Program Progress Performance Report for University Transportation Center

Submitted to: U.S. Department of Transportation
Office of the Assistant Secretary for Research and Technology (OST-R)

Grant Number: DTRT13-G-UTC60

Project Title: University Transportation Centers
Transportation Research Center for Livable Communities (TRCLC)

Program Director: Jun-Seok Oh, Ph.D.
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Submitting Official: Same as Program Director

Submission Date: October 30, 2014

DUNS and EIN: 622364479 / 386007327

Recipient Account Number: 25-7020240

Recipient Organization: Western Michigan University
1903 West Michigan Avenue
Kalamazoo, MI 49008

Project/Grant Period: September 30, 2013 – September 30, 2017

Reporting Period End Date: September 30, 2014

Report Term or Frequency: Semiannual

Signature of Submitting Official: [Signature]
1. ACCOMPLISHMENTS

1.1 What are the major goals and objectives of the program?

The TRCLC addresses five USDOT strategic goals through the prism of Livable Communities. The Center’s primary focus is to help developing communities that provide people with access to affordable and environmentally sustainable transportation through coordination between transportation, housing, and commercial development. In particular, the Center will concentrate on “bringing technological advances to aid the development of livable communities” by coordinating efforts among faculty in associated fields at five universities to collectively enable livable communities through transportation research.

**Research**
Livable communities are where people can enjoy their daily lives without having to drive their car. Toward this end, the TRCLC focuses on three research objectives:
- improving public transit systems and alternative transportation modes,
- providing better and safer pedestrian and bicycle networks, and
- enhancing transportation accessibility for children, people with disabilities, older adults, and lower income populations.

**Education and Workforce Development**
The TRCLC consortium will create opportunities for learning and knowledge sharing through a comprehensive education and workforce development program based on a lifecycle of occupational development approach that emphasizes K-12 outreach, career-oriented higher education and professional development. Our program goals are to:
1) Develop activities for teachers, counselors, administrators and students in K-12 schools to enhance awareness of the forms and functions of transportation systems.
2) Develop career-oriented higher educational programs that combine multidisciplinary course work, experiential education, participative research and industry-university partnerships
3) Create programs for professional development on a broad range of transportation topics geared to the needs of decision-makers, transportation officials, community members and professional staff.

**Technology Transfer**
The Center’s technology transfer program will leverage and extend our existing activities as well as build new capacity to achieve the following inter-related goals:
1) to formalize a widely distributed and multi-format knowledge-sharing infrastructure, and
2) to create opportunities for context-sensitive problem identification and participatory research.
**Collaboration**

Our primary collaborative goal is: *to develop capacities to identify, cultivate and sustain inter-disciplinary and inter-sectoral partnerships in order to meaningfully frame and address transportation problems that stifle the development of livable communities.*

**Diversity**

Our goal for diversity is to outreach to underrepresented groups, low income communities, and diverse disciplines and partners.

1.2 **What was accomplished under these goals?**

**Research**

- Based on the RAC’s ranking and the available funds, the center Executive Committee finally funded 12 research projects.

**List of Projects Funded**

<table>
<thead>
<tr>
<th>Project ID</th>
<th>Title</th>
<th>Institution</th>
<th>PI</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-1</td>
<td>Explorations into the Equity Dimensions of US Bicycle Sharing System</td>
<td>WMU</td>
<td>Smith</td>
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<tr>
<td>14-2</td>
<td>Developing Performances Measures to Capture the Effects of Transportation Facilities On Multiple Public Health Outcomes</td>
<td>UTA</td>
<td>Casey</td>
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<tr>
<td>14-3</td>
<td>Developing Performances Measures to Capture the Effects of Transportation Facilities On Multiple Public Health Outcomes: A Case in Michigan</td>
<td>WMU</td>
<td>Oh</td>
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<tr>
<td>14-4</td>
<td>Conditions that Influence Drivers’ Yielding Behavior at Uncontrolled Crossings and Intersections with Traffic Signal Controls</td>
<td>WMU</td>
<td>Emerson</td>
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<td>14-5</td>
<td>Development of Decision Support Tools to Assess Pedestrian and Bicycle Safety: Development of Safety Performance Functions</td>
<td>WMU</td>
<td>Kwigizile</td>
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<tr>
<td>14-7</td>
<td>Development of Decision Support Tools to Assess Pedestrian and Bicycle Safety: Focus on Population, Demographic and Socio-economic Spectra</td>
<td>TSU</td>
<td>Chimba</td>
</tr>
<tr>
<td>14-8</td>
<td>Big Data Analytics to Aid Developing Livable Communities</td>
<td>WMU</td>
<td>Yang</td>
</tr>
<tr>
<td>14-9</td>
<td>Alternatives for Providing a Safe Passage for Non-Motorized Traffic across an Existing Highway Bridge</td>
<td>WMU</td>
<td>Attanayake</td>
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<tr>
<td>14-10</td>
<td>Innovative Park-and-Ride Management for Livable Communities</td>
<td>USU</td>
<td>Song</td>
</tr>
<tr>
<td>14-11</td>
<td>Travel in Adverse Winter Weather conditions by Blind Pedestrians</td>
<td>WMU</td>
<td>Kim</td>
</tr>
<tr>
<td>14-12</td>
<td>Capacity Analysis of Pedestrian Facilities Involving Individuals with Disabilities</td>
<td>USU</td>
<td>Christensen</td>
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</table>


*Education and Workforce Development*

- Offered an invited speaker series on sustainable transportation systems by inviting two speakers on September 8, 2014
  - “Transit-oriented development with high-speed urban express railway system,” Dr. Keechoo Choi, Director of TOD center and Professor at Ajou University, Korea
  - “A novel method to monitor bicycling environments,” Dr. Cheol Oh, Professor at Hanyang University, Korea

*Technology Transfer*

- Developed a website ([www.wmich.edu/transportationcenter](http://www.wmich.edu/transportationcenter)) and provided information on Center activities
- Developed a web survey for center partners
- Continued delivering relevant information to the affiliated members, center partners and general public through the center Facebook page at [www.facebook.com/TRCLC](http://www.facebook.com/TRCLC).
- Disseminated the first newsletters to center partners
- Hosted the First Summer Conference on Livable Communities on July 16, 2104 at Western Michigan University

**Program of the First Summer Conference on Livable Communities**

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>Opening 10:30 – 10:40</td>
<td>Welcoming Remarks</td>
<td>Paula Kohler, WMU</td>
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<tr>
<td>Morning 10:40 – 12:00</td>
<td>[1-1] Conditions that Influence Drivers’ Yielding Behavior at Uncontrolled Crossings and Intersections with Traffic Signal Controls</td>
<td>Robert Emerson, WMU</td>
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<td>[1-2] Better long cane design and biomechanics for blind cane users</td>
<td>Dae Kim, WMU</td>
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<td>[1-3] Leveraging the General Transit Feed Specification (GTFS) for Research, Workforce Development and Technology Transfer</td>
<td>Scott Smith, WMU</td>
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<td>[1-4] The Use of a Gateway R1-6 Sign Configuration to Increase Yielding to Pedestrians</td>
<td>Ron Van Houten, WMU</td>
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<td>Lunch 12:00 – 1:00</td>
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<tr>
<td>Afternoon 1 1:00 – 2:20</td>
<td>[2-1] Raising Awareness of Patterns in Health Outcomes: Disparities in Poor Birth Outcomes in Southwest Michigan</td>
<td>Kathleen Baker, WMU</td>
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<tr>
<td></td>
<td>[2-2] Exploring Opportunities for Engaging Public Health in Transportation Planning</td>
<td>Colleen Casey, UTA</td>
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<td>[2-4] Using Behavioral Attributes to Assess Pedestrian and Bicyclist Safety</td>
<td>Timothy Gates, WSU</td>
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<td></td>
<td>[2-5] Survey on Benefits of MDOT’s Intelligent Transportation Systems</td>
<td>Matthew Clark, WMU</td>
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</table>
### Collaboration
- Disability Network Southwest Michigan and Kalamazoo Township became new TRCLC partners
- USU research team has collaborated with the Rocky Mountain ADA Center to assess and analyze the transportation access of individuals with disabilities in the intermountain west region VIII.
- TSU research team established collaboration with Tennessee Department of Transportation (TDOT) to access crash data
- TSU research team established mutual collaboration with Williamson County MPO in Tennessee for case study locations

### Diversity
- To promote diversity, the Center funded a research project for underrepresented groups and low income communities - "Explorations into the Equity Dimensions of US Bicycle Sharing System."
- TRCLC encouraged PIs to increase involvement of African American graduate students and female students, and at least three African American students and two female students were involved in projects funded from the center grant.

1.3 *What opportunities for training and professional development has the program provided?*

- The TRCLC hosted the First Summer Conference on Livable Communities at Western Michigan University on July 16, 2014
  - Fourteen (14) presentations were made
  - A total of 35 members attended

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<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter</th>
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<tr>
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<td>2:20 – 2:30</td>
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<td>Afternoon 2</td>
<td>[3-1] Non-Motorized Transportation Initiatives and Programs at the Western Michigan University Office for Sustainability</td>
<td>Luis Morales-Espinal, WMU</td>
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<td>[3-4] A Study on Bicycle Safety</td>
<td>Hamidreza Ahady Dolatsara, WMU</td>
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<td></td>
<td>[3-5] Road Users’ Hazardous Actions: Evidence from Michigan Crash Data</td>
<td>Elisha Wankogere, WMU</td>
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<tr>
<td>Closing</td>
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<td>Jun-Seok Oh, WMU</td>
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<td>3:50 – 4:00</td>
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</tbody>
</table>
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  - “Transit-oriented development with high-speed urban express railway system,” Dr. Keechoo Choi, Director of TOD center and Professor at Ajou University, Korea
  - “A novel method to monitor bicycling environments,” Dr. Cheol Oh, Professor at Hanyang University, Korea
- WMU Geography Colloquium Series:
  - Talk by Richard Church Department of Geography, University of California, Santa Barbara. Mitigating the Impacts of Global Shipping on Los Angeles: A Focus on Drayage. May 21, 2014.
- Dr. Chen at USU provided multiple international seminars
  - Chen, A. (2014) A two-stage bicycle traffic assignment model. Invited presentation at the 2014 International Conference on Sustainable Urban Transportation Research and Innovation, TOD-based Sustainable Urban Transportation Engineering Research Center, Ajou University, Suwon, Korea, 2 June 2014. (80 attendees)
  - Chen, A. (2014) Path flow estimator for planning applications in small communities. Invited presentation at Ajou University, Suwon, Korea, 3 June 2014. (10 attendees)
  - Song, Z. Innovative Pricing Strategies for Traffic Congestion Mitigation. Invited seminar at the College of Transport and Communications, Shanghai Maritime University, Shanghai, P. R. China, August 6, 2014. (25 attendees)

1.4 How have the results been disseminated?
- TRCLC news and information have been disseminated though e-mails, website, and Facebook.

1.5 What do you plan to do during the next period to accomplish the goals and objectives?

Research
- The TRCLC will implement the next funding cycle and release research projects to start from May 2014.
- Research problem statements will be collected in November for the second round request for proposals.
- Western Michigan University and University of Texas at Arlington will fund mini research projects for students

Education and Workforce Development
- ITE technical meeting will be hosted in October at Western Michigan University
Students will be supported to attend TRB meeting in January 2015
A livable community app development competition will be initiated during the Spring of 2015
Summer education programs will be developed.
USU will hold monthly ITE seminar series by inviting speakers from public and private sectors to share their knowledge and experience with transportation students.

Technology Transfer
• Newsletters will be published and disseminated
• Technical information will be disseminated through the TRCLC website (www.wmich.edu/transportationcenter) and the TRCLC Facebook (https://www.facebook.com/TRCLC).
• USU will develop a Facebook site to provide information on on-going projects to interested stakeholders
• Continue to provide news and information through the Utah Transportation Center website (http://transportation.usu.edu).

Collaboration
• TRCLC will develop a community research problem depository system for communities to submit their research problems as a way of strengthening collaborations with local communities.
• TRCLC will build a collaboration network with other UTCs for the second summer conference on livable communities.

Diversity
• Recruit more women and African American research staff and graduate students
• Provide opportunities to students from underrepresented groups and low income communities

2. PRODUCTS

2.1 Publications, conference papers, and presentations

Publications


**Conference Papers**


**2.2 Website or other Internet sites**

TRCLC website and the TRCLC Facebook page were developed and information and relevant news are being disseminated.
- Website – [www.wmich.edu/transportationcenter](http://www.wmich.edu/transportationcenter)
- Facebook – [www.facebook.com/TRCLC](http://www.facebook.com/TRCLC)

**2.3 Technologies and techniques**

- Nationwide bicycle sharing system station locations, characteristics and associated socio-economic data to be shared on website
During project performance period, shared hardware and software developed by Blindness and Low Vision Studies (BLS) and Electrical Engineering and Computer Engineering (ECE) to assist training blind pedestrians to walk straighter paths in crosswalks and other open areas with University of California, Santa Cruz engineering faculty who are considering incorporating the technology into a smartphone app.

2.4 Inventions, patent applications, and/or licenses
- Nothing to report.

2.5 Other products
- Nothing to report.

3. PARTICIPANT & COLLABORATING ORGANIZATIONS

3.1 What organizations have been involved as partners?

<table>
<thead>
<tr>
<th>Organization Name</th>
<th>Type / Location</th>
<th>Financial support</th>
<th>In-kind support</th>
<th>Facilities/Data</th>
<th>Collaborative research</th>
<th>Personnel exchanges</th>
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</table>

- List of Research Projects from Other Partners
- [WMU] Reflective Cracking between Precast Prestressed Box Girders, Wisconsin Highway Research Program- Wisconsin DOT, August 1, 2013 – July 31, 2015, $85,000, Upul Attanayake, Haluk Aktan
- [WMU] Remote Monitoring of Fatigue Sensitive Details on Bridges, Michigan DOT, October 1, 2012 – September 30, 2014, $250,000, Upul Attanayake, Haluk Aktan
- [UTA] Oregon Heavy Vehicle (HV) Seasonal and Growth Factors, September 2014 –June 2015, $27,395, ODOT

3.2 Have other collaborators or contacts been involved?

- Worked with the Transit-oriented Development Research Center at Ajou University in Korea to develop a collaborative relation between two universities.
- Talia McCray, University of Texas Austin, School of Architecture, Community and Regional Planning
4. IMPACT

4.1 What is the impact on the development of the principal discipline of the program?
- Non-motorized traffic safety is incorporated into CCE 4300 Traffic Design offered Fall 2014 by WMU’s Department of Civil and Construction Engineering
- Non-motorized transportation research activities are incorporated into class curricula for CORP 5430 Transportation Planning offered fall 2014 by WMU’s Department of Geography
- Improved recruitment of graduate students especially those interested in the transportation engineering and planning field

4.2 What is the impact on other disciplines?
- TRCLC built a collaborative environment not only among TRCLC members but also researchers from other disciplines. Disciplines involved include civil engineering, computer science, electrical and computer engineering, mechanical engineering, industrial engineering, geography, urban planning, blindness and low vision studies, psychology, statistics, etc.

4.3 What is the impact on the development of transportation workforce development
- Nothing to report.

4.4 What is the impact on physical, institutional, and information resources at the university or other partner institutions?
- Nothing to report.

4.5 What is the impact on technology transfer?
- Nothing to report.

4.6 What is the impact on society beyond science and technology?
- There have been many requests from communities to attend meetings for their non-motorized transportation and livability issues. TRCLC members had great opportunity to provide technical advises to the community.
5. CHANGES/PROBLEMS

5.1 Changes in approach and reasons for change
   • Nothing to report.

5.2 Actual or anticipated problems or delays and actions or plans to resolve them
   • Nothing to report.

5.3 Changes that have a significant impact on expenditures
   • Nothing to report.

5.4 Significant changes in use or care of animals, human subjects, and/or biohazards
   • Nothing to report.

6. SPECIAL REPORTING REQUIREMENTS
   • Nothing to report.