



From the Director



Spring has come to Vermont and has brought not just abundance of maple sap but also of activity at the UVM Transportation Research Center (TRC).

The TRC Research Expo in March featured the president of the American Association of State Highway and Transportation Officials (AASHTO), UVM alum Michael Lewis, and a host of presentations by partners, faculty and students. Nineteen graduate student poster presentations illustrated the breadth and interdisciplinarity of research being conducted at UVM, including work on roundabouts, porous pavement, multimodal transportation infrastructure, biofuels, bridge scour, workforce development and active transport and obesity rates. Congratulations go to Kristine Harootunian for her winning poster, Drive Like a Local! Findings from the Vermont State Crash Database.

Many of these posters and a number of other undergraduate and graduate transportation-related presentations appeared at the UVM Student Research Conference in April.

We were very pleased to learn that Benjamin Rouleau, a civil engineering junior who has worked on a number of research projects at the TRC, has been selected as a 2013 Goldwater Scholar. In addition, TRC Scholar Ben Carlson (MPA 2013) has been chosen for a Presidential Management Fellowship and will be heading to Washington DC at the end of the semester.

In addition to the stories included in this newsletter some very recent developments at the TRC that we are very excited about include:

- Two TRC Faculty Associates, David Novak (Business) and Luis Vivanco (Anthropology) were recognized as recipients of UVM REACH grants (read more here), a new initiative that seeks to identify and promote promising research and scholarship.
- Faculty Associate Pablo Bose (Geography) worked with the Public Administration Capstone graduate students to explore mobility and accessibility challenges of the growing refugee population in Chittenden County to inform the state Refugee Service Network about future options.
- Graduating Senior Alexandra Evarts of the Vermont Clean Cities Coalition produced a guide to Sustainable Transportation Practices on college campuses, detailing best practices and strategies to integrate transportation initiatives into campus climate action and green team initiatives.

Finally, the TRCs summer brown bag series will be starting up soon with a number of interesting presentations and discussions featuring various stakeholders, partners and faculty of the TRC. You can join us in person on selected Fridays or attend online. A full schedule will be sent out soon.

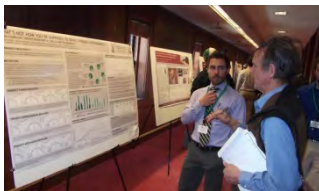
Austin Troy
Professor and TRC Director

[Read our 2011-2012 Annual Report](#)
[Read the TRC Charter](#)

Spring 2013 News

UVM Transportation Research Center (TRC)

The TRC is a hub for innovative and interdisciplinary research, education and outreach focused on risk and resiliency as they relate to transportation systems, particularly in northern, rural, exurban and micropolitan contexts.



Innovative Research at TRC Research Expo

Research showcased from across the disciplines.
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Expo Highlights '13

A focus on challenges, innovation, and research, with keynote by AASHTO President Michael Lewis
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VTCCC Clean Fleets

Speakers discussed the pursuit of fleet efficiency and alternative fuel options
See P. 5



TRC Alumni at Work: Dr. Peter Pettengill

Dr. Pettengill is an Outdoor Recreation Planner at the Grand Canyon
See P. 5



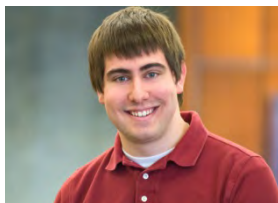
TRC Alumni at Work: Diana Colangelo

Colangelo is an Economic Development Specialist in Burlington, VT
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TRC Burack Lectures

Dr. John Landis & Dr. Jonathan Rubin shared urban growth & energy economics expertise
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Ben Rouleau Wins Goldwater Scholarship

Rouleau, a junior in engineering, received this prestigious award
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UVM Student Research Conference

See videos and posters of TRC student research
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Innovative Research on Display at TRC Research Expo



Nathan Belz, PhD student in civil and environmental engineering, presents his research at the Expo

“Drive Like a Local!” proclaims the research poster by Kristine Harootunian, a master’s student in civil and environmental engineering, at the TRC Research Expo. This year’s poster competition featured 19 student posters, showcasing research from across the disciplines. Harootunian’s research included the examination of 5 years of the Vermont State Crash Database, with a major finding that out-of-state drivers have double the odds of being at fault for a single vehicle crash. Crashes with two vehicles, however, were not significantly different. Her poster earned first place in the poster contest and the headline in the Burlington Free Press coverage of the Expo (“Beware of out-of-state drivers, on main roads at least”).

The many posters at the Expo covered a wide range of topics, demonstrating the huge breadth of research, education and programs active within the transportation field at UVM; from biodiesel emissions, to pervious pavement, to transportation workforce development (See abstracts here). An independent judging team looked for the posters that displayed the greatest potential for societal impact and influence; advanced overall bodies of scholarly knowledge; embodied innovative and creative explorations; exhibited high levels of collaboration or interdisciplinarity in the research design and execution.

Geoffrey Battista, a master’s student in Community Development and Applied Economics, won second place for his research, “Estimating the Effect of Mobility and Food Choice on Obesity”. A

major factor, according to Battista’s study of the literature, in determining choice of food and mobility is the built environment, which in turn could impact obesity. Studying survey data covering Vermont, New Hampshire, and Maine from 2008 and 2009, Battista is developing final models to determine the connection, with prior results showing rural residents less likely to benefit from the calorie burn of an active commute.

Isaac Lawrence, a master’s student in the Rubenstein School, utilized the UrbanSim modeling tool to assess flooding and stream health due to impervious surface, testing his constructed model on Chittenden County, Vermont. His research tied for third place with Nathan Belz, a doctoral student in civil and environmental engineering. Belz was also featured in the Free Press article for his project, “That’s Not How You’re Supposed to Drive through a Roundabout!! His research observed improper use of roundabouts, such as stopping without reason, entering unsafely, or yielding to drivers entering and not only found that they occur, but that some happen frequently.

While only four prizewinners were formally recognized, multiple speakers at the Expo gave high praise for the value of the many posters and the tremendous breadth in research that they represented for efforts of the university and the Transportation Research Center.

Michael Lewis, AASHTO President and Expo Keynote Speaker, placed a large emphasis on research as a key component for solving our issues in transportation in his Expo presentation. Sue Minter, Deputy Secretary at VTrans, echoed that in her opening comments, citing the value to the state of having a Transportation Research Center at UVM, especially one that works in close partnership with the state agency and other transportation sector organizations working in the state. The posters presented at this year’s expo are important indicators of the value of interdisciplinary research and collaboration at UVM and in how the TRC will continue to play a significant role in advancing new solutions to the transport challenges of the future.

UVM TRC Research Expo '13 Highlights Transportation Challenges, Innovation, and Research Across Disciplines



“We have a massive amount of infrastructure to take care of”, according to AASHTO President Michael Lewis, and whatever the transport options of the future are it will still be essential for the foreseeable future. Lewis, also the Director of the Rhode Island Department of Transportation and UVM alum, was the keynote speaker at Wednesday’s TRC Research Expo. He focused on the present issue of under-investment in transportation, while highlighting a larger time scale, from the beginnings of transportation to its future nearly a century from now. Lewis believes the future holds the potential for innovation, such as connected, smaller vehicles and improved transit, but there will still be a need to move freight across our nation’s roadways.

Despite the future technologies that may improve transportation in the long-term, he likened the current time to standing at a cliff edge, due to the vastly inadequate support for maintenance of our transportation system. Damages from increasingly powerful and frequent storms, such as Tropical Storm Irene and Hurricane Sandy, have only worsened the problem. While Lewis believes the nation is largely finished with building more highways, it is now time to bring the focus to maintaining what we have, an issue that he is working to convey in Rhode Island as well, where soon 40 percent of bridges will be structurally deficient. Despite this current challenge, Lewis finds great potential in research to support innovative solutions for transportation in the years and decades ahead, such as that on display at the Expo, which took over the entire first floor of Billings Library.

The Expo highlighted transportation innovation and research from the University and around the state with a student and professional poster session and competition. Vermont Deputy

Secretary of Transportation Sue Minter joined Michael Lewis in highlighting the importance of the research conducted at UVM that stretches across disciplines to meet the many challenges we face in the present and future. Topics on display at the Expo ranged from pervious pavement to emissions testing to land use modeling to bicycling. See abstracts here.

Student Research Poster Competition

TRC Graduate Scholar Kristine Harootunian (CEMS) took first place in the poster competition with her entry, “Drive Like a Local! Findings from the Vermont State Crash Database”. The study drew from reported crashes statewide and among the findings determined that out-of-state drivers had twice the chances of being in a single vehicle crash. Other prizes included Geoffrey Battista’s (CDAE) examination of the effect of food choice and mobility’s impact on obesity, Nathan Belz’s (CEMS) examination of roundabout non-compliance, and Isaac Lawrence’s (RSENr) modeling with UrbanSim.

A series of presentations and discussions were also organized to parallel the research poster session. These included:

- Rubenstein School Prof. Bob Manning presenting his new book, *Walking Distance*
- Regina Mahony, Michele Boomhower and Charile Barker from the Chittenden County Regional Planning Commission discussing the ECOS project, an new approach to combined regional land-use, economic development and transportation planning
- Sue Minter, Deputy Secretary of VTrans, and Leon Heyward, Deputy Commissioner of NYC Department of Transportation, reviewing lessons learned from the recent natural disasters (Irene and Sandy) faced by their respective regions.

The TRC Transportation Research Expo seeks to highlight innovative research in the transportation field from UVM faculty and students, as well as partners from around the state. It organizes key speakers and discussions to continue to advance dialogue for future research and action between UVM and its partners in the state and community. This year’s Expo once more demonstrated the vibrancy and breadth of the research and project work contributing to the transportation field.

To more Expo stories, abstracts, and posters, visit the TRC Expo Page at <http://bit.ly/ZRCJIO>

VTCCC Clean Fleet Solutions Recap



On February 28, the Vermont Clean Cities Coalition held a stakeholder meeting titled “Clean Fleet Solutions,” with several speakers discussing the pursuit of fleet efficiency and alternative fuels.

Keynote speaker Larry Beaulieu, UPS East Region Automotive Manager, presented a fascinating overview of national and international UPS fleets. Highlights of the presentation included everything from the company’s ranking in the top 20 nationally for airline fleet size to their use of bicycle transportation in remote tropical locations. Beaulieu also described the many efforts of the company in improving their efficiency and fuel consumption, from alternative fuel use, anti-idling efforts, safety measures, and use of telematics, which provide extensive data. These and other efforts by the company have led to annual petroleum fuel consumption reduction of 3 million gallons and 30 million miles reduced from vehicle miles traveled. The presentation made it very clear that UPS is constantly evaluating, at the national and local level, how they can improve efficiency. UPS is a member of the Clean Cities National Clean Fleet Partners.

Also presenting at the event was James Muldowney of Vermont Gas Systems. He profiled the Vermont Gas vehicle fleet. Muldowney shared information on their successful implementation of natural gas vehicles (NGV) for service vans and passenger cars.

Peter Bourne of Bourne’s Energy spoke about his company’s new biodiesel initiative, detailing the implementation of a new biodiesel blending facility in Morrisville, VT. With the new facility, customers now have access to biodiesel blends ranging from B5 to B-99 (5 to 99 percent biodiesel, blended with petro-diesel) for both home heating and on-road use.

VTCCC Coordinator Tom McGrath gave an update detailing the coalitions inclusion in the Northeast Clean Cities Coalitions’ Project: “Removing Barriers, Implementing Policies, and Advancing Alternative Fuel Markets in New England.” The project includes barrier reduction

initiatives, market development and outreach initiatives, drafting model policy language, working with MPO’s, and safety and training workshops.

TRC Alum at Work: Dr. Peter Pettengill



In March 2013, TRC faculty member Dr. Lisa Aultman-Hall visited TRC and RSENR alumni Dr. Peter Pettengill at Grand Canyon National Park, where he is now serving as an Outdoor Recreation Planner in Science & Resource Management for the National Park Service. Pete received his PhD in Natural Resources under the direction of Dr. Robert Manning in 2013. His dissertation was entitled: “Managing Transportation in Parks and Outdoor Recreation.”

Lisa was on a Utah and Arizona vacation during her research leave at the University of California Davis. She was very interested to learn how Pete was putting skills honed at the RSENR Park Studies Lab and the TRC into his strategic planning work for the National Park Service. In particular, Pete is striving for data-driven outdoor recreation planning and has been using infrared counters to measure pedestrian activity on trails in the park. Pete’s research will help inform Grand Canyon’s backcountry management plan which includes over 400 miles of trails as well as primitive road networks and remote car-camping destinations. Pete maintains research interests in measuring and managing the quality of transportation and has recently been appointed an adjunct faculty member at Northern Arizona University in Flagstaff.

Lisa’s tour included numerous National Parks giving her even more appreciation for Dr. Manning and the Park Studies Lab and their efforts to measure carrying capacity and levels of experiential quality in recreation. She observed several examples of NPS transit, biking and walking systems. Grand Canyon Village and other National Park gateway communities shared common landscapes and transportation challenges with rural America including Vermont.

Pete and his wife Anna live in the remote Grand Canyon Village within the park.

TRC Alum at Work: Diana Colangelo, CEDO, Burlington, VT: Making Communities Safe, Sustainable, and Vibrant



How do we make sure that our communities are safe, sustainable, vibrant places that are accessible to all? While we must all work together in our individual roles to contribute to the health of our neighborhoods, local government plays a key role in planning and implementing the ideas that strengthen the livability of our communities. The issues that fall to local government to tackle are numerous, and one of them is transportation planning and infrastructure.

As an Economic Development Specialist at Burlington's Community & Economic Development Office (CEDO), Diana Colangelo has the opportunity to work on transportation-related initiatives in the City of Burlington. As a Graduate Research Assistant at the TRC during the 2009-2010 academic year, she worked with Dr. Asim Zia to analyze national commuting patterns using data from the American Housing Survey's Journey to Work section. Although her work is no longer in the realm of research, she regularly uses the skills she developed at the TRC and in her Master of Public Administration program.

Tasked with fostering economic growth in Burlington and helping small businesses startup, grow, and expand here, the range of activities that Diana is involved with that relate to transportation and infrastructure is broad. Activities range from providing technical assistance to help small bike-related businesses startup, find space, and market themselves, to working with other City departments on long-term plans for infrastructure improvements. One example is the City's Public Investment Action Plan, which will determine how tens of millions of dollars in waterfront and downtown public infrastructure investments will be made. The City has put out a Request for Concepts, and the deadline is approaching. That is the first step in a year-long process that will culminate in a public

vote on a slate of infrastructure investment projects in March of 2014. Diana and other CEDO and City staff will be intimately involved with this project over the course of the next year. Many concepts will deal with transportation-related infrastructure on the waterfront as well as better physical connections between the downtown and the waterfront.

On a smaller scale, in addition to providing assistance to bike-related businesses, Diana has been involved with initiatives to highlight the contributions these businesses make to the community. CEDO's "They Chose Burlington" poster series offers businesses the chance to market themselves and show the public why they chose to locate their business in Burlington. The posters in the series have featured Terry Bicycles and more recently Magliano Café, a haven for bicyclists whose owner is a bicycling advocate and major part of the modern mobility movement. The images appear at the waterfront information kiosk, in City Hall, and at Burlington International Airport, bringing featured businesses in front of a wide audience.

Another example of small scale economic development that highlights the importance of our bike-related businesses is a "Welcome Budnitz Bicycles" ride that Diana helped to coordinate. Starting on the steps of City Hall, the Mayor welcomed Paul Budnitz to our community and riders biked down to Budnitz's new headquarters at Magliano Café, where the Mayor offered more remarks and attendees got a tour of the new store.

Diana also works with the Department of Public Works and area businesses on locating bike racks in front of commercial properties, as well as issues that come up for businesses related to parking and parking signage. Resolving parking issues for businesses can help drive more customers to their stores as well as create more effective and efficient parking in general for visitors to the downtown. Stay tuned for more on parking, which is a critical issue that Diana and other CEDO staff will be working on in the coming year.

Working at the TRC not only helped Diana hone both quantitative and qualitative skills, but it gave her countless opportunities to learn about the complexities of making transportation decisions in communities. From attending lectures and research expos to collaborating with other scholars, Diana's experience at the TRC informed her perspectives and helps her to be a better and more knowledgeable public servant when it comes to transportation issues in the City of Burlington.

TRC Burack Lectures: Dr. John Landis & Dr. Jonathan Rubin



Dr. Landis delivers his Burack lecture

The TRC was fortunate to host two excellent speakers from the Burack President's Distinguished Lecture Series during the Spring 2013 semester. This is a lecture series funded by a donation by Dan and Carole Burack to bring distinguished speakers to campus. Dr. John Landis spoke on urban growth and modeling, while Dr. Jonathan Rubin discussed reducing transportation emissions.

In his lecture, Dr. Landis highlighted the complexity of determining the type of growth model a city or region should use based on what their growth strategy is, ranging from providing more affordable housing, to more public space, to more transit options, etc. He explained that every city is different in that they all have a unique set of goals. Once you understand what the goals are, then you can choose the best growth model for that city. He also discussed the policies that shape this growth, such as zoning, growth boundaries, and fees or incentives.

Dr. Landis followed this discussion with some statistics about how cities have been growing across the country, highlighting that suburban growth far outpaced core city growth in the 1990's. Some metros, however, did increase average density during this time, such as New York, Phoenix-Mesa, and Las Vegas. After this overview, Dr. Landis went into detail about the different types of models that are used for growth modeling. He used Vermont's Chittenden County as an example to show how growth may occur using the various models and assuming certain growth strategies for the region.



Dr. Rubin presents on some of his work to TRC graduate students preceding his lecture

Forty years after the oil embargo, Jonathan Rubin delivered a lecture on his approach to reduce petroleum dependence and carbon emissions in the transportation sector. He believes this is a critical task, not only for the bipartisan goal of energy security, but also to prevent the economic costs of high fuel prices. Rubin's solution does not pick a certain fuel to replace oil. "We've been searching for a magic technology for a long time", he notes, citing the options that held the most promise at certain points over the years, such as hydrogen, ethanol, and natural gas.

Rubin instead proposes a Low Carbon Fuel Standard (LCFS) to gradually lower the emissions and fuel consumption by setting a gradually decreasing cap on carbon intensity. With this process, transportation emissions could be reduced 10 percent by 2030, reaching a cost of \$.37 per gallon. He proposes this LCFS approach rather than a tax, which he notes would be ineffective due to inelastic demand. In other words, people would continue to drive even with the price increase from a tax, as seen already with the large variations in gas prices.

While cars have gotten more efficient, Rubin noted, fuels have increased in emissions, due to energy intensive processes such as mining oil sands and deep water drilling. As Dr. Rubin noted grimly, the concern should not be that fossil fuels are running out, but that they are still in large supply as technology increases access, thus making switching to alternatives more difficult. Low Carbon Fuel Standard, however, may be an effective step in the path to wide adoption of alternative fuel vehicles in transportation.

Ben Rouleau Wins Goldwater Scholarship



Benjamin Rouleau, a civil engineering junior who has worked on a number of research projects at the Transportation Research Center, has been selected as a 2013 Goldwater Scholar. This is a very prestigious prize awarded by the Barry Goldwater Scholarship and Excellence In Education Foundation. Students must go through a competitive process at UVM first before their nominations are forwarded to the national level. Goldwater Scholars receive \$7,500 for each of their remaining years of undergraduate studies.

Of the 271 scholarships awarded for the 2013–2014 academic year to undergraduate sophomores and juniors from the United States, Ben was the only representative from the University of Vermont and only one of three students from our state (the other two are attending schools outside of Vermont). He is also only one of two civil engineering students (both with career goals in transportation) that have been selected nationally. Here is the full list of the 2013 Goldwater Scholars

Ben has completed several projects over the years at the UVM Transportation Research Center, beginning after his first year where he spent the summer working with researchers Jim Sullivan and Jonathan Dowds, calculating daily travel by bikes and pedestrians in Chittenden County, including managing the video footage, collecting data, and assisting in project planning. This project continued until the end of his sophomore year, with Rouleau's work expanding to automating counting with Eco-Counter tools and calculating the variation in pedestrian and bike traffic by season. Last spring, Rouleau worked on another video project with civil engineering doctoral student Nathan Belz, recording video of roundabouts and analyzing the resulting data. This fall, Rouleau also worked with TRC Associated Faculty member Brian Lee, recording

counts of vehicles in work zones in conjunction with a speed sensor.

While Ben has already participated in numerous TRC projects in his undergraduate studies, his focus on transportation continues for his senior year. His thesis proposal this spring will be based on his data from his earlier work with Sullivan and Dowds, as Rouleau looks to determine factors that influence bike and pedestrian use of roads in rural areas, specifically in Chittenden County. This work will focus specifically on built environment factors, such as grade, speed, etc.

UVM Student Research Conference

A dozen graduate students presented their TRC research at the annual conference. To view videos of their poster presentations and the posters themselves, visit <http://bit.ly/12ZYfRS>



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