2022 - 2023
ANNUAL REPORT

NIATT

National Institute for Advanced Transportation Technology
University of Idaho

MISSION

To develop engineering solutions (knowledge and technology) for transportation problems in the state of Idaho, the Pacific Northwest, and the United States while preparing our students to be leaders in the design, deployment, and operation of our nation's complex transportation systems.

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DIRECTOR'S MESSAGE

Many of you will be familiar with the cover from this year's NIATT Annual Report. The image shows the University of Idaho's Memorial Gym, which has been a campus landmark for nearly one hundred years.

NIATT's own historical footprint is represented by its past and present research activities, along with the dedication of its faculty, graduate and undergraduate students, advisory board, and supporting community. The impact of NIATT activities will leave a lasting legacy, and the possibilities and opportunities in this ever-changing transportation and technology landscape are limitless.

There have been several notable events in the past year. In February, Professor Ahmed Abdel-Rahim stepped down from the NIATT Director position after serving for nine years. On behalf of the entire NIATT community, I want to thank him for his leadership and service. In the same month, the University Transportation Centers Program announced its new national, regional, and Tier 1 centers. The University of Idaho, in partnership with the University of Washington and several other institutions from the Pacific Northwest, was selected as the Region X Center. A few more details about this Region X Center, which retains the PacTrans name, are provided in the "Worth Sharing" section of this report.

This past spring and summer, NIATT reached out to both its faculty and advisory board to gauge the direction of the research center and to revisit its mission and vision statements. While the mission statement was kept, the vision statement will be updated. At press, a working group is being formed to re-evaluate this aspect and how NIATT's core focus areas should be defined. An update will be shared and incorporated as part of next year's Annual Report.

While this document serves an annual snapshot to capture the valuable efforts of NIATT faculty and its affiliates, the work will continue well after the ink dries. If you have not yet done so, then please join NIATT's new LinkedIn page at [www.linkedin.com/in/niatt/]. This site will be regularly updated so that you can be apprised of news from our community more than just once a year.

With appreciation,

Kevin Chang, Ph.D., P.E., F.ITE
Director

ADVISORY BOARD

AFFILIATE FACULTY

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Culture, Society, and Justice

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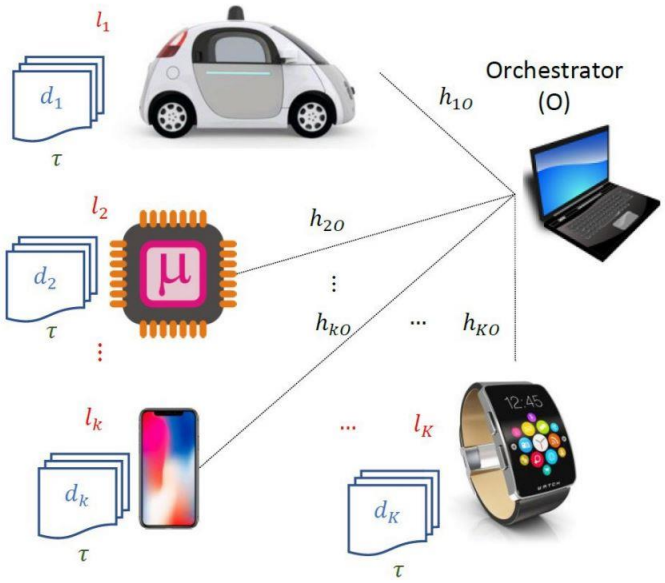
Computer Science

Philip Watson
Agricultural Economics and Rural Sociology

Tao Xing
Mechanical Engineering

FEATURED RESEARCH

A Hybrid Platform for Context-Aware V2X Communications
PI: Hefeida
Funding Source and Budget: PacTrans (USDOT); $40,000



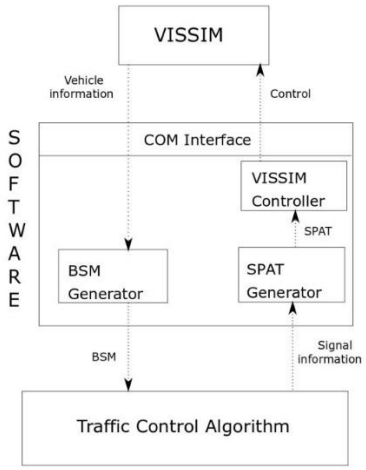
SYSTEM MODEL OF A MEL SETTING

This report presents a new paradigm for Mobile Edge Learning ("MEL") that enables the implementation of realistic distributed machine learning (DML) tasks on wireless edge nodes while taking into consideration heterogeneous computing and networking environments. A heterogeneity aware (HA) scheme was designed to solve the problem of dynamic task allocation for MEL in a way that maximizes the DML accuracy over wireless heterogeneous nodes or "learners" while respecting time constraints, enabling context aware vehicle to everything (V2X) communication. The problem was first formulated as a quadratically constrained integer linear program. Being non-deterministic polynomial-time-hard, it was relaxed into a non-convex problem over real variables that could be solved by using commercially available numerical solvers. The relaxation also allowed us to propose a solution based on deriving the analytical upper bounds of the optimal solution using Lagrangian analysis and Karush-KuhnTucker conditions.

The merits of the proposed analytical solution were demonstrated by comparing its performance to numerical approaches and comparing the validation accuracy of the proposed HA scheme to a baseline heterogeneity unaware equal task allocation approach. Simulation results showed that the HA schemes decreased convergence time up to 56 percent and increased the final validation accuracy up to 8 percent.

For more info, go to [depts.washington.edu/pactrans/research/].

Connected-Vehicle Traffic Signal System Modeling Platform
PI: Heckendorn
Funding Source and Budget: PacTrans (USDOT); $50,000



DATA EXCHANGE AMONG CoVeTTware, VISSIM, AND THE TRAFFIC CONTROL ALGORITHM

VISSIM is a popular micro-simulation package for traffic analysis that simulates the behavior of individual cars in motion in traffic and breaks up time into small steps. Unfortunately, VISSIM lacks an application programming interface for connected vehicles and roadside infrastructure development. In response, this was a technology enabling project rather than a research project. Software was designed and implemented to augment enable the VISSIM simulator to model a connected-vehicle environment. This included interfaces that allow the design and creation or roadside infrastructure software that accesses realistic and precise basic safety messages from VISSIM and the controlling of signals in VISSIM via signal phasing and timing (SPaT) commands, as if it were connected to real traffic hardware and controlling real traffic.

This project aimed to design and develop Connected Vehicle Traffic control algorithm Testing Software (CoVeTTware). The traffic simulation in this work was done by using the VISSIM simulation tool. The component object model interface was used to access the objects of the VISSIM simulation tool. The exchange of information between VISSIM and CoVeTTware was performed in real time. CoVeTTware retrieves information about vehicles at intersections from VISSIM and generates the basic safety messages (BSMs) of the vehicles in real time, according to the Society of Automotive Engineers J2735 standard. The BSMs can be used by a connected vehicle traffic control algorithm to generate signal information for an intersection. The signal information includes the signal phase to be set for a signal and the period for which the signal phase should be set. The signal information is used by CoVeTTware to generate SPaT messages. Using CoVeTTware, the statuses of the signals of the intersection are changed in VISSIM in real time by on the basis of the SPaT messages. This model can be used to test any connected vehicle traffic control algorithm.

For more info, go to [depts.washington.edu/pactrans/research/].

Development of a Correlation between CoreLok® and AASHTO T 85 Tests for Specific Gravity of Coarse Aggregates used in Idaho
PI: Kassem and Sharma
Funding Source and Budget: Idaho Transportation Department, $123,600
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QUARTERING AGGREGATE SAMPLES ON LABORATORY FLOOR

Specific gravity and absorption values of coarse aggregates are typically measured in accordance with the AASHTO T 85 standard. The test requires considerable experience to recognize the stage when a soaked sample reaches the saturated surface dry condition upon drying. The CoreLok device offers an alternative approach which can be completed in less than 45 minutes compared to the 24 hours required by the AASHTO procedure.

This study investigated the results from AASHTO T 85 and CoreLok testing of coarse aggregates to develop a correlation between bulk (dry) specific gravity (G_{sb}) values measured using the two test procedures. Blended samples, consisting of coarse and fine aggregates, were also tested to evaluate the use of the CoreLok method to reliably determine G_{sb} values. After testing 15 coarse aggregates and 17 blended aggregates, this study developed three equations that may be used to modify the CoreLok G_{sb} results to more closely reflect G_{sb} values based on AASHTO T 85 tests. The recommended equation uses the CoreLok G_{sb} and the fine aggregate percentage to predict the equivalent AASHTO T 85 G_{sb} with an $R^2 = 0.967$. Furthermore, five reclaimed asphalt pavement (RAP) materials were also tested to see if the G_{sb} of the uncoated aggregate could be determined using the CoreLok method. Preliminary results indicate that the CoreLok G_{sb} results can be reliably calculated if the effective and absorbed binder content is known, or presumed, based on experience.

For more info, go to [itd.idaho.gov/alt-programs/].

Development of a Methodology to Evaluate the Highway Safety Improvement Program
PI: Lowry
Funding Source and Budget: Idaho Transportation Department, $120,000

PROJECT FOOTPRINT AND CRASH DATA (SAMPLE OUTPUT)

The Highway Safety Improvement Program (HSIP) is a core Federal-aid program to reduce fatalities and severe injuries on all public roads. Each state must submit its HSIP Annual Report to the Federal Highway Administration Division Administrator. The goal of this research study was to provide information and develop tools that can help the Idaho Transportation Department (ITD) conduct safety effectiveness evaluation consistently across the state, provide data-driven rationale for future investments, and to help prepare the evaluation section of the HSIP Annual Report.

A method and a geographic information system (GIS) tool were developed to evaluate the safety effectiveness of projects. The tool uses readily available data to calculate four safety performance measures: crash frequency, crash rate, annual economic cost, and severe crash proportion. The tool output includes: an Excel file with safety performance measure data; GIS files for mapping the crash data; and a report that provides tables and charts for the safety performance measures, a Google Street View image, and crash map. In the future, ITD could implement the process through a different platform, such a web application, or modify the tool for future needs.

A case study evaluation was done for nineteen HSIP projects that were completed between 2014 and 2016. Ten of the projects experienced reductions in crash frequency; eleven experienced reductions in crash rate; eight experienced reductions in annual economic cost; and ten experienced reductions in severe crash proportion. Four projects experienced reductions in all four safety measures.

For more info, go to [itd.idaho.gov/alt-programs/].

Development of an Acoustic Method to Collect Studded Tire Traffic Data
PI: Chang
Funding Source and Budget: CSET (USDOT), $135,000

SOUND METER DISPLAY

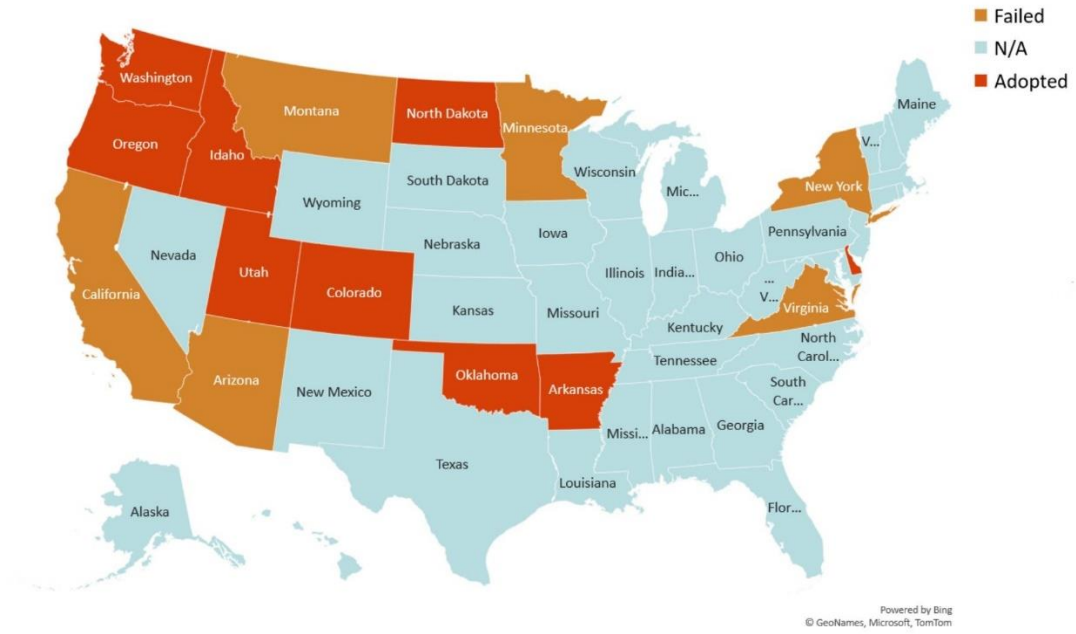
Travel during winter months remains particularly problematic in the Pacific Northwest due to the regular occurrence of inclement weather in the form of snow and ice during freezing and sub-freezing conditions. For travelers and commuters alike, vehicle traction in the form of studded tires serves to provide an added level of driving confidence when weather conditions deteriorate. However, recurring studded tire usage causes damage to the roadway infrastructure in the form of surface wear and rutting over time. Left unattended, this damage contributes to challenging and potentially dangerous driving conditions in the form of standing water and the increased potential for hydroplaning.

Currently, an efficient and automated method to collect site-specific studded tire traffic volumes is lacking. While studded tire usage can be locally estimated based on manual roadway traffic counts, parking lot counts, or household surveys, the lack of real-world traffic volumes prevents the fine-tuning of roadway deterioration models that measure performance and estimate infrastructure life. This project tested the use of off-the-shelf sound meters to determine if an acoustic method could be developed to measure studded tire volumes. Based on the results, a prediction model was developed to allow for data-driven solutions.

The study outcomes yielded results that were similar to previously established methods such as parking lot surveys. The study concluded that the use of off-the-shelf sound meters alone was not sufficient to definitively collect volume data. However, the insights from this study will support future research efforts that provide new data-driven solutions for local transportation officials, planners, and engineers responsible for managing highways and roadways.

For more info, go to [cset.uaf.edu/research/].

Evaluation of the Idaho (Bicycle) Stop Laws in the Pacific Northwest
PI: Chang (with Hurwitz, OSU and Young, GU)
Funding Source and Budget: PacTrans (USDOT), $180,000 (shared)



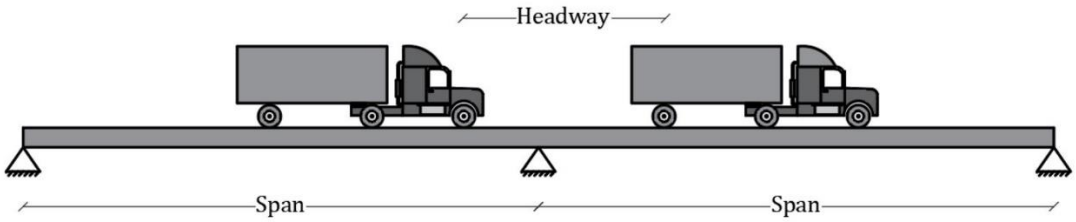
POTENTIAL GROWTH IN BICYCLE ROLLING STOP LAWS

Bicycle Rolling Stop (BRS) laws refer to legislation that allow bicyclists to treat stop signs as yield signs. Many states have passed statutes or attempted to pass similar statutes with varying permissive actions for bicyclists in response to stop signs. Previous research has focused on crash data analysis and the factors that motivate bicyclists who perform a rolling stop when it is illegal under prevailing law, but no research has identified the safety effects of BRS laws.

To that end, this research used stakeholder interviews, an online survey, and a networked driving and bicycling simulator experiment to evaluate the safety implications of the BRS law. Seventeen interviews were conducted with identified stakeholders, including emergency response and law enforcement personnel, legislators, avid cyclists, and non-cyclists. A total of 550 survey responses were collected from residents of Idaho, Washington, and Oregon. Sixty participants successfully completed a networked simulator experiment in which a "live interaction" occurred at a stop-controlled intersection between a participant in the driving simulator and a participant in the bicycling simulator. The results from these different methods consistently concluded that more outreach is needed with regard to BRS laws. This research also provides bicycle advocacy groups, transportation agencies, and decision makers with information to support future legislative decisions, program educational initiatives, and design enforcement practices regarding BRS laws.

For more info, go to [depts.washington.edu/pactrans/research/].

Impact of Autonomous and Connected Truck Platoons in the Pacific Northwest on Transportation Infrastructure
PI: Ibrahim
Funding Source and Budget: PacTrans (USDOT), $40,000



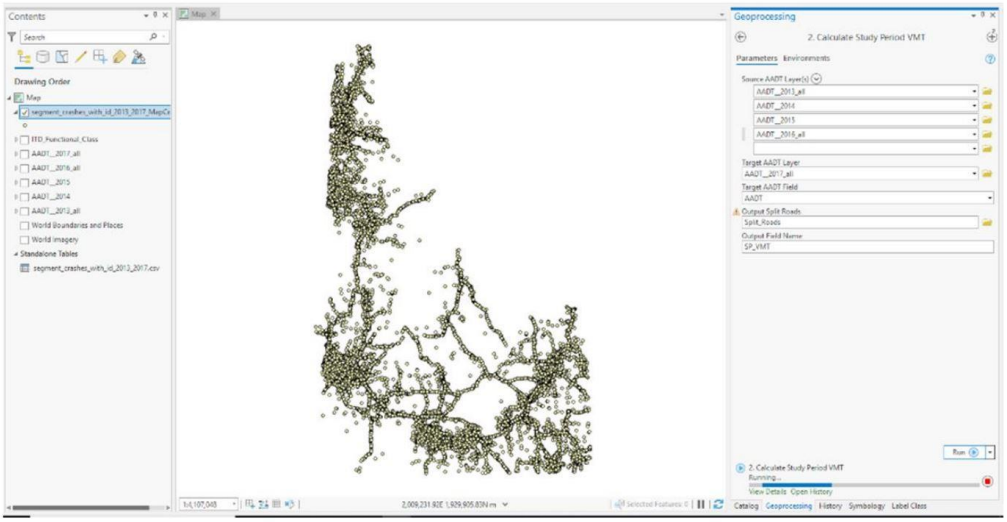
CRITICAL MAXIMUM NEGATIVE MOMENT CONFIGURATION FOR TWO-SPAN BRIDGES

The operational characteristics of freight shipments will significantly change after implementation of autonomous and connected trucks (ACTs). This change will have major impacts on mobility, safety, and infrastructure service life. Truck platooning is one of the truck arrangements that will soon become feasible with connected vehicle technology. It will enable trucks to be connected with themselves and the surrounding infrastructure. Although truck platooning will increase fuel efficiency and improve transportation services, the platooning configuration is expected to accelerate damage to the existing infrastructure. This damage, if accumulated, will cost the country billions of dollars to fix and will affect the mobility of people and goods.

This research aimed to develop a well-defined framework for assessment and a data-driven solution for addressing the influence of truck platoons on existing bridges in the Pacific Northwest to be ready for the near future implementation of ACTs and to preserve the current bridge inventory. An extensive parametric study of 59,200 models considering a wide range of parameters was conducted. Four bridge cases were included: simple span, two-span, three-span, and four-span bridges. The effects of bridge continuity was demonstrated by the two-, three-, and four-span bridges. Spans varied from 20 ft. to 200 ft. (6 m to 60 m), increments of 5 ft. (1.5 m). The HS-20 design truck was arranged, according to the parametric study, to form different platooning configurations by using up to 20 trucks at headway spacings varying from 10 to 30 ft. The results were then used to provide guidelines for the optimum parameters and load rating charts for future truck platooning applications.

For more info, go to [depts.washington.edu/pactrans/research/].

Improving Safety for RITI Communities in Idaho:
Documenting Crash Rates and Possible Intervention Measures
PI: Abdel-Rahim, Chang, and Lowry
Funding Source and Budget: CSET (USDOT), $115,000



CALCULATING STUDY PERIOD VMT FROM AADT FEATURE CLASSES

This report describes a new set of Geographic Information System (GIS) tools that were created to conduct safety analyses. These new GIS tools can be used by state DOTs and transportation agencies to document crash rates and prioritize safety improvement projects. The tools perform Network Segment Screening, the first step in the Roadway Safety Management Process (RSMP) outlined in the Highway Safety Manual (HSM). After developing these new tools, two case studies were conducted to demonstrate how they can be used. The first case study was for screening intersections. Our analysis included all intersections on the Idaho State Highway System. In practice, the analysis would likely be done only for a subset of intersections, such as only for signalized intersections on urban arterials. All intersections were chosen for illustration purposes.

The result was a ranking of intersections that would most likely benefit from safety improvement efforts. Three performance measures were applied to rank the intersections: Crash Frequency, Crash Rate, and Equivalent Cost. The second case study was for screening roadway segments. Again, the entire Idaho State Highway System was included for illustration. The HSM describes two key methods for screening roadway segments: Simple Ranking and Sliding Window. Both methods are available in the new tools. This case study demonstrates the advantage of the Sliding Window, which would be impractical to accomplish on a large scale without the assistance of our new GIS tools. The final part of the work presented in this report was a synthesis to identify and document possible measures to reduce crashes for RITI communities in Idaho and throughout the Pacific Northwest region.

For more info, go to [cset.uaf.edu/research/].

IoT Platforms for Smart City Implementation in Rural and Urban Communities: A Comparative Review
PI: Sheldon and Abdel-Rahim
Funding Source and Budget: PacTrans (USDOT), $40,000

Vendor Criteria	Amazon Webservices	Park Mobile	AbleLink
Comprehensiveness	-Most comprehensive vendor evaluated -Hundreds of amazons and 3rd party services	-Simple and niche market	- Simple product with a narrow use case
Total Costs	-Pay as you use plan -Minimal to no new infrastructure needed	-Low overhead as there is minimal infrastructure -Cost passed on to consumer	- Low initial cost -Cost passed on to consumer
Expertise and smart city focus	-Specific smart city and government branches -Large amount of expertise in house	-Highly smart city focused -Parking experts	-Not specifically focused on smart cities -Expertise in cognitive disabilities
Openness and Integration Strategies	-Many ways to integrate into existing systems -Open to working with additional vendors	-Easy to integrate with web portal and mobile application -Open to work on multidiscipline projects	-Open to work on multidiscipline projects -No mention of integration capabilities

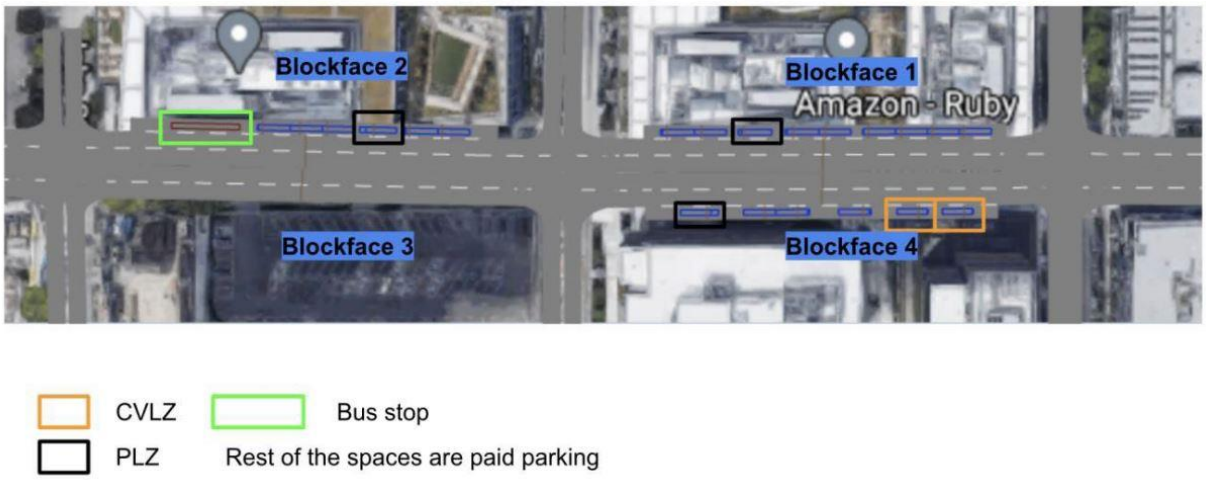
IoT VENDOR SOLUTION EVALUATION RESULTS

Several transportation agencies in urban, sub-urban, and rural areas have started the planning or the actual implementation of their first Smart City projects. A major element of these systems includes the Internet of Things (IoT) smart city platform to help manage data exchange and flows and run the analytics needed for user data and system performance monitoring. For many agencies, IoT platform selection is very challenging with the limited technical resources most these agencies experience. Several of these IoT solutions have proprietary vendor-specific attributes that lock agencies to specific vendors' solutions. IoT platforms developed by smaller vendors, which come with strong customer support and high degree of openness, face many challenges in system integration and scalability. The primary objective of this comprehensive review study is to establish an improved understanding among transportation agency policy makers and professionals regarding IoT Platform operation characteristics.

Within this report there was an in-depth evaluation of 3 smart city projects developed and funded through public-private partnership and 4 smart city implementations funded through the U.S. Department of Transportation. The study also covered 3 IoT platforms currently available from different vendors. For the 7 smart city projects (public and private), they were evaluated to the criteria of system functionalities, interoperability, integrability, usability, security, and survivability). For the 3 IoT platforms, they were evaluated by comprehensiveness, total cost, expertise and smart city focus, openness, and ease of integration. This evaluation derived industry-based criteria to assist both rural and urban transportation agencies understand the technical opportunities, challenges, and barriers from existing smart city implementation projects. Each project and vendor evaluated in this report provided valuable insight into the current reality of smart city projects.

For more info, go to [depts.washington.edu/pactrans/research/].

Managing Increased Demand for Curb Space in the City of the Future
PI: Chang (with Goodchild, UW and McCormack, UW)
Funding Source and Budget: PacTrans (USDOT), $180,000 (shared with UW)



STUDY NETWORK MODELED IN VISSIM

The rapid rise of on-demand transportation and e-commerce goods deliveries, as well as increased cycling rates and transit use, are increasing demand for curb space. This demand has resulted in competition among modes, failed goods deliveries, roadway and curbside congestion, and illegal parking. This research increases our understanding of existing curb usage and provides new solutions to officials, planners, and engineers responsible for managing this scarce resource in the future. The research team worked with local agencies to ensure the study's relevance to their needs and that the results will be broadly applicable for other cities. This research supports the development of innovative curb space designs and ensures that our urban streets may operate more efficiently, safely, and reliably for both goods and people.

The research elements included conducting a thorough scan and documenting previous studies that have examined curb space management, identifying emerging urban policies developed in response to growth, reviewing existing curb management policies and regulations, developing a conceptual curb use policy framework, reviewing existing and emerging technologies that will support flexible curb space management, evaluating curb use policy frameworks by collecting curb utilization data and establishing performance metrics, and simulating curb performance under different policy frameworks.

For more info, go to [depts.washington.edu/pactrans/research/].

Pavement Winter Operations in Cold Regions
PI: Kassem
Funding Source and Budget: PacTrans (USDOT), $40,000

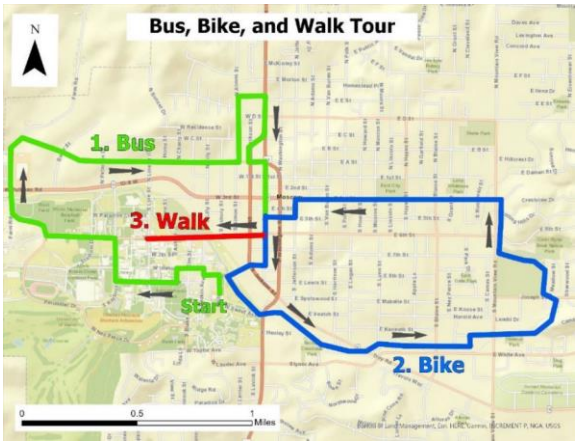
THREE-WHEEL POLISHER DEVICE

Deicing and anti-icing chemicals are both used to improve the mobility of motorists in cold climates. Deicers are applied to melt and break bonded snow and ice. Anti-icers are proactively applied before ice formation to prevent and weaken the bond between the pavement surface and ice. This study evaluated a laboratory testing protocol to examine the performance of different deicing and anti-icing materials under different conditions for efficient winter maintenance operations. For this purpose, this study used three deicers, liquid calcium chloride ($CaCl_2$), liquid potassium (K), and granular sodium acetate (NaCl) (i.e., D1, D2, and D3), and two anti-icers, magnesium chloride ($MgCl_2$) with two different inhibitors (i.e., A1 and A2). The proposed laboratory evaluation protocol included three tests: a friction test, an accelerated loading test, and a debonding test.

The results demonstrated the following: 1) All test products were effective at melting the ice and weakening the bond between the pavement surface and ice. 2) Better performance of various products was obtained at a higher application rates. 3) Various chemicals had comparable friction performance. 4) The accelerated loading test with a three-wheel polishing device indicated that all test products were effective on both asphalt and concrete surfaces; however, deicers D2 and D3 had better performances than the other products. 5) A new debonding test was used to evaluate the effectiveness of deicers/anti-icers at weakening the bond between the ice and test surfaces, and the test chemicals were found to reduce the shear force required to break the bond between the ice and test surfaces.

For more info, go to [depts.washington.edu/pactrans/research/].

Shared Mobility Options for the Commute Trip
PI: Lowry (with Shen, UW; Ban, UW; and Vernez Moudon, UW)
Funding Source and Budget: PacTrans (USDOT), $180,000 (shared)



MAP OF MULTIMODAL EXPOSURE TOUR

This multi-institutional research project consisted of two components that were conducted by University of Washington (UW) and University of Idaho (UI) team members. The UW component explored the commuting experience of essential workers during the COVID-19 pandemic. The empirical work started with a quantitative analysis of data from a transportation needs assessment survey. It found that most pre-pandemic public transit riders switched to other modes, whereas almost all the essential workers who had driven alone, biked, or walked before the pandemic continued to do so. A qualitative analysis, based on a series of focus group discussions with UW employees, was then performed to gain deeper insights into essential workers' travel constraints and corresponding decision making. It revealed that most participants switched away from transit at the beginning of the pandemic because of safety concerns related to virus infection and issues with transit frequency, schedules, and reliability. The results of the UW study suggest the need for timely adjustments in TDM policies in response to the evolution of the pandemic, as well as to expand the mobility options for employees, especially essential workers.

The UI component investigated the travel behaviors of university students from rural and suburban communities and how their experience with non-automobile modes of transportation affected their mode choice. This research component was implemented through surveys, which were aimed at identifying any relationship between previous multi-modal experience and current travel behavior, and an experiment that took participants on a 90-minute tour of the community by bus, bike, and on foot and then evaluated the impact of the tour on the participants' travel behaviors. The results showed that students from rural communities who had frequently driven to high school and had had little experience with public and private transit were more likely to be driving currently and that participation in the experiment increased the students' bus and bike use and walking.

For more info, go to [depts.washington.edu/pactrans/research/].

WORTH SHARING

Dean Long Joins College of Engineering
July 2022

Suzanna Long was named dean of the University of Idaho's College of Engineering, and started on July 1st. Long was previously professor and chair of Engineering Management and Systems Engineering at Missouri University of Science and Technology (Missouri S&T). She brings a wealth of experience in academic leadership, industry collaboration, successful research, external funding and strategic management to this role. Long earned bachelor's degrees in physics and history, a master's degree in engineering management and a doctorate in engineering management all from the University of Missouri-Rolla, now Missouri University of Science and Technology. She also earned a master's degree in history from the University of Missouri-St. Louis.

5th Annual Kyte Distinguished Lecture
September 2022

Rhonda Young, Professor and Department Chair in the Department of Civil Engineering at Gonzaga University, was the invited speaker at the 5th Annual Kyte Distinguished Lecture. Her presentation was titled, "Transportation Connections: People, Communities, and Vehicles."

This annual event honors University of Idaho Emeritus Professor of Civil Engineering Michael Kyte by acknowledging his professional accomplishments in the field of transportation engineering and his almost three decades of service as a highly respected and popular faculty member.

Idaho Asphalt Conference
October 2022

Under the leadership of Associate Professor Emad Kassem, the 62nd Idaho Asphalt Conference was held in October. This event is supported by the University of Idaho, the Idaho Transportation Department, and the Asphalt Institute. It addresses issues related to asphalt pavements that are of concern to local and state governments as well as consulting engineering firms. Attendees, from contractors to material suppliers, have found this conference to be an excellent forum to address design, construction, and maintenance issues of asphalt pavements.

Ibrahim Recognized by ASCE Structural Engineering Institute
January 2023

Associate Professor Ahmed Ibrahim was named a Structural Engineering Institute (SEI) Fellow by the American Society of Civil Engineers (ASCE). The ASCE designation demonstrates a commitment to excellence in structural engineering and distinguishes SEI members as leaders and mentors in the profession. Ibrahim joined the UI faculty in 2015, and his research involves blast resistant design, experimental testing and numerical analysis of structural elements, and the performance and strengthening of reinforced and prestressed concrete bridges.

Williams Named CSET Student of the Year
January 2023

Jade Williams, an MSCE student under the supervision of Professor Kevin Chang, was recognized by the Center for Safety Equity in Transportation (CSET) as its Outstanding Student of the Year. CSET is a Tier 1 University Transportation Center (UTC).

Each year, outstanding students from participating UTCs are honored by the USDOT for their achievements and promise for future contributions to the transportation field at the annual awards banquet of the Council of University Transportation Centers in Washington, DC. Students are selected based on their accomplishments in such areas as technical merit and research, academic performance, professionalism, and leadership.

In January 2023, Jade started her professional career with HMH Engineering in Twin Falls, ID.

University of Idaho's Clean Snowmobile Team Finds Success
February 2023

In its 11th national competition podium finish, the University of Idaho's Clean Snowmobile Challenge Team took second overall in the Spark-Ignition category of the 2023 Society of Automotive Engineers (SAE) Clean Snowmobile Challenge. The interdisciplinary team competed against 16 teams from across the U.S. and Canada in the weeklong challenge to produce innovative solutions to make a cleaner, quieter, and more efficient snowmobile practical for manufacturers and enthusiasts alike.

UI has been participating in this event since 2001, and NIATT has been proud to support this great team and its effort for many years. The faculty advisor for the Clean Snowmobile Team is Professor Kamal Kumar.

PacTrans Retained as Region X Center for University Transportation Center Program February 2023

To continue and expand its important work to improve the movement of people and goods throughout the region, the Pacific Northwest Transportation Consortium (PacTrans) received a $15 million renewal grant over the course of five years from the U.S. Department of Transportation (USDOT).

PacTrans is one of 10 regional University Transportation Centers (UTC) across the U.S. As the UTC for Federal Region 10, PacTrans represents Washington, Oregon, Idaho and Alaska. In partnership with regional universities, PacTrans supports a variety of transportation research related to advancing mobility, including technology transfer, and education and workforce development.

The center's core focus will continue to be centered on mobility challenges related to the movement of people and goods throughout the region, with the addition of several strategic goals identified by USDOT. The center will work toward two overarching strategic goals: economic strength and global competitiveness. Secondary goals are equity, transformation and safety.

The four core university partners are Portland State University, University of Alaska Anchorage, University of Idaho and Washington State University. The Northwest Indian College, which has six campuses in Western Washington, will also serve as an education and outreach partner.

(Credit: ce.washington.edu/news/article/2023-02-23/pactrans-receives-usdot-15m-renewal-award)

McDonald Recognized as University of Idaho Distinguished Professor
April 2023

Armando McDonald, a professor in the Department of Forest, Rangeland, and Fire Science, was recognized as a University of Idaho Distinguished Professor at the 2023 University Excellence Awards Program. A Distinguished Professor has national and international recognition and has brought distinction to the University of Idaho through their research activities.

Distinguished Professor McDonald's research interests include carbohydrate chemistry and biochemistry, biopolymer and biomaterials science, and natural products chemistry. He joined the University of Idaho faculty in 2001.

Chang Receives University of Idaho's Excellence in Teaching Award
April 2023

NIATT Director and Associate Professor Kevin Chang received the University of Idaho's Excellence in Teaching Award, the university's highest teaching honor, during the 2023 University Excellence Award Program. Chang teaches a number of undergraduate and graduate transportation courses, along with the College of Engineering's First Year Engineering course.

This award was established in 1990 and recognizes exemplary teachers who demonstrate excellence in teaching, and strong dedication to students. It also

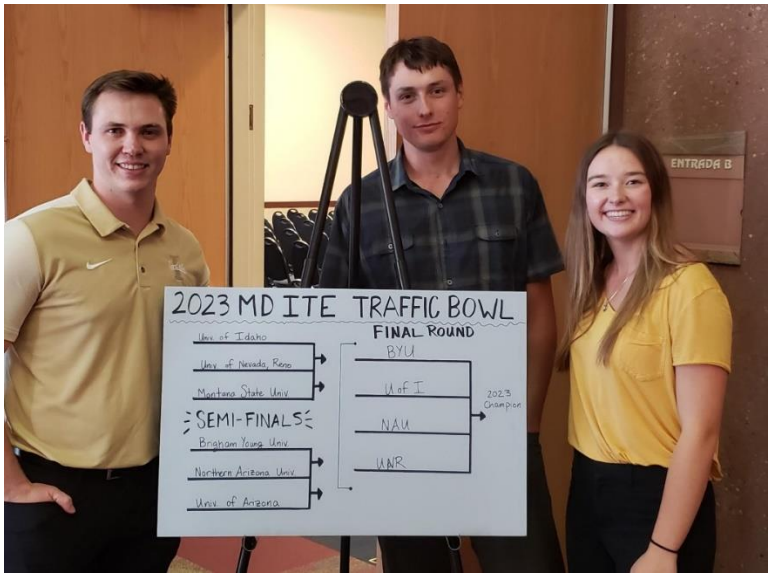
encourages and rewards teachers for their pursuit of excellence and shows the value teaching holds for our university. Chang is the College of Engineering's first award recipient since 2012.

Lowry Recipient of College of Engineering Teaching Award
April 2023

Associate Professor Michael Lowry received this year's Outstanding Teaching Award from the University of Idaho's College of Engineering. Lowry teaches courses on traffic safety, benefit-cost analysis, travel demand modeling, and computer-aided engineering. The students in his service-learning course previously collaborated with the City of Moscow and were honored with an award from the mayor for outreach excellence. Lowry joined the University of Idaho faculty in 2009.

This past year, Lowry stepped into a new role as a faculty advisor for the University of Idaho's Humanitarian Engineering Club (HEC).

ITE Student Chapter Finishes Second at Mountain District Traffic Bowl
June 2023



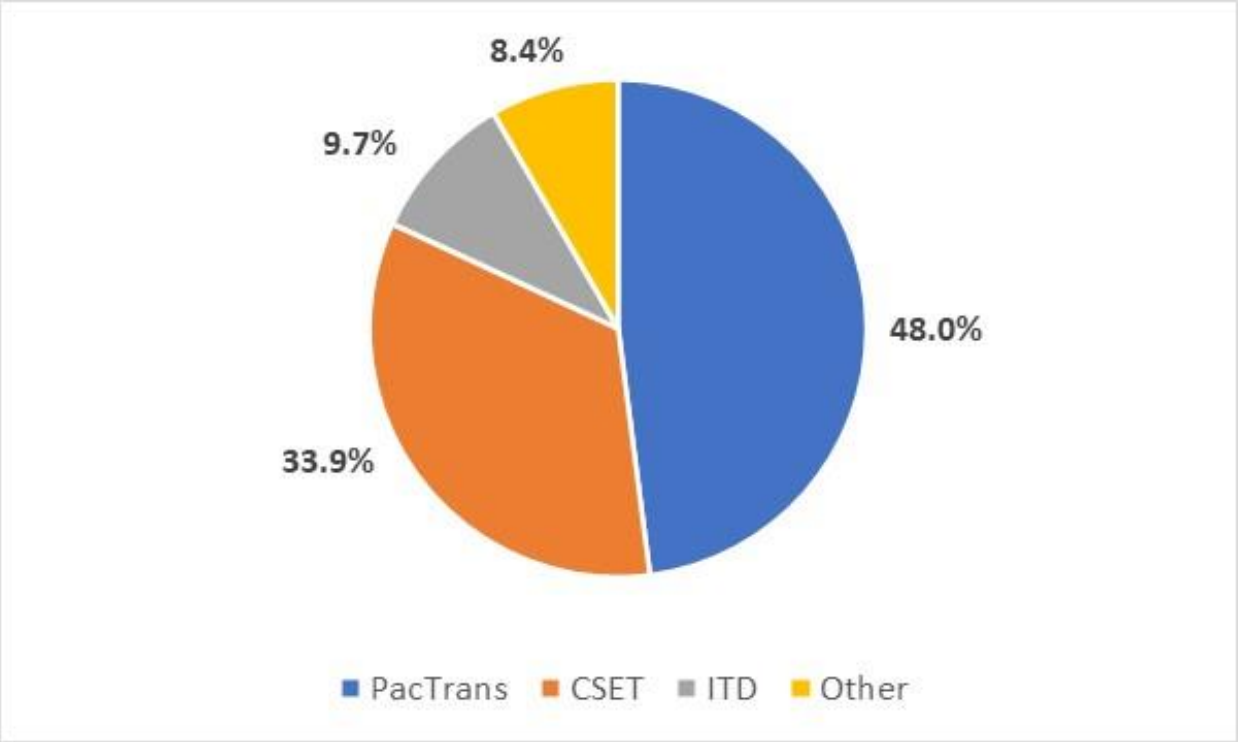
The ITE Student Chapter team finished second at the Mountain District Traffic Bowl competition in St. George, UT this summer. The second place finish was the University of Idaho's strongest showing in many, many years.

The Traffic Bowl competition is like Jeopardy!, but all of the questions are transportation-related. The UI team, comprised of Logan Prescott, Gabe Brandt, and Destiny Hillyard, fell behind early in the finals. A late run was not quite enough and they eventually lost to BYU by a score of 2100 to 2000.

NIATT is a proud supporter of ITE student activities. Professor Kevin Chang serves as the faculty advisor for the ITE Student Chapter.

FINANCIAL SUMMARY

The FY22 expenditures, as of June 30, 2023, totaled $1,592,828. A percentage breakdown, by source, is shown below.



Of note, NIATT has historically relied on funding from the USDOT's University Transportation Centers (UTC) program. This trend continues in the present day.

PacTrans is the UTC's Region X Center and is led by the University of Washington. CSET (Center for Safety Equity in Transportation) is a Tier 1 UTC led by the University of Alaska-Fairbanks.

ACTIVE PROJECTS

The following list identifies all of the active NIATT projects. The list is presented in alphabetical order based on project title, and includes the principal investigator(s) and funding source.

Advanced Energy Storage System for Electric Vehicle Charging Stations for Rural Communities in the Pacific Northwest
Hess
PacTrans (USDOT)

Alkali-Silica Reaction Mitigation Strategies with Specific Admixtures
Kassem (with TTI)
ITD

Analysis of Asphalt Mixtures Using Alternate Aggregate in SMA and Superpave
Kassem (with Missouri S&T)
Missouri DOT

Assessing the Relative Risks of School Travel in Rural Communities
Chang
CSET (USDOT)

Assessment and Repair of Prestressed Bridge Girders Subjected to Over-Height Truck Impacts
Ibrahim (with Missouri S&T)
FHWA Pooled Fund

Characterization of Underserved Population Perceptions and Mobility Needs in Connected-Vehicle and Smarter City Environments
Abdel-Rahim (with UW, OSU, UAF, WSU)
PacTrans (USDOT)

Development of PacTrans Workforce Development Institute
Chang (with UW, OSU, UAF, WSU)
PacTrans (USDOT)

Efficient and Data-Driven Pavement Management System using Artificial Intelligence
Kassem (with UAF)
PacTrans (USDOT)

Estimating County to County Transportation and Trade Flow
Lowry, Watson, and Alward
PacTrans (USDOT)

Impact of the COVID-19 Pandemic on Fatal Crash Rates for RITI Communities in Idaho
Abdel-Rahim and Chang
CSET (USDOT)

Implementation of Balanced Mix Design of Asphalt Mixtures Prepared with Reclaimed Asphalt Pavements and Rejuvenators for Enhanced Performance
Kassem
ITD

Integrating Foot Access with Public Transit Service where there are Food Deserts
Liao
PacTrans (USDOT)

Interfacing Major Subsistence for Resilient Electric Charging Facilities for Rural Areas
Hess
PacTrans (USDOT)

Optimization of Electrified Propulsion Systems for School Bus Fleets using Scheduled (Daily) Routes Data
Abdel-Rahim
PacTrans (USDOT)

Perception of Autonomous Driving in Rural Communities
Chang
CSET (USDOT)

Promoting Positive Traffic Safety Culture in RITI Communities through Active Engagement: Barriers and Opportunities
Abdel-Rahim
CSET (USDOT)

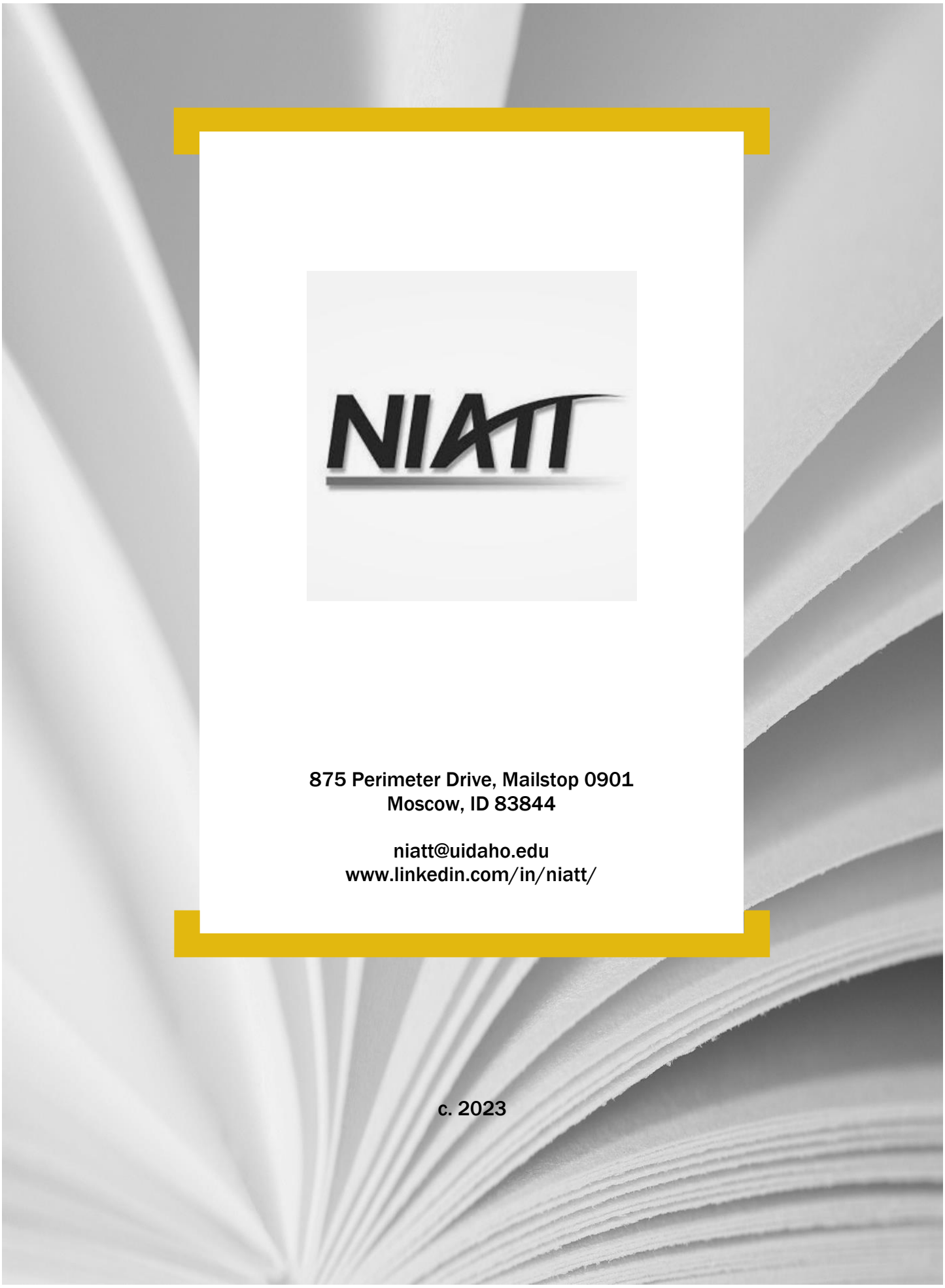
Promoting Positive Traffic Safety Culture in RITI Communities through Active Engagement: Implementation Guide and Outreach Activities
Abdel-Rahim
CSET (USDOT)

School Travel Behaviors in Rural Communities
Chang and Abdel-Rahim
CSET (USDOT)

Simplified Analysis Methods of Traffic Speed Deflectometer (TSD) and Falling Weight Deflector (FWD) Data for Effective Pavement Preservation Program
Kassem
ITD

Using Computer Vision to Evaluate Bicycle and Pedestrian Improvements
Lowry (with UW)
PacTrans (USDOT)

Using Machine Learning to Customize Traffic Prediction for High Performance Traffic Analysis and Optimization
Heckendorn
PacTrans (USDOT)



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