

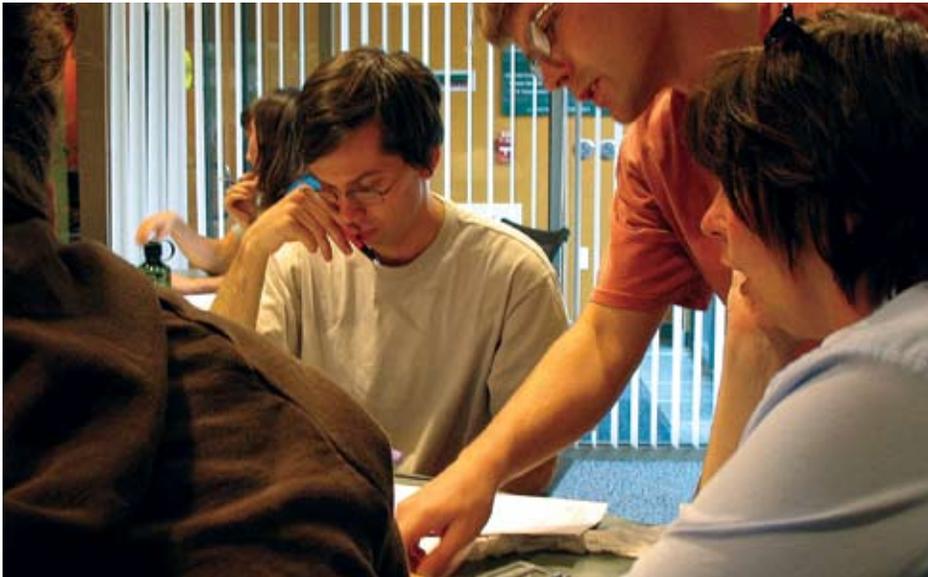


UNIVERSITY OF VERMONT

TRANSPORTATION RESEARCH CENTER

Newsletter

Volume 5, Fall 2008



Students working in small groups during, "Critical Issues in Transportation for the 21st Century."

UVM transportation students come from diverse disciplines

In her southern twang, Ruth Willis asks the instructor to explain why raised curb sidewalks enhance the perception of pedestrian safety, but may leave walkers more at risk to car crashes. From another corner of the room, Chris Farmer wonders if better vehicle technology would increase safety. And Matt Davis points out that rising oil prices may cause cars to become unaffordable for many.

These are three of the ten new graduate student researchers at the Transportation Research Center who started this fall. Ruth is a nursing student with a background in health statistics studying for a Nurse Practitioner degree. Chris, an avowed car enthusiast in the Masters program in Electrical Engineering, and Matt, a strong believer that oil resources have peaked, is a student in the Masters of Public Administration program.

The Transportation Research Center sponsors two kinds of graduate student funding programs: research assistantships with faculty on TRC-sponsored projects, and the Scholars Program, which con-

nects graduate students directly with TRC projects at the Center. The program is interdisciplinary and students come from different departments and colleges across UVM. All scholars take the "Critical Issues in Transportation" course and are encouraged to look at transportation problems, and solutions, from different perspectives.

The TRC's ten new graduate student scholars from the Colleges of Engineering and Mathematical Sciences, Agriculture and Life Sciences, Nursing and Health Services, and the Rubenstein School of Environment and Natural Resources.

Through a grant from the US DOT, TRC Scholars receive one-year (12 month) graduate student research assistantships of \$28,000 for the academic year. Students are expected to work 20 hours each week at the Transportation Research Center. For more information contact:

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TRC Hosts Lively Research Expo

The Transportation Research Center welcomed the public to an exposition of its projects and studies at the "Transportation Research Expo" on Monday, May 12, 2008, in the Davis Center at the University of Vermont. More than 75 people turned out to see and discuss the innovative, trans-disciplinary research occurring at the TRC. Researchers presented their work in areas relating to:

- Vehicle Emissions, Carbon Reduction & Sustainable Systems
- Travel Management
- Environmental Justice & Communications
- Infrastructure & Transportation Financing

Ribbons were awarded for best posters by category (student, faculty and staff):

- First place in the **student** category went to Laura Ocasio for "Biodiesel—Application of a Novel Analytical Method—Photoelectron Resonance Capture Ionization Aerosol Mass Spectrometry (PERCI AMS)".
- First place in the **faculty** category went to George McCain, Mandar Devoalkar and George Pinder for "Designing Sustainable Porous Pavements for Northern Communities."
- First place in the **staff** category went to Karen Glitman and Lisa Aultman-Hall for their poster, designed by





Graduate student Shan Huang with his prize poster.

Kim Mercer, on "Transportation Education/Workforce Development Project."

- The "Best in Show" award went to Austin Troy, Adel Sadek and Resource Systems Group for "Integrated Land Use, Transportation and Environmental Modeling: Complex Systems Approach and Advanced Policy Applications."

You can view these and other research posters online at www.uvm.edu/~transctr/news_0505.html

The EXPO was covered by the local CBS affiliate, WCAX, and the Burlington Free Press, Vermont's largest daily newspaper.

24 High School Students attended the TRC-sponsored Summer Transportation Institute

A group of high school students learned a bit about the qualities of porous pavement in a lab setting as part of the Summer Transportation Institute. A partnership of the University of Vermont Transportation Research Center (TRC) and Upward Bound Program, the STI is funded by a US Department of Education grant and the Vermont Agency of Transportation.

To conduct the experiment, students secured cylinders of the pavement mixture in a plastic tube and, using beakers of water and stopwatches, recorded the rates at which water ran through it. The students

then added road salt and/or sand and repeated the experiment, effectively simulating the qualities of absorption on our northern roadways.

Stormwater runoff from traditional, non-porous pavement systems – particularly parking lots – significantly pollute our rivers, lakes and estuaries. Alternative porous pavement systems allow polluted water to pass through into the natural sub-base.

The porous pavement research at UVM focuses on the effects of winter surface applications (salt and sand) on infiltration capacity, and also examines the effects of weathering. The work is being conducted by Mandar Dewoolkar, assistant professor of engineering, George Pinder, professor of mathematics and statistics, and George McCain, an engineering graduate student, and is funded by the TRC through a grant from the US DOT.

More information about this research project can be found online at www.uvm.edu/~transctr/pdf/PorousPavement.pdf. For more information about STI, please contact Program Manager Karen Glitman at Karen.Glitman@uvm.edu.



Students at the Summer Transportation Institute experiment with cylinders of porous pavement.

Vermont Clean Cities Coalition

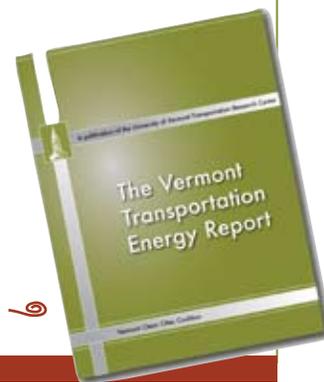
2008 VT Transportation Energy Report

The Vermont Transportation Energy Report—the annual survey of data on the status of fuel consumption, vehicle purchases and travel behavior—has been released by the Vermont Clean Cities Coalition, which is hosted by the University of Vermont TRC and is funded by the US Department of Energy and the Vermont Department of Public Service.

The transportation sector is the largest user of petroleum in Vermont, consuming more petroleum than any other end user. This report focuses not only on petroleum use but also on the vehicle fleet, travel patterns and programs that affect Vermont's overall petroleum use. Some of the reports' key findings are:

- Purchases of new hybrid vehicles has increased from 1% to 3% of total new vehicle purchases from 2006 to 2007 in Vermont, with a concomitant decrease in the purchase of new gasoline-only powered vehicles.
- Vehicle miles travelled is lower in 2007 than it was in the previous three years, while expenditures on fuel continue to increase.
- At a total expenditure of \$1.19 billion in 2007, the amount spent on fuel in Vermont was \$623 million higher in 2007 than in 2002. In six years, in-state spending on transportation fuels has doubled while gasoline and diesel fuel use has remained almost the same.

View the report in its entirety at: www.uvm.edu/~transctr/pdf/VT-TER-2008.pdf



Meet the TRC's Newest Staff Members



CHEN ZHANG
Research Analyst

Please describe your research for the TRC.

I work on various projects by applying statistical modeling methodologies to assist in addressing transportation research issues. For one of the projects, under the sponsorship of VTrans, I am helping to measure transportation efficiency in Vermont. I will also be working on Signature Project #4, the older driver safety project, and emissions model development.

What do you enjoy most about the work you do?

Transportation is such an interdisciplinary field, and the results of our work can widely affect our society and peoples' everyday lives. Also, transportation studies often involve dealing with large amounts of data from various sources. I enjoy investigating and analyzing these data to reveal what the numbers are really telling us about.

What has been your experience in the transportation field prior to coming to VT?

I completed my Ph.D. degree in transportation engineering at the University of Connecticut in 2007. After graduation, I joined Urbitran Associates (now AECOM) in New York City as a transportation engineer. Additionally, I have an MS degree in Statistics, also at UConn.



ANDREW WEEKS
Research Analyst

Please describe your research for the TRC.

My work involves the application of transportation planning models, such as TransCAD, for projects in Vermont and Maine. The project in Vermont will evaluate the suitability of TransCAD for use as the Vermont statewide model. For the Maine project, TransCAD will

be used to study potential Transit-Oriented Development (TOD) plans. I'll also contribute to a project that will evaluate auxiliary lane lengths at signalized intersections using microscopic simulation models.

What do you enjoy most about the work you do?

I enjoy applying transportation engineering and planning techniques to study real-world problems, both in how we move about in our environment and how our land use developments and means of transport affect the environment around us, and to propose workable solutions. I also enjoy conveying engineering problems, techniques, and potential solutions to the public.

What has been your experience in the transportation field prior to coming to VT?

For the past five years, I worked as a consultant at Eng-Wong, Taub & Associates, a transportation engineering/planning firm in New York City. I worked on a number of environmental impact statements and other traffic impact studies for clients in New York and New Jersey, including the Port Authority, the NYC Economic Development Corporation, and the departments of transportation. I received my Bachelor's degree in Civil Engineering and did graduate work at the University of Connecticut.



PADDY SHEA
Program Specialist

Describe the work you do for the TRC.

My job involves planning conferences, seminars, and other outreach events that aim to spread awareness of, and find solutions to, today's transportation challenges. I am also engaged in our workforce development effort; recruiting people, at various life stages and with eclectic skill sets, to work in the multi-faceted transportation industry. I am also helping to design our Summer Transportation Institute, a cooperative effort with Upward Bound, which introduces area youth to our evolving transportation system, and encourages the development of skills in science, technology, engineering, math, computers, literacy, civics, critical thinking, and self advocacy.

What aspect of this work is the most exciting to you?

I am excited by the forward-thinking, environmentally friendly themes that run through much of the research and work being done at the TRC. I am also looking forward to helping high school students explore their options for careers in transportation.

Please provide an overview of your previous work experience.

I have degrees in history, sociology, and secondary education, and have worked as a high school social studies teacher and paraeducator. I have also been an Auxiliary Trooper with the Vermont State Police for 9 years, working marine patrol in the summers and snowmobile patrol in the winters.



KIM MERCER
Communications
Coordinator

Describe the work you do for the TRC

My job involves creating collateral materials for the TRC. Specifically, I provide multimedia services, and produce printed materials such as newsletters, posters, brochures, reports, and press releases. I also maintain and update the TRC website (visit at: www.uvm.edu/transportationcenter).

What do you enjoy most about the work?

It is a good feeling to be able to bring my "layman's" perspective into the TRC world and use it to restate some of the work that our researchers are doing. Some of the more technical reports can be quite daunting, but I like to try to distill the ideas down to simpler terms. Also, working with the Adobe suite and having the right tools to create high-quality design is very cool!

What is your previous work experience?

Before coming to the TRC, I worked part-time as an administrator for a small Vermont municipality. This gave me a taste for policy-making and the public realm. Prior to that, I was a marketing maven in the NYC theater world, where I worked for The Shubert Organization to promote Broadway shows.

FOCUS ON RESEARCH:

SIGNATURE PROJECT #1H - Network Robustness Index (NRI): A Comprehensive Spatial-Based Measure for Transportation Infrastructure Management

Research Team: Dr. David Novak, James Sullivan, Dr. Lisa Aultman-Hall, Dr. Darren M. Scott

Funding Agency: US DOT

Partners: RSG, CCMPO, CCRPC, and McMaster University

Summary – This project investigates the robustness, redundancy and resiliency of the transportation network under current and future conditions. Transportation planning efforts, especially those involving highway capacity expansions, have traditionally relied on the Volume/Capacity (V/C) ratio to identify congested or critical links, resulting in localized solutions that do not consider system-wide impacts related to congestion, security and emergency response. NRI is a new, comprehensive, system-wide approach for identifying critical links and evaluating transportation network performance, and it relies on readily available sources of data from travel demand forecasting models.

Following is an excerpt from a conversation with Jim Sullivan, a graduate student researcher working on this project:

Q – Why is this research relevant?

A – This method uses the idea of network

robustness—or the ability of a network to adapt to adverse disruptions—to identify the most important parts of the network. In the last 10-20 years, planning for disruptions to our networks has become more important. In many cases, it is becoming more important than planning for normal “day-to-day” network function, since disruptions are becoming so frequent and serious.

Q – Can you explain how the NRI fits in with the rest of Signature Project 1?

A – S.P. #1 seeks to develop new output metrics for transportation planning models, including consideration of many factors that have been excluded in traditional models. The NRI method will be included to provide the “security/robustness” viewpoint. As future scenarios are looked at from the viewpoint of robustness, better decisions can be made about whether to invest in new modes of transport, like light rail, for small cities where that mode is not already present.

Q – How might this model be applied for use in policy-making?

A – This research is important because it provides decision-makers at the municipal and state levels with an improved way of allotting



Jim Sullivan and David Novak, part of the NRI research team.

resources for maintenance and upgrades to their transportation infrastructure in consideration of the entire network, not just an individual link. The NRI can also be used on a larger scale (like the national level) to assess freight supply change logistic networks. Certain corridors could then be seen as representing vulnerability to the overall national transportation infrastructure, and treated accordingly.

What is a “Signature Project”?

The UVM UTC has developed five integrated interdisciplinary three-year research projects using a unique collaborative process involving faculty idea submission, the external advisory committee and facilitated work groups.

Honors College Retreat

(Excerpted with permission from Jon Reidel, University Communications, photo by Robert Biral.)

Twenty University of Vermont professors from different disciplines attended the fifth annual Honors College Faculty Seminar, August 18-20, on “Transportation, Health and Environment” to fabricate

dynamic, energy efficient cities with multi-disciplinary elements not normally found in traditionally designed metro areas.

More importantly, the exercise, as well as other interactive sessions, spurred collaborations among faculty whose ages spanned four decades and backgrounds ranged from geography to political science to computer science. It also showed the

value of working and learning in an interdisciplinary way. Faculty participants said they had met on average only three or four people in the room prior to the seminar.

This year’s seminar was co-facilitated by Dr. Lisa Aultman-Hall, director of the Transportation Research Center and Dr. Alan Rubin, research associate professor of medicine and psychiatry. Non-UVM professionals who participated included representatives from the Chittenden County Transportation Authority, Vermont Department of Health, and the Planning and Zoning Department of the City of Burlington.

“This has been a great experience for me,” said David White, director of planning and zoning for the city of Burlington. “The challenge will be to continue this conversation in the future and develop some key collaborations that last.”



Working together to build a virtual, efficient city are professors Jennifer Jenkins (Rubenstein School for Environmental Resources) Burton Wilcke (College of Medicine), and Donna Ramirez-Harrington (Economics Department).