



Mobility Innovation Center 2023 Annual Report

mobility@uw.edu



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INNOVATION
CENTER

W **COMOTION**
Your Innovation Partner

A culture of innovation



As we look back on 2023 and ahead to 2024, the Mobility Innovation Center continues to be a force for cross-sector partners to shape the future of transportation.

This past year, we listened, we collaborated, and we delivered projects to help unlock what's possible, as part of our ongoing work to move people and goods in smarter and more sustainable ways. We identified new opportunities for transit agencies to transition their facilities to support a zero-emission fleet, uncovered valuable insights into post-pandemic travel patterns, and provided guidance to inform the development of high-speed rail systems. We also built new partnerships to launch projects that evaluate the use of new tools for infrastructure management, and state-level best practices to help address both housing and transportation needs.

The Mobility Innovation Center aims to serve as a convener, bringing people together around a common purpose, and a disruptor—we're here to support the lifecycle of innovation. Innovation, by its nature, means change. We embrace this change out of necessity, in part, because what got us here today may not be the solution we need for tomorrow. It also represents a tremendous opportunity.

We're starting to see the positive effects of our work as we move toward a virtuous cycle of innovation. The projects we've carried to completion are creating lasting change within the transportation system. The Virtual Coordination Center for example, is now a publicly funded program operated by the Washington State Department of Transportation. And the high-impact researchers we work with are engaging with CoMotion's funding and training programs to bring their innovation and discoveries to market and elevate their impact.

As we move forward into the new year, the Center is forging ahead with efforts to build on our success and make the most of the insights and strategies we've developed. We'll also continue to spearhead applied research projects that address both ongoing and emerging challenges.

None of this is possible without the contributions of our partners. This includes UW's talented and driven academic faculty, PhD students, and researchers; the CoMotion team; and collaborators from the private sector, public agencies, and non-profits, all working together for the greater good.

Together we have accomplished so much, and we're just getting started! I am excited to continue this journey with you, as your partner in innovation.

A handwritten signature in blue ink that reads "B. Treece".

Barton G. Treece, III, PTP
Director

Mobility Innovation Center at the University of Washington



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Mobility Innovation Center at the University of Washington, since 2016

BY THE NUMBERS



167
Collaborators



19
UW departments



30
Projects launched

The Mobility Innovation Center brings together the knowledge, talents, and expertise of the University of Washington with partners from private and public sectors to solve real-world challenges facing our transportation system.

UW and Challenge Seattle united in 2016 to establish a multidisciplinary research center that is committed to advancing our region's economy and quality of life by helping to build the transportation system of the future. Within this "center for social good" model, UW researchers collaborate directly with industry partners to scope implementation-ready projects.



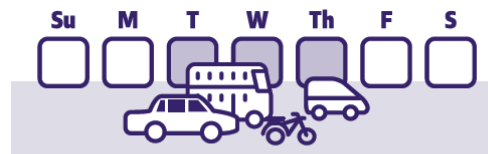
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Seattle Commute Study released

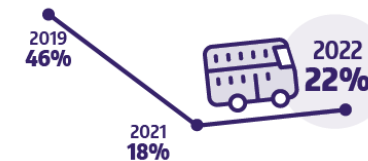
The results from the Seattle Commute Study put the work of the Mobility Innovation Center on the front page of *The Seattle Times* in March!

In partnership with Commute Seattle, the academic team led by professor Qing Shen and PhD candidate Lamis Ashour shared results and in-depth analysis of new trends in post-pandemic travel for the region.

One of every 10 people who work in Seattle completed the survey that produced a rich data set that is continuing to provide additional benefit to transportation agencies and employers. An update is being developed for 2024!



Tuesday, Wednesday, and Thursday commutes are vastly different from Monday and Friday.



Transit commute trips rebounded slightly.



1 out of 5 people drive alone to work at peak times in Central Seattle.

Drive-alone commute trips to Central Seattle have declined since 2019, dropping from 26% that year to 21% in fall 2022.



People in higher-income households are more likely to telework. High-income respondents, those who live in households earning \$150,000 per year or more, are more likely to telework or have hybrid commute options. Respondents who live in households that earn less than \$60,000 per year are more likely to work in person.



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Key highlights and full report: <https://mic.comotion.uw.edu/announcement/the-results-are-in-how-commuting-and-travel-is-shaping-up-in-the-next-normal/>

Transportation Resiliency Roundtable – April 2023



How can Washington state emerge as a leader in transportation resilience with the energy transition to electric vehicles?

That was the topic for a roundtable event organized by the Washington State Academy of Sciences and the Mobility Innovation Center in April that brought together academic experts, public agencies, and industry representatives to identify areas that research can help and partnership opportunities.

What's next?

- Build awareness about work being done in Washington state on the energy transition, e.g., collaboration with others on funding grants
- Align interests of public and private entities for shared benefit
- Coordinate in new ways on actionable activities and projects
- Create opportunities for meetings of various kinds that bring together stakeholders with common interests to expand and broaden the discussions about opportunities for the state and develop new relationships



City of Seattle



King County
METRO



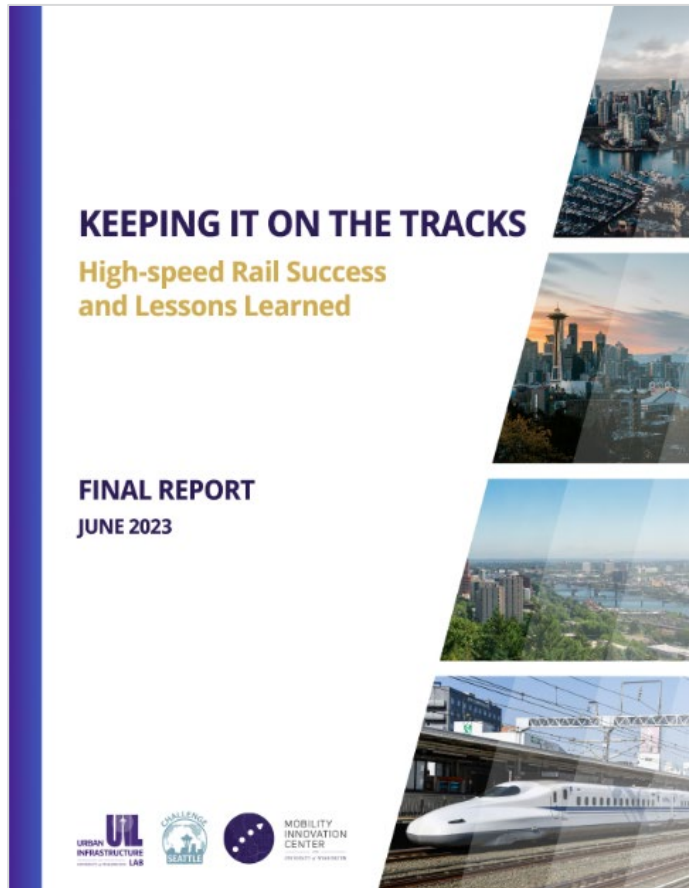
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Key highlights and summary report:

<https://mic.comotion.uw.edu/announcement/transportation-resiliency-roundtable-summary/>

High-speed rail: Success and lessons learned – June 2023



Prof. Whittington interviewed by local media

“Keeping it on the Tracks: High-Speed Rail Success and Lessons Learned” was released in June and is having an impact on development efforts in Washington state and nationwide!

The report comes as Washington’s state legislature allocated \$150 million to begin planning efforts for a high-speed connection between Oregon and British Columbia. The study, launched by the Mobility Innovation Center (MIC), was supported by Challenge Seattle and led by professor Jan Whittington at the Urban Infrastructure Lab.

The report made 40 key recommendations based on interviews with experts from around the world and examining the development of other systems in the United States, Europe, and Asia



Key highlights and full report:

<https://mic.comotion.uw.edu/announcement/keeping-it-on-the-tracks/>

Charging Forward: P3 for bus base electrification – Nov. 2023



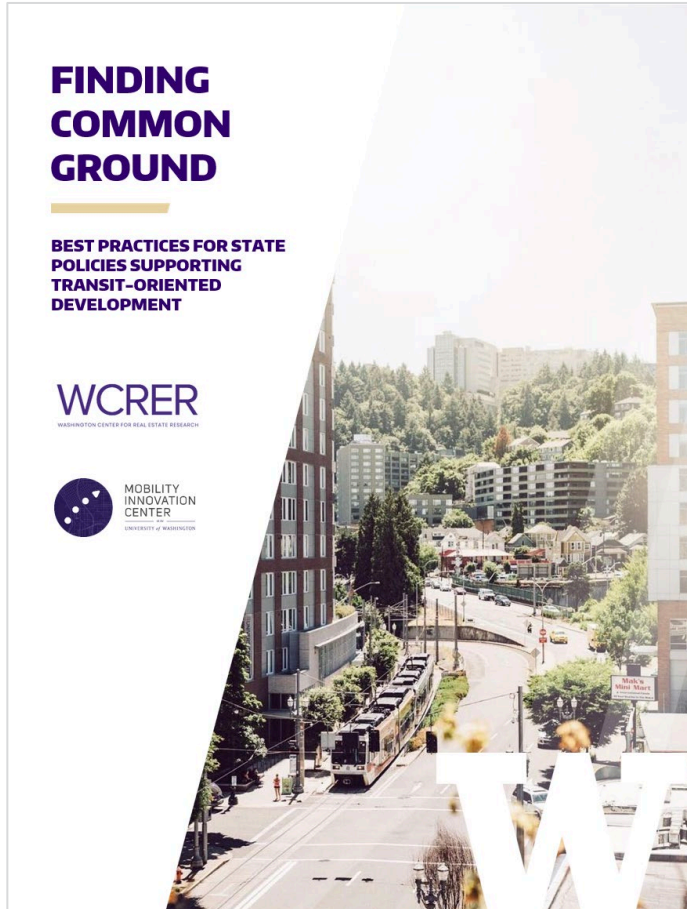
Conversion of bus base facilities, the heart of transit operations, for electric vehicle charging is a large-scale project with many players and complex needs. One option for transit agencies working to shift to a zero-emission fleet is a public-private partnership model (P3), which defers upfront capital construction costs and has the potential to help agencies meet long-term sustainability and resiliency goals.

New research out of the Mobility Innovation Center, led by professor Hyun Woo “Chris” Lee and senior research scientist Laura Osburn of the Department of Construction Management, explored this possibility and highlighted opportunities and challenges. The team found that P3, a practice common to infrastructure projects like toll roads, could apply to transit electrification. The team also looked to existing transit facility conversion projects that have used P3 to glean best practices.



Finding Common Ground: State-level TOD best practices

Launched Sept. 2023, released Jan. 2024



Transit-oriented development (TOD) can address both housing and transportation needs with dense, mixed-use, vibrant neighborhoods that have travel options to reduce car dependency and related greenhouse gas emissions. While there is general agreement about these benefits, it can be difficult for decision-makers to reach consensus on how to support the development of TOD and what the role of states might be in creating an equitable and sustainable framework.

A new report out of the Mobility Innovation Center, led by the Washington Center for Real Estate Research evaluated policies in California, Oregon, Massachusetts, and British Columbia, and also interviewed policy experts, developers, and legislators to identify key themes and elements for transit-oriented development from a state-level perspective to promote private investment.



Key highlights and full report: <https://mic.comotion.uw.edu/projects/transit-oriented-development-evaluation-of-best-practices-for-state-level-policy/>

Mobility Hubs – Electrification



Courtesy: CoMo UK

Nearing completion in 2024, the Mobility Hubs Electrification project worked with Sound Transit, King County Metro, the Seattle Department of Transportation, and Seattle City Light to bring agencies together to reimagine park-and-rides to accommodate electrified mobility. Through the course of four workshops, agency representatives shared their needs for chargers and new uses of places like park-and-rides and transit centers. The research team, led by Jan Whittington, Hyun Woo “Chris” Lee, and Rachel Berney, took their input, identified best practices, and provided tools to help estimate electrification needs and redevelopment costs to support buses, light-duty vehicles, and micromobility devices like e-bikes and scooters using the Burien Transit Center as our case study area. The final report will be available by spring.

Electrified mobility hubs can be a game changer. They remove barriers to electric vehicle adoption by providing new community resources and transportation connections. Utility providers become, in part, the new gas station, and the transit agency shifts from operating buses to being a bridge to a more sustainable, inclusive future.



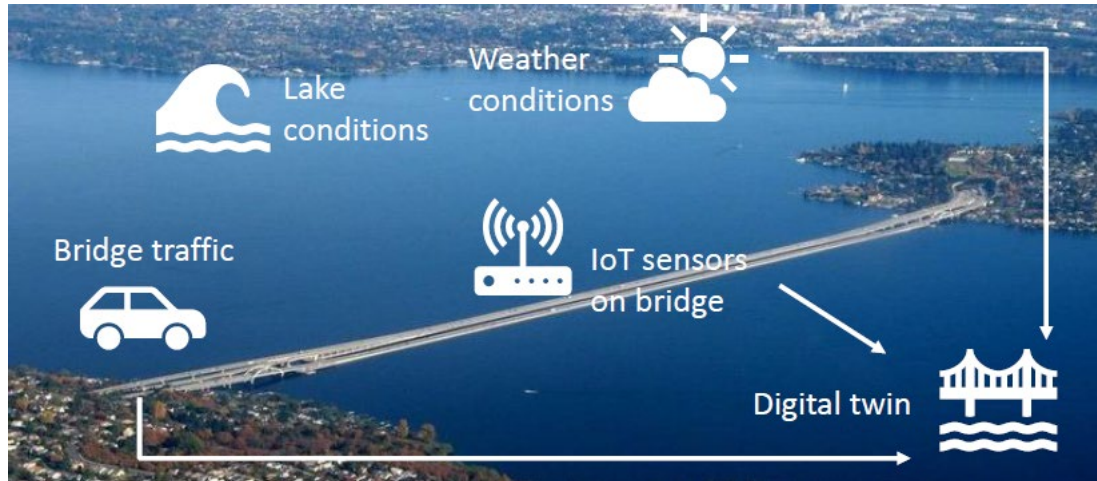
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Project information:

<https://mic.comotion.uw.edu/projects/electric-mobility-hubs-emob/>

I-90 Digital Twin: Launched 2023



Digital twin technology, which uses real-time sensors placed on a physical structure to feed a computer model, has the potential to provide better infrastructure insights.

Using the Interstate 90 Homer Hadley floating bridge between Seattle and Mercer Island as a test case, the Mobility Innovation Center launched a proof-of-technology project to evaluate the benefits, limitations, and tradeoffs that an agency or agencies could expect using Internet of Things (IoT) digital twin technologies for asset management, maintenance, and operations. Funding is provided in part by the Federal Highway Administration, Challenge Seattle, and the US Department of Transportation. Several private sector partners are contributing in-kind support and resources.

The project will deploy sensors on the bridge in spring 2024 for a year of data collection, with a final report in summer 2025.



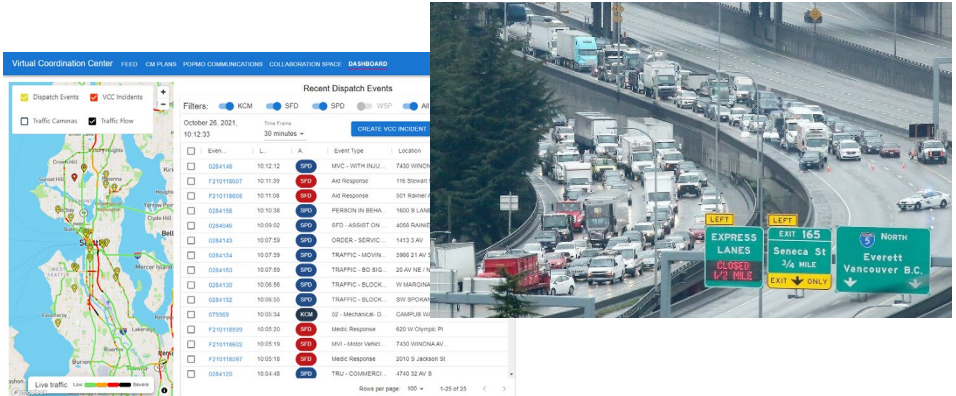
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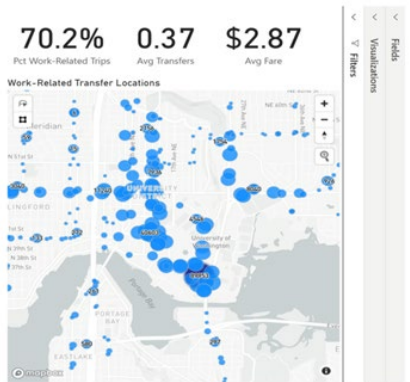
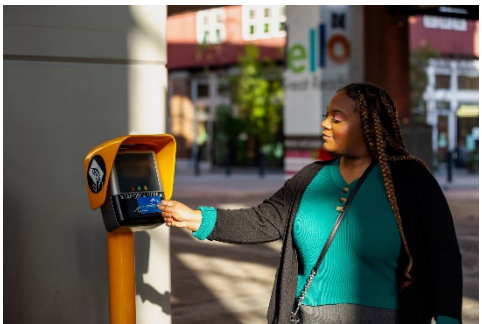
Project information: <https://mic.comotion.uw.edu/projects/digital-twin-proof-of-technology-evaluation-on-the-i-90-homer-hadley-floating-bridge/>

Lasting impact of research and innovation

The work of the Mobility Innovation Center continues to provide value! These efforts, which begins with research, have resulted in new tools that unlock what’s possible through collaboration and technology.



Virtual Coordination Center: Emergency responders can work better together during incidents that disrupts regional transportation with the Virtual Coordination Center now built and deployed! This project grew out of the Mobility Innovation Center and is now a program funded by the Washington State Legislature, operated by the Washington State Department of Transportation.



ORCA Data Business Intelligence: Regional transit agencies and employers now have better insights into user origins and destinations, and also the busiest transit lines for commuters, through this project that is now in operation and continuing to improve. ORCA cards generate a significant amount of data, but it’s not easy for a transit agency to process what’s available to see where people are coming from and going. Researcher Ryan Avery from the Washington State Transportation Research Center (TRAC) has been working within the ORCA policy to visualize data while ensuring privacy of users to help with service planning. The dashboard for transit agencies is now available with additional upgrades under development. TRAC will operate and maintain the system for another year. This was funded by partners in the public and private sectors.

Contributing to the virtuous innovation lifecycle

The work of the Mobility Innovation Center is designed to provide partners and supporters of each project a shared win that solves their problem through applied research. The goal is to provide new opportunities for a researcher to take what they've developed and leverage [CoMotion's](#) innovation resources and training to take the next step on their innovation journey.



Professor Hyun Woo "Chris" Lee from the Department of Construction Management is in the I-Corp Customer Discovery program to further his innovation related to tools to help with transportation electrification. He has worked on two Mobility Innovation Center projects: Mobility Hubs Electrification, and Public-Private Partnerships for Bus Base Electrification.



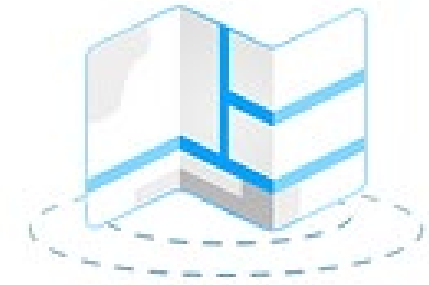
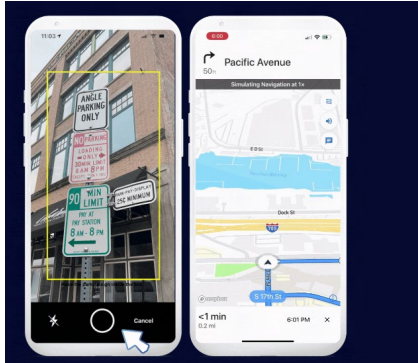
We partner with the UW community on their innovation journey, providing tools, connections, and acumen to transform ideas into economic and societal impact.



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Partners in Innovation – Startups and Spinouts

The Mobility Innovation Center works closely with early-stage startups and spinouts from the University of Washington and connecting innovators with industry partners to develop pilots and aid in user needs. This takes the technology out of the lab and into the real world to test and evaluate the latest transportation research.



SmartStreets – Curbside Management: Developed by Professor Wei Cheng from UW Tacoma, this work uses dash and traffic camera images and artificial intelligence to identify and inventory parking restrictions for cities to manage their curb space and provide the information for drivers to limit circling. This year, the National Science Foundation provided funding to continue developing this tool, which is being tested in Las Vegas and Bellevue.

Traffigram – Developed out of data visualization research by Professor Cecilia Aragon from UW Human Centered Design & Engineering, Traffigram strives to help people make better travel choices with distance cartograms. Even though two routes may look similar on a conventional map program, their software highlights the quickest way to reach their destination through an augmented map with real-time travel information for easier, quicker decision making. The team recently won a grant from the Washington Research Foundation and is competing for additional funds from the National Science Foundation.



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Expanding collaboration with campus partners



TechAlliance



The Mobility Innovation Center continued to be a connector for the private sector, public agencies, and academia with director Bart Treece chairing the Pacific Northwest Transportation Consortium (PacTrans) Conference at the University of Washington in October.

The well-attended event included sessions from WTS, ITS Washington, the Institute of Transportation Engineers, and UW's College of Built Environments.

- Topics: Digital Twins, AI, Innovation in transportation, electrification, Smart Cities
- Keynote featuring Laura Ruderman from the Washington Technology Alliance



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New initiatives in 2024



Unified Control Center

How does Sound Transit operate an expanded system without building additional facilities? Research Scientist Sonia Savelli, co-director of the Center of Collaborative Systems for Safety and Regional Resilience (CoSSaR), will lead a 12-month project to evaluate new ways to operate the system of the future.

Connected-Autonomous Vehicle Test Beds

With the emergence of connected and autonomous vehicles, cities are trying to find the best ways to work with the industry with goals of safety and efficiency for all users of the road. In partnership with the Washington D.C. Department of Transportation and the Seattle Department of Transportation, the Mobility Innovation Center will launch two test beds to evaluate sensing equipment and compare with data from AV companies. The research will be led by Professor Xuegang (Jeff) Ban from the Intelligent Urban Transportation System labs at the University of Washington.



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A shared vision

To ensure a robust economy and quality of life for the region, Seattle needs an integrated transportation system that is reliable, safe, environmentally sustainable, forward-facing, equitable, and accessible.

The Mobility Innovation Center brings together the knowledge, talents, and expertise of the University of Washington and private and public sector partners to solve real-world challenges facing our transportation system.

To accomplish our vision, everyone must be part of the solution.

The Center is truly grateful for the support of our partners. We look forward to continuing our progress into the new year and beyond!



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Thank you!



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