Transportation Research Center for Livable Communities

An introduction to the WMU-based University Transportation Center

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Talking points

I. TRCLC composition and structure
II. TRCLC theme and mission
III. TRCLC activities
   • Research
   • Community outreach
   • Technology transfer
   • Workforce development
IV. Getting involved with the TRCLC
Key members (at WMU)

Director: Dr. Jun-Seok Oh, CCE
Associate Director: Dr. Valerian Kwigizile, CCE
Dr. Osama Abudayyeh, CCE
Dr. Scott Smith, Geography
Dr. Richard Long, Blind & Low Vision Studies
Dr. Ron Van Houten, Psychology

Ms. Kay Mortellaro, Administration
TRCLC theme

State of Good Repair

Economic Competitiveness

Environmental Sustainability

Safety

Livable Communities

Technological Advances

Transit
Walking
Bicycling

people with low vision; lower-income communities; children; commuters
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.
Areas of specialization

**USU**
- Multimodal Network
- Human Health
- Disability Services

**WMU**
- Multimodal Network
- Mobility for Blind
- Non-Motorized Crash
- Safety Performance
- Mobile Application
- Bike-Sharing
- Disability Services
- Community Mapping

**WSU**
- Bus Rapid Transit
- Safe Route School
- Pedestrian LOS

**TSU**
- Bus Rapid Transit
- Environment Impact
- Bike LOS
- Non-Motorized Crash
- Performance for Non-Motorized
TRCLC activities

- Community outreach
- Research
- Workforce development
- Technology transfer
Research projects (round 1)

1. Explorations into the Equity Dimensions of US Bicycle Sharing Systems (C. Scott Smith, WMU)
2. Developing Performances Measures to Capture the Effects of Transportation Facilities On Multiple Public Health Outcomes (Colleen Casey, UTA)
3. Developing Performances Measures to Capture the Effects of Transportation Facilities On Multiple Public Health Outcomes: A Case in Michigan (Jun Oh, WMU)
4. Conditions that Influence Drivers' Yielding Behavior at Uncontrolled Crossings and Intersections with Traffic Signal Controls (Robert Emerson, WMU)
8. Big Data Analytics to Aid Developing Livable Communities (Li Yang, WMU)
9. Alternatives for Providing a Safe Passage for Non-Motorized Traffic across an Existing Highway Bridge (Upul Attanayake, WMU)
10. Innovative Park-and-Ride Management for Livable Communities (Song, USU)
11. Travel in Adverse Winter Weather conditions by Blind Pedestrians (Kim, WMU)
12. Capacity Analysis of Pedestrian Facilities Involving Individuals with Disabilities (Keith Christensen, USU)

In total, the TRCLC awarded $888,511 in funding.
US Bicycle Sharing Systems, 2010
US Bicycle Sharing Systems, 2011
US Bicycle Sharing Systems, 2014
US Bicycle Sharing Systems, 2015
Hardship Index by Community Area
Chicago, IL

Community Area
(% Below Poverty; % No HS Diploma)
Demographic Analysis of Chicago’s Divvy BSS, 2013

<table>
<thead>
<tr>
<th>Hardship Quintile</th>
<th>Population (2010)</th>
<th>% Population</th>
<th>Stations</th>
<th>% Stations</th>
<th>Docks</th>
<th>% Docks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest quintile</td>
<td>476,124</td>
<td>17.7%</td>
<td>19</td>
<td>6.3%</td>
<td>265</td>
<td>5.2%</td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>504,559</td>
<td>18.7%</td>
<td></td>
<td>0.0%</td>
<td>-</td>
<td>0.0%</td>
</tr>
<tr>
<td>Third quintile</td>
<td>465,941</td>
<td>17.3%</td>
<td>22</td>
<td>7.3%</td>
<td>298</td>
<td>5.9%</td>
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<tr>
<td>Second quintile</td>
<td>507,251</td>
<td>18.8%</td>
<td>16</td>
<td>5.3%</td>
<td>232</td>
<td>4.6%</td>
</tr>
<tr>
<td>Lowest quintile</td>
<td>741,723</td>
<td>27.5%</td>
<td>243</td>
<td>81.0%</td>
<td>4,293</td>
<td>84.4%</td>
</tr>
</tbody>
</table>

| Total               | 2,695,598         | 100%         | 300      | 100%       | 5,088 | 100%    |

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Figure 1. Typical Innovative Pedestrian Safety Treatments in Michigan

- Single R1-6
- R1-6 Gateway Configuration
- Pedestrian Hybrid Beacon
- Rectangular Rapid Flashing Beacon
TRCLC partners

Public agencies

• City of Portage, MI
• City of Kalamazoo, MI
• Oshtemo Township, MI
• Kalamazoo County Transportation Authority (KCTA), MI
• Kalamazoo Area Transportation Study (KATS), MI
• Southeast Michigan Council of Governments (SEMCOG)
• City of Dallas, TX
• Texas DOT
• Tennessee DOT
• Michigan DOT

Interest groups

• ITE of Michigan
• ITS of Michigan
• ASCE of Michigan
• Michigan Association of Planning
• League of Michigan Bicyclists
• Building Blocks

Private industry

• Nokia Americas
• Scenaria, A Member of the AVL Group
• URS Corporation
U.S. transit agencies with open data as of March 2013: 272
August 2011: GTFS-realtime released

Source: Reed, 2013
What is the history of GTFS?

A call for Open-Source Public Transit Mapping (Faludi, 2005)

Chris Harrelson (software engineer, Google)

Google Transit Feed System (GTFS)
First iteration 9/25/2006

26 revisions since

Bibiana McHugh (IT Manager, TriMET)

Notable revisions
- GTFS Real-Time (8/2011)
- Wheelchair access (10/2012)
- Bikes allowed (2/2014)
Bertolaccini, Kelly, and Nicholas Lownes. “Effects of Scale and Boundary Selection in Assessing Equity of Transit Supply Distribution.” Transportation Research Record: Journal of the Transportation Research Board 2350, no. -1 (December 1, 2013)

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**FIGURE 5** Distribution of agency average headways for (a) bus, (b) light rail, tram, or streetcar, (c) subway or metro, and (d) rail.
GTFS implications for *livable communities* (and TRCLC)?

- Enhances usability of transit system by existing transit riders (trip planning)
- Makes visible transit as viable option for potential riders (makes transit systems less confusing; approachable)
- Cascading positive effects of increased transit use (public health; environmental health; urban design)
- Allows for regular performance-based assessments of existing, modified and planned transit systems (transparency; equity; collaborative governance)
Urbanized transit organizations
With (black)/without GTFS
- stops.txt
  - stop_id
    - stop_code
  - stop_name
  - stop_desc
  - stop_lat
  - stop_lon
  - zone_id
  - stop_url
  - location_type
  - parent_station
  - stop_timezone
  - wheelchair_boarding

- fare_rules.txt
  - fare_id
    - route_id
    - origin_id
    - destination_id
    - contains_id

(Wong, 2013)
Western Michigan University: College of Engineering & Applied Sciences
College Cir
Kalamazoo, MI 49008

Bell's General Store, 355 E Kalamazoo Ave, Kalamazoo Township, MI 49007

Sorry, we could not calculate transit directions from "Western Michigan University: College of Engineering & Applied Sciences, College Cir, Kalamazoo, MI 49008" to "Bell's General Store, 355 E Kalamazoo Ave, Kalamazoo Township, MI 49007"
Thanks!
Questions?

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