Annual Report

This report covers the Center’s activities from August 23, 2011 - June 1, 2013.

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.

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Director's Message

Nicholas E. Lownes, PhD, P.E.

Dear CTLS Friends and Colleagues:

Over the past 18 months, we at CTLS have worked hard to improve our online presence and communication with stakeholders and the traveling public. I’d like to highlight just a couple of these efforts:

With the help of our excellent communications group in the School of Engineering, we put together a Horizons Lecture Series video (www.youtube.com/watch?v=lybTQDZDv64) describing CTLS and transportation at UCONN. Safety, Public Transit and Urban Planning take center stage – heavily influenced by CTLS research on transportation for smart growth over the past five years.

The Hartford Business Journal's Connecticut Green Guide featured CTLS on the cover of their Spring 2013 issue (www.hartfordbusiness.com/article/20120525/SPECIALEDITIONS/120529981). Several CTLS projects and researchers were featured, including Dr. Peng Zhang’s work in electric vehicle charging station technology and Dr. Norman Garrick’s work on the impact of parking policy on urban design, economics and sustainability.

A video featuring CTLS Project 11-05: “Investigation of Curb Management Strategies to Minimize Freight/Cyclist Conflicts in the Urban Core” is currently featured on Transportation TV (www.transportationtv.org/Pages/default.aspx?VideoId=324) by the American Association of State Highway and Transportation Officials (AASHTO). The footage for this video was shot during the annual meeting of the TRB in January 2013 – where the project received much positive attention.

Looking forward, CTLS has invested in t-HUB, a public transit data hub designed to help transit operators and planners in Connecticut manage big data. The early application of t-HUB is to assist in meeting FTA Title VI reporting requirements. Information on t-HUB can be found at www.thub.uconn.edu with the online tool coming soon.

It has been an exciting time over the past 18 months with CTLS, it continues to be a pleasure to serve as director and I look forward to the new opportunities in the coming year.

All the best,

Nicholas E. Lownes

Center Theme

The CTLS theme of Sustainable and Livable Transportation Systems for Smart Growth 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.
January 2012 ~ The Connecticut Office of Brownfield Remediation and Development web site hosts the Brownfield Mapping Project framed by project CTLS 08-03 research on Reversing Urban Sprawl: A Reclaimability Index Approach for Reviving Downtown Brownfields. Through the online system, users can access a vast array of maps and other GIS data pertaining to brownfields throughout the state.

June 2012 ~ The University of Connecticut continues its role in the UTC program by entering into a partnership with MIT in the New England University Transportation Center (NEUTC), along with the University of Massachusetts – Amherst, University of Maine and Harvard. The Center for Transportation and Livable Systems manages the call for first year proposals and, guided by CTLS Advisory Panel review and ranking, recommends projects for UConn’s initial program of research.

August 2012 ~ t-HUB, a large-scale UConn database initiative focusing on the needs of transit system operators and planners, receives support provided in part through CTLS pilot project funding. Early stages of t-HUB center on merging the transit system and operational-level data of transit systems in Connecticut with the demographic and socioeconomic data needed for Title VI (equity in service provision) analysis.

October 2011 ~ James Mooradian is named CTLS Outstanding Student of the Year. While pursuing M.S. degrees in both Transportation Engineering and Statistics, Mr. Mooradian concentrated on statistical analysis and modeling of traffic safety operation with a focus on trends in senior crash severity. His research involved determining the extent and impacts of the relative risk of seniors for more severe accidents, as well as proposing a potential new procedure for accurate crash severity modeling.

May 2011 ~ CTLS selects the second group of Transportation Undergraduate Research Fellowship (TURF) winners. The three recipients competed for fellowships supporting independent transportation research under the guidance of CTLS-affiliated faculty:

- Kevin McKernan (Advisor, N. Lownes): Complete Streets Manual Research
- Emin Basic (Advisor, J. Ivan): The Effect of Pedestrian Timed-Crossing Signals and its Human Relationship in Conjunction with Accident Rates
- Michael Gangi (Advisor, N. Garrick): How Do Changes in Building Height Impact the Ratio of Usable Floor Space to Parking?

October 2012 ~ Ph.D. candidate Kelly Bertolaccini is uniquely honored as the Outstanding Student of the Year nominee by both CTLS and the New England UTC. Since entering UConn’s graduate program, Ms. Bertolaccini has explored a range of research topics related to social equity, public transportation, and economic development. In 2012, she received an Eisenhower Fellowship to support her research focusing on transit policy choices and the impact of transportation availability on social equity. While pursuing her M.S. at UConn, with a prior Eisenhower Fellowship grant Kelly explored the role of social equity and other aspects of livability in the transportation policies of government transportation agencies around the world. For her doctoral research, intends to build upon this foundation but focus in particular on the proliferation of projects across the nation.
Technology Transfer

April 2012 ~ CTLS participates in sponsorship of the 8th Annual Transportation Student Symposium organized by the Connecticut Chapter of ITE and the UConn ITE Student Chapter in Storrs, CT. More than 100 participate in the event where students representing universities across New England present their research findings in technical sessions. Keynote speakers are Thomas Harley, Chief Engineering for the Connecticut DOT, Mark Paquette, Executive Director of the Windham Regional Council of Governments, and Mary Ellen Kowalewski, Director of Policy and Planning for the Capitol Region Council of Governments. Among awards bestowed at the symposium, is the 2012 Inaugural Scholarship that goes to CTLS graduate student researcher Kelly Bertolaccini.

Outreach

May 2012 ~ Professor Nick Lownes and graduate assistant Abigail Osei-Asamoah conduct an outreach activity with Mansfield (CT) Middle School science students based on CTLS Project 10-05 Transportation System Sustainability and Adaptation Using Physarum Polycephalum, more commonly known as The Slime Mold Project. The project seeks to find ways transportation engineers and planners can learn to design and plan for resilient transportation networks by studying the network of feeding tubes produced by slime mold. Under controlled circumstances, the organism has the ability to replicate transportation networks with evolution having led to an adaptive behavior in which cost, efficiency and resilience are optimized in the feeding networks it constructs. Over the course of a week, the 8th graders conduct experiments growing their own slime mold samples on maps of Connecticut with major cities marked by points of an oat flake food source, and learn about transportation systems and biomimicry in the process.

March 2013 ~ The spring 2013 issue of the Hartford Business Journal Connecticut Green Guide features a cover story profiling CTLS faculty research. The spread highlights studies conducted by Drs. Norman Garrick, Nicholas Lownes, Joe Bushey (Civil & Environmental Engineering), Peng Zhang (Electrical & Computer Engineering), and Peter Miniutti (Landscape Architecture).

November 2012/March 2013 ~ CTLS co-hosts a two-session Title VI and FTA Reporting Workshop for transit operators and regional planning organizations in Connecticut. The event is an interactive, product-focused, intensive stakeholder gathering focused on identifying challenges and needs associated with reporting/monitoring requirements and brainstorming potential solutions to challenges and issues posed by those requirements. Newly modified reporting procedures that are more demanding and data intensive inspired UConn’s related t-HUB database initiative, designed to make data management and analysis easier for all transit organizations in Connecticut.

Throughout 2012 ~ With industrial partner Fuss & O’Neill, non-profit partner Connecticut Main Street Center, and the state DOT, CTLS co-organizes a series of workshops on “Complete Streets” in Connecticut. Complete Streets is a design philosophy for roadways that promotes the consideration of all users—pedestrians, cyclists, drivers, and transit users—when designing roadway environments. The highly successful workshops held in March, June and November draw hundreds of participants from across the state.

April 2013 ~ The UConn School of Engineering releases a Horizons Lecture Series video showcasing several ways in which faculty and students are exploring transportation engineering challenges through CTLS. It highlights how, through their efforts, they are promoting efficient transportation systems that contribute to the quality of life in our communities.
Current Projects

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

This project examines the early returns to proposed and under-construction Light Rail Transit (LRT) investment and how these vary across neighborhoods. 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.

**Principal Investigator:** Carol Atkinson-Palombo, Ph.D., Assistant Professor of Geography  
**Research Team:** John Clapp, Ph.D., Professor of Finance, Nicholas Lownes, Ph.D., Assistant Professor of Civil & Environmental Engineering and Robert Cromley, Ph.D., Professor of Geography


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 and Eric Jackson, Ph.D., Assistant Research Professor of Civil & Environment Engineering, 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
CTLS 10-04: Developing an Index for Comparing Sustainability of Statewide Transportation Systems

This research investigates 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 US 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. The objectives of this project 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

CTLS 11-03: The Impact of Infrastructure and Mobility Patterns on the Variation of Traffic Fatality Rates in Industrialized Countries

Even after the notable decrease in fatalities in recent years, the US still has a per capita fatality rate three times that of the safest countries. The rate of decrease in fatalities in countries like the Netherlands shows no sign of slowing down and continues to outpace that in the US. Many observers, including the Federal Highway Administration, have noted these results and are seeking to learn how the experiences in these countries can be applied to improving traffic safety in this country. This project is designed to address a part of the issue by focusing on the role that differences in transportation infrastructure and mobility patterns might play in affecting traffic safety. The goal will be to assess the extent to which differences in infrastructure, land use and mobility patterns affect the observed differences between the states and between the countries themselves.

**Principal Investigator:** Norman Garrick, Ph.D., Associate Professor of Civil & Environmental Engineering

CTLS 11-05: Investigation of Curb Management Strategies to Minimize Freight/Cyclist Conflicts in the Urban Core

New York City is currently undergoing a massive expansion of its bicycle network, and among the many problems that are emerging is the need for freight vehicles to park in bike lanes to make deliveries. This is likely to be an increasing problem in New York and other urban areas across the country as green design initiatives are implemented with little or no analysis of freight vehicle-specific operations–leading to unexpected problems for both bicycles and freight vehicles. The purpose of this research is to develop an analysis framework and construct simulation models to quantify the impacts of curb control strategies on curbside freight vehicle operations, and explicitly examine the impacts on freight vehicle interactions with bicycles. The results of this analysis can be used to identify effective policy options for management of shared curb space.

**Principal Investigator:** Nicholas Lownes, Ph.D., Assistant Professor of Civil & Environmental Engineering
**Research Team:** Alison J. Conway, Ph.D., Assistant Professor of Civil Engineering, City College of New York and Jeffrey J. LaMondia, Ph.D., Assistant Professor of Civil Engineering, Auburn University
New Pilot Project

CTLS 12-01: t-HUB: The Public Transport Data Center of Connecticut

We are in the age of "Big Data". The total quantity of global digital data is expected to reach 7.9 zettabytes (1 trillion gigabytes) by 2015. The McKinsey Global Institute estimates there will be a Big Data talent gap of 140,000 – 190,000 people globally, a gap between the supply and demand for people with the skills to properly analyze and interpret Big Data. Big Data and its inherent challenges and opportunities for improved public transportation operations and research in Connecticut has spurred efforts to develop t-HUB, an initiative designed to serve big data needs for the public transportation community. t-HUB is a central data storage point, access point, management point and analysis point for transit operators and planners, hosted at the University of Connecticut.

The initial t-HUB prototype focuses on the application of spatial data and demographic information to the reporting and analysis needed to meet Title VI of the Civil Rights Act of 1964 requirements for equity in transit service provision. Below is a screen shot of the early prototype which will help all transit operators and planning organizations perform Title VI analysis, regardless of expertise with Geographic Information Systems or other analytical techniques.

Principal Investigator: Nicholas Lownes, Ph.D., Assistant Professor of Civil & Environmental Engineering
Research Team: Eric Jackson, Ph.D., Assistant Research Professor of Civil & Environmental Engineering, Connecticut Transportation Institute; Jeffrey Osleeb, Ph.D., Professor of Geography; and Dong-Guk Shin, Ph.D., Professor of Computer Science & Engineering

Research Advisory Panel

Michael Knodler, Ph.D. (Chair)
Associate Professor
Civil & Environmental Engineering
University of Massachusetts Amherst

Michael Accorsi, Ph.D.
Director, Center for Resilient Infrastructure and
Professor, Civil & Environmental Engineering
University of Connecticut

Ted DeSantos, P.E., P.T.O.E.
Vice President, Transportation and Structures
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CT Department of Transportation

Michael Sanders
Public Transit Administrator
Office of Transit and Ridesharing
CT Department of Transportation

Peter Simmons
Director
Office of Responsible Development
CT Department of Economic and Community Development
Completed Projects

**FULL PROJECTS**

**CTLS 08-02: Green Modes of Transportation for Connecticut’s Mixed Use Developments**  
Principal Investigator: Peter Miniutti, M.L.A.  

**CTLS 08-03: Reversing Urban Sprawl: A Reclaimability Index Approach for Reviving Downtown Brownfields**  
Principal Investigator: Maria Chrysochoou, Ph.D.  

**CTLS 08-04: Public Transit Design for Smart Growth: Using Choice Experiments to Quantify Tradeoffs, Values & Funding Implications**  
Principal Investigator: Nicholas Lownes, Ph.D.  

**CTLS 11-04: Evaluation of Surrogate Measures for Pedestrian Safety in Various Road and Roadside Environments**  
Principal Investigator: John Ivan, Ph.D.  
Co-Researcher: Nalini Ravishanker, Ph.D.  

**PILOT PROJECTS**

**CTLS 10-06: A Vision Plan to Re-connect Downtown New London to the North End**  
Principal Investigator: Peter Miniutti, M.L.A.  

**CTLS 11-01: Critical Technologies for Grid Integration of Electric Vehicles—Moving Towards Sustainable Transportation and Smart Grid**  
Principal Investigator: Peng Zhang, Ph.D.  
Co-Researcher: Bing Wang, Ph.D.  

**CTLS 11-02: Sustainable and Livable Transportation Systems for Smart Growth: Linking Electric Vehicles to Adoption of Off-Peak Electricity Rates**  
Principal Investigator: Fred Carstensen, Ph.D.  
Co-Researcher: Peter Gunther  
Paper: *Driving Smart Growth: Electric Vehicle Adoption and Off-Peak Electricity Rates*, University of Connecticut, Connecticut Center for Economic Analysis, August 2011
Selected Papers, Proceedings, and Presentations

2011


Gunther, P. Electric Vehicle Adoptions among Connecticut Zip Codes and Off-Peak Electricity Rates: County-level Impacts, presented at the 26th Annual REMI Users’ Conference, North Lake Tahoe, NV, October 12, 2011.


2012


2013


Organization

The Center for Transportation and Livable Systems is one of several centers administered through the Connecticut Transportation Institute (CTI) within the School of Engineering at the University of Connecticut. CTI seeks to promote collaboration, cooperation and communication amongst the transportation centers, with CTLS serving as the focal point for smart growth, public transportation, and urban planning research.

The leadership and administrative staff of CTLS includes Director Nicholas Lownes, Program Coordinator Stephanie Merrall, Financial Assistant Lori Judd, and CTLS Undergraduate Intern Christopher Burns.

Facilities

The Transportation Systems Laboratory combines an interactive educational environment with the cutting edge of simulation, GIS and transportation planning software. Within the lab there are 12 workstations used for teaching and research as well as a 12-processor high-performance supercomputer used for large-scale simulation, modeling and optimization. The lab is also equipped with a high-definition projector system. The workstations are pre-installed with transportation software that supports the simulation, GIS, mapping modeling, statistical analysis and optimization needs of CTLS researchers. The lab also houses the Connecticut Photolog libraries in a high-volume (48TB) Network Attached Storage (NAS) server.
Contact Us

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