Annual Report

This report covers the Center's activities from August 23, 2009-August 22, 2010.

The Center for Transportation and Livable Systems (CTLS) is the University of Connecticut’s University Transportation Center. Our research activities, educational programs and outreach activities focus on Sustainable and Livable Transportation Systems for Smart Growth.

Index

Director’s Message................................................................. 3
What’s New................................................................................. 4
Center Theme............................................................................ 5
Research..................................................................................... 6
Technology Transfer................................................................. 10
Education................................................................................... 12
Outreach..................................................................................... 14
Structure & Financials................................................................. 15

University of Connecticut
Longley Building
270 Middle Turnpike Unit 5202
Storrs, CT 06269-5202
Telephone: (860) 486-6446
Fax: (860) 486-2399
Web: www.ctls.uconn.edu

The preparation of this report was funded by a grant from the Research and Innovative Technology Administration of the U.S. Department of Transportation. This document is disseminated under the sponsorship of the U.S. Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.
Director's Message

We have had an exciting and busy 2009-2010 at the Center for Transportation and Livable Systems (CTLS). The director's message is typically a place to reflect on the accomplishments of the past year, acknowledge those who made it possible and look to the year ahead. In this spirit, let me begin by highlighting several accomplishments of the past year. First, I am proud to highlight our new look. Much effort went into making our new logo and website (www.ctls.uconn.edu) and I think the results speak for themselves. We have laid an excellent foundation for communicating the research and activities of CTLS to the world and begun the process of creating an interactive website that will make our research program run more efficiently.

We also completed the selection of five research projects for the third year of our research program, covering a wide variety of topics related to sustainable and livable transportation systems — from low-impact design and transit-oriented development impacts to sustainability indices and network adaptation. You’ll find summaries of all projects on our website. I also want to point out that CTLS researchers are not confined to the campus — our researchers and students have been busy providing expertise to design charrette processes around the state and creating fun LEGO® activities for elementary-school children.

Of course, these many successes cannot happen without a great deal of effort and support from many places. The support of USDOT, RITA and the UTC program has been very much appreciated over this transitional year. The University of Connecticut and School of Engineering have been very supportive and have enabled many of the accomplishments of CTLS. Our research advisory board has been instrumental in guiding the research program and has my sincere thanks. The UConn Consortium of Transportation Centers (CTLS is one of three member centers) has been an excellent resource for both CTLS and me. I also want to thank the Connecticut DOT for the support they have provided, and I look forward to continuing to strengthen the relationship between ConnDOT and CTLS. Last, I want to thank the excellent staff of CTLS, who have worked hard to help make this past year a success and have met all of the challenges with grace and composure.

The coming year has a great deal in store for CTLS, its researchers, staff and students. The variety of activities described in this annual report provide insight into where we have been, where we are, and where we are going. I look forward to continuing to serve and work with everyone associated with CTLS.

Nicholas E. Lownes, PhD, P.E.
Director, CTLS and
Assistant Professor of
Civil and Environmental
Engineering
New Look, New Logo

The Center launched a new website with a new look this year. The site serves as the primary information tool for those interested in CTLS news, events, and research activities.

www.ctls.uconn.edu

Our new name and look include a new logo, which has at its central element a modified version of a catenary curve. The catenary can be found everywhere; it is the curve that describes the shape a cable or chain makes when it is supported at both ends. It is an important feature of many civil and infrastructure engineering projects across the globe. “Catenary” is also a term used to describe the overhead electrical system used to power light rail and streetcar systems around the world. Our integrated, multi-modal approach to transportation systems solutions is well-represented by this deceptively simple curve.
As we prepare for the coming year and reauthorization legislation, we have realigned our activities to better capitalize on resources and emerging trends. Most notably, the name of our center has changed to the Center for Transportation and Livable Systems (CTLS), with the theme of Sustainable and Livable Transportation Systems for Smart Growth. The primary focus of activities within the center has not changed; however, it now allows us to better leverage some of the research and technical expertise at the University of Connecticut within and beyond the School of Engineering toward addressing pressing national issues and research needs.

The CTLS theme engages multi-disciplinary engineering and planning activities that promote a sustainable transportation system and livable communities connected by this system. The following Sustainability and Livability Principles jointly developed by USDOT, EPA and HUD are represented in the research activities of CTLS:

1. Provide more transportation choices.
2. Promote equitable, affordable housing.
3. Increase economic competitiveness.
4. Support existing communities.
5. Leverage federal investment.

CTLS pursues an innovative, integrative, and multi-disciplinary vision of sustainable transportation systems. We see sustainable transportation systems harnessing and integrating advanced technology for communications, sensing and monitoring. Sustainable transportation systems will be less dependent on fossil fuels, and as such will utilize alternative fuels and will require supportive infrastructure and policy—all guided by cutting-edge research and outreach.
Current Projects

**CTLS 08-01: Assessing the Impact of Light Rail Transit on Land Values and Tax Revenues**

Light Rail Transit (LRT) has become an increasingly popular centerpiece of smart growth policies in the United States, yet considerable debate exists about its cost-effectiveness. This project is examining the early returns to proposed and under-construction LRT investment and how these vary across neighborhoods. It may take 10 or 20 years to generate substantial revitalization of a given neighborhood, but early increases in property value and tax collections may stimulate neighborhood change and defray capital costs. The research team is building a series of models to estimate the effects of LRT on the land markets. Detailed Geographic Information Systems-based data on land-use, new construction, market foreclosures, and residential transactions is being analyzed for the LRT system in Phoenix, AZ. Innovative independent variables include dynamic measures of accessibility at the metropolitan scale derived from GIS-T models, and a proxy for neighborhood change derived from data on new construction.

**CTLS 08-02: Green Modes of Transportation for Connecticut’s Mixed Use Developments**

This study is an idea-to-implementation project focusing on the food delivery sector of the downtown Storrs area within the University of Connecticut environs. The project objective is to determine the sustainability and efficiency of the existing delivery infrastructure and propose green alternative systems. Downtown Storrs delivery services currently generate anywhere from 50,000-100,000 deliveries per year with an average of 136-272 per day. With deliveries topping 1,000 trips on some of the busiest days of the year, the use of zero/low emission vehicles such as pedal bikes or electric cars could have a significant effect on the area’s carbon footprint. The goal is to create business and transportation models that will demonstrate how the current system for delivery of goods can be transformed into an organized approach that will increase profits for the local businesses using green modes of transportation.
CTLS 08-03: Reversing Urban Sprawl: A Reclaimability Index Approach for Reviving Downtown Brownfields

Brownfield redevelopment aids in using existing infrastructure instead of developing green fields, and promotes the creation of walkable neighborhoods that were the paradigm of growth prior to the prevalence of urban sprawl in cities across America. The conversion of brownfields into local business centers would also favor public transportation and revival of local markets. However, brownfield reclamation meets significant obstacles, depending on the local legal, economic and social conditions. The intervention of state and city authorities with financial and policy-based aid is crucial to overcoming those obstacles. However, allocation of (limited) funds should take into consideration smart growth principles to maximize the related benefits. To support the decision making process, this research analyzed the current conditions in the state of Connecticut, investigated the obstacles for the successful brownfield reclamation, and is developing a spatially-based tool that can be used by public planners to prioritize brownfield redevelopment options based on a consideration of overall social benefits relative to costs, including the promotion of smart growth.

CTLS 08-04: Public Transit Design for Smart Growth: Using Choice Experiments to Quantify Tradeoffs, Values and Funding Implications

Studies that document the value of public transportation tend to use proxies to determine this value through ridership or property values. This study is an attempt to get at the value of public transportation and its impact on placemaking more directly. The research team is developing a stated preference survey that will be deployed in a Phase II of this project. Utilizing a main effects conditional logit model, our pilot study of over 110 responses suggests that people do place a significant value in placemaking, as defined by wider sidewalks, narrower streets, more pedestrian facilities, multistory mixed-use development and reduced building setbacks. This value was calculated as $190 per year — a value of both statistical and practical significance.
New Projects

Based on recommendations provided by the CTLS Research Advisory Panel in April 2010, five new projects were funded for the 2010-2011 year.


This project involves a comprehensive and compact study of the built environment in light rail transit station areas in Denver, CO and travel behaviors in both transit-oriented development (TOD) and non-TOD areas in the region. The principal objectives are to provide insight into how different types of transit-oriented development affect travel behavior patterns—specifically reductions in vehicle miles travelled—and to understand what prevents people from living in TOD areas.

Principal Investigator: Carol Atkinson-Palombo, Ph.D., Assistant Professor of Geography
Research Team: Robert Cromley, Ph.D., Professor of Geography and Wesley Marshall, Ph.D., Assistant Professor of Civil Engineering, University of Colorado Denver

CTLS 10-02: Effect of Low-Impact Sustainable Transportation Design as a Strategy for Alleviating Stormwater Runoff and Reducing GHG Emissions

The objectives of this research are to examine the potential for low impact transportation design as an option to reduce sewage system costs and environmental greenhouse gas (GHG) and nitrogen releases, and to assess green design alternatives to reduce transportation impacts on combined sewer loading and GHG emissions.

Principal Investigator: Joseph Bushey, Ph.D., Assistant Professor of Civil & Environmental Engineering
Research Team: Carol Atkinson-Palombo, Ph.D., Assistant Professor of Geography, Adam Zofka, Ph.D., Assistant Professor of Civil & Environmental Engineering and Eric Jackson, Ph.D., Assistant Research Professor, Connecticut Transportation Institute

CTLS 10-03: Assessing the Relationship between Transportation Mode Choice and Transportation Land Consumption

The goal of this study is to develop models relating mode choice to the amount of land used for transportation in a city. With the increased emphasis being placed on building transit oriented developments in Connecticut and across the country, there is an immediate need to improve our knowledge relating to the efficient use of land in dense urban places and how this land allocation is affected by mode choice in our transportation system.

Principal Investigator: Norman Garrick, Ph.D., Associate Professor of Civil & Environmental Engineering
Co-Researcher: Alexander Vias, Ph.D., Associate Professor of Geography
CTLS 10-04: Developing an Index for Comparing Sustainability of Statewide Transportation Systems

The objective of this research is to investigate how the concept of sustainability relates to the transportation enterprise and use the knowledge about transportation and sustainability to create an index that measures sustainable transportation for states. The index will contain economic, environmental, and social components of transportation that reflect the changing priorities of U.S. policymakers.

Principal Investigator: Norman Garrick, Ph.D., Associate Professor of Civil & Environmental Engineering
Co-Researcher: Carol Atkinson-Palombo, Ph.D., Assistant Professor of Geography

CTLS 10-05: Transportation System Sustainability and Adaptation Using *Physarum Polycephalum*

Recently, researchers in Japan and the U.K. have discovered that a particular species of mold, *Physarum polycephalum*, or “Slime Mold” has the unique ability to replicate transportation networks. *P. polycephalum* networks merit study because millions of years of evolution have led to an adaptive behavior in which cost, efficiency and resilience are optimized in the feeding networks it constructs. The research objectives of this proposal are to investigate, quantify and model the network adaptation of *P. polycephalum* and to apply the information to an analysis of the Connecticut interstate highway and rail network. Further, an outreach experiment for middle school students will be developed and a website will be created to disseminate results and provide materials for educators to conduct the activity.

Principal Investigator: Nicholas Lownes, Ph.D., Assistant Professor of Civil & Environmental Engineering

Pilot Project

A Vision Plan to Re-connect Downtown New London to the North End

The north end of New London, Connecticut, is home to two prestigious institutions: Connecticut College and the U.S. Coast Guard Academy. When Interstate I-95 was built in the 1960’s, the highway essentially severed the physical connection between the downtown and the north end of the city. The result is that unlike such New England towns as Northampton or Amherst, Massachusetts, New London does not look, feel or function like a college town and does not accrue the financial or social benefits of having two of the most important colleges in the country in its backyard.

The goal of this pilot project is to create a visioning plan that will improve the overall functioning of the city, putting it on the path to a more prosperous future. Through a workshop/charrette process the focus will be on restoring pedestrian and bicycle connections between the colleges and the downtown by investigating solutions to overcome the physical barrier and foster New London as a compact, walkable college town.

Principal Investigator:
Peter Miniutti, L.S.A.S., Associate Professor of Landscape Architecture
Research Team:
Norman Garrick, Ph.D., Associate Professor of Civil & Environmental Engineering
Catherine Johnson, Architect and Town Planner
Lucinda E. Gibson, P.E., Principal, Smart Mobility Inc.
Journal Papers

**CTLS 08-01: Assessing the Impact of Light Rail Transit on Land Values and Tax Revenues**


**CTLS 08-03: Reversing Urban Sprawl: A Reclaimability Index Approach for Reviving Downtown Brownfields**


**CTLS 08-04: Public Transit Design for Smart Growth: Using Choice Experiments to Quantify Tradeoffs, Values and Funding Implications**


Conference Presentations

**CTLS 08-01: Assessing the Impact of Light Rail Transit on Land Values and Tax Revenues**


**CTLS 08-02: Green Modes of Transportation for Connecticut’s Mixed Use Developments**

Green Modes of Transportation for the Delivery of Fast Food in Connecticut’s Mixed-Use Developments.
Miniutti, P. TRB Conference on Transportation for Livable Communities: Charting a Research Agenda, Washington D.C., October 18-19, 2010, poster presentation (accepted).

**CTLS 08-03: Reversing Urban Sprawl: A Reclaimability Index Approach for Reviving Downtown Brownfields**


**CTLS 08-04: Public Transit Design for Smart Growth: Using Choice Experiments to Quantify Tradeoffs, Values and Funding Implications**


**Colloquia**

**CTLS 08-01: Assessing the Impact of Light Rail Transit on Land Values and Tax Revenues**


OUTSTANDING STUDENTS OF THE YEAR

CTLS Student of the Year Craig Yannes

Craig received his B.S and M.S. degrees in Civil Engineering (2007 and 2009) from the University of Connecticut. His thesis work involved the design of a choice experiment survey instrument around econometric models to estimate the value the general public places in both placemaking and transit system characteristics. In 2007 and 2008 he received the New England University Transportation Center fellowship for his graduate studies. In 2009, he joined Dewberry-Goodkind Inc. in New York City as a transportation engineer in the rail and transit division. His research interests include public transportation operations and planning.

Craig was selected as the Center for Transportation and Livable Systems Student of the Year based on his academic accomplishments, his publication record as a master’s student with two archival publications and two refereed conference proceedings, his active leadership role in student organizations and in his research team, and his professionalism and work ethic. As a student, Craig played a vital leadership role among veteran and new students and contributed to the strength of the UConn transportation program.

NEUTC USDOT Student of the Year, UConn Nominee Wesley Marshall

Wesley completed his doctorate at the University of Connecticut in August of 2009 and is currently an Assistant Professor of Civil Engineering at the University of Colorado Denver. He earned his master’s degree from the University of Connecticut in 2006 and is a 1998 graduate of the University of Virginia. While at UConn, Wesley received the Dwight D. Eisenhower Transportation Fellowship as well as the Charley V. Wootan Award for Outstanding TRB Paper in the field of Policy and Organization.

Wesley specializes in transportation planning, safety, and sustainability as well as urban design, congestion pricing, and parking. His research has included defining and measuring the street network and an empirical study considering the role of street patterns, connectivity, and network density in road safety and sustainability. Related research has focused on analyzing parking at mixed-use centers in small New England cities, investigating the effects of parking on urbanism, a reassessment of on-street parking, and developing a child pedestrian safety curriculum for the Connecticut Transportation Institute.

As UConn’s 2009 nominee for the New England University Transportation Center (NEUTC) USDOT Outstanding Student of the Year, Wes—along with other consortium university nominees—was eligible for the New England Center’s award.
New England ITE Student Research Symposium

The University of Connecticut Institute of Transportation Engineers (ITE) student chapter hosted the 6th annual New England ITE Student Research Symposium in Storrs, CT on April 7, 2010. The symposium focused on displaying research activities of students from across New England. Two research sessions over the course of the day—each with three parallel tracks—covered 22 presentations from students at four different institutions throughout New England: UConn, University of Massachusetts–Amherst, Northeastern University and University of Rhode Island.

Students were asked to prepare a lecture and poster presentation, which allowed for the traditional format to be coupled with interaction with symposium attendees at the posters. Graduate student Jason Zheng presented on his CTLS-funded research project “Development and Application of a Composite Index for Transportation Sustainability,” which focuses on developing, creating and testing a comprehensive metric for assessing the broader outcomes of transportation systems.

Center Director Nick Lownes provided the dinner address, “Transportation Research: UConn’s Role in a National Challenge,” discussing the resources and talent available through the UConn transportation centers, thoughts on the national transportation research agenda, and how industry-academia partnerships present exciting opportunities for collaboration.

An Opportunity to Learn and Share at the UConn TRB Reception

In an effort to effectively promote University of Connecticut transportation research to a wider audience and attract new graduate students to the transportation program, the 2nd Annual UConn TRB reception was held at the Churchill Washington on January 11, 2010. Attending the reception were more than 80 friends and colleagues of UConn transportation in academia, industry and the public sector from across the globe. Fifteen UConn transportation graduate students attended the meeting, along with several recent graduates. The relaxed atmosphere was conducive to discussions of UConn transportation research and allowed faculty and students to showcase exciting new developments, network with prospective collaborators and employers, and speak with potential students.

The event was sponsored by grants from the Graduate School, the School of Engineering, Civil & Environmental Engineering Department; and corporate sponsors Fuss & O’Neill, Lochner, and Beta Group, Inc.
Pre-College Outreach

This summer, a group from the University of Connecticut Civil & Environmental Engineering Department conducted a fun and educational learning activity for a gathering of 4th and 5th grade students at the East Hampton (CT) Public Library. Their objective was to introduce the grade-schoolers to some of the issues involved in transportation and community planning.

The UConn team, which included Dr. Nicholas Lownes, Director of the Center for Transportation and Livable Systems, and graduate students Kelly Bertolaccini and Alex Bernier, created a unique lesson plan utilizing special components of the popular LEGO® block system to demonstrate the impact of transportation on the way cities develop.

During their visit the team briefly explained general concepts of transportation engineering to the young audience, such as how community design reflects the transportation systems available. They also discussed some of the many elements of interest to transportation professionals, including the interactions of pedestrians, vehicles and transit systems such as cars, planes and trains, and even oil pipelines.

The team then built three different transportation networks from the LEGO®s representing systems that favor cars, bikes/pedestrians, and public transit, and allowed the youngsters to imagine and create their own LEGO cities around the roads and rail lines. This engaging opportunity to “engineer” and construct their own community plans quickly helped the kids recognize some of the real challenges associated with different types of transportation systems.

A few weeks later the team presented their LEGO activity to the “Know Your Town Fair” in Mansfield (CT), where several teachers expressed an interest in re-creating the lesson in their own classrooms.
Organization

The Center for Transportation and Livable Systems is part of the University of Connecticut Consortium of Transportation Centers (UCTC). Formed in 2010, the UCTC seeks to promote collaboration, cooperation and communications between the three transportation centers housed at UConn. UCTC comprises CTLS, the Connecticut Transportation Institute (CTI) and the Center for Resilient Transportation Infrastructure (CRTI) – a Department of Homeland Security National Transportation Security Center of Excellence. CTLS is housed within the School of Engineering.

The administration of CTLS includes Director Nicholas Lownes, Program Coordinator Stephanie Merrall, Financial Assistant Lori Judd, Program Aide Amy Smith and CTLS Undergraduate Intern Nathaniel Merriman.

Funding and Expenditures
Contact Us

**Director**
Nicholas E. Lownes, Ph.D., P.E.
Assistant Professor
Department of Civil & Environmental Engineering
261 Glenbrook Road Unit 2037
Storrs, CT 06269-2037
Phone: 860-486-2717
Fax: 860-486-2298
Email: nlownes@engr.uconn.edu
Web: http://engr.uconn.edu/~nlownes

**Program Coordinator**
Stephanie G. Merrall
Connecticut Transportation Institute
University of Connecticut
270 Middle Turnpike Unit 5205
Storrs, CT 06269-5202
Phone: 860-486-6446
Fax: 860-486-2399
Email: smerrall@engr.uconn.edu

www.ctls.uconn.edu