



UNIVERSITY OF VERMONT

TRANSPORTATION RESEARCH CENTER

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Photo by Jordan Silverman

Message from the Director

We at the TRC sometimes have trouble explaining what transportation research is. We often say that it is the study of trip decisions and travel patterns and the way in which these affect quality of life, energy, and environment. The definition likely varies from transportation center to center and I believe the Vermont center is truly unique in our approach.

In Fall 2006, when UVM and TRC advisors assisted me in selecting future-looking topics to seed the expertise of our group, we chose quality of life (livability), leisure/tourism travel, tailpipe emissions, and alternative energy. At that time, few universities were studying topics like transportation system efficiency or seasonal and climate effects on travel for northern rural landscapes. In four short years, many of the topics we chose to study have become mainstream topics in the forefront of national policy debate.

One of our themes, livability and transportation, is particularly prevalent within the new administration of the USDOT, which is our primary funder through the University Transportation Center (UTC) program. Livability has sometimes erroneously become synonymous with transit-oriented development in large urban areas where high levels of walking and biking are easily attainable. The TRC has become active in the national debate to not only better define livability for transportation, but also to figure out how to measure it. We are proponents of the idea that the way in which transportation affects local economies, public health, and quality of life is a critical area of concern not only for large urban areas, but also for suburbs, villages,

and rural areas. The TRC and its partners in exploring livability (New England Transportation Institute, UVM Center for Rural Studies, Resource Systems Group, Center for Health Promotion and Research, AARP, VTrans, and CCMPO) have gathered unique datasets and are poised to contribute to this important national discussion. At the same time, the data provides a foundation for relevant graduate and undergraduate education.

After years of designing experiments and collecting data, 2009-2010 was the year in which we could enjoy having our datasets in hand. It has been a pleasure to lead a diverse array of TRC faculty and students from mere ideas to large, concrete datasets with timely policy applications. I look forward to a dynamic future as national recognition grows for our unique, interdisciplinary transportation research center.

Sincerely,

Lisa M. Aultman-Hall, Ph.D.
Professor and Director

Message from the Vice President for Research

This year, a significant portion of the UVM faculty and administration invested a substantial amount of time in the University's Transdisciplinary Research Initiative, otherwise known as the "Spires of Excellence." The goal of the Spires is to develop and support collaborative research excellence at UVM, which is consistent with the aims of the TRC. The TRC, one of UVM's first Matrix Centers, is a hub for innovative and interdisciplinary research, education, and outreach on sustainable transportation system solutions.

Funded by the U.S. Department of Transportation and UVM, since 2006, the TRC has brought together researchers and students from across campus with citizens from across the region to discuss transportation funding, transportation and climate change, alternative energy, and other timely topics.

Because the TRC has focused on interdisciplinary research and graduate-level education, it is well positioned to play an active role in the development of the UVM Spires (Complex Systems, Food Systems, and Neuroscience, Behavior, and Health).

I extend my sincere congratulations for another outstanding year to TRC Director Dr. Lisa Aultman-Hall, as well as the faculty, staff, graduate students, and board of advisors of the TRC.

Sincerely,

Domenico Grasso
Vice President for Research



Photo by Sally McCay, UVM Photo

TRC COURSE DEVELOPMENT



Transdisciplinary Graduate Course Development Continues

Part of the TRC's mission is to develop new educational partnerships with colleges and departments at UVM to broaden transportation-related curriculum at the University. Transportation systems provide an excellent focus for considering the complex interplay between public health, environment, economy, and quality of life.

This year, three TRC courses were approved by the UVM Graduate College, marking the first use of the course prefix **TRC**:

TRC310 Transportation Systems Seminar
TRC312 Critical Issues in Transportation
TRC314 Travel Safety and Human Factors

Even before the official course numbers were approved, the 2009-2010 academic year saw two pilot offerings of TRC310. In partnership with the CDAE department, Dr. Richard Watts led a seminar on Transportation and Community Development in Fall 2009. In Spring 2010, the topic was Transportation and Food Systems. TRC312 has been offered every Fall since 2006 under a temporary number.



In Fall 2010, Dr. Watts will lead a seminar in partnership with the College of Medicine and the College of Nursing and Health Sciences on the topic of Mobility for Aging Populations. This course will examine the impact of demographic changes on the delivery of health services and health policy. The TRC plans to establish a two-year rotation through four UVM departments for the innovative seminar course. Members of the public are welcome at seminars when guest speakers are featured.

Eco Driving Workshops

As part of our commitment to reducing petroleum consumption in the transportation sector, the Vermont Clean Cities Coalition, housed at the TRC (a nationally designated University Transportation Center), developed a two-hour long Eco Driving workshop designed to instruct participants in becoming more fuel efficient. Reducing fuel usage is both ecologically friendly and economical. The workshops are designed to reduce gasoline consumption and tailpipe emissions by instituting efficient driving habits and maintenance practices. The workshops include the following interactive, hands-on instruction:

- **Road test and measure the miles per gallon of participants' vehicles with a scan gauge to demonstrate how Eco Driving techniques affect performance**
- **Create a personal Eco Driving action plan for reducing fuel consumption**
- **Receive a tire pressure gauge to jump-start their new Eco Driving action plan**

TARGET AUDIENCES

General Public: Eco Driving workshops have been given in Jericho, VT and Thetford, VT, organized by the towns' Energy Task Forces. Shelburne, VT is scheduled to host an Eco Driving workshop in the coming year.

Fleet Managers: More than 200 Central Vermont Public Service (CVPS) employees will have been trained in Eco Driving by the end of September 2010. CVPS is the largest utility company in the state of Vermont. Companies with large gasoline costs can benefit greatly by training their drivers in Eco Driving.

Driver Education: Preliminary contacts and conversations have been made with driver education teachers with the goal of introducing the program to their curriculum, either on a case-by-case or statewide basis.



Photo by Andy Duback

A LOOK BACK: 2009-2010 AT A GLANCE

JULY

July 2009

Vermont high school students attend the National Summer Transportation Institute (NSTI), which aims to provide awareness about the complex transportation system upon which we all rely.



July 2009

Drs. Aultman-Hall and Manning start work on the Paul S. Sarbanes Transit in Parks Technical Assistance Center with colleagues from Montana, Florida, Maine, and other states.

July - August 2009

Dr. Manning and graduate students of the Park Studies Lab collect data for their USDOT-funded TRC project that examined the use of roads, greenways, and public transit at nine sites across the nation, including park, rural, and urban environments.

AUGUST



August 5, 2009

The UVM TRC and the College of Engineering and Mathematical Sciences hire Dr. Brian Lee as assistant professor to teach transportation systems in the School of Engineering.

August 2009

Graduate student Micheal Schwob presents "Driving Better: A Study of Changing Driver Behavior to Reduce Gasoline Use" at the TRC summer "brown bag" discussion series.

SEPTEMBER

September 2009

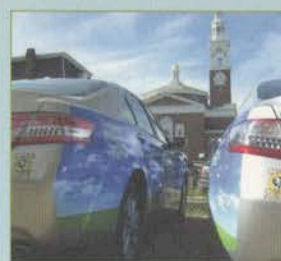
Drs. Holmén and Fukagawa start their NIH grant to study the health impacts of diesel particles, the first partnership between the Transportation Air Quality Lab (TAQLab) and the College of Medicine.



September 2009

Ph.D. student Nathan Belz recruits volunteer drivers at the Wake Robin Life Care Community in Shelburne. The participants, all age 70 and up, drive their own vehicles while Nate tracks their second-by-second driving behavior.

OCTOBER



October 2009

The University of Vermont acquires two 2010 Toyota Camrys - one with a hybrid engine, the other with a traditional gas-combusting engine - for studying vehicle tailpipe emissions.

October 25, 2009

Dr. Richard Watts makes a presentation in California to officials of the American Association of State Highway and Transportation on making the case for gas tax revenue in transportation.

October 2009

Students of the Transportation Air Quality Lab (TAQLab) present five papers at the American Association for Aerosol Research (AAAR) national meeting in Minneapolis, MN.

NOVEMBER

November 5, 2009

Dr. Per Garder of the University of Maine gives a well-attended talk on roundabouts.



November 18, 2009

Dr. Elizabeth Deakin, Professor of City and Regional Planning at UC Berkeley, talks about her work on strategies for stronger communities through sustainable mobility.



DECEMBER



Photo by Andy Duback

TRC by the NUMBERS

Graduate students funded	40	Invention Disclosures	2
Colleges involved in TRC projects	6	New 09-10 funding awarded	
Attendees at TRC-hosted events	958	to TRC associated activities	\$1.2M*
Conference presentations	20		

* (not including USDOT UTC grant of \$3.2M)

A LOOK BACK: 2009-2010 AT A GLANCE

JANUARY

January 12, 2010

Karen Sentoff, a candidate for a Masters in Environmental Engineering at UVM, receives award for the TRC UTC Outstanding Student of the Year. The prize was \$1,000 along with paid attendance to the 2010 TRB meeting in Washington, DC., in addition to a banquet and a plaque from the US DOT.

January 10-14, 2010

Faculty, staff, and graduate students from the TRC present 17 transportation-related projects at the Transportation Research Board (TRB) 89th Annual Meeting in Washington, DC. A majority of the TRC's research fits into the newer interdisciplinary topics related to sustainable transportation systems, efficiency, and livable communities.

January 2010

TRC Program Manager, Karen Glitman, shares her work on the TEDPP grant and serves as keynote speaker for the National American Association of Community Colleges - Workforce Development Institute.

FEBRUARY



February 24, 2010

Hosted by the TRC, Dr. Joseph Coughlin, the Director of MIT's AgeLab, delivers a talk on "The Demographics of Aging: Impacts on Transportation and Mobility" as part of the Burack Distinguished Lecture Series.



Photo by Andy Duback

MARCH



March 4, 2010

TRC hosts Dr. Reid Ewing from the University of Utah to present his expertise on transit and pedestrian-oriented development.

March 2010

TRC founding Director, Dr. Lisa Aultman-Hall, is chosen to chair the 2010 USDOT UTC Spotlight Conference "Research Perspectives on Transportation Systems for Livable Communities," organized by the Transportation Research Board.

APRIL

April 6, 2010

As part of the Burack Distinguished Lecture Series, the TRC hosts Dr. Deb Niemeier from UC Davis, who presents "Climate Change and Transportation: Lessons from California."

April 14, 2010

The TRC Research Report outlines the economic impact of the Burlington waterfront bike path, finding that path users cumulatively spend approximately \$4.5 million annually during their visit to the area.

MAY

May 6, 2010

Eighteen incarcerated men graduate from the inaugural Transportation Systems Academy, after completing 96 hours of coursework in topics such as CPR and First Aid, Work Zone Flagging, and OSHA.



May 12, 2010

Thirty-four research projects are shared with the public, press, and other stakeholders at the Third Annual Transportation Research Expo.



May 12, 2010

TRC's board of external and faculty advisors meet to catch up on the center's recent milestones and evaluate future challenges.

JUNE



June 2010

The fourth season of our popular lunchtime seminar series – the "brown bag" discussions – kicks off with a discussion on best practices for paper submissions to the Transportation Research Board.

June 11, 2010

Fifteen state DOT employees from New Hampshire, Vermont and Maine conclude the first Transportation Systems Institute program of the Transportation Education Development Pilot Program (TEDPP) grant.

June 2010

Drs. Waits and Macias host focus groups to understand people's understanding of tailpipe emissions, including what is in them, what is harmful about them, and what we can do to reduce them.

BUILDING RELATIONSHIPS

Strong Partnership with VTrans Key to TRC's Success

In August 2005, when UVM received its first University Transportation Center (UTC) grant from the USDOT to start the TRC, the Vermont Agency of Transportation (VTrans) was quick to offer its support. VTrans filled two slots on the TRC's external advisory committee and played a vital role in defining focus areas. This close partnership has been key to the TRC's significant accomplishments, a few of which are mentioned here.

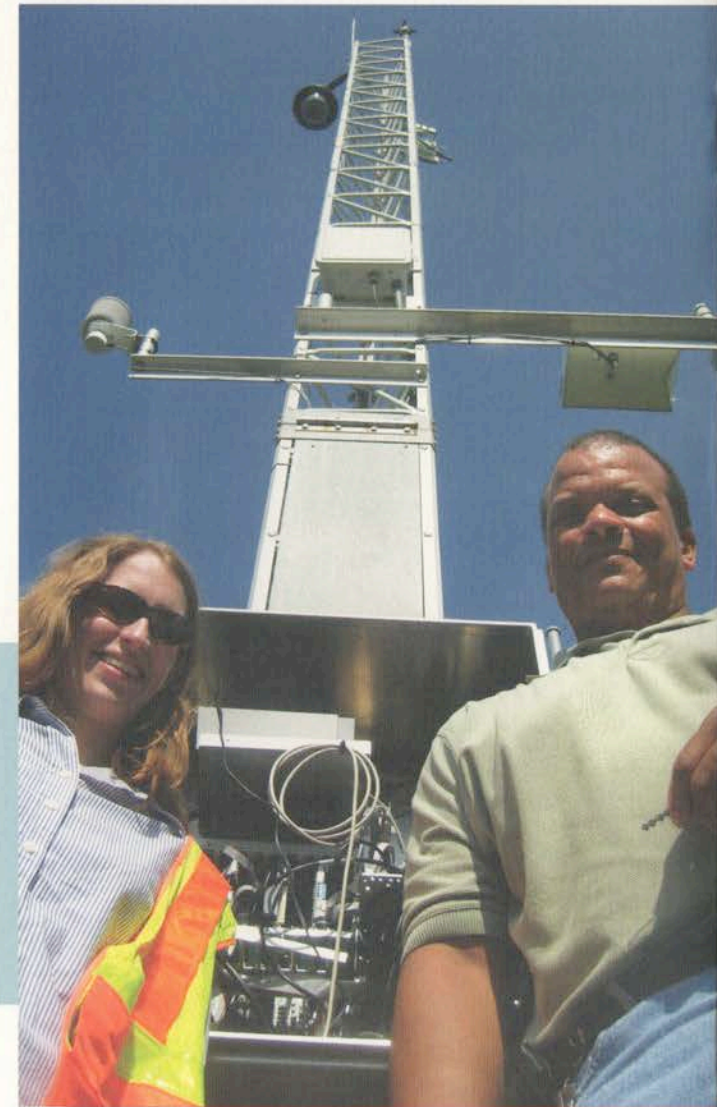
The annual National Household Travel Survey (NHTS) conducted by the Federal Highway Administration provides comprehensive data on U.S. travel and transportation patterns. In previous surveys, few observations were collected in Vermont. However, in 2009 the TRC, VTrans, and the Chittenden County Metropolitan Planning Organization together purchased extra Vermont surveys, an "add-on" of 1,690 households—541 in Chittenden County and 1,149 in the rest of the state. This resulted in a Vermont sampling intensity rate that is more than five times the national average. This data will be invaluable for assessing new ways to provide mobility to rural residents, measure the greenhouse gas impact of the transportation sector, increase accessibility for Vermont households, measure the impact of transportation fees and taxes on Vermont households, as well as many other policy applications.

As a rural state, Vermont faces significant obstacles to improving transportation system efficiency. In recent decades nationwide, automobile use has markedly increased while the average number of passengers per vehicle has decreased. Phase One of a VTrans-funded project at the TRC found that strategies for transportation energy savings in rural Vermont would need to be very different from other more populous states and urban areas. Phase Two of this project looked at carpooling as a means to increase personal mobility, access to services, reduce environmental and infrastructure impacts, reduce individual transportation costs, and save energy.

In addition, the TRC and VTrans are working together on the following projects:

- **Reducing polluting storm water runoff from traditional pavement systems (such as parking lots) by developing Alternative Porous Pavement Systems.**
- **Exposing high school students to careers in the transportation industry during the National Summer Transportation Institute (NSTI), a two-week long intensive program at the UVM campus.**
- **Addressing key issues in VTrans's "Strategic Highway Safety Plan", which focuses on preventing vehicles from running off the roadway and the safety of drivers under age 21 years.**
- **Maintaining the Statewide Travel Demand Forecasting Model, which uses the latest passenger travel data and provides routine updates on trip generation and travel behavior. The data is also used for teaching and graduate research.**

Nationwide, the most successful transportation research centers are those that work closely with their state's department of transportation. Since its inception, TRC has leveraged a strong working relationship with VTrans in order to gather and analyze data that will be useful to policy makers to increase transportation efficiency and accessibility for all Vermonters.



REPORTS + PROGRAMS + FINANCES

Reports

- **Vermont Transportation Energy Report 2009**
Author(s): Kenyan, Jennifer; Glitman, Karen; Watts, Richard
- **Transportation Impacts of Smart Growth Development in Maine**
Author(s): Weeks, Andrew
- **Modeling the Emissions of Heavy-Duty Diesel Vehicles on Interstate 89/189 and US Route 7 in the Burlington Area**
Author(s): Weeks, Andrew
- **Plug-in Hybrid Electric Vehicle Research Project: Phase II Report**
Author(s): Dowds, Jonathan; Hines, Paul; Farmer, Chris; Watts, Richard; Letendre, Stephen
- **Transportation Workforce Development at Community Colleges**
Author(s): Glitman, Karen
- **Estimating Tourism Expenditures for the Burlington Waterfront Path and the Island Line Trail**
Author(s): Zhang, Chen; Jennings, Lance; Aultman-Hall, Lisa
- **Effect of Miles Per Gallon Feedback on Fuel Efficiency in Gas-Powered Cars**
Author(s): Solomon, Laura; Lange, N.; Schwob, Michael; Callas, P.
- **Gasoline Taxes: An Examination of News Media Discourse Related to Gas Tax Funding Debates in Six States**
Author(s): Watts, Richard
- **Vermont Statewide Travel Demand Model - A Preliminary Evaluation**
Author(s): Weeks, Andrew
- **Application of the Network Robustness Index to Identifying Critical Road-Network Links in Chittenden County, Vermont**
Author(s): Sullivan, Jim; Aultman-Hall, Lisa; Novak, David



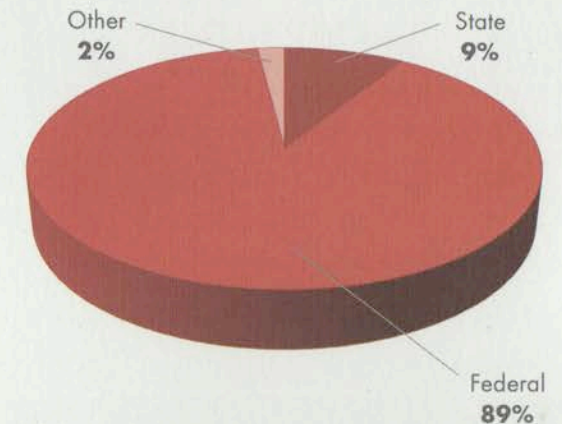
Photo by Andy Duback

Programs

- **University Transportation Center (UTC)**
Lisa Aultman-Hall
- **Vermont Clean Cities Coalition**
Karen Glitman
- **Transportation Education Development Pilot Program**
Karen Glitman
- **National Summer Transportation Institute (NSTI)**
Tom McGrath

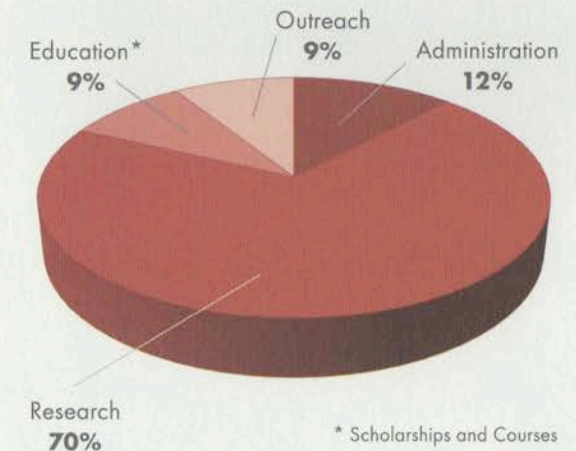
Finances

External Funding by source (FY10)



Expenditures by category (FY10)

Total: \$4,029,165



* Scholarships and Courses



The University of Vermont Transportation Research Center (UVM TRC), located in Farrell Hall, is a hub for research, education and outreach related to sustainable transportation. The TRC serves as the host of the National University Transportation Center (UTC), funded by the US Department of Transportation, as well as the Vermont Clean Cities Coalition, funded by the US Department of Energy and the Vermont Department of Public Service.



UVM's goals with the TRC

- To build graduate research.
- To build an interdisciplinary team of transportation researchers that contribute solutions to critical transportation problems, improving our health and our environment.
- To have a sustainable, diversely funded Center at the end of the first UTC grant period.

FACULTY ADVISORY COMMITTEE

- Meghan Cope - Department of Geography
- Mandar Dewoolkar - School of Engineering
- Christopher Koliba - Community Development and Applied Economics (CDAE)
- Jane Kolodinsky - Community Development and Applied Economics (CDAE)
- Robert McCullough - Department of History
- David Novak - School of Business Administration
- Austin Troy - Rubenstein School of Environment and Natural Resources
- Brian Lee - School of Engineering
- Britt Holmén - School of Engineering
- Richard Watts - Community Development and Applied Economics (CDAE)

EXTERNAL BOARD OF ADVISORS

- Thomas Adler - Resource Systems Group, Inc.
- Ernie Blais - Federal Highway Administration Vermont Division
- Michele Boomhower - Chittenden County Metropolitan Planning Organization
- Dan Brand - CRA International
- Cindy Burbank - Parsons Brinckerhoff
- Gina Campoli - Vermont Agency of Transportation
- Matt Chase - National Association of Development Organizations
- Chris Cole - Chittenden County Transit Administration
- Matt Coogan - New England Transportation Institute
- Lawrence Dwyer - Federal Highway Administration Vermont Division
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- Leon W. Heyward - NYC Department of Transportation
- Dick Mudge - Delcan Corp.
- Robert Penniman - Campus Area Transportation Management Association
- Peter Plumeau - Resource Systems Group, Inc.

www.uvm.edu/trc

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