

UNIVERSITY OF VERMONT TRANSPORTATION RESEARCH CENTER



ANNUAL REPORT 2017-2018

Reflecting on another year

The year 2018 marks the TRC's 12th year at the University of Vermont. Our work for more than a decade has focused on transportation planning as it relates to resilience, energy and equity. As our portfolio of projects and programs has grown and evolved, we have continued to foster an interdisciplinary and cross-cutting approach to transportation research, education, and outreach. National partnerships, like the National Center for Sustainable Transportation led by UC Davis and FHWA's

Northeast Transportation Workforce Center, have been fruitful in supporting the efforts of TRC faculty, staff, students, and affiliates across campus. Continued dedication to our partnership with the Vermont Agency of Transportation (VTrans) has helped us to better serve the state and continue our mission to conduct meaningful research with real-world data and pursue programs for sustainable transportation that have community relevance.

PROGRAM UPDATES:

National Center for Sustainable Transportation

Lisa Aultman-Hall, Professor

UVM began its partnership with the University of California Davis for the National USDOT-funded University Transportation Center (UTC) in 2013. Since that time NCST has funded 10 UVM graduate students and many undergraduate student researchers. To date, five research projects and three white papers have been selected for funding in the program. The NCST theme of sustainable transportation complements well the research, education and workforce efforts at the TRC.



Dr. Aultman-Hall arrives at the TRC by bicycle (photo credit: Nich Hall)

Northeast Transportation Workforce Center

Glenn McRae, Director

The NETWC is a partnership with Rutgers University, and is funded by FHWA as one of five regional Centers that compose the National Network for the Transportation Workforce (NNTW). The national network recently won a new FHWA grant to create the National Transportation Career Pathway Initiative. UVM's contribution has been the examination of priority career pathways in the environmental area of transportation. We have also forged a new partnership with USDOTs ITS Professional Capacity Building effort.

Vermont Clean Cities Coalition

Peggy O'Neill-Vivanco

Vermont Clean Cities Coalition, a Department of Energy funded program, provides technical assistance and outreach, and helps raise awareness of alternative fuels, advanced vehicle technology, and transportation energy efficiency to fleets in Vermont. After three years as VTCCC Coordinator, Abby Bleything has transitioned to a new position at UVM Transportation and Parking Services as their Sustainable Transportation Coordinator. Peggy O'Neill-Vivanco was already working at the TRC and stepped up in February 2017 as the new VTCCC Coordinator. Gabby Freeman joined the TRC in September 2017 as a Clean Cities Intern with funding from Argonne National Laboratory. Together the VTCCC team compiles data, conducts outreach and plans educational events.

New England Transportation Consortium

Hannah Ullman

The New England Transportation Consortium (NETC) is a research cooperative between the six New England State DOTs, which serves as a valuable regional partnership in research and dissemination. Since January 2016, the UVM Transportation Research Center has coordinated 14 full research projects and three quick response projects with VTrans as lead state. In February 2019, MaineDOT will assume lead state responsibilities with a new coordinator. It has been a great opportunity to host the NETC and build regional relationships.

PROJECT HIGHLIGHTS:

Quantifying the Impact that New Capital Projects Will Have on Roadway Snow and Ice Control Operations

In recent years, many Snow Belt states have experienced heavy burdens on their roadway snow and ice control (RSIC) budgets due to an increase in extreme winter weather. The goal of this project was to support state DOTs' operations & maintenance efforts by developing an automated method for quantifying the expected impact that new capital projects will have on RSIC operations. The results of a series of applications of the TRC's Integrated RSIC Model and innovative GPS data collection from plow trucks showed significant increases in effort and needs for additional equipment for RSIC. New suburban roadways had the most significant impact on effort as measured by vehicle-hours of service, but adding left-turn lanes to a rural intersection approach also had a significant effect. *Contact: Jim Sullivan*

The Vermont Transportation Energy Profile

Smart policymaking is driven by and responsive to empirical data. In recognition of this fact, the Vermont Legislature, through the State's Comprehensive Energy Plan, mandates the tracking of 12 transportation energy use and greenhouse gas emissions metrics. In response to the mandate, VTrans has retained the TRC to produce the biannual Vermont Transportation Energy Profile. The Energy Profile, now in its third edition, tracks the State's progress toward achieving the transportation-sector targets articulated in the State's Comprehensive Energy Plan and informs transportation-related policy-making more broadly. *Contact: Jonathan Dowds*

Vermont Bicycle and Pedestrian Counting Program

In spite of the growing recognition of the importance of non-motorized travel, tracking of bicycles and pedestrians with volume counts lags behind comparable efforts focused on motorized travel. In Vermont, non-motorized traffic counts are collected by the UVM TRC, VTrans, and several of the state's regional planning commissions. The TRC compiled all existing counts in Vermont into a new unified database containing over 200,000 hours of observation at 194 locations. A web portal was developed allowing users to view and interact with the Site Data in a GIS web environment. A spatiotemporal/categorical gap analysis and semi-random site selection process were employed in order to improve the robustness of the set of count locations in Vermont. A total of 20 new sites were selected in this way. *Contact: Karen Sentoff*

Climate Adaptation & Resilience

The TRC's climate adaptation portfolio continues to expand. In a series of projects funded by the National Center for Sustainable Transportation, the TRC team has mapped out the complementary roles of transportation agencies at the federal, state, and local levels in adapting our transportation systems to climate change, advanced methods for prioritizing potentially vulnerable infrastructure, and identified key competencies for current and aspiring adaptation professionals. This body of work is motivated by the understanding that there are both technical and organizational barriers to advancement. The TRC's criticality indices are currently in use in the Vermont Statewide Travel Model for a wide variety of applications. Leveraging the technical expertise at the TRC, the workforce group is now working to define the skill sets that will be in demand for adaptation related jobs and to inform how agencies can develop job descriptions, conduct recruitment, and allocate internal training resources. *Contact: Jonathan Dowds*

TRC PARTNERS AT UVM:

Transportation Air Quality Lab (TAQLab)

Britt Holmen, Director and Professor

In 2017-2018, the TAQLab located in the historic Perkins Building underwent many renovations synced with the major renovation of labs and spaces in Votey Building. The students of the TAQLab have been focusing on biodiesel, particularly biodiesel particle emissions. Active partnerships with the UVM College of Medicine, the Gund Institute for Environment, and the US Department of Agriculture form the basis of the TAQLab's continued commitment to sustainability.

UVM Spatial Analysis Lab (SAL)

Jarlath O'Neil-Dunne, Director

The University of Vermont Unmanned Aircraft Systems (UAS) Team carried out over 130 flights in the past year. UAS integration projects with the New Hampshire and Massachusetts DOTs had the team traveling all over New England and private sector partnerships expanded the team's reach to Hawaii and California. Six students earned their FAA UAS certification, the majority of which were women.



SAL's Jarlath O'Neil-Dunne and Adam Zylka in the field with UAS (photo credit: UVM UAS team)

TRC'S ALUMNI GROWS:

After 12 years, TRC alumni are now spread far and wide, working in government, industry and academia. At the 2018 Transportation Research Board Annual Meeting, our current team gathered for dinner with graduate alumni and VTrans partners. TRC alumni included Russ Mills (front right), one of the TRC's graduate students from 2006, now teaching aviation and local economic development as a Professor at Bowling Green State University in Ohio; Sean Neely (front left), works in Civil Engineering at Stantec in Vermont; Phoebe Spencer (back left), a consultant at the World Bank; and Nathan Belz (at the end of the table), an Assistant Professor at the University of Alaska Fairbanks. VTrans' Research Manager, Emily Parkany, and, Geotechnical Engineering Manager, Callie Ewald (herself a UVM Engineering alumna), also joined for some lively transportation conversation.



TRC Team in Washington DC January 2018 (photo credit: Glenn McRae)

RECENT REPORTS AND PUBLICATIONS:

Xiao Xiao, Lisa Aultman-Hall, Robert Manning, and Brian Voigt. (2018) The Impact of Spatial Accessibility and Perceived Barriers on Visitation to National Parks. *Journal of Transport Geography*.

Rosaria Berliner, Lisa Aultman-Hall, Giovanni Circella. (2018) Exploring the Self-Reported Long-Distance Travel Frequency of Adult Californians. *Transportation Research Record*.

John Kasumba and Britt Holmén (2018) Heterogeneous ozonation reactions of PAHs and fatty acid methyl esters in biodiesel particulate matter. *Atmospheric Environment* 175, 15-24.

Jonathan Dowds, Karen Sentoff, James L. Sullivan, and Lisa Aultman-Hall. (2017) Assessing the Impact of Network Resolution and Origin-Destination Aggregation on the Stability of Transportation Network Criticality Rankings. *Transportation Research Record* 2653. DOI 10.3141/2653-11

Karen Sentoff, James Sullivan, David C. Novak, and Jonathan Dowds. (2017) Examining the Potential Impacts of Maintenance Investment and Capital Reinvestment in Vermont's Roadway Infrastructure Network [TRC Report # 17-002](#)

Lisa Aultman-Hall and Jonathan Dowds. (2017) Designing the All-in-One Vermont Transportation Survey [TRC Report #17-004](#)

Jonathan Dowds, Lisa Aultman-Hall, Carol Vallett, Glenn McRae. (2017) Climate Adaptation and Resiliency Planning: Agency Roles and Workforce Development Needs [National Center for Sustainable Transportation Research Report](#)

James Sullivan, Jonathan Dowds, David C. Novak, Darren Scott, and Cliff Ragsdale. (2017) Quantifying the Impact that New Capital Projects Will Have on Roadway Snow and Ice Control Operations [Clear Roads Project CR 14-02](#)

Jonathan Dowds, James Sullivan, David C. Novak, Darren Scott. (2016) Identifying Best Practices for Snowplow Route Optimization [Clear Roads Project CR14-07](#)

Brian Cronin (ICF), Janet Leli (Rutgers), Glenn McRae (UVM). (2016) Transportation Job Needs and Priorities Report, Phase 1: Northeast Region. [Northeast Workforce Center Report](#)

Brian Cronin (ICF), Janet Leli (Rutgers), Glenn McRae (UVM). (2016) Transportation Job Needs and Priorities Report, Phase 2: Action Plans Northeast Region. [Northeast Workforce Center Report](#)

Abby Bleything, Greer Cowan, Glenn McRae, Linnea Myers. (2016) Alternative Fuels in Transportation: Workforce needs and opportunities in support of reducing reliance on petroleum fuels. [Northeast Workforce Center Report](#)

THE YEAR IN REVIEW:

July 2017

- Jim Sullivan starts new partnerships with local partners in Burlington providing data collection, technical expertise and network analysis.

August 2017

- Glenn McRae is the Keynote Speaker at the New Jersey Transportation, Logistics and Distribution Industry Summit

September 2017

- Graduate Student Sarah Howerter joins TRC, the first transportation student pursuing the Complex Systems Certificate



TRC Graduate Research Assistant Sarah Howerter (photo credit: Sally McCay)

- TRC begins its 10th year of hosting the Vermont Travel Model
- The National Center for Sustainable Transportation funds six undergraduate research assistants at UVM

October 2017

- Abby Bleything honored with [ACT 40 under 40 National Leadership Award](#)
- Jonathan Dowds attends the kick-off of the Joint Clean Climate Transport Research Partnership, an international consortium dedicated to reducing transportation emissions led by the University of Quebec at Montreal

November 2017

- Lisa Aultman-Hall serves on a Vermont Agency of Transportation panel on Automated Vehicles as part of the Vermont Highway Safety Alliance Annual Meeting in Burlington

January 2018

- Jim Sullivan re-establishes 200-level transportation modeling class in Civil and Environmental Engineering at UVM

February 2018

- UNH's Dr. Jo Daniel seminar: Assessing Impacts of Sea-Level Rise on Coastal Road Infrastructure and Development of an Adaptation Framework for Climate Resilient Roads

March 2018

- Carol Vallett launches interactive knowledge management pilot at VTrans
- Glenn McRae appointed to TRB Task Force on Knowledge Management
- Lisa Aultman-Hall appointed chair of the TRB Committee on National Transportation Data



Selfie while Hiking by Bob and Martha Manning

April 2018

- Robert and Martha Manning Seminar "Walking the Talk" attracts 70 attendees
- Josh DeFlorio Seminar "Resilience and Sustainability at the Port Authority of New York and New Jersey" is co-hosted between TRC and the UVM Civil and Environmental Engineering Department

May 2018

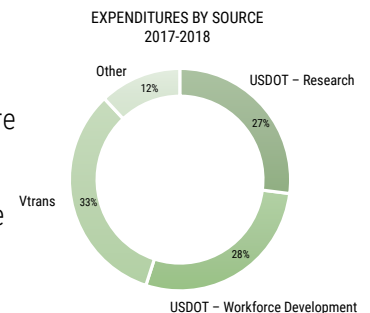
- VTrans' Todd Sears seminar "Emergency Management at the Vermont Agency of Transportation"
- TRC hosts Transportation Alumni Career Panel with guests Julia Ursaki, Sean Neely, Cassidy Cote and Erica Quallen
- Peggy O'Neill-Vivanco "Closing Vermont Skills Gap with Bicycle Mechanics" at the 2018 Vermont Walk/Bike Summit
- Lisa Aultman-Hall is the keynote dinner speaker on Automated Vehicles for the Vermont Society of Engineers at Jay Peak

June 2018

- UVM is on UMaine's successful Regional USDOT UTC team – Dr. Mandar Dewoolkar is UVM PI

EXTERNAL RESEARCH GRANTS:

Over the last two years, TRC external grant expenditures have been just over \$3M. The majority of the external grants are funded from the USDOT almost equally split between research and workforce development. One third of our FY18 expenditures were grants from our in-state partner the Vermont Agency of Transportation. The other grants came from the Department of Energy and other states.



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