Vermont’s Transportation Research Center (TRC) is a hub for innovative and interdisciplinary research, education and outreach on sustainable transportation system solutions. The TRC focuses on transportation planning as it relates to resilience, energy and health.


Update on the Transportation Research Center
Glenn McRae, Associate Director

The TRC was created to grow capacity at UVM to advance high quality research, education and outreach for sustainable transportation systems solutions and serve the needs of the state of Vermont. In the past year the TRC reached a number of high water marks in key research, expanded collaborative relationships, research conducted by graduate and undergraduate students, and programmatic development in both research management and areas such as promoting non-petroleum fuel alternatives.

Underlying all of this has been our continuing commitment to growing the next generation of transportation professionals across multiple disciplines. The TRC has supported graduate researchers and hosted a Graduate Certificate in Sustainable Transportation Systems and Planning. It also has increased opportunities for undergraduate students in classroom and research activities leading to future transportation careers. The Center remains committed to a pathway approach to the great prospects in the field of transportation, starting with efforts for K-12 students and all along the continuum to second career seekers and continuing professional development for those already in the field.

I want to thank the UVM research community, our dedicated staff, an amazing group of graduate scholars, our partners at the Vermont Agency of Transportation, as well as our many other local, state and national associates whose continuing support and enthusiasm has contributed to the success of the TRC.

University Transportation Center – Program Status
Lisa Aultman-Hall, Program Director

This past year, the UVM TRC team has been working on two University Transportation Center (UTC) grants. The US Department of Transportation UTC program supports research, education, outreach and workforce development at universities throughout the United States. Vermont’s original $17M UTC grant started in August 2005, ends in June 2015 and was used to found the TRC. The team is finalizing project analysis, publishing final reports and documenting the required 1:1 non-federal cost share. We appreciate the support of our partners on campus, within state government and the private sector who assisted in raising these matching funds.

Our new UTC grant is in partnership with the University of California Davis on the National Center for Sustainable Transportation. We launched the first project on adaptation to climate extremes for local and state agencies this spring. New research projects under the National UTC’s focus parallel UVM’s strengths in resiliency, long distance travel, land use, non-motorized travel, rural travel behavior and tailpipe emissions.

In 2006, the UTC was the TRC’s only grant. We have now grown into a diversely funded center with important partners at the state, regional and national scale. However, the UTC program remains a critical piece of our portfolio facilitating some of our most fundamental work, supporting innovative graduate theses and strengthening the administrative and outreach functions of our Center. It is an honor to continue to serve as Vermont’s UTC Director.

A MESSAGE FROM THE VICE PRESIDENT FOR RESEARCH

Sincerely,

Richard Galbraith, MD PhD.
Vice President for Research

The Transportation Research Center has made major contributions to advancing UVM’s research enterprise. It has both addressed issues that Vermonter’s care about as well as achieved national recognition for the quality and breadth of its accomplishments. In the last six years, more than 100 graduate students have been funded by the Center to advance their education and contribute to sustainable transportation solutions from across seven colleges at the University, a remarkable testament to interdisciplinary education and research.

The strategic work of the staff and faculty has helped forge strong ties with Vermont state and regional entities and attracted a diverse portfolio of funding. This has created important niches to advance the research agenda in sustainable transportation solutions building on strengths of the UVM academic community, particularly in environment, energy and health.

I look forward to working closely with them to grow a stable and sustainable Center that will consolidate its achievements and advance new initiatives in the years to come.
July 2013
Zoombikes visits TRC to show the future of electric bike transportation and discusses research possibilities involving electric bicycle transportation

Brown Bag Lecture Series: “Fracture Experiments of Asphalt Mixtures” by Dr. Ting Tan, Assistant Professor, College of Engineering and Mathematical Sciences at the University of Vermont (UVM)

Brown Bag Lecture Series: “Refugees and Transportation in Vermont: Travel Behaviour and Critical Questions based on Gender, Age and Transportation Hierarchies” by Pablo Bose, Assistant Professor in the Department of Geography at UVM

August 2013
Brown Bag Lecture Series: “Pervious Concrete Pavement at UVM’s Trinity Parking Lot” by Dr. Mandar Dewoolkar, Associate Professor, Ian Anderson, Graduate Assistant, Lalita Oka, Research Technician, and Dylan Walsh, Undergraduate Assistant, in the College of Engineering and Mathematical Sciences at UVM

Brown Bag Lecture Series: “Liquefied Natural Gas (LNG): Current Applications and Future Possibilities in Vermont” by Mike Laurent and Craig Rautiola, Omya, Inc and hosted by Vermont Clean Cities Coalition (VTCCC)

September 2013
Brown Bag Lecture Series: “Health Care Systems and Transportation” by Jack Conry, Transportation Coordinator, Fletcher Allen Health Care

The TRC Sponsors the New England Regional Transportation Workforce Summit. The summit is designed to foster a cross-cutting dialogue on the transportation workforce of the future for the New England Region

October 2013
Glenn McRae (TRC) presents on the results of the National Summit on Transportation Workforce Development at the National Transportation Training Directors Annual Meeting in Seattle

First flight of the Unmanned Aerial System (Sensefly eBee) used in the Rapid Exploitation of Commercial Remotely Sensed Imagery for Disaster Response & Recovery project

November 2013
Buckley Lecture: “The Lessons from the Haiti and Japan Disasters for Humanitarian Logistics” by Dr. José Holguín-Veras (William H. Hart Chair Professor, Director for the Center for Infrastructure, Transportation and the Environment)

Brown Bag Lecture Series: “What you need to know about Software Intellectual Property and Licensing – How it impacts your research” by Daniel Dardani, MIT Technology Licensing Office

Seminar: “Don’t Jersey Vermont: Land Use Policy in the Green Mountain State” by John Adams, ACIP, Planning Coordinator, Vermont Department of Housing and Community Development

TRC PROGRAMS AND CONTACTS
• University Transportation Center – Lisa Aultman-Hall
• Transportation Workforce Development – Glenn McRae
• Graduate Certificate & Education – Glenn McRae
• Vermont Clean Cities Coalition – Michelle McCutcheon-Schour
• New England Transportation Consortium – Amanda Hanaway-Corrente
• VTrans Statewide Travel Demand Model – Jim Sullivan
• UVM Transportation Air Quality Lab – Britt A. Holmén
• Remotely Sensed Imagery for Disaster Response – Amanda Hanaway-Corrente
• Outreach Education Events – Zachary Borst

TRC BY THE NUMBERS
Graduate students funded 24
Undergraduate researchers 16
Expenditures $2.5M
Active grants 32
Attendees at UVM TRC hosted events 545
Conferences, workshops & hosted events 23
Transportation research reports 22
Website visits 14,259
January 2014
TRC Staff and students attend the Transportation Research Board Annual Conference in Washington, D.C. The TRC presented eleven different topics at the conference.

February 2014
Volpe Research Center’s Straight from the Source Seminar Series: “Transportation and Livability: What’s That Really Mean for Rural Transportation Systems?” by Dr. Lisa Aultman-Hall at the Volpe Research Center in Cambridge, MA.

March 2014
Seminar: “Teens, Technology, and Transportation: A Vermont Case Study” by Brian Lee, Assistant Professor, Engineering & Meghan Cope, Professor & Chair; Department of Geography, University of Vermont, Center for Research on Vermont

2014 Vermont Walk/Bike Summit - The TRC Sponsored and assisted with the organization of the first statewide bike and pedestrian summit

TRC Staff talk with Deputy Associate Administrator for Research and Innovation, Anne D. Aylward

TRC Seminar: “The Highway Safety Manual: Vision and Implementation” by Dr. John Ivan from the University of Connecticut

April 2014
Seminar: “The Vermont Highway Safety Plan and the Vermont Highway Safety Alliance” by Kevin Marshia, Assistant Chief Engineer for VTrans and Chair of the VT Highway Safety Alliance

Burack Lecture: “The Implications of Travel-Based Multi-Tasking for Modeling and Policy: A Conceptual Exploration” by Dr. Patricia Mokhtarian (Georgia Institute of Technology)


May 2014
“Biodiesel Workshop for Diesel Technicians” was hosted by VTCCC at the Hannaford Career Center, Middlebury, VT

TRC researchers represent the TRC at the 2014 AASHTO GIS-T Symposium in Burlington, Vermont

June 2014

Dr. Brian Lee and Dr. Lisa Aultman-Hall attend the 2014 World Symposium on Transport and Land Use Research in Delft, The Netherlands

FINANCES
FUNDING BY SOURCE

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EXPENDITURES

Total: $4,329,802

TRC STAFF:
Glenn McRae; Lisa Aultman-Hall; Brian H. Y. Lee; Britt A. Holmén; Jarlath O’Neil-Dunne; Jacob Leopold; Margo Baxter; Laurie Eddy; Jim Sullivan; Amanda Hanaway-Commande; Michelle McCutcheon-Schour; Jonathan Dowd; Karen Sentoff; Zachary Borst; Samantha Tilton

TRC GRADUATE RESEARCH ASSISTANTS:
Geoff Battista (CDAE); Jim Dunshee (CEMS); Daniel Stokes Hagan (CEMS); Chester Harvey (RSENR); Tim Pede (RSENR); Saghar Sadeghpour (CEMS); Paola Rekalde Aizpuru (CEMS); Anna Schulz (Public Administration, CDAE); Phoebe Girouard Spencer (RSENR); Xiao Xiao (RSENR)
Lisa Aultman-Hall, TRC Faculty

Studying long distance overnight travel behavior

The most exciting research moment for me in 2014 was the successful completion of the Longitudinal Survey of Overnight Travel in partnership with Dr. Jeffrey LaMondia (Auburn University) and RSG Inc. Monthly, we collected travel data from more than 600 participants. The study of overnight and long distance travel is particularly timely for UVM TRC. First, long distance travel data is rarely collected; planners and researchers have typically focused on daily routine travel. Second, long distance travel comprises a significant portion of all travel and thus the energy use and emissions associated with passenger travel. Finally, long distance and overnight travel is critical to Vermont, its tourism economy and access to services for rural residents. Understanding this type of travel behavior is becoming increasingly important for planning and for our statewide travel demand forecasting model in Vermont.

Overnight travel patterns are intriguing, complex and understudied. These trips involve multiple stops over large areas, many modes of travel from car to automobile, multiple travel parties comprised of co-workers or family and mixed purposes for work, leisure and personal business. Participants were oversampled in Vermont, Alabama and California. The TRC acknowledges this contribution to our research and thanks all those who gave their time to the year-long study.

Brian Lee, TRC Faculty

Improving the mobility of Vermonters with physical disabilities

In June, I started a new transit research project called Personal Transportation Plan Pilot Program (PTP3), Phase 1: Pre-Program Assessment. This is a collaboration between the UVM TRC, VTrans (the funder), and VT Statewide Independent Living Council (SILC). The primary objective of the entire program is to improve the mobility of Vermonters with physical disabilities by creating a personal transportation planning tool that would be used by the target population as well as their families, friends, and other caretakers to match existing transportation resources with their travel needs. We have two specific goals for this Phase 1 project, which takes place in Chittenden County: First, we aim to identify the mobility needs of people in the county with physical disabilities, which include employment, health care, social interactions, education, and other aspects of their lives. Second, we seek to measure the abilities of this population to meet these needs with existing public transportation options as well as private support from family, friends, and the community.

Geoff Battista, Samantha Tilton, and Sean Nealy are the three research assistants working on this project. They have been contacting organizations who serve different segments of the population with physical disabilities as well as transportation providers. We will be hosting focus groups and interviews to identify relevant themes on mobility needs. The data gathered from these sessions will provide case studies of organizations who serve different segments of the population with physical disabilities as well as transportation providers. We will be hosting focus groups and interviews to identify relevant themes on mobility needs. The data gathered from these sessions will provide case studies of organizations who serve different segments of the population with physical disabilities as well as transportation providers.

TRC Reports for 2013-2014

- Impacts of Transportation Infrastructure on Storm water and Surfaces Waters in Chittenden County, Vermont, USA
  Author(s): Holmen; Battista; Bowden; Holmen; TRC Report # 14-013

- Evaluation of Transportation / Air Quality Model Improvements Based on TOTEMS On-road Driving Style and Tailpipe Emissions Data
  Author(s): Holmen; TRC Report # 14-012

- Understanding and Managing the Impacts of Electric Vehicles on Electric Power Distribution Systems
  Author(s): Hines; Holmen; Marshall; TRC Report # 14-010

- Quantifying Biodiesel Fuel Effects on Light-Duty Diesel Engine Particle Composition by GCMS
  Author(s): Holmen; Kaumbia; TRC Report # 14-009

  Author(s): Holmen; Robinson; Sun; TRC Report # 14-008

- Light-Duty Gasoline Hybrid-Electric and Conventional Vehicle Tailpipe Emissions Under Real-World Operating Conditions
  Author(s): Holmen; Robinson; Sun; TRC Report # 14-007

- Vehicle, Driver and Atmospheric Factors in Light-Duty Vehicle Particle Number Emissions
  Author(s): Jackson; Aultman-Hall; Holmen; TRC Report # 14-006

- Signature Project 1B: Integrated Land-Use, Transportation and Environmental Modeling
  Author(s): Troy; Voigt; Sullivan; Azaria; Lanzl; Sadek; Lawe; TRC Report # 14-005

- Work Zones and Travel Speeds: The Effects of Uniform Traffic Officers & Other Speed Management Measures
  Author(s): Lee; Holmen; TRC Report # 14-004

- Implementation, Driver Behavior, and Simulation: Issues Related to Roundabouts in Northern New England
  Author(s): Selle; Aultman-Hall; TRC Report # 14-003

  Author(s): Watts; Sun; TRC Report # 14-002

- Bicycles, Transportation Sustainability, and Quality of Life
  Author(s): Sun; TRC Report # 14-001

- Travel Importance and Strategic Investment in Vermont’s Transportation Assets
  Author(s): Sullivan; Scott; TRC Report # 13-016

- Vermont Travel Model 2012-2013 (Year 5) Report
  Author(s): Sullivan; Jim; Conger; Matt; TRC Report # 13-015

- Sustainable Transportation for Tourism: Green Certification Programs
  Author(s): Manning; Chase; Anderson; Kestenbaum; Mastrangelo; Pettengill; Waag; TRC Report # 13-014

  Author(s): Watts; Selle; TRC Report # 13-013

- Laboratory & Field Evaluations of Pervious Concrete
  Author(s): Mastrangelo; Pettengill; Waag; TRC Report # 13-012

- The Social Drivers of Conservation: Social Capital, Environmental Concern and Transportation
  Author(s): Holmen; TRC Report # 13-011

- Optimization of Snow Removal in Vermont
  Author(s): Dowd; Sullivan; Scott; TRC Report # 13-010

- Multi-Scale Model of the U.S. Transportation Energy Market for Policy Assessment
  Author(s): Epplen; Rizzo; Marshall; TRC Report # 13-009

- Refuges and Transportation in Vermont: Travel Behavior and Critical Questions Based on Gender, Age, and Transportation Hierarchies
  Author(s): Basco; TRC Report # 13-008

UVM TRANSPORTATION RESEARCH CENTER | ANNUAL REPORT 2013 – 2014
2014 Outstanding Student of the Year: Nathan Reigner

Nathan Reigner was named the University of Vermont Transportation Research Center 2014 Student of the Year. Nathan is a PhD candidate with the Park Studies Laboratory in the Rubenstein School of Environment and Natural Resources. His research focuses on informed transportation management in the context of parks and public lands and explores issues of crowding, conflict and carrying capacity.

Through his research, Nathan has realized many connections between recreation and transportation, including the influence transportation networks have on recreation use and behavior, and the simultaneity of transportation and recreation activities. These realizations have allowed Nathan to extend traditional transportation modeling techniques, including computational, network and simulation models, to recreation settings. He uses these techniques to investigate and inform recreation planning and management for optimized user experiences and transportation system function. Robert Manning, the head of UVM’s Park Studies Lab, and Nathan’s advisor, says “Nathan’s research has helped develop an understanding that conventional transportation management must often be revised and adapted when applied in the context of parks and public lands. His research leadership has grown with each project he undertook, culminating in a large and complex study of the relationship between transportation and recreation at Yosemite National Park, funded by the NPS, and resulting in a special issue of the George Wright Forum.” Dissertation Title: “A Multi-Dimensional Model of Park and Recreation Use and Crowding: Management, Perception and Behavior”

Geoff Battista
Community Development and Applied Economics

In his master’s thesis work, Geoff considered the health care supply, the transportation system, and personal circumstances to provide an integrated assessment of health care access among Vermont’s rural seniors.

Geoff employed a mixed-method research approach that combined the capabilities of Geographic Information Systems (GIS) with insights from semi-structure interviews on transportation-to-health care experiences. The research results highlighted the interconnectedness between institutions, social networks, and transportation for senior health care access. Geoff will continue his research efforts while pursuing a PhD at McGill University in the fall.

Saghar Sadeghpour
Civil & Environmental Engineering

Dr. Aultman-Hall and Research Analyst Jim Sullivan are particularly excited this year to have a new graduate student, Saghar Sadeghpour, focusing her thesis work on the further development of the NRI for measuring transportation system resiliency.

The NRI is a model based calculation procedure that allows analysts to determine which links in a network are most important or most critical. The busiest links are not always the most important to accessibility and system resiliency. Links with few proximate alternatives such as bridges are often most critical.

Chester Harvey
Rubenstein School of Environment and Natural Resources

Chester Harvey, a graduate student in the Rubenstein School of Environment and Natural Resources, focused his research on the form and scale of streets and how these are influencing livability in a community.

Building and measuring livable streets is especially prescient for small-sized cities where the boundary between urban and suburban land use is narrow and there are challenges to promoting downtown growth in lieu of nearby greenfield development opportunities. Chester will be continuing to assist the TRC as a researcher upon his graduation.

Dean Luis Garcia of the College of Engineering and Mathematical Sciences visits the Transportation Air Quality Lab (TAQLab). Student Tyler Feralio and TAQLab Director Britt Holmén show Dean Garcia instruments used during research.