The TRC is a hub for innovative and interdisciplinary research, education and outreach focused on sustainable transportation systems supporting livable communities, particularly in northern, rural, exurban and micropolitan contexts.
As this newsletter heads out the door TRC researchers have just returned from a trip to the Volpe Center in Cambridge, Massachusetts. The trip provided opportunities for meetings between TRC research staff, grad students and faculty and a group of Volpe researchers working on common themes. While at Volpe, Faculty Member Lisa Aultman-Hall presented a national webinar on the theme of “Transportation and Livability: What’s that Really Mean for Rural Transportation Systems?”, as part of their Straight from the Source series, to a packed room and 130 remote sites. The trip provided an opportunity to further our understanding of national research agendas and how the TRCs work can contribute. It also provided exposure for some of our graduate cohort to meet with and engage excellent researchers working on projects similar to their own.

As the TRC continues to grow both its research and education portfolio we are also investing in new ways to communicate and disseminate opportunities, results and information. Our website will undergo an overhaul this March, building on a new platform that will allow for it to be much more interactive and responsive. We will continue to grow our use of social media to increase our presence and deliver tools, research results and program information to a growing number of followers. If you are not already following us on Facebook or Twitter please check us out. We are also working with faculty and researchers to actively explore and participate in blogging and other ways to communicate the processes and activities of research. Luis Vivanco (Anthropology) is helping pilot this with his blog: Bogota Bicycle: An Ethnographer’s Perspective, during his Fulbright in Columbia.

If you are in Burlington for any of the upcoming conferences that are being hosted here please be in touch and come by the TRC for a visit.

Sincerely,

Glenn McRae, Ph.D.
TRC Associate Director

Upcoming Conferences in Burlington, Vermont:

- May 5-8: AASHTO’s GIS for Transportation Symposium
- July 21-23: TRB National Conference on Transportation Planning for Small and Medium Sized Communities
- September 21-24: Northeast Wildlife & Transportation Conference

Upcoming TRC Events:

- March 25th - Teens, Technology, and Transportation: A Vermont Case Study
  Location: Memorial Lounge, Waterman Building, University of Vermont
  Time: 7:00 PM
- March 29th - Vermont Walk/Bike Summit
  Location: Hilton Conference Center, Burlington, VT
  Registration opens at 8:30
- April 8th - First Responder Safety Training – Caseous Fuels and Hydrogen Powered Vehicles
  Location: Vermont Fire Academy, Pittsford, VT
  Information: uvm.edu/trc
- April 14th - Burack Lecture Series - Dr. Patricia Mokhtarian
  “The Implications of Travel-Based Multi-Tasking for Modeling and Policy: A Conceptual Exploration”
  Location: Waterman Building, Memorial Lounge
  Time: 3:00 - 4:30 PM with a reception to follow
- April 16th - UVM Student Research Conference
  Location: Davis Center, 4th floor
  Time: 9:00 AM - 4:30 PM
- April 23rd - Cow Power - Turning Organic Waste into Vehicle Fuel
  Location: Billings Center
  9:00 AM - 3:30 PM
- May 21st - Biodiesel workshop for Diesel Technicians
  Save the Date
  9:00 AM - 1:00 PM
Transportation Research Center Student of the Year:
Nathan Reigner!

12/17/13
By: TRC Staff

Congratulations to Nathan Reigner, 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, in particular looking 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.”

Each year the UVM Transportation Research Center selects a student to be selected as the Student of the Year. The student is selected based on their accomplishments and contributions to the field of transportation.

The TRC goes to the TRB

02-10-2014
By TRC Staff

Every year nearly 12,000 people descend on Washington DC to attend the Annual Meeting of the Transportation Research Board. This is the largest transportation research conference in the country and provides a unique chance to network with thousands of your fellow transportation colleagues.

This year the TRC sent ten of it’s staff, researchers, and graduate students to attend the meeting. The TRC personnel who attended the conference presented papers and posters, presented projects in seminars, and were provided opportunities for professional development and networking. Some of the highlights included Jarlath O’niel-Dunne’s presentation of the TRC and Spatial Analysis Lab project “Rapid Exploitation of Commercial Remotely Sensed Imagery for Disaster Response & Recovery” and a 2013 Best Paper Award that was presented to Nathan Belz, Lisa Aultman-Hall, Bryan H. Lee, and Eric Garder.

The Cost of Clear Roads

12-09-2013
By TRC Staff

Imagine it’s the dead of winter and a snowstorm is looming. This leads most of us to dream of fresh powder, skiing and snowboarding, or maybe enjoying hot cocoa by the fireplace. If you are Jim Sullivan or Jonathan Dowds, researchers from the Transportation Research Center at the University of Vermont, you are more likely calculating salt application rates or determining efficient resource allocation techniques. Not necessarily the quintessential image of Vermont winter you may have grown up with. However, this important research may eventually lead to better snow removal techniques that will get you out on that ski hill faster, safer, and cheaper.

In 2011, Jim Sullivan and Jonathan Dowds provided a proposal to the Vermont Agency of Transportation. Their goal was simple, use technology to try to determine if there are more efficient ways of removing snow and ice from Vermont’s roads. Keeping roads clear, or performing “snow and ice control” as it’s known in the transportation industry, is a complex and expensive process. The cost of keeping Vermont’s roads safe during the winter is nearly 25 Million dollars of the total budget for the Agency of Transportation. That doesn’t account for other costs such as lost revenue due to closed roads or stranded skiers and tourists. Even more important than the economic impact of performing winter maintenance is the safety of the travelling public. The researchers knew that better approaches to snow and ice control could lead to safer roads that are cleared faster, more often, and at a lower cost to the taxpayers of Vermont.

The researchers found two specific challenges the Vermont Agency of Transportation faced in its snow and ice removal operations. The first challenge was to get the roads open following a winter storm as quickly as possible. The second challenge was to operate as efficiently and cost effectively as possible due to the huge expense associated with snow and ice removal. These opposing challenges made it very difficult to find a solution for one challenge that didn’t make the other challenge worse.

The researchers decided that they would use off-the-shelf technology, TransCAD, which is currently in use by many transportation agencies. By using the same software as other transportation agencies, they were able to develop models that can later be more easily implemented.

The researchers needed to find a way to get roads cleared as quickly as possible without increasing costs. What they discovered was that small changes in technique over the long term created big results. “Issues that appear very small, grow exponentially with the cost of trucks, drivers, and fuel,” stated researcher Jim Sullivan. The researchers were shocked by how even minor adjustments in truck routing can result in significant cost savings and more efficient operations. While the researchers were able to model several solutions, there are still a large number of factors that need to be accounted for to use their results during an actual winter storm. The researchers emphasized that a strong relationship with their partners at the Agency of Transportation will be critical in developing better roadway snow and ice control models in the future.

(Continued on next page)
The results of the study did not identify any glaring deficiencies in what the state currently does and the researchers were not surprised by this. Years of experience and knowledge have already refined the snow and ice removal process. However, by using the model developed in the study and adjusting the snow and ice removal model currently used in the state, the researchers believe they can further enhance the already amazing job the state does in keeping the roads safe. Future studies will be conducted to identify more of the variables that exist during storms and refine snow removal approaches even further. The next time you are safely travelling through Vermont’s winter landscape, be sure to stop and appreciate just how complex the process of keeping roads plowed is.

**Distinguished Lecturer Discusses Difficulty of Disaster Logistics**

UVM welcomes Dr. Holguin-Veras for Burack Series

02-12-2014
By Zachary N. Bost!

Most researchers can probably list off a few locations where their field work led them to uncomfortable or austere environments. Dr. José Holguín-Veras, a researcher specializing in disaster humanitarian logistics, almost always finds himself in the most severely damaged locations on earth.

Dr. Holguín-Veras was on campus November 14th, 2013, as a distinguished guest of the Burack Lecture Series. Dr. Holguín-Veras discussed his research and the nuances of understanding how humanitarian aid finds its way to victims. The presentation was unfortunately very timely with the disaster in the Philippines unfolding as he spoke. Dr. Holguín-Veras conducts his research during or immediately following disasters around the world. The goal of the research is to take lessons learned during events and then translate these lessons into policy to better prepare governments for future disasters.

For his presentation at UVM, Dr. Holguín-Veras focused on his Disaster Humanitarian Logistics research. Much of the talk was focused on the massive scale of a disaster and then need to organize the materials that will flood into the area. Dr. Holguín-Veras explained that people want to help and often this means sending things that they believe will help the people who have been affected by a disaster. Unfortunately, this is often not what is needed following a disaster and the huge amounts of materials can delay or prevent the arrival of needed materials. An example given by Dr. Holguín-Veras was the delivery of winter jackets following the 2010 earthquake in Haiti, a country in the Caribbean.

Before the talk, Dr. Holguín-Veras met UVM staff and students as well as several personnel from the State of Vermont involved in disaster response. This was a unique opportunity for researchers and those involved in disaster operations to get together and discuss the field of disaster logistics.

The day’s events were thanks to the Burack Distinguished Lecture series. The series is designed to bring outside guest speakers to the university and is funded by a generous endowment provided by Dan and Carol Burack. Dan is a UVM alum from the class of ’85.

**2014 Walk/Bike Summit Coming to Burlington**

2-12-2014
By TRC Staff

The 2014 Annual Walk/Bike Summit will take place on March 29th and 30th in Burlington, Vermont at the Burlington Hilton Hotel. The conference will feature 10 different workshops and will feature several prominent speakers from Vermont and outside the state. The keynote speaker, Caroline Sampanaro, is the Senior Director of Campaigns and Organizing at Transportation Alternatives, a transportation advocacy organization based in New York City. She was instrumental in helping transform New York City into a bicycle friendly city.

This is the first year that the conference is a statewide conference and the organizers have made a conscious effort to highlight all of the great bike and pedestrian projects taking place around the state. The Transportation Research Center is involved in planning and supporting the event. The summit is being organized by the Chittenden County Regional Planning Commission (CCRPC) who previously held a regional bike and pedestrian summit. The summit will feature local, state, and national agencies and organizations and this year will also play host to the Vermont Bike Expo which was previously held as a separate event with a focus on road and mountain biking and is organized by Sparta Synergy of East Montpelier.

Registration is now open on CCRPC’s [website](#).

Farrell Hall is blanketed by a recent snow storm.
The Transportation Research Center has created a brand new web series on the Transportation Research Center Youtube channel, www.youtube.com/uvmtrc. The series will feature professionals who are involved in transportation discussing their work and interests related to transportation. Our first guest was Karen Gilman, a former member of the TRC and current Director of Transportation Efficiency at Vermont Energy Investment Corporation. Future guests include some of our current researchers, faculty, and outside professionals. All episodes will be featured on our Youtube channel and will be added to the website.

TRC Research Staff Updates:

Jim Sullivan is completing updates and improvements to the Vermont Travel Model, pursuant to the recommendations of our peer review panel last summer. In addition, Jim is developing a poster presentation for the INFORMS Conference on Business Analytics & Operations Research, which is March 30 - April 1 in Boston.

Jonathan Dowds is working on determining optimal locations for satellite salt storage facilities that would reduce the distance state trucks had to travel to refill with salt; characterizing changes in vehicle speed distributions to developed a metric for evaluating RSIC (roadway snow and ice control) efforts this will be developed into TransCAD scripting to run all components of the statewide model through a single interface.

Karen Sentoff is currently working on summarizing the results for a final report on Signature Project 2 which compares onboard tailpipe emissions from a 2010 Toyota Camry hybrid vehicle to its conventional counterpart; developing a manuscript quantifying the carbon dioxide and fuel consumption benefit of operating a hybrid in place of a conventional vehicle during real-world driving; and characterizing driver behavior based on individual driver’s vehicle dynamics during typical, real-world travel.

UVM staff researchers and graduate research assistants prepare for Dr. Aultman-Hall’s presentation at the Volpe Transportation Center in Cambridge, MA.

Northeast Transportation Consortium (NETC)

We have five open projects:
- NETC 06-4 Preventative Maintenance and Timing of Applications looks to optimize the effectiveness of pavement maintenance programs in New England.
- NETC 07-1 In-Place Response Mechanisms of Recycled Layers Due to Temperature and Moisture Variations looks at the variations in pavement performance of recycled layers that result from seasonal changes in temperature and moisture content.
- NETC 09-2 Effective Establishment of Native Grasses on Road-sides is investigating native, non-invasive grasses that can be planted on the road side in New England to optimize slope stabilization, infiltration of stormwater runoff, and stand up to the effects of winter roadway maintenance.
- NETC 09-3 Advanced Composite Materials: Prototype Development and Demonstration involves the development and field testing of a standard drain system that could be used throughout bridges in New England to eliminate the problems with corrosion and leakage that occurs when using traditional materials, and to extend the service life of bridge drains.
- NETC 10-3 Low Temperature and Moisture Susceptibility of RAP Mixtures with Warm Mix Technology will evaluate the low temperature cracking properties and moisture susceptibility of Recycled Asphalt Pavement (RAP) mixtures produced with warm mix technologies.

VTrans Research Advisory Council

We have four new projects starting soon which include UVM faculty and staff:
- Tian Xia (CEMS) High Speed Ground Penetrating Radar (GPR) for Road Pavement and Bridge Structural Inspection and Maintenance (Proposal #13-01) - 24 month project
- Dryver Huston (CEMS) Cost-Effective and Rapid Concrete Repair Techniques (Proposal #13-11) - 12 month project
- Jarlath and Jim Sullivan (SAL/TRC and TRC) Using Remote Data Collection to Identify Bridges and Culverts Susceptible to Blockage During Flooding Events (Proposal #13-15) - 24 month project
- Brian Lee (CEMS/TRC) Personal Transportation Plan Pilot Program (PTP3), Phase 1 (Proposal #13-17) - 12 month project
vertical road curvatures where those crashes occurred in order to identify any road system characteristics, analyzing guardrail locations and both horizontal and vertical road curvatures where those crashes occurred in order to identify any relationships and provide with construction advice. In addition, she is working on understanding transportation opportunities and behavior among specific groups in Vermont, such as teenagers, disabled citizens and veterans. She is looking at their mobility options and habits in relation to the current state of public transit and transportation systems in Vermont.

Anna Schulz (Public Administration, Community Development and Applied Economics)

Anna’s research focuses on how transportation governance networks assess resilience, primarily as it relates to flooding. She is currently collecting and analyzing data on how New England states prioritize and fund bridge projects.

Phoebe Girouard Spencer (Rubenstein School for Environment and Natural Resources)

Phoebe’s research effort employs American Time Use Survey data to measure pedestrian behavior between and among seasons and climatic regions while controlling for socio-demographic characteristics of the respondents and their household. Her research focus is continuing to narrow toward equity and social justice in active transportation systems, which will play a role in her next project, using GIS and geostatistical techniques to understand preferences in transportation and built environment by home location in Chittenden County.

Xiao Xiao (Rubenstein School for Environment and Natural Resources)

My current research is focused on building the indicators and standards for Transportation Recreation Opportunity Spectrum (T-ROS), and the visitors’ perception of the diversity of transportation in recreational areas. I also engaged in the research project “Transportation as a barrier,” which focused on whether the transportation is a barrier for the minorities to visit national parks, and how to increase the visitation of minority groups.

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Chester Harvey (Rubenstein School for Environment and Natural Resources)

Chester Harvey uses GIS and crowdsourced data to investigate how the physical design of streetscapes influences perceptions of them as safe and attractive environments. His thesis, Assessing Streetscape Design for Livability Using GIS-Based Quantitative Methods, will introduce an innovative method for batch-assessment of block level streetscape design characteristics. It will apply this tool to evaluate relationships between design and perception data in Boston and New York City.

Tim Pede (Rubenstein School for Environment and Natural Resources)

Linking Land Use Change and Transportation Energy Modeling: Tim is using the land use change and transportation forecasting model, UrbanSim, for non-commercial transportation energy demand analysis in Chittenden County. The goal is to use this model to assess how factors such as growth boundaries, fuel economy, and mode choice will alter annual energy consumption in comparison to a business as usual scenario over an extended period of time.

Paola Rekalde Aizpuru (Civil and Environmental Engineering)

Paola is currently working on spatial analysis of Vermont crash data and Vermont road system characteristics, analyzing guardrail locations and both horizontal and vertical road curvatures where those crashes occurred in order to identify any...