route for the Kalamazoo River Valley Trail through the downtown to connect the east leg at Harrison Street and the west leg at Westnedge Ave. It was clear the only way to get consensus on the route and concept, would be a demonstration project. The city and KRVT teamed up to create a project to iron out any final details that would accompany the design of a downtown trail. The "Pop-Up" bikeway was demonstrated from June 18th to June 21st. On June 20th, a celebration ice cream social event was held at the Arcadia Festival site with bike valet, bike clinic, and feedback was taken on surveys from pedestrians and riders. We had 70 surveys filled out on Friday, and 60 more filled out online. While many survey respondents had varied needs for the bikeway, whether it was to access downtown, or if they preferred a more direct route, all of the respondents were pleased that we offered the demonstration project. So often we plan things that feel intangible to users and need a way to get input in a real way. Moving forward on the design is not based on "what ifs" but on real user ideas. The city also knows that the trail is an integral piece to the non-motorized network downtown. That bike lanes need to connect to the trail in a variety of ways to help people access the rest of the neighborhoods, employers, and downtown amenities with north and south routes that complement the east and west connection. Technical design of the route and budgets will be shared.

[4-2] Alternatives for Providing a Safe Passage for Non-motorized Traffic across an Existing Highway Bridge

Upul Attanayake and Lizmert Lopez
Civil and Construction Engineering, Western Michigan University

Non-motorized transportation increases mobility choices, relieves congestion, promotes local economy, reduces greenhouse gas emission, promotes a healthy lifestyle, and improves quality of life. Recently, there is an emphasis on developing integrated transportation systems with off-road shared use paths and on-road facilities. A majority of highway bridges that are located on the planned or existing non-motorized paths have become bottle-necks for non-motorized traffic. Therefore, there is a need to evaluate the bridges on non-motorized paths to identify safe-passage alternatives to non-motorized traffic. Meantime, the bridge owners need to have access to various case studies to lean the state of practice and acquire associated costs for the alternatives used in those case-study projects. Also, the owner agencies need to have access to a methodological process to evaluate a site for the best possible alternatives and develop accurate cost estimates for funding proposals. The presentation includes case studies, cost information, and a methodology for evaluating safe passage alternatives for non-motorized traffic across an existing bridge. Finally, a few implementations are discussed to illustrate the application of the methodology.

[4-3] Integrated Crowdsourcing Platform to Investigate Non-Motorized Behavior and Risk Factors on Walking, Running and Cycling Routes

Ala Al-Fuqaha, Professor
Computer Science, Western Michigan University

In 2013, there were 1,902 crashes involving bicyclists and 29 were fatal crashes among them throughout the state of Michigan. While the number of bicycle crashes decreased by 15.3 percent from 2004, the number of fatal bicycle crashes increased by 38.1 percent from 2004 in Michigan. Informing the public about the potential risk factors on walking, running, and cycling routes plays a critical role in saving lives. Information Technology (IT) plays an important role to keep the public and relevant city/county offices informed about risk factors on walking, running, and cycling routes in their areas of interest. The deployment of intelligent systems that help the public identify, track, and monitor risk factors in their routes of interest will be of vital interest to the local communities, city/county departments, and the local economy.

A major goal of this research is to work with the Kalamazoo Bicycle Club, the Kalamazoo Area Runners Club, and other stakeholders and the local city/county authorities to build and experiment with an intelligent software system that enables citizens to utilize a mobile app to inform local authorities of risk factors on local walking, running, and cycling routes. Our proposed system will enable local authorities to operate more efficiently to handle the feedback provided by the citizens. Also, the local government will be able to provide statistical reports that provide estimates of the traffic on the different routes throughout the local community.

At the core of the proposed route traffic analysis system, we will perform statistical analysis of data collected by the general public. The results of this analysis will be summarized and made available to the public through asynchronous alerts sent to their mobile devices using a color coded system to help the public interpret the results easily. We intend our novel approach to be scalable to handle a large number of public subscribers.

Extensive and systematic experiments will be conducted to demonstrate the capabilities of the proposed system. These experiments will be conducted by teams from Western Michigan University and local authorities in Kalamazoo in collaboration with volunteers from the local bicycle and runner clubs. This enables us to perform rigorous tests of the proposed platform in real-life scenarios before large-scale deployment of the platform for use by local authorities and the general public.

This platform will help local authorities in south western Michigan to timely inform the public about risk factors on local routes and manage their resources to prioritize the removal of these risk factors. Thus, saving lives and reducing liability issues. Furthermore, the deployment of the proposed software in Kalamazoo will serve as a model to encourage nearby communities, cities, and hopefully the rest of the nation to deploy similar systems.

[4-4] Confronting Equity in Bike-Sharing Systems

C. Scott Smith, Research Professor
Transportation Research Center, Western Michigan University

Research over the past several decades has made it increasingly clear that livable communities are inextricably linked to the provision of active (i.e., non-motorized) transportation infrastructure. Indeed, communities where bicycle and pedestrian travel options are plentiful tend to experience positive environmental, economic and social outcomes including improved public health, reductions in harmful emissions and enhanced mobility and accessibility, especially for populations with limited incomes. In recent years, municipalities have viewed the adoption of "fourth-generation" or IT-based bicycle sharing systems (BSS) as a desirable strategy to advance active transportation and its associated benefits within their communities. Indeed, since 2010, over 60 cities in the US have installed such systems. However, the locational distributions of recent BSS installations have been criticized for largely benefiting middle- and upper-class neighborhoods while excluding lower-income, Latino and African American communities. This presentation discusses results from a nationwide study of 46 bicycle sharing systems paying special attention to their distributional characteristics and related accessibility across different demographic groups.

Poster Abstracts

[P-1] Effects of Vehicular Emissions on Human Health
Ali Alzuhairi and Mustafa Aldhaheri, Civil and Construction Engineering, Western Michigan University

Because exposure to air pollutants may cause serious health problems, the U.S. Environmental Protection Agency (EPA) has established air quality standards to protect human health. In order to understand such health impact of vehicular emissions, this research analyzes effects of motor vehicle emissions on human health by estimating emission concentrations and individual exposures near roadways. VISSIM microscopic traffic simulation model is used to estimate CO and NOx concentrations by different types of highways, and CALIAN software is used to estimate individual emission exposures. A school zone in downtown Chicago is selected as a test site. This study estimates concentrations of CO and NOx and individual exposures from the pollutants, and compares the results with the EPA standards to analyze the level of health risk within the school zone.

[P-2] An Analysis of Countermeasures for Pedestrian and Bicycle: the Michigan Case
Brenda Hodgell and Ahmed Alzubaidi, Civil and Construction Engineering, Western Michigan University

As exercise and alternative modes of transportation are becoming more promoted, an increased focus has been on pedestrian and bicycle safety. Similar to other states, a significant number of crashes involving pedestrians and bicyclists in Michigan, tend to be very severe. Several countermeasures for pedestrian and bicycle crashes have been implemented in Michigan, and are analyzed in this paper. Crash typing was performed in order to identify the most common crash types, followed by analyses to determine common causes and potential countermeasures. In addition to a comprehensive literature review, a survey of engineers, enforcement officers, and advocacy group members was conducted to identify current countermeasures and their effectiveness. The countermeasures that are already in use were compared with the recommended countermeasures obtained from crash analysis. A recommendation of appropriate countermeasures to be implemented in order to improve pedestrian and bicyclist safety in Michigan is given.

[P-3] Bayesian hierarchical analysis of Pedestrian crashes and sociodemographic factors
Emmanuel Kidando, Abram Musinguzi and Deo Chimba, Tennessee State University

Understanding environments under which pedestrians are more likely to be killed or injured in traffic crashes can help to improve walking safety and overall community livability. This study is based on statewide pedestrian crash records collected in Tennessee from 2008 to 2012 and applied Local Moran's I technique in GIS to identify clusters of pedestrian crashes. Bayesian hierarchical model was then developed to identify significant contributing factors for pedestrian crashes. Results indicate statistically significant relationships between pedestrian crashes and neighborhoods with, high number of people commuting to work by walking, low-income population and housing units with low no vehicles. By understanding common causes and spatial dependence of pedestrian crashes, this information can be used to identify high-risk areas of pedestrian crashes and lead to development of effective countermeasures to reduce pedestrian crashes.

[P-4] Implementation of a Decision Framework for Corridor Planning within the Roadside Right-of-Way for Non-Traditional Developments

Gentjan Heqimi and Timothy Gates, Wayne State University

A spatial decision framework for context-sensitive planning within the roadside Right-of-Way (ROW) was implemented for freeways in the State of Michigan. The framework represents a roadside suitability assessment model which may be used to support decision-making for ROW use and development, particularly those that are non-traditional. The model accommodates a broad range of developments, while considering a diverse range of roadside contextual features, including land cover, environmental and natural features among others. Contextual features were identified, weighted and prioritized based on coordination with state stakeholders. The primary function of the model is to identify areas along the highway corridor that are most (or least) suitable for development within the roadside ROW, as well as providing a relative indication of their overall suitability along a corridor. Various macro and micro level data were used to assess the potential of five non-traditional ROW developments, including solar panels, wind turbines, farming, vegetation management, and green infrastructure. The model was originally applied to a limited freeway network in Michigan. State implementation was based on available datasets and general land use planning importance. The resulting relative index scores for the statewide corridors were generally consistent with standard land-use planning considerations. The final product consists of a compilation of individual maps for each Michigan freeway segment utilizing a global relative scale. Reference data such as mile markers were further provided for geographical referencing purposes.

[P-5] A Comparison of Wide vs. Narrow Gateway, and Other Configurations, of In-Street Signs on Driver Yielding

Jonathan Hochmuth, Miles Bennett, and Ron Van Houten, Western Michigan University

Two studies were conducted. The first study examined whether the width of the gateway configuration of the in-street sign influenced the efficacy of the treatment. Data were collected at sites with a narrow and a wider gateway configuration. The gateway treatment was more effective in the narrow configuration then the wide configuration at two of the three sites and made little difference at the third site. Contextual variables appeared to be related to whether the narrow or the wide configuration were more effective. These data showed that perceived narrowing was a variable influencing the efficacy of this treatment. The second study compared the use of edge lane in-street signs alone, lane line use of in-street signs alone and the full gateway (edge lane and lane line signs used together on driver yielding behavior to pedestrians). The edge line alone and lane line alone configurations produced marginal increases over baseline levels of yielding behavior while the full gateway configuration lead to a marked increase in yielding behavior at this site. These data were interpreted in terms of behavioral principles.

[P-6] Investigating the correlation between factors contributing to pedestrian involved crashes and its impact on crash severity

Keneth Morgan Kwayu, Civil and Construction Engineering, Western Michigan University

There are several factors that influence the potential for crash occurrence. These factors can be summarized as road environment, vehicle defects, driver and pedestrian behavior. Often, the influence of these factors on the likelihood of a potential crash or post-crash injury severity have been addressed independently without considering their synergy effect. This study aims at exploring co-variation of road environment factors, driver and pedestrian actions prior to crash and link their synergy effect on injury severity level. Vehicle condition prior to crash was not included in the scope of this study and the study focus only on crashes involving one driver and one pedestrian. This scenario covered 90% of all pedestrian crashes that were analyzed. Tetrachoric correlation was used to measure the association between pedestrian's conditions and their corresponding hazardous actions prior to crash. Similar analysis was performed for drivers involved in vehicle-pedestrian crashes. The variables encompassing drivers and pedestrians actions prior to crash, which showed significant conformity were then combined. Multinomial Logit model was used to test the significance of these combined variable to crash severity levels. The study will be useful especially in identifying locations with high risk of fatal and incapacitating injuries, and will aid in coming up with the holistic form of crash countermeasure.

[P-7] Evaluation of Safety Effectiveness of Clearview font and Fluorescent Yellow Sheeting in Michigan

Lusanni Mercedes Acosta Rodriguez, Civil and Construction Engineering, Western Michigan University

Due to halation and irradiation fonts on guide signs are difficult to be seen mostly during night time. Drivers missing the needed information from the guide sign, such as exit information, tend to be anxious and confused thus potentially causing accidents. In order to avoid or mitigate the situation a newer font, Clearview, is installed to provide better readability in long distances. In a similar context the lack of brightness in sheeting material for warning signs leads to possible misses of the cautionary information. Installation of fluorescent yellow sheeting has been done to provide signs with more noticeable and brighter materials. This study evaluates the effectiveness of the Clearview fonts along with fluorescent yellow sheeting installed in Michigan freeways and non-freeways. Through observational before and after studies; and development of Safety Performance Functions (SPFs) and Crash Modification Factors (CMFs), conclusions on the contribution provided by the fonts and sheeting materials are drawn. A prior perception survey added to the justification of the study and analysis performed. Besides the preference of drivers on the countermeasures, decrease in the number of crashes was observed in different crash conditions per age and time of the day, generally. Reductions are observed with the use of the different type of countermeasures in the former highway classifications.

[P-8] Capacity analysis of pedestrian facilities involving individuals with disabilities

Mohammad Sadra Sharifi, Anthony Chen, Keith Christensen, Utah State University

Walking facilities are important infrastructures which must be designed to accommodate the behavior of pedestrians to be effective. Heterogeneity in pedestrian composition is one important factor generally overlooked in walking facility design guidelines and handbooks. Particularly, individuals with disabilities are often ignored due to lack of available data on their pedestrian behaviors. A controlled large-scaled walking experiments involving individuals with disabilities was conducted at Utah State University (USU) to observe individual pedestrian walking behaviors in various walking facilities; including passageways, right and oblique corners, queuing area, bottlenecks, and stairs. In this research, a mixed time headway distribution model is developed to study on interactions between different individual types and identify the factors affecting the capacity estimation of various walking facilities. The resulting methods are expected to improve the estimation of facility capacity required to meet a preferred level-of-service for heterogeneous populations.

[P-9] Evaluating the Effectiveness of Countdown Pedestrian Signals on the Safety of Older Drivers in the State of Michigan

Richard Boateng, Civil and Construction Engineering, Western Michigan University

This study seeks to evaluate the effectiveness as well as economic benefits of pedestrian countdown signals of randomly selected treatment sites and its safety impacts on the older drivers. A Before-After study with a comparison group methodology was used to evaluate the effectiveness and safety impacts of this counter measure. Geometric characteristics, land use characteristics as well as traffic data for each of the treated sites were used as the basis for selecting the comparison group. The study showed reductions of 15.08% and 52.34% in total and fatal/injury crashes involving drivers 65yrs-and-older respectively. An economic analysis conducted also showed a tremendous benefit-cost ratio of 438:1 for drivers 65yrs-and older-years.

[P-10] Evaluating the Effectiveness of Countdown Pedestrian Signals on the Safety of Older Pedestrians in the State of Michigan

Richard Boateng, Civil and Construction Engineering, Western Michigan University

This study seeks to evaluate the effectiveness as well as economic benefits of pedestrian countdown signals of randomly selected treatment sites and its safety impacts on pedestrians with emphasis on older pedestrians. The first part of this study deals with a perception survey of drivers and pedestrians in Michigan whilst the second and third part deal with crash and economic analysis respectively. A Before-After study with a comparison group methodology was used to evaluate the effectiveness and safety impacts of this pedestrian Countdown Signals. Geometric, land use characteristics as well as traffic data for each of the treated sites were used as the basis for selecting the comparison group. The perception survey results revealed that, more than 90% of the participants generally preferred pedestrian countdown signals to the standard pedestrian signals. The crash analysis resulted in 31.72% reduction for total (all severities) pedestrian crashes and 64.71% reduction in total (all severities) crashes involving pedestrian 65years-and-older. An economic analysis conducted also showed a tremendous benefit-cost ratio of 122:1 for pedestrians crashes.

[P-11] Longitudinal Analysis of Traffic Fatalities Considering Socioeconomic and Demographic Factors

Trevor Kirsch (presenter) and Peter Savolainen, Wayne State University

The year 2012 marked the first time that traffic fatalities increased in the United States since the year 2005. A variety of factors may help to explain this result, including increases in travel, as well as policy changes and changes in state revenues allocated for highway use. While current safety literature includes numerous examples of micro-level analyses aimed at ascertaining the effects of targeted policies and programs on traffic safety, research is rather limited with respect to aggregate-level studies that examine statewide traffic safety policies, as well as important population factors, which may be captured by demographic and socioeconomic characteristics. Various data were collected on a state-wide level from 1998 to 2011. The results show that seat belt use and increased education levels have an adverse effect on state traffic fatalities. However, increased vehicle miles traveled, general alcoholic beverage consumption, and substandard drunk driving enforcement legislation has a tendency to increase traffic fatalities over the thirteen year analysis period.

[P-12] Traffic data preparation and mining
Xiaokun Wang, Computer Science, Western Michigan University

Ubiquitous deployment of traffic sensors has generated huge amount of data in transportation. For example, the traffic data we obtained from NAVTEQ Real-Time Flow Feed for major Michigan roadways has the size of about 6 terabytes in uncompressed XML format. Loading the data to database is a big challenge. We share the experience of loading the data to a MySQL database and preprocessing the data for statistical analysis. A commonly used data reporting tool is data cube, which can be considered as a multi-dimensional generalization of a spreadsheet. Visualization of data cube is difficult due to the curse of dimensionality. We introduce a strategy to prune and visualize data cubes using a technique we developed previously for association rule visualization.

[P-13] Infrastructure and Technology for Sustainable Livable Cities
Yashodhya Kankanamge and Upul Attanayake, Western Michigan University

Providing access and mobility for key installations and businesses located in cities have become a challenge. This is mainly due to limited public transport and non-motorized facilities. The challenges are significant in cities that are subjected to severe winter weather conditions. A higher percentage of millennials prefer to live in urban centers or cities with improved mobility. Most of them prefer to have a walkable and technology-enabled environment with affordable and convenient transportation options, regardless of the size of the city. Lack of mobility affects the small and medium size cities economically due to migration of millennials to larger cities. This research will review and document infrastructure and technology implementation policies, procedure, cost, associated risks, case studies, implementation challenges, and successes and lessons learned to introduce best practices to improve mobility within cities while enhancing sustainability. The ultimate goal is to develop a 'catalog of infrastructure and technology' that can be used by the city planners to select appropriate infrastructure and technology for a city.

List of Attendees

Abu shattal	Mohammad	Research Assistant	Western Michigan University
Abudayyeh	Osama	Professor and Chair	Western Michigan University
Acosta	Lusanni	Graduate Student	Western Michigan University
Aldhaheri	Mustafa	Graduate Student	Western Michigan University
Al-Fuqaha	Ala	Professor	Western Michigan University
Alsafasfeh	Moath	PhD Candidate	Western Michigan University
Alzubaidi	Ahmed	Graduate Student	Western Michigan University
Alzuhairi	Ali	Graduate student	Western Michigan University
Ameli	Zahra	Graduate Student	Western Michigan University
Arif	Muhammad	Traffic Engineer	City of Portage
Arndt	Megan	Planner	Kalamazoo Area Transportation Study
Atta Boateng	Richard	Research Assistant	Western Michigan University
Bolanowska	Maja	Director	Midland Area Transportation Study
Carpenter	Jessica	Engineering Technician	City of Traverse City
Casey	Colleen	Associate Professor	University of Texas at Arlington
Chang	May	Associate Dean, Libraries IT	Western Michigan University
Christensen	Keith	Associate Professor	Utah State University
Christy	Irene	n/a	n/a
Colclough	Marcy	Senior Planner	Southwest Michigan Planning Commission
Cole	Molly	Supervisor's Assistant	Kalamazoo Township
Dill	Jennifer	Professor	Portland State University
El-Jamaly	Soud	Sr. Project Engineer, P.E.	City of Dearborn
Emerson	Rob Wall	Professor	Western Michigan University
Esmail	Aaid	Sr. Project Engineer, P.E.	City of Dearborn
Gallagher	Kimberly	Senior Transportation Planner	Southwest MI Planning Commission
Gates	Timothy	Associate Professor	Wayne State University
Hartman	Jim	Traffic Supervisor	Ingham Co Road Department
Heqimi	Gentjan	Graduate Research Assistant	Wayne State University
Hochmuth	Jonathan	Graduate Student	Western Michigan University
Hodgell	Brenda	Research Assistant	Western Michigan University
Hoekstra	Jim	Traffic Engineer	City of Kalamazoo
Hoekwater	Elisa	Transportation Program Manager	Macatawa Area Coordinating Council
Iishraidi	Younes	Chief Engineer	Meridian Township
Johnson	Matt	City Engineer	City of Kalamazoo
Jung	Debbie	Assistant City Engineer	City of Kalamazoo
Kankanamge	Yashodhya	Graduate Assistant	Western Michigan University
Kerr	Linda	Planning Commission	Texas Township
Kidando	Emmanuel	Graduate Student	Tennessee State University
Kik	Rebekah	Transportation Planner	City of Kalamazoo
Kilpatrick	Andy	Transportation Engineer	City of Lansing
Kim	Dae	Associate Professor	Western Michigan University
Kirsch	Trevor	Student Research Assistant	Wayne State University
Kohler	Paula	Associate Vice Pres for Research	Western Michigan University
Kwayu	Keneth	Graduate Student	Western Michigan University

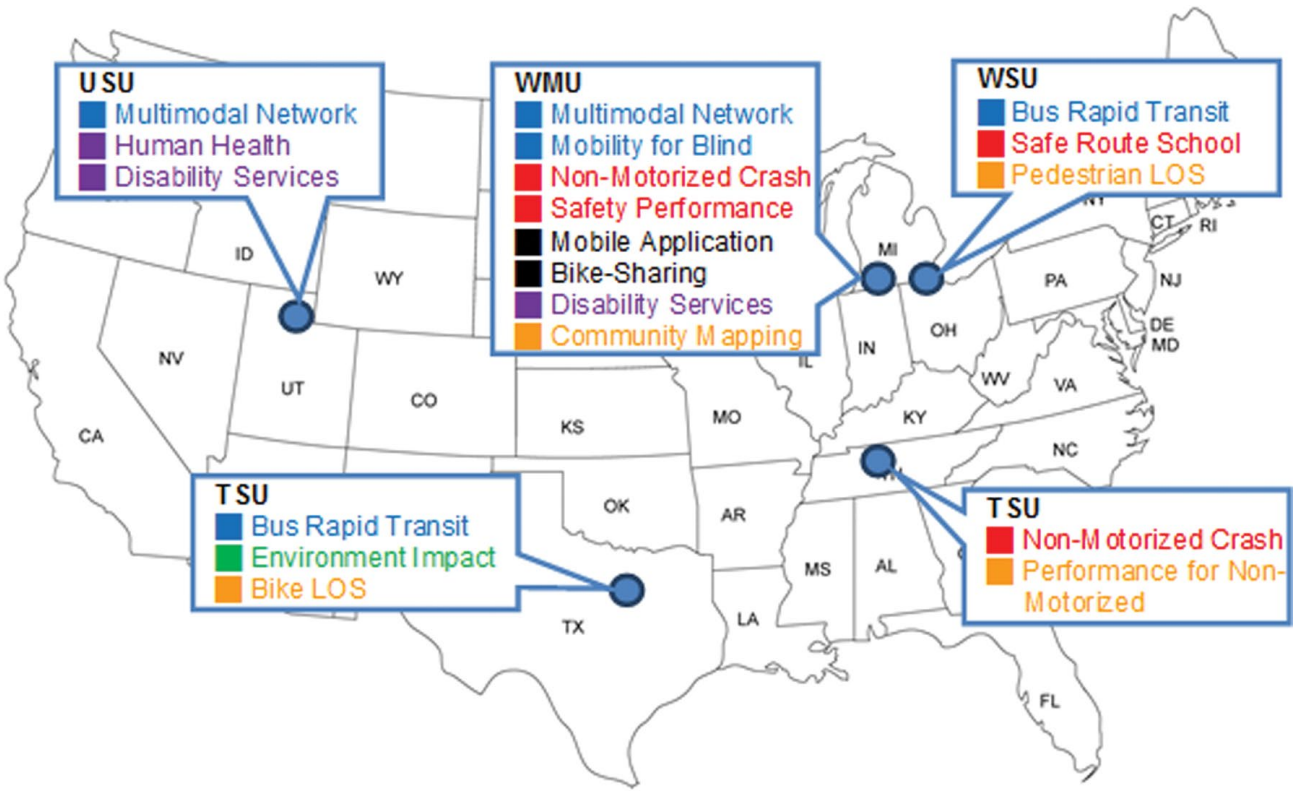
Kwigizile	Valerian	Assistant Professor	Western Michigan University
Litynski	Dan	Vice President for Research	Western Michigan University
Liu	Yu	Senior Project Manager	Washtenaw County Road Commission
Long	Richard	Professor	Western Michigan University
Lopez	Lizmert	Graduate Research Assistant	Western Michigan University
Mani	Gautam	Transportation Planner	Southwest Michigan Planning Commission
Martin	Don	Trustee	Charter Twps of Kalamazoo.
Mattingly	Stephen	Associate Professor	University of Texas at Arlington
McBride	Sean	Executive Director	Kalamazoo County Transportation Authority
McCrumb	Tad	Civil Engineer I	City of Battle Creek
McQuiston	Carissa	Non-Motorized Safety Engineering Specialist	Michigan Department of Transportation
Mohammadi	Sepideh	Graduate Student	Western Michigan University
Mohammadi	Mehdi	Graduate Student	Western Michigan University
Montenegro	Susan	Director of Community Development	City of Owosso
Musinguzi	Abram	Graduate Student	Tennessee State University
Nagler	Frederick	Associate Planner	Kalamazoo Area Transportation Study
Nelson	Carole	Grants &Contracts Office	Western Michigan University
Ofori-Amoah	Benjamin	Professor/Chair	Western Michigan University
Oh	Jun	Professor	Western Michigan University
Patel	Yunus	City Engineer	City of Dearborn
Patel	Mitulkumar	Student Assistant	Western Michigan University
Pawlik	Brian	Planner	Southeast Michigan Council of Governments
Potter	Tim	Sustainable Transportation Mgr	Michigan State University
Reid	Ronald	Supervisor	Kalamazoo Township
Schultz	Jim	Manger of Planning - Metro Detroit	Michigan Department of Transportation
Schultz	Kathy	Special Projects Coordinator	Kalamazoo Metro Transit
Schweitzer	Terry	Community Development Director	City of Kentwood
Sharifi	Mohammad Sadra	Graduate student	Utah State University
Smith	Christopher	Research Professor	Western Michigan University
Snitgen	Michelle	Active Communities Coordinator	Michigan Fitness Foundation
Stepek	Steve	Senior Planner	Kalamazoo Area Transportation Study
Sun	Zhanbo	Assistant Professor	Western Michigan University
Tafelsky	Nick	Traffic Engineering Intern	City of Traverse City
Teachout	Chad	Ped/Bike Safety Coordinator	Michigan Office of Highway Safety Planning
Thomas Ackerman	Meg	Director of Safe Routes to School	Michigan Fitness Foundation
Toutanji	Houssam	Dean, College of Engineering	Western Michigan University
Tribbett	Kurt	Engineering Administrator	City of Battle Creek
Van Houten	Ron	Professor	Western Michigan University
Wang	Xiaokun	Graduate Student	Western Michigan University
Williams	John	Sales Rep	Carrier & Gable
Yang	Li	Professor	Western Michigan University
Yassin	Joyce	Transportation Engineer	Opus International Consultants
Zull	Chris	Traffic Safety Manager	City of Grand Rapids

About TRCLC (Transportation Research Center for Livable Communities)

Transportation Research Center for Livable Communities (TRCLC) is a Western Michigan University-led consortium with four other universities (University of Texas at Arlington, Utah State University, Wayne State University, and Tennessee State University). TRCLC is one of 35 University Transportation Centers funded by the U.S. Department of Transportation in 2013. TRCLC has received a total of $3.74 million from the USDOT for research, education, technology transfer, and workforce development. With matching funds from universities and other agencies, TRCLC manages a total of $5.6 million. TRCLC awarded a total of $1.8 million in funding for 25 research projects during past two rounds, and plans to award more research projects and facilitate other activities.

TRCLC aims to address the nation's critical transportation challenges through the prism of livable communities. The Center's primary goal is to improve affordable and environmentally sustainable transportation options for conventionally underserved communities with special attention paid to non-motorized travel, pedestrian and bicycle safety, job accessibility and 'smart' transport technologies. The central mission of this Center is to engage in research that helps to achieve more balanced, affordable and environmental sustainable transportation systems for all. Such systems will foster the development of livable communities where people can enjoy their daily lives without having to drive a car. In particular, the Center concentrates on "bringing technological advances into livable communities" by coordinating efforts between researchers, practitioners and advocates. Toward this end, the TRCLC aims to achieve three objectives:

- improve public transit systems and alternative transportation modes;
- provide better and safer pedestrian and bicycle networks; and
- enhance transportation accessibility for people with disabilities, older adults, and lower income populations



List of Research Projects funded by TRCLC

- TRCLC 14-1: Explorations into the Equity Dimensions of US Bicycle Sharing Systems (C. Scott Smith, WMU)
- TRCLC 14-2: Developing Performances Measures to Capture the Effects of Transportation Facilities On Multiple Public Health Outcomes (Colleen Casey, UTA)
- TRCLC 14-3: Developing Performances Measures to Capture the Effects of Transportation Facilities On Multiple Public Health Outcomes: A Case in Michigan (Jun Oh, WMU)
- TRCLC 14-4 Conditions that Influence Drivers' Yielding Behavior at Uncontrolled Crossings and Intersections with Traffic Signal Controls (Robert Emerson, WMU)
- TRCLC 14-5: Development of Decision Support Tools to Assess Pedestrian and Bicycle Safety: Development of Safety Performance Functions (Valerian Kwigizile, WMU)
- TRCLC 14-6: Development of Decision Support Tools to Assess Pedestrian and Bicycle Safety: Field Evaluation of Driver Behavior and Traffic Operations (Timothy Gates, WSU)
- TRCLC 14-7: Development of Decision Support Tools to Assess Pedestrian and Bicycle Safety: Focus on Population, Demographic and Socio-economic Spectra (Deo Chimba, TSU)
- TRCLC 14-8: Big Data Analytics to Aid Developing Livable Communities (Li Yang, WMU)
- TRCLC 14-9: Alternatives for Providing a Safe Passage for Non-Motorized Traffic across an Existing Highway Bridge (Upul Attanayake, WMU)
- TRCLC 14-10: Innovative Park-and-Ride Management for Livable Communities (Song, USU)
- TRCLC 14-11: Travel in Adverse Winter Weather conditions by Blind Pedestrians (Kim, WMU)
- TRCLC 14-12: Capacity Analysis of Pedestrian Facilities Involving Individuals with Disabilities (Keith Christensen, USU)
- TRCLC 15-1: Effect of Cycling Skills on Bicycle Safety and Comfort Associated with Bicycle Infrastructure and Environment (Jun Oh, WMU)
- TRCLC 15-2: Development and Assessment of Performance Measures for Evaluating and Improving Regional Transit Coordination Using GTFS Data (Jun Oh, WMU)
- TRCLC 15-3: Real Time Bicycle Simulation Study of Bicyclists' Behaviors and Their Implication on Safety (Valerian Kwigizile, WMU)
- TRCLC 15-4: Travel Behavior of Blind Individuals before and after Receiving Orientation and Mobility Training (Dae Kim, WMU)
- TRCLC 15-5: Infrastructure and Technology for Sustainable Livable Cities (Upul Attanayake, WMU)
- TRCLC 15-6: Integrated Crowdsourcing Platform to Investigate Non-Motorized Behavior and Risk Factors on Walking, Running and Cycling Routes (Ala Al-Fuqaha, WMU)
- TRCLC 15-7: App-Based Crowd Sourcing of Bicycle and Pedestrian Conflict Data (Stephen Mattingly, UTA)
- TRCLC 15-8: Community-Aware Charging Station Network Design for Electrified Vehicles in Urban Areas: Reducing Congestion, Emissions, Improving Accessibility and Promoting Walking, Bicycling and Use of Public Transportation (Ratna Babu Chinnam, WSU)
- TRCLC 15-9: Impact of Access Management Practices to Pedestrian and Bicycle Operations and Safety (Deo Chimba, TSU)
- TRCLC 15-10: Development of Multi-Class, Multi-Criteria Bicycle Traffic Assignment Models and Solution Algorithms (Anthony Chen, USU)
- TRCLC 15-11: Development of a New Combined Modal Split and Traffic Assignment Model for Evaluating Transit Oriented Development Strategies (Anthony Chen, USU)
- TRCLC 15-12: Analysis of Walking Facility Performance Guidelines for Individuals with Disabilities (Keith Christensen, USU)
- TRCLC 15-13: Exploring Bicycle Route Choice Behavior with Space Syntax Analysis (Ziqi Song, USU)

NOTES