



May 2024

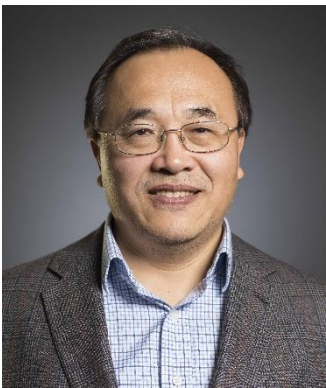
TRAC e-News: Delivering Research Results!

The Washington State Transportation Center (*TRAC*), conducts transportation research through collaborative partnerships among WSDOT, the University of Washington (UW), and Washington State University (WSU).

In this issue

- Welcoming Yinhai Wang as new TRAC-UW Director
- Assessing the ability of airports to deliver electricity for electric aviation
- Investigating digital twin technology for bridge assessment
- Comparing innovative transit approaches for disadvantaged communities
- Optimizing the use of recycled materials in asphalt concrete (RAP)
- Developing rapid, cement-based repair materials for concrete panels
- Recent WSDOT Webinar Wednesday presentation

Yinhai Wang is appointed new TRAC-UW Director



Dr. Yinhai Wang has been appointed the new Director of TRAC at the University of Washington. Wang is a professor of transportation engineering in the UW Department of Civil and Environmental Engineering. He is founding Director of the UW Smart Transportation Applications and Research Laboratory (STAR Lab). He also serves as Director for the Pacific Northwest Transportation Consortium (PacTrans), a USDOT University Transportation Center for Federal Region 10, and Director of the Northwestern Tribal Technical Assistance Program (NWTTAP) Center.

Wang looks to continue TRAC's 40-year tradition of excellence in transportation research, coordinating both public and private research efforts, developing research opportunities both locally and nationally, and maintaining and growing the links among government agencies, university researchers, and the private sector.

For over 20 years, Wang's research has been dedicated to developing new traffic sensors, data quality control algorithms, big data analytics tools, data-driven methods, and data management solutions to support the research and practical needs of traffic operations, traffic safety, urban mobility, and connected/automated vehicle deployment. In 2023 he was elected to the Washington State Academy of Sciences for "pioneering contributions to traffic sensing, transportation data science, edge AI, and smart infrastructure system theory and technologies, as well as exceptional leadership in regional collaborations among academia, industry, and agencies for creating transformational mobility solutions."

Wang has served on multiple committees for the Transportation Research Board, American Society for Civil Engineers, and IEEE Smart Cities and has served as an editor for three transportation engineering journals. He

has a Ph.D. in transportation engineering from the University of Tokyo (1998), a master's degree in computer science from the UW, and another master's degree in construction management (1991) from Tsinghua University in China.

Airports

Assessment of electric utility capacity to deliver electricity for electric aviation at Paine Field and Grant County International Airport

Research team: [Don MacKenzie](#) (UW) | [Daniel Malarkey](#) (UW) | [John MacArthur](#) (WSDOT) | [Jon Peterson](#) (WSDOT)

Sponsor: WSDOT

Report: [WA-RD 918.1](#)

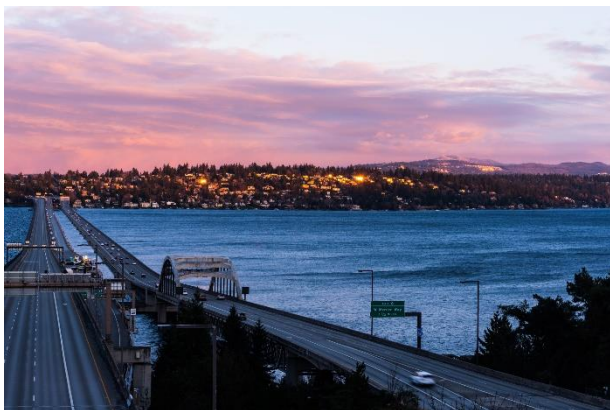
Completed: When electric aircraft become more widely used, will regional airports in Washington state have the electrical capacity to support them? This study developed a method to estimate the plausible future energy and power demands of electric aircraft

operating at regional airports in Washington to determine whether the electricity grid near those airports will have the capacity to serve the aircrafts' energy needs over the next one to two decades. The researchers applied the method to two regional airports, Paine Field in Everett, Washington, and Grant County International Airport near Moses Lake, Washington. Given the capacities reported by the local electric utilities serving those airports, the researchers determined that there will be enough electric capacity at the neighboring substations to meet the demand for electricity over the next decade. Experience gained in the first decade of commercial electric aircraft deployment at these airports will help inform future analyses into whether local grid capacity will eventually support or impede the growth of electric aircraft charging. [Read more...](#)



Bridges

I-90 digital twin bridge proof of technology evaluation



Research team: [Bart Treece](#) (UW) | [Travis Thonstad](#) (UW) | [Nick Rodda](#) (WSDOT) | [Mustafa Mohamedali](#) (WSDOT)
Sponsors: WSDOT/Washington State Transportation Innovation Council | Challenge Seattle

Ongoing: Agencies that own transportation infrastructure such as bridges, dams, and marine terminals need validated, science-based tools to inform crucial decisions regarding the maintenance, repair, and operation of that infrastructure. This proof-of-technology project is evaluating the benefits, limitations, and tradeoffs that an agency can expect when

using digital twin technologies for asset management. A digital twin is a virtual representation of an object or system designed to accurately reflect a physical object, including its functionality, features, and behavior. For this project, researchers are positioning sensors, the data from which will feed digital twin models, on the I-90 Homer M. Hadley Memorial Bridge between Mercer Island and Seattle, one of the most complex bridges in the world. The resulting analyses should provide insights into the realistic capabilities of digital twins and how the technology may be helpful to transportation agencies in stretching preservation dollars and staff resources. [Read more...](#)

Multimodal Travel

Improving mobility for disadvantaged communities through innovative transit approaches: a comparative cost evaluation

Research team: [Qing Shen \(UW\)](#) | [Justin Nawrocki \(WSDOT\)](#) | [Jon Peterson \(WSDOT\)](#)

Sponsor: WSDOT

Ongoing: Transportation planners and policymakers need an effective and flexible method for estimating and comparing the costs of increasing transit access to more people, especially those living in urban peripheries or rural areas. This research is comparing the costs of three alternative approaches to improving mobility and accessibility for residents of several representative communities located outside of a major metropolitan area or in a rural area. Those alternatives are driving a car, taking a bus on a fixed route connecting directly to a destination, and using transit that incorporates mobility on demand (TIMOD) service provided through partnership between local transit agencies and ride-hailing companies. To conduct this comparison, the research team is developing a standardized method for the state, transit agencies, cities, counties, and non-profits to use in comparing the costs and benefits of traditional and innovative public transportation solutions. This will allow them to more effectively make decisions about allocating limited funding for different transit operations challenges. [Read more...](#)



Pavements



RAP reset—responsibly optimizing recycled materials use in asphalt concrete and pavement performance life

Research team: [Stephen Muench \(UW\)](#) | [Joe DeVol \(WSDOT\)](#) | [Jon Peterson \(WSDOT\)](#)

Sponsor: WSDOT

Report: [WA-RD 912.1](#)

Completed. The WSDOT has successfully used recycled asphalt pavement (RAP) since the mid-1970s. This project sought to improve the durability and

performance of asphalt concrete pavements in Washington state that contain recycled materials by helping WSDOT enhance its asphalt concrete materials selection, mix design, and standard specifications. The scope of the project included a literature review, an assessment of the supply of reclaimed asphalt material (RAM) in the state, a statewide comparison of performance data from low and high RAM usage to determine whether differences were observed, and evaluation of raw materials and field mixtures. It involved evaluation of laboratory mixed-laboratory compacted samples, field mixed-laboratory compacted samples, and field cored samples, as well as statistical analysis of results. The study's recommendations should allow WSDOT to responsibly optimize its use of recycled materials, given readily implementable technologies, in collaboration with industry stakeholders. They will help WSDOT modify its overall recycled materials strategy so that it can be informed by current national best practices, take into account observable local issues and test results, and lead to more durable HMA pavements. [Read more...](#)

Development of rapid, cement-based repair materials for Washington concrete pavement panels

Research team: [Fred Aguayo \(UW\)](#) | [Travis Thonstad \(UW\)](#)
| [Karen Carlie \(WSDOT\)](#) | [Mustafa Mohamedali \(WSDOT\)](#)
Sponsor: WSDOT

Ongoing: When concrete pavement panels must be replaced in congested, urban areas, speedy construction that quickly opens the roadway to traffic is paramount. This project focuses on evaluating potential materials, mixture proportions, and placement techniques for rapid concrete panel repair in Washington state. The research team is evaluating the key technical characteristics that govern rapid and durable repairs for concrete pavement panels through both a comprehensive laboratory-based program and a field component. On the basis of the findings, they will provide recommendations on the most efficient, economical, and durable rapid concrete repair materials and methodologies, and they will develop specifications and training materials for WSDOT. The results should allow WSDOT to maximize the lifespan of its concrete pavements while limiting construction costs and traffic impacts by avoiding full-lane rehabilitation. [Read more...](#)



Webinar Wednesdays

WSDOT's [Research & Library Services Office](#) hosts Webinar Wednesdays, its continuing series of one-hour webinars to promote research technology transfer, encourage implementation, and foster innovation. Generally held every other month, the sessions cover a wide range of transportation topics. Each webinar showcases research results or innovative practices presented by researchers and subject matter experts, and each features a Q&A segment for attendees to pose questions.

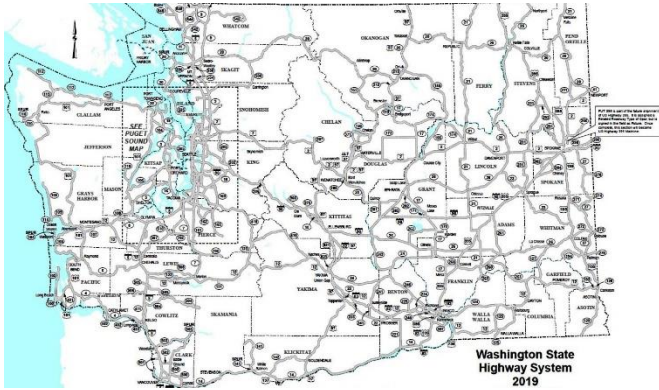
[Sign up here](#) for webinar announcements and registration information. [Previous webinars are available for access here.](#)

Below is information about WSDOT's most recent research webinar:

[We Heard Ya!—Community Engagement and Washington's Highway System Plan \(April\)](#)

Presenters: Jeremy Jewkes, WSDOT Statewide Planning Manager | Mark Hallenbeck, Director (retired)
Washington State Transportation Center

[Access the recording](#)



Community engagement was one of the primary drivers for recommendations in WSDOT's Highway System Plan. Residents, businesses, and travelers in Washington are all affected by transportation funding decisions. Consequently, it makes sense to understand their preferences and viewpoints! This presentation dives into the decision to use robust community engagement, the factors that influenced which tools to use, and the ways that community input ultimately fed into the funding recommendations in the Highway System Plan.

The topic for the June 2024 webinar will be **Wildlife Rapid Detection and Identification Using AI**. [Subscribe to the email list](#) to receive the announcement and registration information, coming soon!

[Upcoming email change](#)

For the next issue, the TRAC e-News will be sent from a new email address, tracnews@tracuw.org. This is intended to help prevent our email from landing in your Spam folder. Please be sure to add this address to your address book or safe senders!

TRAC e-News will be delivered about three times a year. For more information about TRAC and the groundbreaking work we are doing, please visit our [Current Projects](#) and [Research News](#) pages. A downloadable, pdf version of [this newsletter](#) is also available.

For contact information, follow these links:

- [WSDOT Contacts](#)
- [UW Contacts](#)
- [WSU Contacts](#)

The Washington State Transportation Center (TRAC) is a cooperative, interdisciplinary transportation research agency. Its members, the Washington State Department of Transportation (WSDOT), Washington State University (WSU), and the University of Washington (UW), formed TRAC in 1983 to coordinate transportation research efforts—both state and commercial, public and private—and to develop research opportunities both nationally and locally. TRAC acts as a link among government agencies, university researchers, and the private sector.

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