



TRC UNIVERSITY OF VERMONT
TRANSPORTATION
RESEARCH CENTER

ANNUAL REPORT 2011-2012



The
UNIVERSITY
of VERMONT

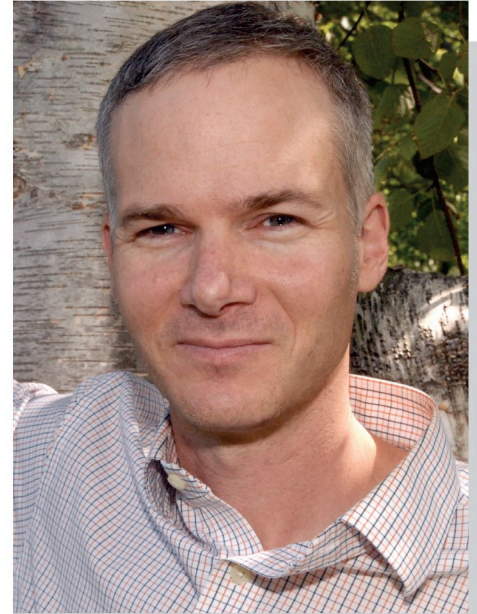
A MESSAGE FROM THE DIRECTOR

As the completion of my first year in the TRC Director position approaches, I'm happy to say that the TRC continues to fire on all cylinders. The TRC's many accomplishments from this past year can be attributed to our fantastic team, including students, staff, and faculty. Directing this team has been an honor, privilege, and pleasure. Rarely have I seen a group of people who work so well together or an office environment that is so positive and creative. I am deeply thankful for this truly excellent team and all the amazing work they've done.

I'm also thankful for our incredible network of support, including the University of Vermont, VTrans, the Chittenden County RPC/MPO, the US Department of Transportation, and our wonderful boards of internal and external advisors. Between them, these partners have offered valuable feedback and ideas, established important professional connections, provided direct and match funding, and helped us disseminate our findings. Without these participants, we simply could not do what we're doing.

The TRC continues to manage our core University Transportation Center (UTC) grant which has in turn awarded 85 research project grants totaling over \$8.4 million to dozens of principal investigators, while funding 109 graduate research assistantships. It has also supported the hiring of three transportation faculty and the hosting of a large number of seminars, workshops, conferences, and outreach activities, reaching 5,500 people. Over \$6.5 million in external funds have been raised above the initial UTC grant. Further, we now administer the \$3.2 million New England Transportation Consortium, an entity that pools transportation research money from the 6 New England State DOTs. Our workforce development efforts are among the most innovative in the nation, including the Transportation Systems Academy with the Community High School of Vermont and our work with the Career and Tech Center Network. Our nationally renowned Transportation Air Quality Lab has conducted groundbreaking research on pollutants. And I am proud to say that this year we have officially launched our Graduate Certificate in Sustainable Transportation Systems and Planning.

While there have been some changes at the TRC recently, our fundamental mission remains the same: engage in high quality inter-disciplinary research, education and outreach on transportation to help build livable, sustainable communities in Vermont and elsewhere. There will be challenges ahead as we adapt to the changing context of government grant funding, but we feel confident that we are well-positioned for a sustainable future, built on a foundation of high-quality work and team spirit.



Sincerely,

Austin Troy
Associate Professor and Director

Photo by Susannah Kerest



Sincerely,

Domenico Grasso
Vice President for Research
Dean of the Graduate College

Photo by Sally McKay, UVM Photo

A MESSAGE FROM THE VICE PRESIDENT FOR RESEARCH

The motto of the Transportation Research Center (TRC) at the University of Vermont is "Mobility, Sustainability, and Livability" – words that reflect both the needs and wants of citizens in Vermont, the United States, and throughout the world. I am very proud to work with and support the faculty, staff, students, partners and programs of the TRC as we strive to meet these needs and wants through innovative, interdisciplinary research and education.

The depth and breadth of the research, graduate education, outreach, and workforce development undertaken by the faculty and staff of the TRC is truly impressive. They partner or collaborate with dozens of entities including state and federal agencies, utilities, colleges and universities, advocacy groups and not-for-profits, and the list grows each year.

I'd like to congratulate TRC Director Austin Troy as he ends his first year leading the organization, and I'd like to thank the TRC faculty, staff, and students for their outstanding efforts as well. I believe that the TRC is well-positioned to take advantage of new opportunities and I look forward to what is sure to be another outstanding year.

UTC Student of the Year

MPA student Jonathan Maddison was named the 2011 Student of the Year. Working with Dr. Richard Watts, Maddison conducted research that applies political science and media theories to understand how transportation issues are framed in the national news media.

Vermont: New Home of the NETC

The UVM TRC was awarded \$3 million by the Vermont Agency of Transportation to provide grant coordination services for the New England Transportation Consortium (NETC). The NETC is a partnership of the six New England state DOTs. NETC shares research initiatives that provide financial leveraging opportunities, stronger partnerships between university faculty and state DOTs, and research dissemination. The six DOT Research Managers have worked hard this year with NETC Coordinator Amanda Hanaway-Corrente to advance funding of 6 previously selected projects and to collect 10 new research problem statements.

Workforce Development

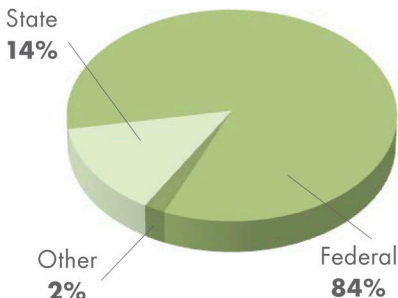
TRC's Glenn McRae was an active part of the April 2012 National Transportation Workforce Summit's planning committee and driving force behind the summit's blog and report-out process. The strong Vermont presence at the Summit in Washington, D.C. resulted from the TRC's four year pilot program (TEDPP) to craft a workforce development agenda including the Transportation Systems Academy for basic skills training in the industry; the Transportation Systems Institute focused on change management, interpersonal and collaboration skills development for mid-career state DOT workers; and focused efforts with Community Colleges and workforce programs for mature workers. The TRC has also conducted a National Summer Transportation Institute for the past three years for high school students and this year initiated a graduate certificate program in sustainable transportation systems.



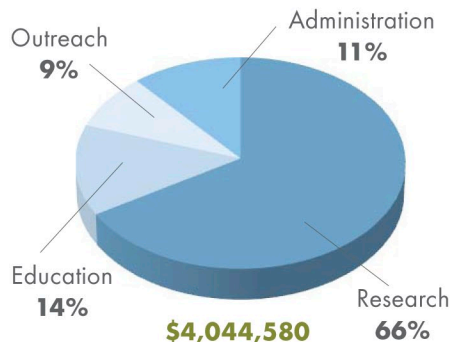
Vermont's delegation to the National Workforce Development Summit included Glenn McRae (TRC), Colleen Montague (VTrans), Dan Sihole (TRC GRA), Nick Leggett (TRC) [pictured above], as well as Lisa Aultman-Hall (TRC), Tammy Ellis (VTrans), Jay Patterson (Vermont Technical College) and Diane Hermann-Artrim (Community College of Vermont).

FINANCES

FUNDING BY SOURCE



EXPENDITURES



TRC REPORTS

Scenario Analyses and Simulations Using TRANSIMS and UrbanSim for the Chittenden County of Vermont
 - Authors: Yu, Jun; Yang, Yi | TRC Report #10-016

Pupil Transportation: Travel Behavior, Traffic Impacts, and Potentials for Improvement
 - Authors: Wang, Qingbin; Campbell, Erica; Parsons, Robert
 TRC Report #10-020

Efficiency in Transportation Report - Optimal Transit Networks for Vermont
 - Authors: Sullivan, Jim; Belz, Nathan; Aultman-Hall, Lisa; Watts, Richard | TRC Report #11-002

Atmospheric Oxidative Chemistry of Organic Particulate Emissions from Fuel Combustion
 - Authors: Geddes, Scott; Petrucci, Giuseppe
 TRC Report #11-004

Navigating Trade-Offs in Complex Systems: Deliberative Multi Criteria Decision Analysis of CCMPO Metropolitan Transportation Plan, 2010-2035
 - Author: Zia, Asim | TRC Report #11-005

Application of the Network Robustness Index to Identify Critical Links Supporting Vermont's Bulk Milk Transportation
 - Authors: Smith, Julia; Sullivan, James; Grover, Rebecca
 TRC Report #11-006

The Vermont Energy Report 2010
 - Authors: Sears, Justine; Glitman, Karen
 TRC Report #11-007

Investigation into the Optimal Hydrologic Design of Porous Concrete Sites Using Mathematical Modeling
 - Authors: Syrrakou, Christina; Pinder, George
 TRC Report #11-008

Vermont Travel Model 2010-2011 (Year 3) Report
 - Author: Sullivan, James | TRC Report #11-009

Integrated Transportation and Land Use Models: Systems Approaches and Applications for Modeling Transport Alternatives
 - Author: Boumans, Roelof | TRC Report #12-001

Seasonality, Mobility, and Livability
 UVM Transportation Research Center
 - Authors: Kolodinsky, Jane; Roche, Erin; DeSisto, Thomas; Sawyer, William; Proben, David; Conte, Faye; Putnam, Matthew | TRC Report #12-002

Identifying Network Representation Issues with the Network Trip Robustness
 - Authors: Sullivan, James; Novak, David; Aultman-Hall, Lisa
 TRC Report #12-004

Weather Factor Impacts on Commuting to Work by Bicycle
 - Authors: Flynn, Brian; Dana, Greg; Sears, Justine; Aultman-Hall, Lisa | TRC Report #12-006

Spatial Analysis of Travel Demand and Accessibility in Vermont: Where Will EV's Work?
 - Authors: Aultman-Hall, Lisa; Sears, Justine; Dowds, Jonathan; Hines, Paul | TRC Report #12-007

A LOOK BACK: 2011-2012 AT A GLANCE

July 2011

Dr. Brian Lee co-organizes World Society for Transport and Land Use Research Conference.

August 2011

TRC and VTrans host the National Summer Transportation Institute with high school students from 5 states. Dr. Lisa Aultman-Hall is appointed to the TRB Task Force on the Future of the National Household Travel Survey.

September 2011

TRC hosts Dr. Susan Handy of UC Davis as a Burack Distinguished Lecturer.

October 2011

Long-time TRC External Advisor Leon Heyward of NYCDOT is awarded the 2011 UVM Alumni Distinguished Service Award. Dr. Glenn McRae presents Transportation 101 to Community High School of Vermont.

November 2011

VT Clean Cities Coordinator Tom McGrath accepts best cinematography award for our CCTV video on State Line Farm's on-site biodiesel. Dr. Brian Lee's "Transportation Systems" class works on seven service learning projects for the City of Burlington.

December 2011

5th annual TRC Year-end Bowling Party.

January 2012

Dr. Austin Troy's book *The Very Hungry City* is published. TRC hosts its first TRB reception for graduate studies in Washington D.C.

February 2012

Dr. Austin Troy makes first presentation to the Vermont Senate Transportation Committee.

March 2012

A paper on electric vehicles in rural states by Aultman-Hall, Sears, Dowds and Hines is among others from TRC selected for publication in the journal *Transportation Research Record*. Dr. Richard Watts hosts over 800 at a seminar by James Howard Kunstler.

April 2012

Dr. Austin Troy speaks at the State of Vermont Climate Caucus. TRC hosts Dr. Robert Cervero of UC Berkeley as a Burack Lecturer.

May 2012

Twenty-seven managers from VT, NH and ME DOTs participate in a forum on leadership development and change in the Transportation Systems Institute. Jim Sullivan's latest paper on transportation system vulnerability is published in *Applied Geography*.

June 2012

Fieldwork begins on the VTrans research project with Dr. Lee on work zone safety. Amanda Hanaway-Corrente hosts VT ASCE and their Infrastructure Report Card at TRC's first Friday Brown Bag of 2012.

TRC MISSION

The TRC's mission is to create, share and apply knowledge that advances equity, sustainability and quality of life through better transportation systems.

The TRC achieves its mission through:

1. Innovative research, graduate education and workforce development from inception through to outreach and research dissemination.
2. Funding from individual project grants, large center grants and research services.
3. Engaging partners within Vermont and New England from the private, public and non-profit sectors, as well as a national and international expert network.

TRC by the NUMBERS

Graduate Students Funded	34
UVM Colleges Involved in TRC Projects	6
New Projects Awarded	25
Attendees at UVM TRC Hosted Events	2090
Conferences, Workshops & Hosted Events	31
Transportation Research Reports	14

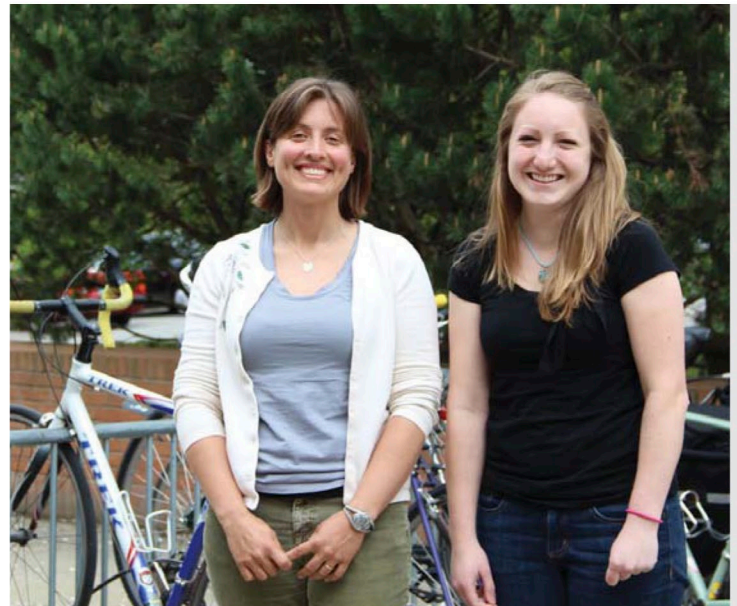
US DOT UTC Program – New Projects

A total of \$1.1M of research funding to 11 projects was announced by the Transportation Research Center's UTC at the beginning of 2012. The new UTC grants overlap between the UTC theme area of Sustainable Systems and Advanced Technologies for Northern Communities and at least one of the three UVM Spires: Complex Systems, Food Systems, Neuroscience Behavior and Health. Project investigators come from TRC and six UVM academic colleges.

The UTC team (Aultman-Hall, Kobus and Zink) managed the external peer review process that resulted in the selection of final projects from the Colleges of Engineering and Mathematical Science, Arts and Science, Medicine, Agriculture and Life Science, Rubenstein School of Environment and Natural Resources and Business Administration.

Final project topics are listed below:

- **Health Effects of Petro and Biodiesel Exhaust Particle Emissions**
- Fukagawa, Holmen, Bates, Palmer and Muyao
- **Transportation/Air Quality Model Improvements Based on On-road Driving Style** - Holmen
- **Bicycles, Transportation Sustainability, and Quality of Life**
- Watts, Vivanco, Farley and Kaza
- **Risk-Based Flood-Planning Strategy for Vermont's Roadway Network** - Novak and Sullivan
- **Social Ties and Reducing Vehicle Tailpipe Emissions**
- Macias and Watts
- **Mobility, Food Choice and Obesity**
- Kolodinsky, Lee, Roche and O'Neil-Dunne
- **Policy and Communications: Transportation Financing and Environmental Issues** - Watts, Ventiss, and Sun
- **Transport Asset Management Processes: Governance of Intergovernmental Decision Making** - Zia, Koliba and Ricketts
- **Micro-Simulation Modeling of Recreational Use of Parks and Public Lands** - Manning
- **Electric Vehicles and their Impact on the Electric Power Delivery System** - Hines, Marshall and Frolik
- **Attitude-Based Latent Factors in Analyzing Public Mode Shares of Inter-city Travel** - Lee



Kristine Harootunian (School of Engineering) and Phoebe Spencer (Community Development and Applied Economics) are dedicated cyclists and the first two students in the Graduate Certificate in Sustainable Transportation and Planning



VTrans Cooperative Research Program

For the third year, the Vermont Agency of Transportation cooperative research program funded diverse project topics at UVM:

- **Work Zones and Travel Speeds** - Dr. B. Lee
- **Scour for Vermont Bridges** - Dr. M. Dewoolkar
- **Porous Concrete, Deicing Salts and Freeze-Thaw**
- Dr. M. Dewoolkar
- **Weigh-in-Motion and Bridge Design**
- Dr. E. Hernandez
- **Trip Importance and Asset Management**
- Dr. D. Novak and J. Sullivan
- **Optimization of Snow Removal** - J. Sullivan

Engineering graduate student Karen Sentoff is adjusting the diesel engine dynamometer in the TRC's Transportation Air Quality Lab. Emissions from biodiesel are being collected this year by doctoral candidate Tyler Feralio. Both students are advised by Dr. Britt Holmen. (photo by Andy Dubak)

TRC PROGRAMS

- **University Transportation Center (UTC)**
- Lisa Aultman-Hall and Debra Kobus
- **New England Transportation Consortium**
- Amanda Hanaway-Corrente
- **Clean Cities** - Tom McGrath
- **Certificate in Sustainable Trans & Planning**
- Glenn McRae
- **Workforce Development Programs**
- Glenn McRae
- **VTrans RAC – UVM Cooperative Program**
- Amanda Hanaway-Corrente
- **State Travel Demand Model**
- James Sullivan
- **National Summer Transportation Institute**
- Glenn McRae



The UVM Transportation Research Center (TRC) is a hub for innovative and interdisciplinary research, education, and outreach on sustainable transportation systems and solutions. The Center was founded in 2006 and designated a UVM Matrix Center in 2008. The TRC also offers a Certificate of Graduate Study in Sustainable Transportation Systems and Planning.

On TRC Graduate Research & Education

"... there is no better place to do it than the TRC where you are surrounded by interdisciplinary research and collaboration. You can literally lean one way and ask someone a quantitative question about GIS and lean another way to ask someone a qualitative question about livability."

Aaron Witham, M.S. Candidate
Rubenstein School of Environment & Natural Resources,
TRC Graduate Scholar



www.uvm.edu/trc

- Front and back photo covers by Andy Dubak



The
UNIVERSITY
of VERMONT

UVM Transportation Research Center
University of Vermont
210 Colchester Avenue, Farrell Hall (Trinity Campus)
Burlington, VT 05405

802.656.1312
802.656.9892 fax
transctr@uvm.edu
www.uvm.edu/trc