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University Transportation Center Newsletter

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PacTrans Hosts 2019 Transportation Conference

Last October, the Pacific Northwest Transportation Consortium (PacTrans) held its seventh annual conference on Friday, October 11, 2019 at the University of Washington (UW). The conference focused on emerging mobility and safety issues in the Pacific Northwest, the theme being "Bridging Innovations and Practice for Enhanced Mobility and Safety".

PacTrans partnered with the Center for Safety Equity in Transportation (CSET) again to put together this conference, which returned to Seattle, Washington after being held at the University of Alaska Fairbanks last year. A special thanks this year goes out to the Washington State Department of Transportation for generously sponsoring the event.

A variety of transportation-focused topics were discussed, with the sessions being split into two different tracks: mobility and safety. The mobility track sessions covered research that works towards the improvement of connected and autonomous mobility, controversies surrounding technology in transportation, and recent advancements in shared mobility. The safety track sessions explored research dedicated to improving transportation in rural areas, issues surrounding traffic safety in indigenous communities, and a workshop for defining isolation in a transportation context. Guided by this year's theme, a total of 22 posters were presented at the conference's annual poster session by PacTrans consortium member universities and participating students. To learn more about the conference, see the [Special Edition Conference Newsletter here](#).



NEWS AND EVENTS

PacTrans Director Selected for ASCE Fellow



PacTrans director and UW professor of Civil & Environmental Engineering, Dr. Yinhai Wang, was selected to become a fellow of the American Society of Civil Engineers (ASCE) last December.

In addition to being PacTrans' director, Dr. Wang also founded UW's Smart Transportation Applications and Research (STAR) Lab in 2003. The lab serves as a resource for students to rely on, allowing them to further delve into the world of transportation through problem solving, instrument and software training,

and networking with transportation agencies offering real-world research opportunities.

Dr. Wang uses his involvement with the UW ITE to encourage students to expose themselves to the larger transportation research community by attending conferences, at which they can present their own findings and build professional relationships.

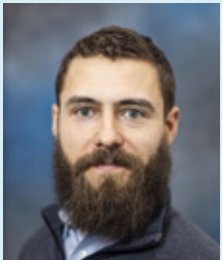
The ASCE is the nation's oldest engineering society. Since it was founded in 1852, the society has played a leading role for civil engineering, an industry responsible for creating and operating our world's built environment as much as it is

dedicated to protecting and restoring its natural environment.

With over 150,000 members working as professionals in the engineering realm across more than 150 countries, the organization currently acts as a major provider of technical, professional, and educational support. The ASCE also publishes more content related to civil engineering than anyone else in the world and has a guiding hand in the industry's ethics.

Congratulations to Dr. Wang on this achievement!

UAF Professor Receives Promotion and Invitation to be on TRB Committee



Dr. Nathan Belz was recently promoted to Associate Professor and awarded tenure in the Civil Engineering department at the University of Alaska, Fairbanks,

one of PacTrans' consortium partner universities.

Dr. Belz serves as the Director of the Transportation Research and Printables (TRAP) Lab and the Assistant Director of the Center for Safety Equity in Transportation (CSET), working alongside CSET Director and PacTrans Associate Director, Billy Connor.

His primary research interest is how and why people make the transportation choices that they do, and the corresponding implications for safety and efficiency of our roadways.

His research and service activities are motivated by a vision to build a transportation network and create a

transportation culture in which a person choosing any mode of travel can reasonably expect to get where they need to go and return home in one piece.

He is actively involved in several UAF, and local Fairbanks activities and organizations, which include serving as a member of the FMATS Bike and Pedestrian Advisory Committee, the UAF Honors Faculty Advisory Council, and the UAF Community Garden Committee.

Dr. Belz serves on the Transportation Research Board Roundabouts Committee in the capacity of Committee Research Coordinator. He was also recently invited to the TRB Native American Transportation Issues Committee and will serve as a member through 2021.

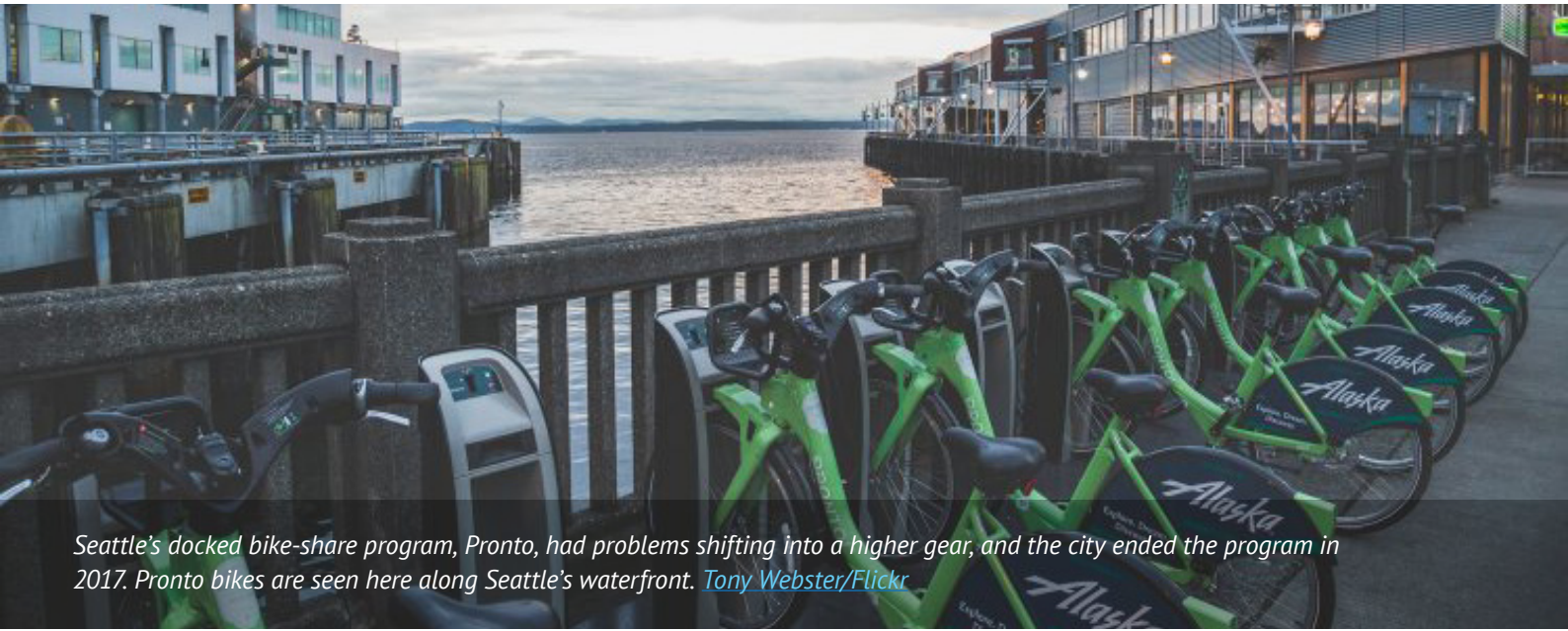
Dr. Belz is a forager, hobby farmer, and avid cyclist with a fleet of more than 10 bicycles. He spends much of his free time enjoying the wilderness and wonderful trails that Alaska has to offer with his significant other and their four-legged adventure comrades.



PacTrans Associate Director Speaks at OSU Student Convocation

PacTrans associate director and OSU professor of civil and construction engineering, David Hurwitz, was invited to be the keynote speaker at OSU's 2019 New Student Walk and Convocation early last fall.

RESEARCH HIGHLIGHTS



Seattle's docked bike-share program, Pronto, had problems shifting into a higher gear, and the city ended the program in 2017. Pronto bikes are seen here along Seattle's waterfront. [Tony Webster/Flickr](#)

Former PacTrans Fellow Co-authors Research Paper on Evolution of Bikesharing in Seattle

Former PacTrans Fellow, Luke Peters, along with UW associate professor of civil and environmental engineering, Don MacKenzie, co-authored a paper that was recently published in, *"Transportation Research Part A: Policy and Practice,"* last December.

Their research, titled, *"The death and rebirth of bikesharing in Seattle: Implications for policy and system design,"* explores the rise of dockless bike sharing and its success in the city just four months after the failure of Pronto.

Pronto was a docked bike-share program that was established in 2014 and quickly saw its downfall three years later.

"We wanted to know if the problems Pronto had were intrinsic to Seattle, like our wet weather, our hills, or our helmet laws. Or if they reflected decisions made by the bike sharing system designers — like the price of a ride or bike location and density across the city," MacKenzie, the paper's senior author, told *UW News*.

Using surveys, press reports, ridership data, and expert opinions, researchers were able to discern 11 factors that contribute to a variety of bike sharing outcomes.

UW News reported some of the research findings, which include:

- "Pronto bikes weren't always in areas that people wanted to go. Many neighborhoods that have high dockless ridership — Alki Point, Ballard, Wallingford, etc. — did not have Pronto docking stations.

- "Pronto had a smaller number of bikes per square mile. It launched with 500 bikes — 50 stations — spread over 5 square miles. Dockless bike sharing launched with 1,000 bikes spread over Seattle's 84 square miles. By the end of the first year, there were 9,000 dockless bikes, owned by three private companies, across the city.
- "Pronto was perceived as "moderately difficult" to use, whereas dockless bikes were perceived as easy to use. For example, Pronto users had to go through multiple steps at the docking station — selecting a bike, renting a helmet, paying by credit card — to check out a bike whereas dockless bike users open their app, scan a QR code on a bike, and start their trip.
- "Pronto was more expensive — \$8 per day with no per-ride option — compared to dockless bikes, at about \$1 per ride."

"These results can help service providers and cities better design and regulate bike-sharing or scooter-sharing systems to increase ridership," MacKenzie told *UW News*. "One of the main implications from our study is that service providers should deploy at scale. A system that covers a large area and has plenty of bikes — or stations — is a system that will provide the greatest utility to travelers, and will achieve the highest ridership. For jurisdictions that aren't ready to commit to a permanent, large-scale deployment, dockless may have an advantage for a temporary deployment because it doesn't require costly investments in docks. Finally, policymakers should ensure that shared bikes or scooters can be picked up and dropped off in the places people want to travel."

RESEARCH HIGHLIGHTS

PacTrans Research on BriM and UAS Technology gets Published



PacTrans PI Yelda Turkan and doctoral student Yiye Xu had their paper, titled, “*BriM and UAS for bridge inspection and management*,” published in the *Journal of Engineering, Construction and Architectural Management* last November.

The purpose of this paper is to develop a novel and system-

atic framework for bridge inspection and management to improve the efficiency in current practice.

The paper explores a new framework that implements camera-based unmanned aerial systems (UASs) with computer vision algorithms to collect and process inspection data, and Bridge Information Modeling (BriM) to store and manage all related inspection information is proposed.

An illustrative case study was performed using the proposed framework to test its feasibility and efficiency.

The test results of the proposed framework on an existing bridge verified that high-resolution images captured by a UAS enable to visually identify different types of defects and detect cracks automatically using computer vision algorithms.

The use of BriM enables assigning defect information on individual model elements, managing all bridge data in a single model across the bridge life cycle.

The evaluation by bridge inspectors from 12 states across the U.S. demonstrated that all of the identified problems, except for being subjective, can be improved using the proposed framework.

The proposed framework enables to:

- collect and document accurate bridge inspection data
- reduce the number of site visits and avoid data overload
- facilitate a more efficient, cost-effective, and safer bridge inspection process

This paper contributes a novel and systematic framework for the collections and integration that the proposed framework should help improve current bridge inspection and management practice.

Furthermore, the difficulties experienced during the implementation are evaluated, which should be helpful for improving the efficiency and the degree of automation of the proposed framework further.

This study supported doctoral student Yiye Xu as a graduate research assistant, and enabled the researchers to collect and analyze the data presented in this paper.

STUDENTS

WSU Engineering Student Places Second in National Competition



WSU senior, Robbie Englehart, placed second in the 2019 Mastercam Wildest Parts Competition, winning himself a \$1,500 cash prize and marking this

the fourth year in a row that a WSU mechanical engineering student has placed within this competition's top three.

Englehart earned the second place title with his oil pan, which he built with the help of WSU's Formula Society of Automotive Engineers powertrain team and instructor Robert "Kurt" Hutchinson, who supervised Englehart in the creation of his invention, using a computer numeric control (CNC) and a manufacturing software by Mastercam.

"We have lots of talented students but every now and then we get exceptional ones like Robbie who go above and beyond," Hutchinson told the WSU Insider. "He's a great guy and really involved in the Cougarshop."

Mastercam, a PC-based computer-aided design and manufacturing software developer, invites students from across the globe to imagine new and innovative machine parts, and challenges them to bring those inventions to life with this annual competition.

WSU Students Travel to National Materials Conference



The WSU student chapter of Material Advantage.

A handful of undergraduate students from WSU's student chapter of Material Advantage travelled to Portland, OR to take part in the national

Materials Science and Technology (MS&T) conference last fall.

"This is a wonderful opportunity for our students as they get ready to begin their careers," Scott Beckman, advisor for the Materials Advantage chapter and an associate professor in the School of Mechanical and Materials Engineering, told the WSU Insider.

The weeklong event consisted of numerous presentations, a poster session, and several competitions, including a ceramic mug drop. The challenges put an emphasis on the students' processing and manufacturing skills. The conference also gave the students a great chance to network with professionals who might one day be their colleagues.

UAF Students Present at PacTrans Conference

Monroe Morris and Jordan Zellhuber were hired by CSET in 2019 for the academic and summer terms to help develop 3D printed models for public engagement and outreach on how building roads in arctic environments can be challenging and create safety issues.

Moe and Jordan were able to share their work at the 2019 PacTrans+CSET Transportation Conference in October and their models are now being distributed to schools and transportation agencies across the state of Alaska.



Towards a Safer Urban Transportation System in the Era of Connected & Autonomous Vehicles and Big Data with Prof. Kaan Ozbay



Last October, Prof. Kaan Ozbay was featured as our Fall Regional Transportation Seminar speaker on UW's Seattle campus, leading a discussion on urban transportation systems, and the potential to make them safer using connected and autonomous vehicle technology.

In the last several years, C2SMART researchers have been developing novel predictive and operations approaches to improve traffic safety, especially in urban areas. Most of the innovation in these research and deployment efforts are fueled by the availability of

big data generated by connected and autonomous vehicles (CAV) as well as ubiquitous mobile devices and sensors deployed throughout the urban areas. In the first part of the talk, it was argued that in an era of disruptive change experienced by all of our transportation systems, there is a need for a comprehensive cyber-physical testbed to develop, verify, and validate novel traffic safety strategies. To support this broad argument, C2SMART's cyber-physical testbed, which is built around the concept of, "city as the lab," was described. In the second part of the talk, the development of predictive safety analytics functions and pro-active traffic safety management approaches with a focus on New York City were presented. The role of the cyber-physical test bed in these research efforts was emphasized.

Prof. Ozbay joined Civil and Urban Engineering at NYU Tandon School of Engineering and Center for Urban

Science and Progress (CUSP) as a tenured full Professor at NYU in Aug. 2013. He is currently the Director of the C2SMART Center (Tier 1 UTC funded by USDOT). Prior to that, he was a tenured full Professor at Rutgers University's Department of Civil and Environmental Engineering, where he joined as an Assistant Professor in July 1996. In 2008, he was a visiting scholar at the Operations Research and Financial Engineering (ORFE) Department at Princeton University. Prof. Ozbay has more than 30 years of expertise in transportation and traffic engineering. His research interests in transportation cover a wide range of topics, including the development of simulation models of large networks with connected and autonomous vehicles, advanced technology and sensing applications for Intelligent Transportation Systems, and modeling and evaluation of traffic incident and emergency management systems, among others.

PacTrans Facilitates HDR Informational Lunch with Students



PacTrans continually endeavours to be a resource to students as they begin to develop professional networks and foster relationships for the purposes of internships and entry level career positions at firms and agencies around the Pacific Northwest. We post job/ internship opportunities on our website, we host events such as our annual

conference that give students opportunities to interact with local practitioners, and, in this case, we work with local firms to facilitate informational sessions for students.

These sessions, such as the one we facilitated for HDR Engineering last fall, give a company the opportunity to come to campus and share about what they do, what kinds of projects they work on, and what kinds of opportunities students have to get involved. HDR brought five or six Engineers in Training (EIT) to share about the wide scope of civil engineering projects they are involved in and let students know about upcoming summer internships and open entry level positions for those who are graduating in the spring.

Probably more important than the presentation, or the free pizza, was the twenty minutes after the programming was over, when students had the opportunity to approach the representatives from HDR to ask questions about their specific roles within the company, follow up about job opportunities, and get more information about some of the projects that were presented on.

PacTrans will continue to help local firms/agencies organize such activities for our students as it has proven to be a very productive way to connect employers with their future workforce!

Overview of Traffic Safety Research Program and Safety Improvement Activities with Prof. Xuesong Wang



Early last November, Prof. Xuesong Wang joined us on the UW Seattle campus from Tongji University to discuss traffic safety.

The presentation introduced the safety program at Tongji University, including research facilities (i.e., high-fidelity driving simulators, naturalistic driving studies, and traffic crash big data) and the development of Joint International Research Lab of Transportation Safety. The ongoing research in transportation safety planning, safety evaluation of roadway design, traffic safety management, driving behavior analysis and

improvement, and autonomous vehicle technologies were introduced.

Prof. Wang is a professor of Transportation Engineering at Tongji University, Executive Director of the Joint International Research Laboratory of Transportation Safety, Associate Director of Key Laboratory of Road and Traffic Engineering-China Ministry of Education, and Associate Director of the Engineering Research Center of Road Traffic Safety and Environmental Engineering-China Ministry of Education. His main expertise is in the areas of traffic safety. He is the Associate Editors of China Journal of Highway and Transport. He is a member of the TRB Standing Committees on Transportation Research Board: Safety Data, Analysis and Evaluation (ANB20), Simulation and

Measurement of Vehicle and Operator Performance (AND30), Transportation in the Developing Countries (ABE90). Prof. Wang serves as the Chair of the Shanghai Institute of Traffic Engineer Traffic Safety Sub-Committee. He is one of the editors of Transportation Research Record. He is a member of the editorial board of Accident Analysis & Prevention, Journal of Transportation Safety and Security. He has published more than 310 papers on academic journals and conferences. He has managed more than 80 scientific research projects. Earlier in his career, he earned his Ph.D. in Transportation Engineering from the University of Central Florida. In 2015, he was awarded as the outstanding young researcher by the Chinese National Science Foundation.

Understanding the Demand of “On-Demand” Freight with Prof. Cara Wang

Late last November, Prof. Cara Wang was present on UW's Seattle campus to lead a discussion on the demands surrounding freight systems and their role in our future.

This presentation talked about the status quo and potential impacts of information technology on the freight system in the near future, especially on the demand side. The presentation discussed the special features of the freight demand in this era and how to get prepared for this new trend from the perspectives of data acquisition, modeling, and policy making.

Prof. Wang got her B.S. and M.S. degrees from Tsinghua University, China, and Ph.D. from the University of Texas at

Austin. Her research mainly focuses on the analysis of the interactions between land use, transport, (both passenger and freight), energy and environment, and the spatial dependence of travel behavior. She has published over 60 papers in peer-reviewed journals and conference proceedings. She is a recipient of the Pikarsky Award for Outstanding Ph.D. Dissertation, and INFORMS Franz Edelman Award. She is a member of the TRB Committee ABJ 70 (Artificial Intelligence and Advanced Computing Applications) and AT015 (Freight Transportation Planning and Logistics). Prof. Wang has been PI and Co-PI of research projects sponsored by National Science Foundation (NSF), National Cooperative Highway Research



Program (NCHRP), National Cooperative Freight Research Program (NCFRP), New York State Energy Research and Development Authority (NYSERDA), U.S. State Department of Transportation, among others.

OSU Participates in International Workshop on Driving Simulations and Behaviors

PacTrans associate director and OSU professor of civil and construction engineering, David Hurwitz, took part in organizing the, “Use of Driving Simulators to Evaluate Driver Behaviors in the Changing Transportation Landscape: Measures and Countermeasures,” an international workshop held in China late last October.

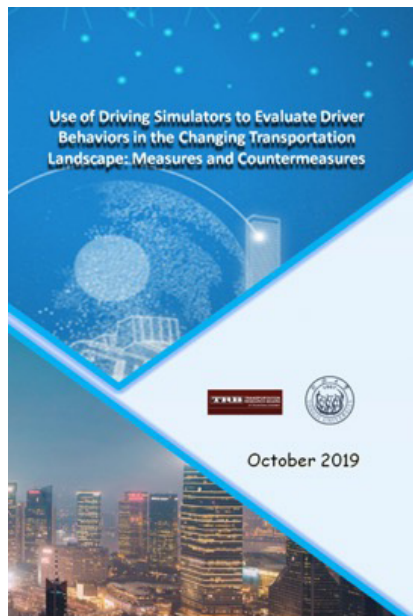
“Driving simulators have been used to measure the behaviors of drivers in different use cases across: levels of experience; levels of impairment; categories of medical, neurological, and neurodegenerative disabilities; differences in road geometry, traffic density, and signs, signals and pavement markings; differences in cognitive, visual, and manual load; alternative designs for a driver-vehicle interface; differences in the level of automation, connectivity, and intelligence of the vehicle; and changes in weather, just to name a few.

“Based on these analyses, and the problems identified, researchers have developed countermeasures and driving simulators have been used to evaluate the wide range of countermeasures so developed.

“The goal of the workshop is to describe in detail how scenarios are constructed for the different measures of driver behaviors appropriate for a given use case and how scenarios are developed to evaluate the different countermeasures for those use cases where drivers are at an increased risk of crashing.”

“For each use case and countermeasure, speakers [focused] on the development of the critical scenarios, the critical independent variables, the different dependent variables (vehicle, driver, and physiological) that are most useful, the experimental designs that are needed, and the statistical analyses that are typically used.”

Hurwitz was featured as a speaker on the first day of the two-day event. Leading a discussion on, “Vulnerable road users: Bicyclists,” Hurwitz focused on bicycle simulator configurations and cited example study designs, performance measures, and findings used in the evaluation of mixing zones, bicycle lane pavement markings, and commercial loading zones during his talk. Hurwitz acted as the session chair during the morning session on day two of the workshop.



UAF co-hosts Safe Cycling Trainings

Last year, UAF co-hosted two cycling safety courses with the League of American Bicyclists.

The Smart Cycling Course and League Certified Instructor course sought to improve cycling safety in Fairbanks and rural communities in Alaska by creating educators and advocates.

Scholarships were provided to offset the cost of certification for attendees.

An application process was announced and required participants to write an essay describing how they plan to use their training to improve safety in RITI communities.



PacTrans Meets with T-Mobile to Discuss Partnerships

Late last fall, PacTrans staff and researchers from the Smart Transportation Application and Research (STAR) Lab at the University of Washington met with representatives of T-mobile to discuss opportunities for collaborations. T-mobile sent a group of eight people representing three or four different groups within their company including their IoT Partners group, their Smart Cities group, and others.

Both parties had an opportunity to spend some time presenting on things they are currently working on and then had some frank discussion about ways to move forward into partnership. The group generated two or three very promising first steps that we will surely elaborate on in future newsletters.

PacTrans Board of Directors



Yinhai Wang, PhD
Professor, Civil & Environmental Engineering
Adjunct Professor, Electrical Engineering
Director, Pacific Northwest Transportation Consortium (PacTrans)
Director and Founder, Smart Transportation Applications and Research (STAR) Laboratory
University of Washington



Billy Connor, MS
Director, Center for Safety Equity in Transportation (CSET)
Director, Alaska University Transportation Center
Associate Director, Pacific Northwest Transportation Consortium (PacTrans)
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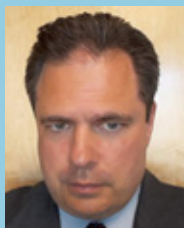


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Western Trailer
Chairman, Idaho Transportation Board
Idaho Transportation Department



SAVE *the* DATE

UNIVERSITY OF IDAHO
CAMPUS
MOSCOW, ID

OCTOBER 16, 2020

Annual

Region 10
Transportation
Conference

Conference Lodging available in Pullman, WA and Moscow, ID
Email questions to pactrans@uw.edu



About Pacific NW Transportation Consortium

The Pacific Northwest Transportation Consortium (PacTrans) is the Region 10 University Transportation Center (UTC) established in January 2012 with funding from the US Department of Transportation (USDOT).

PacTrans is a combined effort of transportation professionals and educators from the University of Washington (UW), Oregon State University (OSU), the University of Alaska Fairbanks (UAF), the University of Idaho (UI), Washington State University (WSU), Boise State University (BSU), and Gonzaga University (GU). With two active centers focusing on both Safety and Mobility, PacTrans serves as an engine and showcase for research, education, and workforce development in the Pacific Northwest.

The goal of PacTrans is to create an environment where consortium universities and transportation agencies within Region 10 work together synergistically. The PacTrans program

focuses on the USDOT-identified priority of Improving the Mobility of People and Goods. The Pacific Northwest offers a unique blend of opportunities to examine a variety of transportation issues, including those related to urban centers, rural communities, diverse geographic features (e.g., coastal plains, mountain ranges), and a growing population of pedestrians and bicyclists. This diversity makes the Pacific Northwest a natural laboratory in which to investigate transportation solutions that are applicable both locally and nationally.

PacTrans is dedicated to collaborating with transportation agencies, companies, and research institutions to jointly develop safe and sustain-able solutions for the diverse transportation needs of the Pacific Northwest.

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