Semi Annual Progress Report for University Transportation Centers

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Pacific Northwest Transportation Consortium (PacTrans): Developing human-centered and transformative multimodal mobility solutions for the Pacific Northwest

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Accomplishments

What are the major goals and objectives of the program?

Pacific Northwest Transportation Consortium (PacTrans) consists of institutions from all four states in our region with the University of Washington (UW) as the lead and Northwest Indian College (NWIC), Portland State University (PSU), University of Alaska Anchorage (UAA), University of Idaho (UI), and Washington State University (WSU) as the consortium institutions. PacTrans' theme centers on "Developing human-centered and transformative multimodal mobility solutions for the Pacific Northwest". PacTrans serves as a focal point within Region 10 to develop initiatives and facilitate collaborative activities with regional partners to maximize the effectiveness of their collective services and programs toward the U.S. Department of Transportation's (USDOT) strategic goal of mobility. Major goals and objectives of PacTrans include:

Research – Serving as Region 10's research engine, PacTrans is committed to funding research in both the categories of advanced and, more importantly, applied research.

Technology Transfer – PacTrans strives to be an applied technology showcase, providing additional funds to projects that are deemed as "Success Stories" to ensure the dissemination of results to policymakers, educators, practitioners, other transportation professionals, and the general public.

Education – As a consortium of six prestigious universities/colleges, PacTrans is devoted to being an education leader. This involves continued evaluation and evolution of our transportation engineering programs as well as providing state-of-the-art research laboratories, student conferences and seminars, mentoring, and scholarship opportunities for our students and future workforce trainees.

Workforce Development – PacTrans endeavors to be a workforce development base: hosting activities that focus on the development of transportation professionals, building strong partnerships with transportation agencies and companies in our region, and designing training programs to address the workforce development needs, while connecting our students with quality jobs where they can implement the knowledge they gained through their education.

Outreach – Throughout all of these other goals and objectives, PacTrans seeks to be in a continual process of outreach: promoting and building the educational student base, making new industry and agency partners, attracting new research, and providing opportunities to share and learn about key outcomes and achievements that have been learned through research and education activities.

Collaboration – PacTrans desires to be a platform for participation and is always on the lookout for potential new partners and new opportunities with current partners to collaborate on transportation-related endeavors.

What was accomplished under these goals?

During the period from October 1, 2024 – March 31, 2025, PacTrans has followed its implementation plan to expedite all the scheduled activities towards its goals and objectives identified above. In this reporting period as well as the previous one, PacTrans was facing staffing shortages while looking to fill

the assistant director position previously held by Cole Kopca. During the search, PacTrans was able to borrow staff members from Washington State Transportation Center (TRAC) including the interim assistant director, Dr. Ryan Avery, to carry the planned tasks forward to contribute to the advancement of the region's transportation research, technology transfer, education, workforce development, outreach and collaboration. The new assistant director, Hadar Albo, began her position at PacTrans on December 9, 2024. The hand-over of responsibility from Ryan Avery to Hadar Albo has further cemented a strong relationship between PacTrans and TRAC. Below are more details about PacTrans achievements during this period.

Research

As Region 10's research engine, PacTrans has been actively engaged in two broader categories of research projects. We engage in multi-institutional research projects that require participation from at least two consortium universities and typically have a larger budget. Such projects include multi-institutional general research projects, as well as a multi-institutional educational project, and a multi-institutional outreach project. We also engage in single institutional projects (also referred to as small research projects) that only require participation from a single consortium university and typically have smaller budgets. Both categories of research are geared towards the goal of advancing the region's transportation mobility research.

In Year 2 we selected two multi-institutional projects for funding. Both projects are currently in progress and have recently completed the first six months of research. The two projects are:

Believe the Clear View: Self-Heating Technology for Optimal Winter Sign Visibility

A Proactive Approach to Examining Transportation Safety for All Users

In addition to the multi-institutional projects, the consortium selected seventeen smaller proposals for funding. These projects range in award amounts and topics, but all are in line with the scope and directives of the grant. A few examples of the smaller research project currently underway are:

Unveiling the Future of Durability and Safety with 2-D Material-Infused Anti-Icing Concrete

Liquefaction Impacts on Mobility: Mechanics-Informed AI Modeling for Disaster Simulation and Near-Real-Time Response

Safety Analysis and Traffic Monitoring for Bicycles and Pedestrians Using Open-Source Computer Vision Tools

Assessing School Transportation Risk Through Data Mining

In November 2024, PacTrans hosted a research workshop at the University of Washington in Seattle, Washington. Around 40 participants representing local and state agencies, industry partners, non-profits, and university researchers and students from the Pacific Northwest (Federal Region 10 that includes Alaska, Idaho, Oregon, Washington) attended. The goal of this workshop was to share state-of-the-art doctoral research on mobility. We featured invited talks by two visiting faculty from the Chalmers University of Technology, Sweden, as well as seven Ph.D. students from the Civil and Environmental

Engineering, Computer Sciences and Engineering, Urban Design and Planning, and Mechanical Engineering departments.

Technology Transfer

PacTrans and its PIs engaged in several conferences, workshops, and symposiums during this reporting period that offered a platform for us to showcase our research to a broader audience.

PacTrans hosted our annual Region 10 Transportation Conference on Friday, October 11, 2024, on the University of Idaho (UI) campus. The theme of this year's conference was "Serving People: Advancing Mobility, Accessibility, and Safety in Transportation". With around one hundred and twenty people in attendance, it was a successful conference that included a keynote presentation, a plenary session, and three sessions of two breakout technical panels. Panel topics included transportation system reliability, active transportation and planning, pollution management, multimodal systems, transportation technology, and mobility and disability. PacTrans also presented three annual awards and hosted a poster session that showcased over twenty ongoing and/or recently completed PacTrans research projects. Accolades from this conference included:

- Qing Shen, PhD (UW) was awarded PacTrans Outstanding Educator Award
- Wayne Kittelson (Kittelson & Associates) was awarded PacTrans Lifetime Achievement Award
- Graysen Squeochs accepted the PacTrans Outstanding Partner award on behalf of the Yakama Nation
- PacTrans was recognized by the Alaska Native Science and Engineering Program (ANSEP) for our shared commitment to education, innovation, and the empowerment of rural communities

In January, PacTrans participated heavily in the 104th Transportation Research Board (TRB) Annual Meeting. In total, our faculty and student researchers participated in over one hundred workshops, lecterns, and poster presentations. This annual meeting continues to be a very productive way for PacTrans to present research findings to a national and international audience.

Another important activity to mention is that the UW Smart Transportation Applications and Research Laboratory (STAR Lab) is working closely with Yakama Nation, Washington State Department of Transportation, and several other agencies on the SMART Grant that will increase deployment of the Mobile Unit for Sensing Traffic (MUST) technology along US-97 to improve roadway and intersection safety from Union Gap to Toppenish, WA. MUST is a cutting-edge technology developed by STAR Lab using PacTrans funding. It was applied to the intersection of US-97 and Lacrue Road via a pilot project funded by PacTrans. This pilot project was very successful and received the "2023 Innovative Project Award and Best All-Round Award from FHWA's Build a Better Mousetrap Program. This SMART project started in October 2024 and is an expansion of the pilot project. Hopefully, the MUST technology will help save lives in the project area.

Education

This past January, PacTrans supported over fifty students from consortium universities to participate in the 104th Transportation Research Board (TRB) Annual Meeting. Several accolades from this conference included:

- Ekin Ugurel (UW) was awarded the Michael Kyte Region X Outstanding Student of the Year Award
- Ana Tijerina Esquino (PSU) was awarded the Dwight D. Eisenhower Transportation Fellowship by the USDOT FHWA
- Kayla Sorenson (PSU) was awarded the Dwight D. Eisenhower Transportation Fellowship by the USDOT FHWA
- Muhammad Monjural Karim (UW) was awarded the 2025 Young Scholar Award for his paper "Thermal-Forecast: Traffic Trajectory Prediction in Challenging Nighttime Condition Using Thermal Imaging" by the TRB Information Systems and Technology Committee
- Travis Fried (UW) was awarded Outstanding Student of the Year Award by the Council of University Transportation Centers (CUTC)

PacTrans hosted our annual Region 10 Student Conference on October 12. This event was organized by a committee of PacTrans students that represent each of our consortium partner universities. This event was hosted on the UI campus the day after our annual conference. Key activities at the student conference included networking sessions, poster sessions, a keynote presentation, and a pitch competition.

Several other student and faculty-related achievements and highlights from this reporting period included:

- Joshua Borders (UAA) was awarded the Coral Sales Scholarship Award by Coral Sales Company of Portland, Oregon
- Charlene Pugay (UAA) was awarded the Coral Sales Scholarship Award by Coral Sales Company of Portland, Oregon
- Shafkat Bin Jafar (WSU) was awarded TRB Airport Cooperative Research Program Graduate Research Award his paper titled “Study of Foamed Glass Aggregate for Rapid Airfield Pavement and Structure Construction”
- Kishor Shrestha (WSU) was awarded the AASHTO High Value Research Project Award
- Ji Yun Lee (WSU) was published in Fire Technology for her research “Understanding Evacuation Behavior During Wildfires: Exploring Key Factors Affecting Evacuee Behaviors and Developing Predictive Models for Decision-Making”
- Kevin Chang (UI) was named a Fellow of the American Society of Civil Engineers and awarded the 2024 Outstanding Educator Award from the ITE Mountain District
- UI Clean Snowmobile Team placed third in National SAE Challenge
- Led by Jae Ryu (UI) and Kevin Chang (UI), UI was awarded the NSF-RIEF (Research Initiation in Engineering Formation) Project
- Yinhai Wang (UW) presented “Revolutionizing Road Transportation Systems Through Customized AI and Edge Computing” at the AI Transforming Systems Symposium (AITS) in Saudi Arabia
- Yinhai Wang (UW) participated in the session titled “Enhancing Urban and Rural Traffic Safety through Generative AI Innovations” at the Pioneering Transportation Innovation with Generative AI Workshop at the University of Maryland

During this reporting period, PacTrans offered six informative webinars/seminars to our students and our broader community:

1. In October, we hosted José Holguín-Veras (Professor at Center of Excellence for Sustainable Urban Freight Systems at Rensselaer Polytechnic Institute) for a talk titled "Freight Transportation Policy and Planning" at our autumn quarter PacTrans Regional Seminar
2. In November, we hosted/partnered with:
    a. Hironori Kato (Professor at the CEE Department, Graduate School of Engineering, at The University of Tokyo) on a talk titled "Travel Time Variability and Assessment of Benefits from Travel Time Reliability Improvement of Road Projects in Japan"
    b. Karen Philbrick (Executive Director at Mineta Transportation Institute at San Jose University) for a talk titled "Igniting the Spark and Creating Change: Communication and Leadership Lessons for the Transport Sector" at our Leadership Development Seminar
    c. Washington State Department of Transportation (WSDOT) on a talk titled "An International Perspective to Achieving Vision Zero"
3. In February, we hosted Anne Stockem-Novo (Professor at Applied Artificial Intelligence at the Institute of computer science at Ruhr West University of Applied Science in Germany) on a talk titled "Increasing Safety of Deep Learning for Automated Vehicles with Physics-Informed Neural Networks"
4. In March, we hosted Scott Murrell, P.E. (President of the ASCE Transportation & Development Institute) for a talk titled "The times they are a-changin'… so what else is new?" at our Leadership Development Seminar

Workforce Development

The PacTrans Workforce Development Institute (WDI) provides training and continuing education for Region 10's transportation workforce as well as STEM education opportunities for K-12 students. PacTrans' major activities on workforce development have been implemented using the WDI platform.

The WDI is composed of transportation stakeholder partners including universities, industry, and state and local departments of transportation (DOTs) who collaborate to design, develop, and deliver innovative transportation workforce development solutions in the Pacific Northwest.

During the last six months, the WDI has engaged transportation stakeholders in identifying and developing multiple new short courses. The following professional development courses were developed during this period:

- AI for Transportation Operations Management
- Engineering and the Law
- Design Innovations in Active Transportation
- Intersection of Public Health and Law Enforcement
- Middle School (MS) Summer Camp
- High School (HS) Summer Camp
- Manual on Uniform Traffic Control Devices (MUTCD) Overview

- Introduction to Road Safety
- Intersection of Public Health and Law Enforcement

Content experts and instructional designers are currently collaborating to build new online courses, including:

- Field Course in Active Transportation
- Work Zone Safety Courses (ex. Flagger Training)
- MUTCD Update
- Online, on-demand version of Design Innovations for Active Transportation
- Online, on-demand version of Engineering and the Law
- Machine Learning for College Students Online
- Online, on-demand road safety courses

The WDI also focused on student-centered initiatives. One initiative involves collaborating with the UW Teen and Youth Program to re-offer the course Introduction to Autonomous Cars. This program introduces middle school students to transportation and robotics concepts. Students work with high school robotics team mentors to build robotic vehicles.

The PacTrans WDI program is teaming up again with the Washington State Department of Transportation (WSDOT) for the Washington Transportation Camp. Washington Transportation Camp is a one-week residential high school summer program covering transportation topics such as urban planning, traffic safety, supply chain logistics, and the cutting-edge realm of connected and autonomous vehicles. The primary objective of the program is to increase the number of students pursuing advanced degrees and careers in STEM-related fields associated with transportation. As a result of increased interest, this year's camp will be larger than past years.

What opportunities for training and professional development has the program provided?

Many of the specific details of these opportunities are discussed above. More generally, PacTrans provides training and professional development opportunities through multiple channels:

Research: Through the lifespan of this grant, PacTrans annually selects research projects that offer faculty and student researchers funding to conduct cutting edge research in a variety of areas directly tied to the USDOT strategic goals.

Education: PacTrans consortium partners offer a variety of other on-campus and online courses designed for professional development in addition to the regular degree programs. The online programs, such as the online master's program of sustainable transportation, are particularly good for working professionals because of the flexibility in schedule and location. PacTrans also supports a wide variety of student activities geared toward enhancing their education. Several examples include: supporting ITE student chapter activities, travel support for students to present accepted work at conferences, sponsorship of student competition teams, and so much more.

Outreach: PacTrans offers training and educational opportunities to K-12 students through its outreach activities. Three examples include: (1) UW partners with the UW Teen and Youth Program to deliver a course titled *Introduction to Autonomous Cars* that is offered to sixth through eighth graders during the summer months, and (2) PacTrans consortium partners UW and WSU have partnered with WSDOT to offer a week long, high school transportation summer camp, and (3) PSU participates in the National Summer Transportation Institute (NSTI) program to bring roughly 25 students to campus each summer for a week long transportation experience.

Funding assistance: PacTrans financially supports students through their participation in research activities, as well as fellowships. During this past reporting period, PacTrans welcomed six new graduate fellows and continues to offer undergraduate research fellows. The Undergraduate Research Fellowship offers undergraduate students the opportunity to participate in research while receiving a stipend for things like conference travel or research supplies.

Seminars, workshops, and conferences: As outlined above, PacTrans offers many opportunities for training and professional development through its webinar series and various workshops. PacTrans also emphasizes our Region 10 Transportation Conference and Region 10 Student Conference as important opportunities for training and professional development.

Internships: PacTrans shares internship opportunities on our website as circulates announcements to our student mailing lists. We collaborate with our external partners to develop internship programs for our students. During this reporting period, PacTrans set up internship opportunities in the WSDOT traffic management center and tolling operations group.

This year we also utilized funds from a Washington State Legislative Proviso in partnership with the Washington State Transportation Center (TRAC) to provide additional internship opportunities for high school and first through third-year college students. A total of ten students are working with multiple groups within WSDOT. We hope to expand the program next year with continued legislative proviso support.

Partnerships: PacTrans has developed strong partnerships with many agencies, companies, and non-profit organizations. One example is the robust relationships with local ITE chapters in student mentoring and training. ITE Washington has a mentor program for university students. They offer student fellowships and also host events for student training.

PacTrans has also worked with the Washington State Transportation Center (TRAC) to undertake a study on pathways to the engineering field and the looming shortage of qualified employees in civil engineering and related fields. This study, performed in partnership with the Washington State Board of Registered Professional Engineers and Land Surveyors (BRPELS) and the Washington State Association of Counties (WSAC), is currently nearing completion. Early results were presented to the Washington State Senate Transportation Committee on February 24, 2025. We are continuing to partner with these groups to continue this work in the coming year through identifying solutions to address the challenge, provide more training opportunities, and support growth and retention in transportation and related fields.

How have the results been disseminated? If so, in what way/s?

PacTrans has a strong outreach program to local and state transportation agencies and private partners in the region, where PacTrans research outcomes are presented and demonstrated. Research outcomes are posted on the PacTrans website, distributed through our monthly newsletter and annual reports, and promoted through social media channels such as LinkedIn and the University of Washington press media. We also disseminate news, events and results through our website at www.pactrans.org. The PacTrans website is undergoing a large remodel which aims to make the website more user-friendly for anyone looking to learn more about our goals and our work.

Another avenue for dissemination is presentations at conferences, workshops, and symposia. This is a key dissemination method for us. Each year we send roughly 100 PIs and students to the TRB annual meeting where we participate in over 100 committee meetings, poster presentations, workshops, and lecterns. Our annual conference each October also provides an invaluable platform for our researchers to present work either through presentation or poster.

PacTrans also encourages new and innovative dissemination materials through the identification of success stories, where PacTrans offers limited additional funds to projects that have results with potentially strong impacts. These funds can then be used to explore new and innovative opportunities to get knowledge, methods, and products into the hands of practitioners. This year these funds have been used to host workshops/trainings, produce informational videos, build online tools and procedure manuals, etc.

Finally, per our obligation as a UTC, research results are posted on our website and are disseminated to all of the required repositories that include, TRID, USDOT, Transportation Library, Volpe National Transportation Systems Center, Federal Highway Administration Research Library and the US Department of Commerce National Technical Information Service.

What do you plan to do during the next reporting period to accomplish the goals and objectives?

Research

In March, PacTrans issued a call for proposals for multi-institutional projects from the consortium faculty. 19 proposals were received and are currently under review. The board will meet on April 28, 2025 to evaluate the reviewer feedback and make selections. The reviewer pool is a list of experts in various disciplines that PacTrans maintains in order to select qualified reviewers based on their knowledge in fields related to the proposed research. PacTrans strives to avoid any conflicts of interest where some reviewers may be close colleagues of the researchers submitting the proposal. Reviewers are expected to provide a timely, fair, and comprehensive review.

Each consortium member also has funding to select single-institution projects. The process for project selection is left to the associate director at the member university. The UW has 11 small projects currently under review. Reviewer feedback is due in late April and projects are selected in early May.

Once selected, PacTrans will begin the process of awarding Year 3 research and establishing contracts with consortium partners.

Technology Transfer

PacTrans will provide technology transfer-related training and assistance to those who are interested in pushing their research products into practice. Although PacTrans typically does not begin offering Success Story funding until after our first year of research projects has been completed, we are open to supporting promising research products to complete the last step to make them practical.

In addition, PacTrans foresees several great opportunities for technology transfer, including: the 2025 PacTrans Region 10 Transportation Conference, the 2026 TRB Annual Meeting, TRB Data and AI Conference, ASCE ICTD, 2026 Safe Mobility Conference, etc.

Education

As discussed above, PacTrans is engaged in the Engineering Pathways Study to investigate the challenges facing the transportation field and related civil engineering and planning disciplines. During the next year, we intend to continue this work with support from the Washington State Legislature. Elements of this work may include considering opportunities to modify or enhance the curriculum to meet the workforce needs for tomorrow's transportation workers. This will also entail new short courses and training opportunities which include workforce development in the next section.

Workforce Development

PacTrans will continue our quarterly Regional Transportation Seminar where we invite top experts from agencies, industry, and academia to come to campus and present in-person to students, faculty, and local industry professionals about their research. These seminars are also live streamed via YouTube. This Spring, PacTrans will host Michael Zhang, Professor for the CEE Department at the University of California, Davis, to present at one such seminar.

We are in the process of hiring a new Program Coordinator to support education and workforce development efforts. This person will also help drive the Workforce Development Institute (WDI) courses. and provide timely responses to trainees.

The Workforce Development Institute will continue to develop and offer a wider range of short courses to meet the evolving needs of the transportation workforce, including the following courses:

Content experts and instructional designers are currently collaborating to build new online courses.

- Field Course in Active Transportation
- Work Zone Safety Courses (ex. Flagger Training)
- MUTCD Update
- Online, on-demand version of Design Innovations for Active Transportation
- Online, on-demand version of Engineering and the Law
- Machine Learning for College Students Online
- Online, on-demand road safety courses

In addition, the WDI will continue to focus on the following four key areas:

- Program Evaluation: Implement a robust evaluation process to assess the effectiveness of courses and identify areas for improvement.
- Advisory Board Engagement: Actively seek input from the advisory board to inform strategic decision-making.
- Marketing and Outreach: A major effort is underway to enhance marketing efforts to increase awareness of WDI and attract a diverse student population.
- Financial Sustainability: Develop a sustainable financial model to ensure the long-term viability of the institute.

This summer, we will host two summer camps for K-12 students. PacTrans will offer one session of our Introduction to Autonomous Vehicles course to middle school students in July. We will also facilitate the 2nd offering of the WA Transportation Camp in partnership with WSDOT, UW, and WSU.

By focusing on these areas, WDI aims to solidify its position as a leading provider of workforce development training for the transportation industry. Planning is currently underway for a Workforce Development Workshop on May 19, 2025. This workshop will invite leaders to have roundtable discussions on the future needs of workforce development to target our programs for the coming year. We will report on the outcomes of this workshop in the next report.

Participant and Collaborating Organizations: Who has been involved?

What individuals have worked on the program?

- PacTrans Director, **Yinhai Wang**, Ph.D., Professor of Civil and Environmental Engineering at the UW, devotes 50 percent of his time directing PacTrans. Dr. Wang has overall responsibility for program management, oversight of PacTrans operations, including the Research Committee, the Education and Workforce Development Committee, and the Outreach and Technology Transfer Committee, and Student Leadership Council. He is the regional and national leadership for PacTrans, and the contact person for management relationships with USDOT Research and Innovative Administration (RITA) and other USDOT organizations.
- PacTrans Associate Director in Research, **Jeff Ban**, Ph.D., Associate Professor of Transportation Engineering in Civil and Environmental Engineering at the UW spends 5 percent of his time managing the research program for PacTrans and coordinates the research collaboration across the five partner institutions.
- PacTrans Associate Director in Education and Workforce Development, **Anne Vernez-Moudon**, Dr. es SC, Professor of Architecture, Landscape Architecture, and Urban Design and Planning, Adjunct Professor of Epidemiology and in Civil and Environmental Engineering, passed away in April 2025. She was a beloved professor and friend, and she will be greatly missed. We plan to appoint a new Associate Director in Education to assume this role.
- PacTrans Associate Director in Technology Transfer, **Jon Froehlich**, PhD, Professor of Computer Science Engineering, devotes 5 percent of his time leading the Technology Transfer Committee.
- PacTrans Associate Director in Portland State University (PSU), **Jennifer Dill**, Ph.D., Professor of Urban

Studies & Planning at PSU, devotes 5 percent of her time to managing and organizing the education, outreach, and research activities within PSU. She coordinates all results and outcomes with the UW on a regular basis.

- PacTrans Associate Director in the University of Alaska Anchorage (UAA), **Osama Abaza**, PhD, Professor of Civil Engineering at UAA, devotes 5 percent of his time to managing and organizing the education, outreach, and research activities within UAA. He coordinates all results and outcomes with the UW on a regular basis.
- PacTrans Associate Director in University of Idaho (UI), **Ahmed Abdel-Rahim**, Ph.D., Professor of Civil Engineering at UI, devotes 5 percent of his time to managing and organizing the education, outreach, and research activities within UI. He coordinates all results and outcomes with the UW on a regular basis.
- PacTrans Associate Director in Washington State University (WSU), **Haifang Wen**, Ph.D., Professor of Civil and Environmental Engineering at WSU, devotes 5 percent of his time to managing and organizing the education, outreach, and research activities within WSU. He coordinates all results and outcomes with the UW on a regular basis.
- PacTrans representative from Northwest Indian College (NWIC), **Victoria Retasket**, Dean of Student Life at NWIC, devotes 5 percent of her time to managing and organizing the education and outreach activities within NWIC. She coordinates all results and outcomes with the UW on a regular basis.
- Assistant Director, **Hadar Albo**, devotes 75 percent of her time to the day-to-day operations in support of the PacTrans mission. Her responsibilities include project management, grant management, events coordination and outreach, and managing the PacTrans operations staff.
- Interim Assistant Director, **Ryan Avery**, devoted 25 percent of his time to the day-to-day operations in support of the PacTrans mission. His responsibilities included project management, grant management, events coordination and outreach, and managing the PacTrans operations team. His interim position at PacTrans was completed upon the hire of Assistant Director Hadar Albo in December of 2024.
- PacTrans full-time Finance, Grants, and Research Manager, **Christina Yarbrough**, devotes 100 percent of her time to the Center's budget, expenditure, and research management.
- PacTrans part-time Assistant Director of the Workforce Development Institute (WDI), **Melissa Amrhein**, devotes 80 percent of her time to daily operations of the PacTrans WDI. Her responsibilities include partnership building, needs assessment, and coordination of course development and facilitation.
- PacTrans full-time Communications and Marketing Specialist, **Kristine Pham**, devotes 100 percent of her time to the Center's communications and marketing work.
- PacTrans Program Coordinator, **Susan Gilman,** devotes 100% of her time to organizing upcoming training and events for the WDI program. She is a temporary employee while the center is looking to hire a full-time Program Coordinator.
- **Malorie Stites** is a Program Coordinator who has been supporting PacTrans on an interim basis for travel and expense reimbursements. She devoted 15% of her time to PacTrans. Her role at PacTrans

will be phased out upon the hire of a full-time Program Coordinator.

- PacTrans has 27 full-time faculty at the UW engaged in transportation research. Our consortium partners (NWIC, PSU, UAA, UI, WSU) have 35 full-time faculty directly involved in PacTrans research.

What other organizations have been involved as partners?

As the center is still relatively new, PacTrans is focused on building our relationships with partners. In the most recent six months period we have received match from AI Waysion, Washington Department of Transportation and Idaho Department of Transportation. Below is a table of past and present PacTrans community, industry and state partners.

Partner	Type
Alaska Department of Transportation and Public Facilities	Government
Idaho Transportation Department	Government
Oregon State Department of Transportation	Government
Washington State Department of Transportation	Government
City of Bellingham	Government
City of Seattle	Government
City of Lynnwood	Government
City of Bellevue	Government
City of Everett	Government
King County	Government
Snohomish County	Government
Pierce County	Government
Sound Transit	Government Agency
Washington Traffic Safety Commission	Government Agency
Washington State Transportation Insurance Pool	Government Agency
University of Alaska, Anchorage	Educational Institution
University of Washington Transportation Services	Educational Institution
Washington State Department of Ecology	Government

Puget Sound Regional Council	Government
Washington State Transportation Investment Board	Government Agency
American Society of Civil Engineers	Professional Association
Institute of Electrical and Electronics Engineers	Professional Association
Institute of Transportation Engineers	Professional Association
Yakama Nation	Federated Tribe
Northwestern Tribal Technical Assistance Program (NW TTAP) Center	University Center
ITS Washington	Professional Association
HDR Engineering	Private Industry
Port of Portland	Government
BMW Group	Private Industry
Western Trailers	Private Industry
Coral Sales Co.	Private Industry
National Institute for Transportation and Communities	University Transportation Center
Transportation for Livability by Integrating Vehicles and the Environment	University Transportation Center
Center for Environmentally Sustainable Transportation in Cold Climates	University Transportation Center
Aichele and Associates	Private Industry
Alstom Grid Inc.	Private Industry
Alta Planning and Design	Private Industry
Battelle	Private Industry
Cascade Bicycle Club	Non-profit/ Foundation
Feet First	Non-profit/ Foundation
DENSO	Private Industry
T Mobile	Private Industry
DKS Associates	Private Industry
Fehr and Peers	Private Industry

FLIR	Private Industry
Inrix Inc.	Private Industry
Wejo	Private Industry
AIWaysion	Private Industry
Tom Tom	Private Industry
Amazon	Private Industry
Nokia	Private Industry
Transpo Group	Private Industry
Intelligent Transportation Systems of Washington	Professional Association
Luum	Private Industry
Kittelson and Associates	Private Industry
Microsoft	Private Industry
BlackBerry	Private Industry
Verizon	Private Industry
Q-Free	Private Industry
PACCAR, Inc.	Private Industry
West Salem High School	Educational Institution
The Bush School	Educational Institution

Outputs

	Total	UW	PSU	UAA	UI	WSU	NWIC
Publications: peer reviewed journal articles	**63**	25	2	2	25	9	0
Publications: Book chapters and other edited manuscripts	**0**	0	0	0	0	0	0
Conference papers	**44**	26	6	1	3	8	0
Conference presentations	**50**	29	5	1	6	9	0
Lectures/Seminars /Workshops/ Invited Talks	**25**	15	3	2	3	2	0

Policy Papers	**1**	1	0	0	0	0	0
Websites or Other Internet Sites	**0**	0	0	0	0	0	0
New Methodologies, Technologies or Techniques	**6**	2	1	1	0	2	0
Inventions, patent applications, and/or licenses	**0**	0	0	0	0	0	0
Other products: data or databases, physical collections, audio or video products, software or NetWare, models, educational aids or curricula, instruments, or equipment	**4**	1	1	0	0	2	0

Outcomes

OUTPUTS: Technology Transfer Plan Output Metrics	Annual Targets	Numbers for Reporting Period
Number of publications, presentations, and posters made at conferences or workshops explaining or promoting the research outputs	100	94
Number of software tools and technologies made available to practitioners	10	6

Examples of peer reviewed journal articles

Elshazli, Mohamed T., Hussein, D., Bhat, G., Abdel-Rahim, A., and Ibrahim, A. (2024) "Advancing infrastructure resilience: machine learning-based prediction of bridges' rating factors under autonomous truck platoons." Journal of Infrastructure Preservation and Resilience 5.

Monjurul Karim, M., Qin, R., & Wang, Y. (2024). Fusion-GRU: A Deep Learning Model for Future Bounding Box Prediction of Traffic Agents in Risky Driving Videos. Transportation Research Record, 2678(9), 699-709.

Liu, C., Jantarathaneewat, N., Zhang, S., Yang, H., Fu, X., and Wang, Y. "Advancing Automatic Asset Management: An Edge-Based US-Specific Traffic Sign Detection and Recognition System Based on Image Processing." Journal of Transportation Engineering, Part A: Systems. Vol. 151, No. 3, 2025. https://doi.org/10.1061/JTEPBS.TEENG-84.

Monjurul Karim, M., Wang, B., & Wang, Y. (2025). Thermal-Forecast: Traffic Trajectory Prediction in Challenging Nighttime Conditions Using Thermal Imaging. Transportation Research Record.

Examples of conference papers and presentations

Eapen, N., R. Heckendorn, and A. Abdel-Rahim. "Fast Machine Learning-Based High Fidelity Mesoscopic Modeling Tool for Traffic Simulation." In International Conference on Transportation and Development 2024, pp. 417-430. 2024.

Griffen A., Ishparsh U., X. Zhao "An Efficient Road Detection Framework for Supporting Autonomous Driving in Rural Areas", the 2nd IEEE International Conference on Mobility Operations Services and Technologies (MOST 2024), Dallas, TX, 2024.

Zhang, Y., Ban, X., 2024. Demographic information inference from passively collected data. In proceedings of the 103rd Annual Meetings of Transportation Research Board.

He, J. "A pilot study of developing carbon-neutral concrete by using engineered biochar as a replacement of cement" 1st Symposium on Community-Smart infrastructure innovations & implementation (CSi3), Miami, FL, March 3rd 2025.

Example of lectures/seminars/workshops/invited talks

Maurer, B.W. and Sanger, M.D. (2025). "Mechanics-Informed Machine Learning for Geospatial Modeling of Liquefaction: Global and National Surrogate Models for Simulation and Near-Real-Time Response." Pacific Earthquake Engineering Research Center Annual Meeting, 25 March 2025, Berkeley California.

Yinhai Wang, "Revolutionizing Road Transportation Systems Through Customized AI and Edge Computing", AI Transforming Systems Symposium (AITS) in Saudi Arabia.

Yinhai Wang, "Enhancing Urban and Rural Traffic Safety through Generative AI Innovations", Pioneering Transportation Innovation with Generative AI" Workshop hosted at the University of Maryland.

Examples of New Methodologies, Technologies or Techniques

A new regional scale approach to predicting earthquake induced soil liquefaction, and its impacts to roads and bridges, is being developed using AI learning from very large subsurface test databases. The model effectively learns to predict subsurface characteristics and response in the absence of subsurface samples. This is accomplished using a large library of geospatial information sourced from existing maps, models, and remote sensing datasets. The above-ground geospatial features correlate to below ground conditions and are exploited by AI learning.

A joint inversion technique was proposed and demonstrated for characterization of permafrost degradation in highway or airport runways built in warm permafrost regions.

Wang, Bingzhang, Muhammad Monjurul Karim, and Yinhai Wang. "TP-GPT System." Coded in Python with ChatGPT API. 2024.

New soil specimen preparation and testing technique was developed to study the effect of plasticity index (PI) on fine-grained soil behavior. The new technique separates the plastic and non-plastic components of natural soil, then these components can be re-mixed at set proportions to study their effect on soil behavior. Previously, this work was done with manufactured soil mixtures; this method is an improvement to study natural soil behaviors.

Examples of Data/Database/Video/Software/Educational Aids/Curricula/Equipment

A comprehensive dataset on vehicle choice and usage behavior for 600,000 households in Texas.

A street-block-level dataset on travel safety and the spatial distribution of economic activities in Seattle from 2021 to 2023

OUTCOMES: Technology Transfer Plan Outcomes Metrics	Annual Targets	Numbers for Reporting Period
Number of early adopters of our research outputs	10	2
Changes made to the transportation system, or its regulatory, legislative, practice manuals, design standards, or policy frameworks	1	0

Over the years PacTrans research has been implemented into practice dozens of times. PacTrans PIs utilize research and/or technology transfer (Success Story) funds, and leverage match resources from external partners, to create new techniques and technologies that solve real world problems. Examples of outcomes from this grant during this reporting period are as follows:

The PacTrans project “Liquefaction Impacts on PacTrans Mobility: Mechanics-Informed AI Modeling for Disaster Simulation and Near-Real-Time Response” has had two different engineering consulting firms contact them to use the project developed model to study regional scale liquefaction impacts to distributed infrastructure. One planned implementation is for community transportation planning in a coastal Washington town, and the other is for energy infrastructure in the central United States. Both implementations are ongoing and the team hopes to point to specific outcomes in the future.

WSDOT has designed an e-bike purchase incentive program based on the policy brief created by the PacTrans multi-institutional e-Bike Incentive research team. Malarkey, D., Prendez, D., MacKenzie, D., MacArthur, J. “Policy Brief on Designing and Evaluating Electric-Bicycle Incentive Programs.” Active Transportation Division Washington State Department of Transportation, March 2024. https://wsdot.wa.gov/sites/default/files/2024-06/Designing-Evaluating-Electric-Bicycle-Incentive-Programs-Policy-Brief-June2024.pdf

Impact

Nothing to report at this time.

Changes/Problems

None.

Special Reporting Requirements

Research Project Requirements

Per our research update above, PacTrans is working diligently to initiate our third year of funded projects. They will be uploaded to RiP and put on our website in short order. Further, PacTrans will continue to include the requirement for an ORCID number from each PI before their project funds are released.

Submission of Final Research Reports

As final versions of technical project reports are completed and checked for ADA compliance, they will be uploaded to our repository and linked on the research project profiles on the PacTrans website. Then they will be submitted to TRID, NTL Research HUB, etc. This process will not begin until our first year projects are wrapped up (likely middle of 2025).