



Semi-Annual Progress Report #14

<b>Federal Agency</b>	U.S. Department of Transportation
<b>Federal Grant Number</b>	69A3551747109
<b>Project Title</b>	Pacific Southwest Region 9 University Transportation Center (UTC)
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<b>Name of Submitting Official, Title and Contact Information</b>	Same as above
<b>Submission Date</b>	4/30/2024
<b>DUNS/EIN Numbers</b>	072933393 / 95-1642394
<b>Recipient Organization</b>	University of Southern California Department of Contracts and Grants 3750 S. Flower St. CUB 325 Los Angeles, California 90089-4019
<b>Recipient Identifying Number if any</b>	USC Account #: 53-5701-7109
<b>Project/grant Period</b>	11/30/2016 – 09/30/2024
<b>Reporting Period End Date</b>	03/31/2024
<b>Report Term or Frequency</b>	Semi-Annual. This report covers the period from October 1, 2023 to March 31, 2024 per Exhibit D, Grant Deliverables and requirements for 2016 UTC Grants
<b>Signature of Submitting Official</b>	

**Contents**

- 1. [Accomplishments](#)..... 2
  - A. [Research Accomplishments](#) ..... 2
    - i. [Research dissemination](#)..... 5
    - ii. [Plans for next reporting period](#) ..... 10
  - B. [Educational Accomplishments](#)..... 10
    - [Student Programs](#) ..... 10
    - i. [Workforce development](#) ..... 10
    - ii. [Education and Workforce Development goals for next reporting period](#) ..... 12
  - C. [Outreach Accomplishments](#)..... 12
    - i. [Outreach plans for the next reporting period](#)..... 13
- 2. [Participants & Collaborating Organizations](#)..... 13
  - A. [Financial support](#)..... 13
  - B. [Other support](#) ..... 14
    - [Additional Support](#)..... 14
  - C. [Collaborations](#)..... 15
- 3. [Outputs](#) ..... 16
  - A. [Websites](#) ..... 16
  - B. [New methodologies, technologies, or techniques](#) ..... 17
  - C. [Other products](#)..... 17
- 4. [Outcomes](#)..... 17
- 5. [Impacts](#)..... 20
- 6. [Changes/Problems](#) ..... 20
- 7. [Special Reporting Requirements](#)..... 20
- 8. [Appendix A](#) ..... 21

## 1. Accomplishments

### Major goals of the program

The Pacific Southwest Region UTC (PSR) addresses the transportation issues of Region 9 through an integrated, multidisciplinary program of research, education, and technology transfer aimed at FAST Act research priority area 1: improving the mobility of people and goods throughout the region. The goal of PSR is to improve passenger and freight transportation throughout Region 9.

Our consortium of universities and community colleges, together with partnerships with state Departments of Transportation (DOTs), Metropolitan Planning Organizations (MPOs), and industry leaders, forms a comprehensive, region-wide network. The University of Southern California (USC) leads the consortium. Partners include California State University Long Beach (CSULB); University of California, Davis (UCD); University of California, Irvine (UCI); University of California, Los Angeles (UCLA); University of Hawai'i at Manoa (UH); Northern Arizona University (NAU); and Pima Community College (PCC). USC and CSULB are both partners in the METTRANS Transportation Center, the entity that houses the PSR UTC.

### Accomplishments under these goals

Our accomplishments are categorized under research, education, and outreach.

#### A. Research Accomplishments

The goal of our Center is to address regional issues and provide public policy advisement, technical assistance to state and local agencies, and innovative workforce development strategies. Our multi-modal, multi-disciplinary research program is organized around four themes that are covered in our previous SAPR.

Our research program has three parts: 1) research conducted by PSR faculty; 2) research conducted by researchers inside or outside PSR but within Region 9; and 3) a graduate research fellowship program. We have reserved a small pool fund for a Region 9-wide solicitation with the purpose to promote broader participation across the states and territories.

The total research project and white paper count for PSR is 160. We have funded 6 regional pool fund projects at UC Santa Barbara and 4 at UC Riverside, the remainder of the projects are based at PSR-member institutions. PSR partners have now completed a total of 143 research projects and white papers.

**Table 1: Projects Completed during current reporting period.**

**Note on Funding Sources: DOT= DOT funded**

Partner	Project No.	PI	Title	Funding Source
USC	PSR 22-12	Petros Ioannou	Systematic and Provably Safe Design Methodology for Connected and Autonomous Vehicles	DOT
USC	PSR-21-SP80 TO 042	Genevieve Giuliano	Implementation of Action 6 of CSFAP Phase 4 Tracking Economic Competitiveness	Caltrans
UH	PSR-21-72	Qi Chen	Sketch Planning Tool for Sustainable and Resilient Urban Goods Distribution: User Manual	DOT
UCD	PSR-22-48	Miguel Jaller	Sketch Planning Tool for Sustainable and Resilient Urban Goods Distribution: User Manual	DOT
USC	PSR-22-19	John Gunnar Carlsson	Continuous Approximation Models with Temporal Constraints and Objectives	DOT

PSR research accomplishments:

- Dr. Qi Chen (**UH**) completed project, “Rapid and Accurate Assessment of Road Damage by Integrating Data from Mobile Camera Systems (MCS) and Mobile LiDAR Systems (MLS): Can we get the best of both worlds.”
- During the reporting period, **UCD** completed one cost-share research project (funded by the California Air Resources Board) came to an end during the reporting period. The report, “Post-Covid Transportation Scenarios: Evaluating the Impact of Policies” was finalized and published by CARB.

UCI also awarded two dissertation fellowships during this reporting period.

- Henry Bernal, Ph.D. Economics
- Negin Shariat, Ph.D. Civil & Environmental Engineering

One of **UCLA’s** faculty research projects, “**Student Transit Programs and Other Modes to School,**” match funded by Caltrans, is approximately 43 percent complete. To date, the project team has completed a draft literature review of school travel behavior and student public transit use, designed a stratified random sample of 120 school districts to analyze (25 large districts, 75 randomly-selected districts, and 20 transit-rich districts), piloted the collection of available transportation resources to students in a sample of California school districts (pilot of 10 districts; overall sample of 120 districts), and piloted the analysis of alternate modes of travel to and from school for a sample of dummy address data using the Google Directions API (in preparation for the travel survey sample of 2,518 trips). This progress comes after the project experienced substantial data acquisition challenges and delays due to a change in Caltrans procedure that limited access to required data and software to complete this project. (Issues have now been resolved, and a no-cost extension has been requested.) The team has submitted the project for presentation at the annual conference of the Association of Collegiate Schools of Planning (ACSP) and intends to submit a full paper for the Transportation Research Board Annual Meeting in 2025.

**Match funding**

PSR has the following match funding priority rankings: new funding, match from other existing research projects, and in-kind match. It is important to note that we have met our match. The University of California partners continue to have access to state funding through SB1, which increased the California fuel tax by 12 cents per gallon. A portion of SB1 funding is allocated to the UC Institute of Transportation Studies (ITS). UCD, UCLA, and UCI are part of ITS and receive SB1 funds. Some of these funds are used for PSR match. ITS is funded in-part by the state of California, as well as by Caltrans research contracts. There are several statewide research collaborations taking place through ITS. The California partners continue to award funding via Caltrans, who has committed to a 50% match for PSR. USC has obtained additional research funding from foundations, local industry, and agencies for specific projects. NAU continues to receive in-kind match funding from the Arizona Board of Regents Research Innovation Fund for research aimed at increasing freight safety and mobility along the I-10 corridor. UH requires each research project to provide its own match; the match is mainly in-kind. [Table 2](#) shows match funding sources and amounts.

**Table 2: Match funding sources for PSR (as of September 2023)**

Fund source	Amount
USDOT total for PSR	\$15,584,200.00
Caltrans match funding for PSR	\$4,912,339.00
Other match funding for PSR	\$14,370,796.00
Total match funding, all sources for PSR	\$19,283,135.00

**Student opportunities for research**

Student support is an important component of research project selection. Highlights of how PSR has supported students:

**PCC’s** Integrated Basic Education and Skills Training (IBEST) students all passed their permit testing and moved on from their theory training to behind the wheel training in October 2023. A primary goal of the rewrite was to add new technology, including H5P, to make the course as interactive as possible for the students to enhance their learning.

For this period, as this grant winds down, **NAU** continued supporting undergraduate and graduate transportation students through paid internships, fellowships, as well as engage in outreach activities. Furthermore, during this reporting period, their big events was attending the Transportation Research Board (TRB) annual meeting (three faculty and five students) with funding split between the BIL grant and the FAST grant. While at TRB, NAU’s group had a total of eight presentations at TRB, seven of which were on work funded by PSR. As a research group, Dr. Gehrke continued his work on one FAST- funded project during this reporting period, entitled “Evaluation of Transportation Safety and Security Barriers in Bicyclist Accessibility”.



NAU students and faculty at the 2024 Annual Meeting of the Transportation Research Board, Washington, DC

**NAU** continues to contribute through their undergraduate and graduate research interns, as well as their fellowships. During this reporting period, they had the following ITE in-person seminars:

1. 10/11/23: Estella Hollander, Mobility Planner for Mountain Line Transit
2. 10/25/23: Steven Gehrke, Assistant Professor at Northern Arizona University in the Department of Planning and Geography
3. 11/08/23: Erin Stam, Director of University Transit Services, Northern Arizona University
4. 01/31/24: Edward Smaglik, Professor at Northern Arizona University in the Department of Civil Engineering, Construction Management, and Environmental Engineering
5. 2/14/24: Sam Taylor, Senior Transportation Engineer at the City of Scottsdale
6. 2/28/24: Nate Reisner, Assistant County Engineer for Coconino County, AZ

### **Additional accomplishments**

#### **i. Research dissemination**

Dissemination of our research results takes place via research reports and research briefs, scholarly publications, popular publications, conference presentations, and media. Numerous PSR researchers present at conferences and seminars throughout the region, nationally, and internationally. Projects that are funded by Caltrans require the PI to present findings to a panel of practitioners, and particularly to Caltrans personnel.

#### **Dissemination highlights**

Completed final reports and research briefs are available on the PSR research website at <https://www.mettrans.org/mettrans-research>.

**USC METRANS** hosted four PSR funded METRANS Research Seminars during the reporting period. Recordings of the seminars are available via the links below.

- Roadblocks, Rush Hour, Rainstorms: Can a Self-Driving Car Really Handle It All? Petros Ioannou, USC, University Professor of Electrical and Computer Engineering, Aerospace and Mechanical Engineering, and Industrial and Systems Engineering
- Clean Air for All: A Conversation with Chair Delgado from the South Coast Air Quality Management District, Vanessa Delgado, Chair, South Coast Air Quality Management District Board of Directors
- Resilient by Design: Simulating Street Network Disruptions Across Every Urban Area in the World, Geoff Boeing, USC, Assistant Professor of Urban Planning and Spatial Analysis
- A Conversation with Uber’s Director of Global Policy for Cities and Sustainability, Shin-pei Tsay, Director of Global Policy for Cities and Sustainability, Uber



**METRANS**  
**SPRING 2024**  
SPEAKER SERIES

March 20, 2024  
12 - 1 PM PST

**CLEAN AIR FOR ALL: A CONVERSATION WITH SCAQMD'S CHAIR DELGADO**

Zoom <https://usc.zoom.us/j/98793874966>

University Gateway Village (UGV), 100B

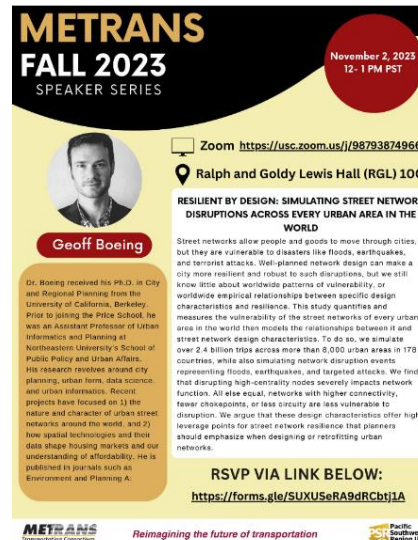
**Vanessa Delgado**

South Coast Air Quality Management District is responsible for controlling air quality for all of Orange County, urban portions of Los Angeles, Riverside, and San Bernardino counties, impacting the quality of life of over 16.8 million people. The Governing Board adopts policies and regulations to promote clean air in the region. Vanessa Delgado was sworn onto the Governing Board in May 2019, after serving as a State Senator and Mayor of the City of Montebello. Join Chair Delgado on January 24 and learn more about AQMD's regulatory work!

RSVP VIA QR CODE OR LINK BELOW:  
<https://forms.gle/mf6s33H2pFBoz2Rf68>

Lunch will be provided.

METRANS Reimagining the future of transportation Pacific Southwest Region UTC



**METRANS**  
**FALL 2023**  
SPEAKER SERIES

November 2, 2023  
12 - 1 PM PST

Zoom <https://usc.zoom.us/j/98793874966>

Ralph and Goldy Lewis Hall (RGL) 100

**RESILIENT BY DESIGN: SIMULATING STREET NETWORK DISRUPTIONS ACROSS EVERY URBAN AREA IN THE WORLD**

**Geoff Boeing**

Street networks allow people and goods to move through cities, but they are vulnerable to disasters like floods, earthquakes, and terrorist attacks. Well-planned network design can make a city more resilient and robust to such disruptions, but we still know little about worldwide patterns of vulnerability, or worldwide empirical relationships between specific design characteristics and resilience. This study quantifies and measures the vulnerability of the street networks of every urban area in the world then models the relationships between it and street network design characteristics. To do so, we simulate over 2.4 billion trips across more than 8,000 urban areas in 178 countries, while also simulating network disruption events representing floods, earthquakes, and targeted attacks. We find that disrupting high-centrality nodes severely impacts network function. All else equal, networks with higher connectivity, fewer chokepoints, or less circuitry are less vulnerable to disruption. We argue that these design characteristics offer high leverage points for street network resilience that planners should emphasize when designing or restricting urban networks.

RSVP VIA LINK BELOW:  
<https://forms.gle/SUXUSeRA9dRcbtj1A>

METRANS Reimagining the future of transportation Pacific Southwest Region UTC

Marlon Boarnet (**USC**) was on a panel hosted by the USC Gould Law School on Transportation Planning in Advance of the 2028 Los Angeles Olympics in February 2024, with the chair of the board of L.A. World Airports, Karim Webb, and the chief operating office of LA Metro, Conan Cheung, moderated by Chris Smith, Of Counsel, Mintz, Levin, Cohn, Ferris, Lovsky, and Popeo.

**USC** presented the following work and supported three students to travel at the Transportation Research Board in January 2024:

- Performance Evaluation of Ramp Metering under Different Traffic Measurement Scenarios,” by M. Pooladsanj, Z. Li, K. Savla, and P. Ioannou
- "Exploring the Effects of Monetary and Time Cost on Travel Mode Choice: A Study of Transit and Ridehailing in California", authored by Marlon, Qifan, and Clemens Pilgram.
- “Use of Parcel Lockers and Travel Behavior” by Jaehyun Ha, Genevieve Giuliano, Robert Binder, and Andrea Holmes

**USC** presented the following eight projects and supported two students to travel to the Association of Collegiate Schools of Planning conference in October 2023:

- “Computer-assisted Methods for Thematic Coding of Large-Scale Text Data in Urban Planning” by L. Madison, J. Harten and G. Boeing.
- “Improving the Accuracy of Intersection Counts and Density Measures of Urban Street Networks” by Y. Shou and G. Boeing.
- “Simulating Street Network Resilience and Robustness Around the World” by J. Ha and G. Boeing.
- “Where Greens Spaces are Efficient? Exploring Green Open Spaces Accessibility by Non-Motorized Transit Modes and Analysis of Street Networks Around Green Spaces” by D. Pugacheva and G. Boeing
- “Exploring the Effects of Monetary and Time Cost on Travel Mode Choice: A Study of Transit and Ridehailing in California” by Q. Shao, M. Boarnet and C. Pilgram
- “Leaving Gentrification Behind? The Geography of Moves Out of Gentrifying Areas in the San Francisco Bay Area” by A. Comandon, S. Rodnyansky and M. Boarnet.
- “New Open-Source Analyses of Transit Job Access and Transit Ridership” by J. Gross and M. Boarnet
- “Pathway Buffer Measures of Pedestrian Quality for the Entire United States” by C. Pilgram

**UCD’s** researchers presented on their PSR research at the 2024 PSR Congress at the University of Nevada, Las Vegas campus. (The PSR Annual Congress drew over 100 students, faculty, and professionals from across Region 9 and is described more fully in the BIL SAPR.) Several UC Davis researchers also presented on their PSR research at the Transportation Research Board’s 103rd Annual Meeting in January 2024. Their researchers also presented or had posters at the Institute of Transportation Studies Sustainable Transportation Energy Pathways (STEPS+) Fall 2023 Research Symposium in December 2023.

**NAU** presented work funded through this consortium at the following venues:

- Arizona Roads and Streets Conference, November 1<sup>st</sup>-3<sup>rd</sup>, 2023; Oro Valley, AZ
- North American Meetings of the Regional Science Association International, November 16, 2023; San Diego, CA
- Annual Meeting of the Transportation Research Board, January 12<sup>th</sup>-16<sup>th</sup>, 2024; Washington, DC
- PSR9 Annual Congress, March 11<sup>th</sup>-12<sup>th</sup>, 2024; Las Vegas, NV.
- 2023 ASCE/ASHE Annual Conference, September 28, 2023, Phoenix AZ.

**PCC** hosted the Advanced Program Manager attended the Mobilize Summit October 30 and 31, 2023 in Long Beach, California. The event is a showcase for the future of mobility technology and workforce training. Tracks included autonomous technology, workforce development, clean cities, and sustainable infrastructure.





Pictured above (two photos): PCC provided a tractor and staffing for Southern Arizona Construction Career Days, a 2-day event held November 14 and 15<sup>th</sup>. Approximately 4,600 students from 90+ high schools were expected to attend. The event had vendors from all trades with hands on activities available for the students. Students were able to climb into the tractor and see what it looks and feels like to be inside a tractor trailer cab.



Pictured above: PCC also attended a career day at Sunnyside High School on November 30, 2023. Pima brought a tractor to campus for the students to experience the inside of a big rig cab.

**UCI** continued its regular seminar series highlighting PSR work and PSR-related work by external researchers. These are listed below.

- 1/19/2024 - **Longitudinal Trajectories and Outcomes of Teens that Ride with Impaired Drivers & Drive Impaired (presented by Federico Vaca)**
- 11/17/2023 - **Early Findings of Consumer Interest in Bi-directional & Smart EV Charging (presented by Matt Dean)**
- 11/3/2023 - **Provably Safe and Human-like Car-following Model for Automated Vehicles (presented by Wenlong Jin)**

**Uriah Campos (UCI)** was named PSR undergraduate student of the year for summer work he conducted for the PSR-supported TURAP program. [See <https://www.its.uci.edu/index.php/node/670> for detailed content description].

The following **UCI** students received travel support to 2024 TRB from PSR to either attend or present research.

- Younghun Bahk - Poster 4071: Household Activity Pattern Problem with Automated Vehicle-Enabled Intermodal Trips; Younghun Bahk and Michael Hyland
- Henry Bernal - Attendee
- Uriah Campos - Poster 3058: Equitable Design of Shared E-Scooter and E-Bike Systems; Uriah Campos & Arash Ghaffar
- Siwei Hu - Lecturn 3127: Perspectives from Future Leaders; Siwei Hu and poster 2163: Policy and Equity Implications from an Urban Network Assignment Platform with Fair Peer-to-Peer Congestion Pricing; Siwei Hu, Pengyuan Sun, Daisik Nam, R. Jayakrishnan, Michael Hyland
- Pengyuan Sun - Poster 2170: An Eco-driving Algorithm with Two-Stage Advisory Speed Limits at Signalized Intersections; Pengyuan Sun & R. Jayakrishnan

### Media coverage

Marlon Boarnet (**USC**) was quoted LA Times in December, on the significance of the opening of a \$2 billion toll lane project in Orange County, <https://www.latimes.com/california/story/2023-12-01/new-express-lanes-in-orange-county-open-on-405-freeway>.

The white paper “Understanding and Responding to Homelessness in State Transportation Settings” by Anastasia Loukaitou-Sideris (**UCLA**), received media coverage, <https://usa.streetsblog.org/2023/02/23/three-ways-dots-can-help-the-unhoused-on-and-off-the-road>.

Evelyn Blumenberg’s (**UCLA**) project, “Student Transit Programs and Other Modes-to-School in California” was aired on KQED San Francisco, 28 March 2024 (<https://www.kqed.org/news/11982016/why-are-there-so-few-school-buses-in-california>). Interview with project manager Sam Speroni and information provided to reporter from public-use version of the project data.

ii. **Plans for next reporting period**

The next reporting period is April 1, 2024 through September 30, 2024. **We anticipate completing all remaining 17 projects during the next reporting period throughout the consortium.** A few projects have been delayed due to COVID and our Caltrans match funded projects had delayed starts while Caltrans extended their master contract with PSR. Because we have met and exceeded our match requirement for the FAST Act PSR UTC, the most recent delayed-start Caltrans projects (which began after June 1, 2023) will match the BIL PSR UTC and are reported in the SAPR for the BIL PSR. We have requested and received a no-cost extension to September 30, 2024. We will use that time to complete the PSR FAST Act center research agenda. Reports from partners on future work include:

**UCLA** plans on continue working on faculty research projects as planned.

During the next reporting period, **UCD** expects to finalize and publish three research reports and three research briefs for completed projects.

**CSULB** will develop a webinar on best practices for metropolitan planning organizations (MPOs) on communicating with community stakeholders, including GIS. The webinar was originally planned to be part of a National Freight Planning Conference via Caltrans that is no longer being held, so the webinar will be part of another broader upcoming event.

**UCI** researchers Roy and Saphores will continue working on their PSR match projects, which were funded during this reporting period. We will continue to host regular seminars and recruit students for our summer undergraduate student research Immersion program.

**B. Educational Accomplishments**

**PPC** presented a session at National Council for Workforce Education (NCWE) on October 4, 2023 entitled, “Co-Designing Integrated Education and Training to Expand Access to Career Training for New Majority Learners.” Presenters included Wendy Scheder Black, Jodi Perin and Missy Blair. The objectives of the presentation were to define new majority learners, outlines IET models, and information on the Commercial Driver License IBEST program where a CDL instructor and an adult basic education instructor work together with a cohort of students learning the English language in a contextualized transportation setting to assist them with obtaining their CDL. The session was well attended and attendees were engaged in the question and answer session.

**Student Programs**

i. **Workforce development**

**PPC** graduated the following students, earning their commercial driver license (CDL) graduates’ photos and stories are on the next page:



Thania B. obtained her CDL on October 9, 2023 and is researching her local job options.



Asaf Z. earned his CDL Class A license on October 29, 2023. Asaf is currently employed with Amazon and Upskilled in hopes of getting a commercial driving job with Amazon.



Reina M. graduated with her Class A CDL on November 5, 2023 and is looking forward to going over the road.

ii. Education and Workforce Development goals for next reporting period

During the next reporting period, PSR partners will continue to administer degree and non-degree training programs to a broad array of students.

C. Outreach Accomplishments

PSR conducts many outreach efforts that have been described in past SAPRs. Ongoing outreach activities include: **CSULB CITT Center Updates**, bimonthly e-blasts to industry/academia consisting of brief articles covering relevant Center activities with a focus on the freight sector and workforce development; **Logistics Peer Exchange** (CSULB), a peer exchange on best practices in regional freight planning and coordination; **METRANS on the Move** (USC), this is a weekly e-newsletter written and produced by USC students with staff guidance; **Mobility Matters** (CSULB), a CITT podcast series dedicated to addressing mission-critical issues facing the professionals who design, develop, operate, and maintain mobility systems.

**METRANS News:** During this past reporting period, USC METRANS and CSULB continued newsletter issues, with newsletters published in October and December of 2023 and January, March, and April 2024. The newsletters summarize a completed research project in lay terms for workforce and professional audiences. The newsletters also cover events and more. METRANS News also summarizes outreach activities and includes coverage of NCST- and PSR-funded projects and activities. It is distributed to 2219 scholars, students, staff at Caltrans, USDOT, UTCs and faculty throughout the U.S., to federal, state, and local public and private agencies, and to industry. The average open rate for all the newsletters for this reporting period was 66.55%, which is higher than Constant Contact's overall

average of 35%. The range for a good open rate is 15-25%, and the newsletter's open rate slightly exceeds this range. The monthly newsletters are archived [here](#).

The focus of information dissemination for both **METRANS** and **CITT** emphasizes **LinkedIn** over other forms of social media. With the launch of the CA LTAP Center at CITT, efforts took place to launch a LTAP social media presence. CA LTAP has established a regular email newsletter and social media posting schedule and launched a LTAP website in the fall of 2022.

### ***Transfers Magazine:***

Transfers Magazine did not publish during this reporting period. The website [www.transfersmagazine.org](http://www.transfersmagazine.org), which also features regularly updated blogs with transportation-related news, research and events, had more than 25,000 page views during this six-month period, which increased from the previous six-month period. Most of our web traffic peaks in the two- to four-week period immediately after publishing an issue. The Transfers team has worked to create a social media content calendar to maintain promotion of the issues throughout the full period between issues, and has developed short videos as another means of expanding the magazine's audience. The goal of the magazine is to translate the research of faculty, staff, and students at the PSR campuses into highly accessible content for an audience of elected officials, transportation planners, members of the media, and the general public.

#### **i. Outreach plans for the next reporting period**

The PSR Advisory Council advises specifically on PSR, met in March 2024 at the PSR Annual Congress, and will reconvene in July to link our stakeholders to research projects selected for funding. Members of the PSR Advisory Council include representatives from state DOTs, MPOs, local governments, tribal organizations, transportation service providers, non-profit organizations, and the goods movement industry. The Advisory Council provides overall policy guidance to the PSR Center and helps to support its fundraising and development efforts. Please click [here](#) for a list of our Advisory Council members. The METRANS Advisory Board, which advises METRANS on all its activities extending beyond PSR, will convene next in July also.

## **2. Participants & Collaborating Organizations**

Participants contribute to the work of the PSR through financial or other support, or directly in research, education, or technology transfer. Collaborating organizations participate in Center activities, provide advisement, or support the center.

### **A. Financial support**

Over the course of the grant, these are among the entities who provided match funding for PSR research projects:

- Bosch LCC
- California Community Foundation
- California Department of Transportation (Caltrans)
- California Strategic Growth Council
- Chan Zuckerberg Initiative

- Los Angeles County Metropolitan Transportation Authority (LA Metro)
- Los Angeles World Airports (LAWA)
- Port of Long Beach (POLB)
- South Coast Air Quality Management District (SCAQMD)
- Southern California Association of Governments (SCAG)
- State of California
- Volvo Research and Education Foundation (VREF)

### B. Other support

The following organizations provide indirect or in-kind support to PSR:

- **California:** AECOM (Los Angeles); Alliance for Community Transit; Amtrak Capitol Corridor; California Energy Commission (CEC); California Transit Association; Caltrans Office of Earthquake Engineering, Analysis and Research; City of Anaheim; City of Anaheim; City of Davis; City of Santa Clara; Cool Davis; Council of Supply Chain Management Professionals (CSMCP); Fehr & Peers; Foothill Transit; Gateway City Council of Governments; Governor’s Office of Business and Economic Development (GO-Biz); HDR; International Longshoremen and Warehousemen’s Union (ILWU) Local 13; Investing in Place (Los Angeles); Kiwi Inc.; Long Beach Transit; Long Beach Unified School District; Los Angeles Department of City Planning; Majestic Realty; MetroLink; Nixon Peabody; Orange County Transportation Authority (OCTA); Port of Los Angeles; San Francisco Metropolitan Transportation Commission; San Francisco Municipal Transportation Agency; Santa Clara County Assessor’s Office; Southern California Association of Governments (SCAG); Southern California Edison; Toole Design Group; Tree People/Climate Resolve (Los Angeles); UC Davis Feminist Research Institute; UC Davis Policy Institute for Energy, Environment, and the Economy; UC Davis Road Ecology Center; UC Institute of Transportation Studies (UC-ITS); Watson Land Company; Yusen Terminals LLC
- **Arizona:** Arizona Board of Regents, Chamberlin Group, Pima Association of Governments, Northern Arizona University, Southern Arizona Anti-Trafficking United Response Network (SAATURN)
- **Hawaii:** National Disaster Preparedness Training Center (NDPTC), University of Hawaii
- **Others:** Federal Highway Administration; King County Metro (Seattle, WA); staff from state DOTs in California, Colorado, Maine, Minnesota, Nevada, and Virginia.

### Additional Support

PSR has a tremendous network of partners as noted above and in past SAPRs. Additional supporters include: **Council of University Transportation Centers (CUTC)**, Thomas O’Brien (CSULB) completed his tenure as president of CUTC and Genevieve Giuliano (USC) is a past president and past executive committee member, and Susan Handy (UCD) is a member of the board; **Institute of Transportation Studies (ITS)** (UCD, UCI, UCLA), provides match funding and other resources; **MetroFreight Center of Excellence** (USC, CSULB), METTRANS is the home of the Volvo Research and Education Foundation (VREF) Center of Excellence on urban freight and offers many opportunities for international collaboration and partnerships; **National Center for Sustainable Transportation (NCST UTC)** (UCD, USC), strengthens and expands our work in sustainable freight transport; **Southwest Transportation Workforce Center** (CSULB), provides significant infrastructure and professional capacity in support of workforce development programs for PSR; **The Center for International Trade and Transportation** (CSULB), uses its

media and social media channels to announce events and other opportunities to a network of students and industry and government partners; **TuSimple** (PCC), offers program support and priority hiring to graduates; **UCLA Lewis Center for Regional Policy Studies**, provides workspace and matching funds researchers and staff at UCLA ITS; **Velodyne Lidar** (UCL), provided a donation of two LiDAR units that are supporting current graduate student fellowship and faculty research projects. The following **METRANS Associates** provide additional financial support: LA Metro, Majestic Realty, Port of Long Beach, Western States Petroleum Association, Metrolink, Southern California Association of Governments, WSP USA, Los Angeles World Airports, San Diego Association of Governments.

### C. Collaborations

PSR has an extensive network of collaborations with academic, public and private organizations. Many of these have been described in past SAPRs. Ongoing collaborations include: **California Department of Transportation**, an important match funder, **Arizona Technology Park** (PCC), seeks to bring economic developers and academic researchers together to attract autonomous vehicle manufactures to southern Arizona; **Florida Atlantic University** (UH), engages in collaborative research on the use of visualizations to improve the understanding of sea level rise Impacts to transportation in FL and HI; **Maricopa Association of Governments** (NAU), continues to work on pilot evaluation projects with the **University of Arizona**; **Oregon State University** (NAU), partners on two research projects funded by the **Oregon Department of Transportation**; **University of Antwerp** (CSULB), developing an executive workshop that address pharmacological supply chains including the rollout of vaccines in the City of Long Beach.

During this reporting period, **UCD** collaborated with the UC Davis Feminist Research Institute.

**UCLA** collaborated with the **UCLA Lewis Center for Regional Policy Studies**: The Lewis Center provides workspace and matching funds to researchers and staff at the UCLA Institute of Transportation Studies. PI, Evelyn Blumenberg, for the PSR/Caltrans-funded project, “**Student Transit Programs and Other Modes to School**”, serves as the Lewis Center’s Director.

**NAU** collaborated with MAG (Maricopa Association of Governments). They have an ongoing partnership with MAG is ongoing, and have begun a new emerging technologies product evaluation and are scoping a second. Additionally, they are continuing to work on a task order to provide guidance to the city on implementation of LPIs (Leading Pedestrian Intervals) and other signalized intersection pedestrian treatments across the city and have begun work on a new task order to assist the City with configuration and evaluation of an Advanced Traffic Management System.

**NAU** has an IGA with the City of Scottsdale since we completed our first project funded by them in 2022, and have begun work on a new Scope of Work for a project focused on analyzing the operational impacts of left-in left-out median treatments during this period.

Internally at **NAU**, they have multiple collaborative efforts. They are continuing a collaboration with a faculty member in the Department of Geography, Planning, and Recreation, Steven Gehrke. During this period, Dr. Gehrke, Dr. Russo, and Dr. Smaglik concluded research activities on the UTC-funded project, “Evaluation of Transportation Safety and Security Barriers in Bicyclist Accessibility.” This project funded one full-time graduate research assistant and two part time undergraduate research assistants.



**NAU** also collaborated with multiple entities on a research project with the Arizona IAM entitled “A Scenario-Based Test Selection and Scoring Methodology for Inclusion in a Safety Case Framework for Automated Vehicles” which resulted in a paper accepted for publication with SAE this reporting period.

External collaborators include:

- Arizona State University (ASU) (Dr. Junfeng Zhao)
- Science Foundation of Arizona (Dr. Jeffrey Wishart)

**NAU** continues to collaborate with University of Arizona (Dr. Alyssa Ryan and Dr. Yao-Jan Wu) to assist the Arizona Department of Transportation (ADOT) with their safety management practices. During this reporting period, NAU had multiple meetings with the ADOT safety group to continue to advance these efforts with a goal to identify future projects to be funded by the ADOT safety group.

Furthermore, **NAU** has maintained our established relationship with the Arizona Institute of Automated Mobility (IAM). The IAM was established by the Arizona Governor in 2018 to provide technical guidance and coordination aimed at fostering the implementation of automated mobility across Arizona. The IAM is overseen by the Arizona Commerce Authority and is a consortium of academic institutions (NAU, University of Arizona, and Arizona State University), government agencies (Arizona Department of Transportation, Maricopa County Department of Transportation (MCDOT), Maricopa Association of Governments (MAG), and Arizona Department of Public Safety), and private industry. Dr. Russo began a sabbatical in August 2023 (continuing during this reporting period) working primarily with the IAM. As part of this effort, he completed a proposal to the USDOT which is a collaboration between NAU, UA, ASU, MAG, and MCDOT and which was submitted during this reporting period.

Lastly, **NAU** and Metroplan, the planning organization for the Flagstaff region, have finalized an IGA to allow Metroplan to hire NAU for engineering services and research work. At this point, we expect to start our first project on this, a corridor study of West Route 66 in Flagstaff, during the next reporting period.

### 3. Outputs

PSR outputs include publications, reports, papers, presentations, media, and others. Our target for peer-reviewed publications is 5 per year; our target for presentations is 10. During this reporting period, we have produced **25 peer-reviewed** journal publications and **52 presentations**. For a list of the publications, conference papers, and presentations, see [Appendix A](#). See [Table 1](#) for a list of project final reports that were published during the reporting period. For a full archive of METRANS research projects, which includes those for PSR, click [here](#).

#### A. Websites

The [PSR website](#) is the central, authoritative source of information regarding our center. Our consortium members also maintain additional sites that contain information relevant to PSR’s research and activities. Some of these sites are:

- CITT (CSULB): <https://www.cpie.csulb.edu/center-for-international-trade-and-transportation>
- eScholarship (UCD, UCI, UCLA): <https://escholarship.org/>
- ITS-Davis: <https://its.ucdavis.edu/>
- ITS-Davis eScholarship: <https://escholarship.org/uc/itsdavis>

- METRANS: <https://www.metrans.org/>
- NAU PSR UTC: <https://in.nau.edu/aztrans/psr-region-9/>
- Transfers Magazine (PSR flagship publication): <http://www.transfersmagazine.org/>
- UC Davis Feminist Research Institute: <https://fri.ucdavis.edu/>
- UC Davis Policy Institute for Energy, Environment, and the Economy: <https://policyinstitute.ucdavis.edu/>
- UCI ISERT conference: [www.its.uci.edu/isert2020](http://www.its.uci.edu/isert2020)
- UCI seminar series: [www.its.uci.edu/seminars](http://www.its.uci.edu/seminars)
- UCLA ITS YouTube channel: <https://www.youtube.com/c/UCLAInstituteofTransportationStudies/>
- UCLA ITS: <http://www.its.ucla.edu>
- UCLA Lake Arrowhead Symposium: <http://www.uclaarrowheadsymposium.org>
- Open access to UCLA Institute of Transportation Studies reports, capstone projects, and policy briefs: [https://escholarship.org/uc/ucla\\_its](https://escholarship.org/uc/ucla_its)
- UH website (includes posts on PSR research): <https://ndptc.hawaii.edu>
- UH Twitter: <https://twitter.com/uhpurl>
- UH Facebook: <https://www.facebook.com/UH.PURL/>
- NDPTC Twitter: <https://twitter.com/disasterctr>
- NDPTC Facebook: <https://www.facebook.com/disasterctr>
- NDPTC LinkedIn: <https://www.linkedin.com/company/18472899/admin/feed/posts/>
- PURL Twitter: <https://twitter.com/uhpurl>
- PURL Facebook: <https://www.facebook.com/UH.PURL>
- DURP Facebook: <https://www.facebook.com/UH.DURP/>

#### B. New methodologies, technologies, or techniques

#### C. Other products

**Anmol Pahwa and Miguel Jaller (UCD)** created a sketch planning tool for sustainable and resilient urban goods distribution [Dataset]. Dryad. <https://doi.org/10.5061/dryad.bk3j9kdjt>

#### 4. Outcomes

PSR's goal is to effectively and efficiently move research to practice so that new knowledge can be shared, acted upon, and contribute to a more efficient, sustainable, and equitable transportation system. We achieve our goal through technology transfer activities: events, communications, training, and client-based research. We define outcomes as any changes made to the transportation system, or its regulatory, legislative, or policy framework, resulting from research and development outputs.

In an effort to address the urgent necessity of developing a resilient and sustainable urban goods distribution system capable of efficiently recovering from high-severity disruptions, the recently completed **UCD**, "Development of Sketch-Planning Tool for Sustainable and Resilient Urban Goods Distribution," (report forthcoming) created a Sketch Planning Tool for Sustainable and Resilient Urban Goods Distribution tailored for local jurisdictions. The tool is based on a novel analytical model

previously developed by the same research team, the Robustness, Redundancy, Resourcefulness, and Rapidity - Last-Mile Distribution - Resilience Triangle (R4-LMD-RT) framework to address this challenge. The new tool assists in strategically planning urban goods distribution systems, identifying land use requirements, and proposing sustainable and resilient strategies, such as urban consolidation, micro-hubs, alternative delivery points, and zero-emission vehicles. As part of a case study, the authors validate the effectiveness of this planning tool by applying it to the city of Los Angeles for a COVID-19-like disruption. The outcome of this research paves the way for more sustainable and resilient urban goods distribution systems in the post-pandemic world.

UCD's researchers are using information from the PSR report, "Policies and Strategies for Cargo Bike Goods Movement in California", in a new industry partnership exploring urban goods movement which may lead to the deployment of a new technology. At this time, the partnership is under a non-disclosure agreement, but in the future, the researchers should be able to report on that progress as well. There is no evidence at this time that the report has influenced public policy, though.

**Andreas Molisch's (USC)** project, "Deep-learning-based radio channel prediction for vehicle-to-vehicle communications," addressed the complex task of CSI prediction using data from three distinct environments: the USC campus, downtown Los Angeles, and the I10 highway. Specifically, they introduced a new predictive model named SE-LSTM, crafted for the nuanced task of CSI sequence modeling. This model skillfully manages dependencies both within and between sequences by combining a Squeeze-and-Excitation (SE) module and an attention mechanism within an LSTM architecture. Its efficacy was demonstrated through various performance indicators (MSE, MAE, etc.), where it achieved results surpassing those of existing state-of-the-art methods. February 1st to 29th, 2024, they conducted cross-environment testing for our proposed method to assess its effectiveness across various settings. It was observed that all recurrent neural network-based methods are prone to cumulative errors in such tests. To address this issue, they introduced an innovative training approach called adaptive meta-learning. Their case studies confirmed that this method effectively reduces performance degradation in cross-geometry tests, keeping the performance loss within an acceptable margin. From March 1st to 30th, 2024, they applied the proposed training strategy to existing methods, such as ConvLSTM and PredRNN, and found through case studies that this strategy is effective for them as well, maintaining performance loss within an acceptable range. Furthermore, they assessed the computational complexity of all methods used, with the aim of evaluating their efficiency in practical scenarios. Measures of computational complexity included parameters, FLOPs, memory usage, as well as training and testing time. The findings indicated that the complexity of the proposed methods and certain existing methods like ConvLSTM is manageable for most devices, demonstrating their viability for practical applications.

**Cyrus Shahabi's (USC)** project, "Validation of Freight Volume Modeling on Major Highway Links," created a curated dataset subsetting the raw data within the ROI. Shahabi have started to label CCTV images in the ROI dataset and started to scope the requirements for building models of CCTV labeled images to develop and publish predictive freight volume estimation algorithms. He also examined the ROI dataset to understand how to apply the volume estimation algorithms on real world data.

**Jong-Shi Pang's (USC)** project, "A general traffic equilibrium framework with ridesourcing services that considers flow-dependent waiting time and public transit," completed the modeling of the public transit services, and the interaction with ridesourcing services. He has completed the development of the

solution algorithm for the general traffic equilibrium model and have started the experimental analysis task.

**Ketan Savla's (USC)** project, "Dynamic Incentive Design for Transportation Systems with Unknown Value of Time," used algorithms for real-time congestion pricing in routing games with unknown value of time, and unknown coefficients of link latency functions. Human subject experiments in progress to test the algorithms in laboratory setting. Additionally, Savla was appointed as a jury member of the Transportation Awards committee of the California Transportation Foundation (CTF).

**Petros Ioannou (USC)** focused on an automatic vehicle following *under predetermined preference parameters and road geometry constraints with Muhammad Waqas on their project, "Systematic and Provably Safe Design Methodology for Connected and Autonomous Vehicles"*.

**Anastasia Loukaitou-Sideris's (UCLA)** white paper, "Understanding and Responding to Homelessness in State Transportation Settings" was sent to Caltrans. The research and analytical methods have been developed and built upon in a funded research contract in progress, for which our research team is a subcontractor, for NCHRP 20-129: Guide for Addressing Encampments on State Transportation Rights-of-way.

**Evelyn Blumenberg's (UCLA)** project, "Student Transit Programs and Other Modes-to-School in California," hit the biggest milestone in the past quarter was resolving all data issues, with the help of Caltrans and NREL. This will not only benefit this project but a variety of other researchers across the users of TSDC, many of whom are using Caltrans-funded data. The project team is now able to conduct analyses using statistical software on which they have been trained and are able to access the Google Directions API to complete a key component of the project. During the past quarter, the team has also conducted a pilot data collection for the school district sample using 10 districts (the 6 largest, as well as an additional set of 4 districts from a variety of built environment contexts). The team has also conducted a pilot routing analysis using the Google Directions API in preparation for conducting the analysis on the entire travel survey sample. Finally, the team also constructed a sample of 120 school districts (25 largest + 75 randomly selected + 20 over-sampled for transit use/availability). Having the data access issues resolved will allow the team to return to finalizing the literature review, as well as moving forward with the actual analyses of both the transportation options and the travel survey.

The project, "Policies and Strategies for Cargo Bike Goods Movement in California," by **Dillon Fitch (UCD)** used the information from the report in a new industry partnership exploring urban goods movement which may lead to the deployment of new technology. At this time the partnership is under a non-disclosure agreement, but in the future, their research team will be able to disseminate their research findings.

**Miguel Jaller's (UCD)** project, "Dynamic Monitoring of Supply Chain Resilience," improved the performance of the dashboard (changed the programming language). The estimates and the reaction to the users' selection are faster. Additionally, the project refined the text analytics module for more accurate entity recognition and incorporate sentiment analysis. Additionally, Jaller added various advanced data synthesis models to assess bi-words, tri-words, and higher-level relationships. Lastly, it generated system performance metrics for analytics.

The project, “Studying the Effects of Disability on Choices and Desires for Travel and Neighborhood Location” by **Prashanth Venkataram (UCD)** applied discrete choice modeling techniques to the survey data to understand how disability, race, gender, income, age, and location can affect activity performance and mode usage frequencies.

**Scholarly Awards:**

**John Gunnar Carlsson (USC)** was selected as a University Research Fellow from Toyota Material Handling of North America: <https://youtu.be/VdtVI89e3rk>.

**Md (Rabiul) Islam (UCI)** and **Jean-Daniel Saphores (UCI)** received the Best Practice-Ready Paper Award 2024 at the Annual Meeting of the Transportation Research Board for their paper titled "Two Rode, but Not Together: Gender Commuting Trade-offs in Two-worker Households" from the AME20 Committee on Women and Gender in Transportation.

**Impacts**

PSR defines an impact as that which influences the transportation system, or society in general, such as reduced fatalities, decreased capital or operating costs, community impacts, or environmental benefits. The journey of generating outputs and impacts is uncertain and happens over time. Our contributions are judged by the PSR Advisory Council and measured as significant or not significant. PSR’s research products are made [available to the public](#).

**USC** and **UCD** both provided sponsorship support, via PSR, to the WTS UC Davis Student Chapter, the fourteenth WTS student chapter founded nationwide, to help women network and advance their professional careers.

**5. Changes/Problems**

**Changes in approach and reasons for change**

Nothing to report.

**Problems and delays encountered during the reporting period**

The PSR Caltrans-funded project led by **Jiaqi Ma (UCLA)** titled “Modernize Census Infrastructure Technology” has not started yet. It has been contractual reviews and revisions with Caltrans.

**Avipsa Roy (UCI)** requested a no-cost extension for her project “Developing a data fusion framework to map active transportation usage patterns in Orange County” due to a leave of absence. This was pending at the time of this report.

**Change of primary performance site location**

Nothing to report.

**6. Special Reporting Requirements**

Nothing to report.

## 7. Appendix A

This appendix includes lists (non-exhaustive) of PSR researchers' publications and presentations from the current reporting period.

### Publications

#### Peer-reviewed journal publications

1. Boarnet, M. G., Shao, Q., & Pilgram, C. A. (2024, January 5). Monetary cost, time cost, and mode choice: Transit and ridehailing in California. *Transportation Research Part D: Transport and Environment*, 130, 104149. Pergamon. <https://doi.org/10.1016/j.trd.2024.104149>.
2. Boeing, G., & Ha., J. 2024. Resilient by Design: Simulating Street Network Disruptions across Every Urban Area in the World. *Transportation Research. Part A, Policy and Practice*, 182. <https://doi.org/10.1016/j.tra.2024.104016>.
3. Carlsson, J. G., Liu, S., Salari, N., & Yu, H. (2024). Provably Good Region Partitioning for On-Time Last-Mile Delivery. *Operations Research*, 72(1), 91–109. <https://doi.org/10.1287/opre.2021.0588>.
4. Fitch-Polse, D., Mohiuddin, H., & Jaller, M. (2023). Policies and Strategies for Cargo Bike Goods Movement in California. UC Davis: Institute of Transportation Studies. <http://dx.doi.org/10.7922/G2KK994C>.
5. Handy, S.L., Grajdura, S., Sun, R., Barbour, E., Barajas, J.M., Martelo, M.J., D'Agostino, M., & Circella, G. (2023). Post-Covid Transportation Scenarios: Evaluating the Impact of Policies. *California Air Resources Board and the California Environmental Protection Agency*. <https://ww2.arb.ca.gov/sites/default/files/2024-03/Research%20Contract%20STC008%20Final%20Report.pdf>
6. Li, W., Zhong, H., & Boarnet, M. G. (2024, January 3). Effects of new transit lines on commuting: Evidence from restricted-use Census Bureau microdata. *Applied Geography*, 164, 103202. Pergamon. <https://doi.org/10.1016/j.apgeog.2024.103202>.
7. Li, Y., Tok, A.Y.C., Sun, Z., Ritchie, S.G., & Allu, K.R. (2023, June 1). LiDAR Vehicle Point Cloud Reconstruction Framework for Axle-Based Classification. *IEEE Sensors Journal*, 23(11), 11168–11180. doi: 10.1109/JSEN.2023.3235301.
8. Loukaitou-Sideris, A., Wasserman, J., Ding, H., & Nelischer, C. (2023, January 31). Homelessness on the Road: Reviewing Challenges of and Responses to Homelessness in State Transportation Environments. *UCLA Institute of Transportation Studies*. <https://doi.org/10.17610/T6DC77>.
9. Loukaitou-Sideris, A., Wasserman, J., Ding, H., & Nelischer, C. (2023, January 31). Homelessness in State Transportation Environments. *UCLA Institute of Transportation Studies*. <https://doi.org/10.17610/T6J603>.
10. Monteiro, F. V., & Ioannou, P. (2021). Safe Lane Change and Merging Gaps in Connected Environments. *16th IFAC Symposium on Control in Transportation Systems CTS 2021*, 54(2), 69–74. <https://doi.org/10.1016/j.ifacol.2021.06.011>.
11. Monteiro, F. V., & Ioannou, P. (2023). Safe autonomous lane changes and impact on traffic flow in a connected vehicle environment. *Transportation Research. Part C, Emerging Technologies*, 151, 104138-. <https://doi.org/10.1016/j.trc.2023.104138>.
12. O'Brien, T. & Olson, B. (2023, September 1). Equity in Learning Opportunities for Middle School Students: Connecting Communities and Transportation Through GIS. *Mineta Transportation Institute Publication*. <https://doi.org/10.31979/mti.2023.2247>.

13. O'Brien, T. (2023, December). Southern California Transit Training Consortium Online Training in Electrical Systems and Battery Electric Safety Training. *Davis, CA: National Center for Sustainable Transportation*. <https://doi.org/10.7922/G2862DTB>.
14. Pahwa, A., & M. Jaller. (2024). Evaluating private and system-wide impacts of freight eco-routing. *Transportation Research Part D: Transport and Environment, Volume 130*. <https://doi.org/10.1016/j.trd.2024.104170>.
15. Pike, Susie. (2023). A ridehailing access program for regional rail. *Case Studies on Transport Policy, Vol. 14*. <https://doi.org/10.1016/j.cstp.2023.101099>.
16. Reeb, T., Taylor, B., & Swarat, C. (2024). Talent Pipelines for the Fourth Industrial Revolution: How California PaCE Units Can Bridge Critical KSA Gaps. *Berkeley Center for Studies in Higher Education Research & Occasional Papers Series CSHE.SI.2023*.
17. San Diego Association of Governments. (2024, February). San Diego and Imperial Counties Sustainable Freight Implementation Strategy. *Final Report. San Diego, CA: San Diego Association Of Governments*. <https://www.sandag.org/projects-and-programs/goods-movement-planning/san-diego-and-imperial-counties-sustainable-freight-strategy>.
18. Smaglik, E.J., Phair, C.J., Eschen, A.M., & Russo, B.J. (2024, March). Prioritizing Bicyclist Safety and Mobility: Which Guidance Do I Use?. *ITE Journal*.
19. Smaglik, E.J., Phair, C.J., Eschen, A.M., & Russo, B.J. (2024, March). Prioritizing Bicyclist Safety and Mobility: Which Guidance Do I Use?. *ITE Journal*.
20. Sun, R. (2023). Statistical Learning for High-Dimensional Networked Data in Transportation Systems. *UC Davis*. <https://escholarship.org/uc/item/1nw754s6>.
21. Wang, B. S., Rodnyansky, S., Boarnet, M. G., & Comandon, A. (2024, January 1). Measuring the impact of COVID-19 policies on local commute traffic: Evidence from mobile data in Northern California. *Travel Behaviour and Society, 34*, 100660. Elsevier. <https://doi.org/10.1016/j.tbs.2023.100660>.
22. Waqas, M., & Ioannou, P. (2023). Automatic Vehicle Following Under Safety, Comfort, and Road Geometry Constraints. *IEEE Transactions on Intelligent Vehicles, 8*(1), 531–546. <https://doi.org/10.1109/TIV.2022.3177176>.
23. Waqas, M., Nuzzo, P., & Ioannou, P. (2024). Provably Safe Design Methodology for Automatic Longitudinal Control of Autonomous Vehicles. *IEEE Transactions on Intelligent Vehicles, 1–13*. <https://doi.org/10.1109/TIV.2024.3359611>.
24. Wasserman, J., Loukaitou-Sideris, A., Ding, H., & Nelischer, C. (2023, September 1). The Road, Home: Challenges of and Responses to Homelessness in State Transportation Environments. *Transportation Research Interdisciplinary Perspectives, 21C*. <https://doi.org/10.1016/j.trip.2023.100890>.
25. Yang, D., & Hyland, M. F. (2024). Electric vehicles in urban delivery fleets: How far can they go? *Transportation Research. Part D, Transport and Environment, 129*. <https://doi.org/10.1016/j.trd.2024.104127>

#### Other publications

##### Conference papers

26. Fitch-Polse, D., Mohiuddin, H., & Jaller, M. (2023). Policies and Strategies for Cargo Bike Goods Movement in California. *UC Davis: Institute of Transportation Studies*. <http://dx.doi.org/10.7922/G2KK994C> Retrieved from <https://escholarship.org/uc/item/6zq3384v>

27. Flynn, J., G. Circella, & P. Venkataram. (2024, January 8). Exclusion from Activities and Transportation Modes by Disability and Income: Results from a Survey in California. *Transportation Research Board's 103rd Annual Meeting, Poster Session 2224: Innovation in Accessible Transportation and Mobility*, Washington, D.C., United States.
28. Gu, W., Dessouky, M.M., Pang, J.S., & Zhang, H.M. Traffic Equilibrium with Shared Mobility Services in a Coupled Morning-evening Commute Framework. *Transportmetrica A: Transport Science*.
29. Gu, W., Dessouky, M.M., Pang, J.S., & Zhang, M. (2023). General Coupled Morning-evening Traffic Equilibria with Rideshare and Ride-hailing Services. *2023 National Meeting of INFORMS, Phoenix, AZ*
30. Reeb, T. D., & Park, S. (2023, February). *Trade and Transportation Talent Pipeline Blueprints: Building University-Industry Talent Pipelines in Colleges of Continuing and Professional Education* [Paper presentation]. Mineta Transportation Institute, San José, CA, United States. [https://transweb.sjsu.edu/sites/default/files/2144-Reeb-Trade-Transportation-Talent-Pipeline-Blueprints\\_0.pdf](https://transweb.sjsu.edu/sites/default/files/2144-Reeb-Trade-Transportation-Talent-Pipeline-Blueprints_0.pdf).
31. Reeb, Tyler. (2024). "The Future of the Transportation Workforce Development Life Cycle Workshop." *Transportation Research Board Annual Meeting 2024*, Washington, D.C., United States.
32. Waqas, M., Monteiro, F. V., & Ioannou P. Trade-off Between Safety and Traffic Flow for Connected Autonomous Vehicles in the Presence of Traffic Signals. *2022 IEEE 25th International Conference on Intelligent Transportation Systems (ITSC)*, Macau, China, 2022, pp. 2642-2647, doi: 10.1109/ITSC55140.2022.9922391.
33. Waqas, M., Murtaza, M.A., Nuzzo, P., & Ioannou, P. Correct-By-Construction Design of Adaptive Cruise Control with Control Barrier Functions Under Safety and Regulatory Constraints. *2022 American Control Conference (ACC)*, Atlanta, GA, USA, 2022, pp. 5140-5146. doi: 10.23919/ACC53348.2022.9867464.
34. Waqas, M., Naik, N. V., Ioannou, P., & Nuzzo, P. Contract-Based Control Synthesis with Barrier Functions for Vehicular Mission Planning. *2022 IEEE 61st Conference on Decision and Control (CDC)*. Cancun, Mexico, 2022, pp. 2216-2221. doi: 10.1109/CDC51059.2022.9992999.
35. Zhao, X., Liao, X., Wu, G., Boriboonsomsin, K., & Barth, M. Improving Truck Merging at Ramps in a Mixed Traffic Environment: A Multi-human-in-the-loop (MHuiL) Approach. *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, 2023, pp. 4297-4302, doi: 10.1109/ITSC57777.2023.10422261.

#### Research Briefs

36. Fitch-Polse, D., & Jaller, M. (2023). Overcoming the Barriers for Commercial Cargo Bike Goods Movement. *UC Davis: Institute of Transportation Studies*. <http://dx.doi.org/10.7922/G2FT8JC6>.

#### Presentations

37. Anastasiou, C., Krumm, J., & Shahabi, C. *Estimating mobility distributions from uncertain roadside sensor datasets* [Conference Presentation]. 2024 25th IEEE International Conference on Mobile Data Management (MDM). IEEE, 2024.
38. Flynn, J.A., Circella, G., & Venkataram, P.S. *Exclusion from Activities and Transportation Modes by Disability and Income: Results from a Survey in California*.



39. Gehrke, S.R., Allam, M.K., Martinez, A.E., Holliday, T.M., Russo, B.J., & Smaglik, E.J. (2024, January 7-11). *Cycling accessibility to employment, schools, and grocery stores in Arizona metropolitan regions* [Conference Presentation]. Transportation Research Board's 103rd Annual Meeting, Washington, D.C., United States.
40. Jain, A., Sanchez, J., Turner, K., Barajas, J., & Handy, S. (2024, January 9). *The Historical Impacts of Freeway Construction and Urban Renewal in Sacramento* [Conference Presentation]. Transportation Research Board's 103rd Annual Meeting, LECTERN Session 3091: Planned Destruction and the Aftermath: From Freeway Revolts to Movement Toward Repair and Restoration. Washington, DC, United States.
41. McCullough, S. *Mobility Justice: A New Framework for Transportation Researchers and Professionals* [Conference Presentation]. Feminist Geography Conference.
42. McCullough, S. *Mobility Justice: A New Framework for Transportation Researchers and Professionals* [Conference Presentation]. American Association of Geographers.
43. Nocera, L., Anastasiou, C., Kim, S.H., Krumm, J., Giuliano, G., & Shahabi, C. (2024, March 11-12). *Validation of Freight Volume Modeling on Major Highway Links*. PSR Congress 2024, Las Vegas, NV, United States.
44. Raha, F. (G), Eschen, A. (U), Gehrke, S.R., Smaglik, E., & Russo, B.J. (2024, January). *Where to Implement Leading Pedestrian Intervals (LPIs): An Examination of Turning Vehicle-Pedestrian Crashes at Signalized Intersections* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.
45. Smaglik, E., Eschen, A. (U), Khadka, A (G), & Russo, B.J. (2024, January). *An Empirical Analysis of Fisheye Camera Intersection Traffic Detector Performance: Assessing the Potential Impacts of Camera Position and Lighting Conditions* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.
46. Smaglik, E., Phair, C. (G), Eschen, A. (U), & Russo, B.J. (2024, January). *Prioritizing Bicyclist Safety and Mobility: Which Guidance Do I Use?* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.
47. Yu, H. (2023). "Computational Geometric Partitioning for Vehicle Routing" (PhD thesis). University of Southern California.
48. Zhao, X., Liao, X., Wu, G., Boriboonsomsin, K., & Barth, M. (2024). *Improving Truck Merging at Ramps in a Mixed Traffic Environment: A Multi-human-in-the-loop (MHuIL) Approach*. TRB 2024, Washington, D.C., United States.
49. Gehrke, S.R., Kumar, M (G), Martinez, A.E. (U), Holliday, T. (U), Russo, B.J., & Smaglik, E. (2024, January). *Cycling Accessibility to Employment, Schools, and Grocery Stores in Arizona Metropolitan Regions* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.
50. Nambisan, S., Byzyka, J., Erdem, M., Bai, B., and Koneti, S. (2024, March 11-12). *Transportation Needs and Economic Opportunities of Socio-economically Disadvantaged Populations in Las Vegas Hospitality and Tourism Industry*. Pacific Southwest Region University Transportation Center 2024 Congress, University of Nevada, Las Vegas, Las Vegas, NV, United States.
51. Raha, F. (G), Eschen, A. (U), Gehrke, S.R., Smaglik, E., & Russo, B.J. (2024, January). *Where to Implement Leading Pedestrian Intervals (LPIs): An Examination of Turning Vehicle-Pedestrian Crashes at Signalized Intersections* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.

52. Smaglik, E., Eschen, A. (U), Khadka, A (G), & Russo, B.J. (2024, January). *An Empirical Analysis of Fisheye Camera Intersection Traffic Detector Performance: Assessing the Potential Impacts of Camera Position and Lighting Conditions* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.
53. Smaglik, E., Phair, C. (G), Eschen, A. (U), & Russo, B.J. (2024, January). *Prioritizing Bicyclist Safety and Mobility: Which Guidance Do I Use?* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.
54. Dennis, S., Pahwa, A., & Jaller, M. (2023, December 6-7). *Cargo Routing, Health Impacts, & Disadvantaged Communities*. University of California, Davis, Institute of Transportation Studies Sustainable Transportation Energy Pathways (STEPS+) Fall 2023 Research Symposium, Davis, CA, United States.  
<https://docs.google.com/document/d/1hL3KK0XQZrObJZNQJiNtLs8M5LSBnN3D/edit>.
55. Flynn, J. (2023, December 6-7). *Disability and Transportation in California: First Results from a Survey*. University of California, Davis, Institute of Transportation Studies Sustainable Transportation Energy Pathways (STEPS+) Fall 2023 Research Symposium, Davis, CA, United States. <https://docs.google.com/document/d/1hL3KK0XQZrObJZNQJiNtLs8M5LSBnN3D/edit>.
56. Venkataram, P. (2023, December 6-7). *Disability, Activities, and Transportation*. University of California, Davis, Institute of Transportation Studies Sustainable Transportation Energy Pathways (STEPS+) Fall 2023 Research Symposium, Davis, CA, United States.  
<https://docs.google.com/document/d/1hL3KK0XQZrObJZNQJiNtLs8M5LSBnN3D/edit>.
57. Holliday, T.M., Russo, B.J., & Gehrke, S.R. (2024, January 7-11). *Cyclist-involved crashes and level of traffic stress: Evidence from Arizona* [Poster Presentation]. Transportation Research Board's 103rd Annual Meeting, Washington, D.C., United States.
58. Pike, S. (2024, March 11-12). *Gender effects on the access and use of regional rail*. 2024 PSR Congress, University of Nevada, Las Vegas, NV, United States.  
[https://mcusercontent.com/22fd9a0f9eee194b58fb23e86/files/8656424d-94ed-dbce-4b6f-34c3c566f797/2024\\_PSR\\_UTC\\_Congress\\_Program\\_v3.pdf](https://mcusercontent.com/22fd9a0f9eee194b58fb23e86/files/8656424d-94ed-dbce-4b6f-34c3c566f797/2024_PSR_UTC_Congress_Program_v3.pdf).
59. Islam, K.A., & Nambisan, S. (2024, March 11-12). *Driving Forward: Data-based Strategies for Better Road Safety Equity*. Pacific Southwest Region University Transportation Center 2024 Congress, University of Nevada, Las Vegas, Las Vegas, NV, United States.
60. Martinez, Y., & Bein, W. (2024, March 11-12). *Information Visualization for Exploring Road Traffic Congestion*. Pacific Southwest Region University Transportation Center 2024 Congress, University of Nevada, Las Vegas, Las Vegas, NV, United States.
61. Zahid, T., & Morris, B. (2024, March 11-12). *Combining Deep Traffic Prediction and Emission Estimation*. Pacific Southwest Region University Transportation Center 2024 Congress, University of Nevada, Las Vegas, Las Vegas, NV, United States.
62. Boarnet, M. G., Shao, Q., & Pilgram, C. A. (2023, October 19-21). *Monetary cost, time cost, and mode choice: Transit and ridehailing in California* [Conference Talk]. Association of Collegiate Schools of Planning. Chicago, IL, United States.
63. Boeing, G., & Ha, J. (2023, October 19-21). *Simulating Street Network Resilience and Robustness around the World* [Conference Talk]. Association of Collegiate Schools of Planning Annual Conference. Chicago, IL, United States.
64. Wasserman, J. (2023, March 18). *Homelessness on the Road: Reviewing Challenges of and Responses to Homelessness in State Transportation Environments*. Presented at the 2023 Pacific Southwest Region University Transportation Center Congress, Los Angeles, CA, United States.

65. Wasserman, J. (2023, August 9). *The Road, Home: Challenges of and Responses to Homelessness in State Transportation Environments* [Conference Presentation]. Bridging Transportation Researchers 5.
66. Hyland, M. (2023, September 26). *Caltrans Follow-up Report: Evaluating Mixed Electric Vehicle and Conventional Fueled Vehicle Fleets for Last-mile Package Delivery* [Online Presentation]. Inha University.
67. Gu, W., Zhang, M., Dessouky, M.M., & Pang, J.-S. (2023, October 15-18). *General Coupled Morning-Evening Traffic Equilibria with Rideshare and Ride-Hailing Services*. 2023 INFORMS Annual Meeting, Phoenix, AZ, United States. <https://cta-redirect.hubspot.com/cta/redirect/3449182/bf474905-597a-4bf3-beb6-2b12df475c87>.
68. Carlsson, J. (2023, October 17). *Data-Driven Delivery Zoning for Equitable Last Mile Logistics*. INFORMS Annual Meeting 2023, Phoenix, AZ, United States.
69. Gehrke, S.R. (2023, October 19). *Elevating excellence through impactful research. Invited presentation* [Keynote Speaker]. Flash Talk 3.0 at Northern Arizona University, Flagstaff, AZ, United States.
70. Smaglik, E., Gehrke, S.R., & Russo, B. (2023, November) *Bicycle Facility Design, Planning, and Safety: Recent Advancements and Insights* [Conference Presentation]. Arizona Roads and Streets Conference, Tucson, AZ, United States.
71. Gehrke, S.R. (2023, November 2). *Evaluation of transportation safety and security barriers in bicyclist accessibility* [Lectern Presentation]. American Council of Engineering Companies of Arizona's 72nd Roads & Streets Conference, Tucson, AZ, United States.
72. Gehrke, S.R. (2023, November 16). *Cycling accessibility to employment, schools, and grocery stores in Arizona metropolitan regions* [Lectern Presentation]. North American Meetings of the Regional Science Association International, San Diego, CA, United States.
73. Reeb, T. (2023, December 11). *Workforce Development with Eric Rensel* [Virtual Presentation]. Eric Rensel and Institute of Transportation Engineers (ITE). <https://www.linkedin.com/events/7137799828746457089/about/>
74. Reeb, T. (2023, December 14). *Cybersecurity and TSMO Virtual Peer Exchange* [Virtual Presentation]. National Operations Center of Excellence.
75. Boarnet, M. G., Shao, Q., & Pilgram, C. A. (2024, January). *Monetary cost, time cost, and mode choice: Transit and ridehailing in California* [Conference Talk]. 103rd Annual Meeting of Transportation Research Board. Washington, D.C., United States.
76. Campos, U. & Ghaffar, A. (2024, January). *Equitable Design of Shared E-Scooter and E-Bike Systems* [Conference Presentation]. 103rd Annual Meeting of Transportation Research Board. Washington, D.C., United States.
77. Raha, F., Russo, B.J., & Ryan, A. (2024, January). *Investigating the Impact of the COVID-19 Pandemic on Traffic Crash Injury Outcomes among Different Demographic Groups* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.
78. Raha, F.Y., Russo, B.J., and Gehrke, S.R. (2024, January). *Assessing the impact of vehicle type on pedestrian and bicyclist crash injury severity* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.
79. Holliday, T.M., Russo, B.J., & Gehrke, S.R. (2024, January). *Cyclist-involved crashes and level of traffic stress: Evidence from Arizona* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.

80. Raha, F., Russo, B.J., & Ryan, A. (2024, January). *Investigating the Impact of the COVID-19 Pandemic on Traffic Crash Injury Outcomes among Different Demographic Groups* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.
81. Raha, F.Y., Russo, B.J., & Gehrke, S.R. (2024, January). *Assessing the impact of vehicle type on pedestrian and bicyclist crash injury severity* [Conference Presentation]. 2024 TRB Annual Meeting, Washington, D.C., United States.
82. Reeb, T. (2024, January). *Intermodal Freight and the Media: Why Getting the Story Right Matters* [Moderator]. Transportation Research Board Annual Meeting 2024. Washington, D.C., United States.
83. Wasserman, J. (2024, January 8). *Homelessness on the Road: Reviewing Challenges of and Responses to Homelessness in State Transportation Environments* [Conference Presentation]. 103rd Annual Meeting of the Transportation Research Board, Washington, D.C., United States.
84. Dennis-Bauer, S., Pahwa, A., & Jaller, M. (2024, January 9). *Cargo Routing, Health Impacts, and Disadvantaged Communities* [Conference Session]. Transportation Research Board's 103rd Annual Meeting, Lectern Session 3202: Health and Equity at the Heart of Transportation Planning, Policy, and Practice. Washington, DC, United States.
85. Ji, J., Chakraborty, D., & Jenn, A. (2024, January 10). *Leveraging Lessons Learned from the Tolling Industry to Implement Road-Usage Charge: A Mixed-Methods Study to Devise Sustainable Funding Mechanisms for Transportation Infrastructures* [Conference Presentation]. Transportation Research Board's 103rd Annual Meeting, Poster Session 4073: Transportation Demand Management, Tolling, and Congestion Pricing. Washington, DC, United States.
86. Boarnet, M. G., Shao, Q., & Pilgram, C. A. (2024, February). *Monetary cost, time cost, and mode choice: Transit and ridehailing in California* [Conference Talk]. 63rd Annual Meeting of Western Regional Science Association. Monterey, CA, United States.
87. Wei, D. & Giuliano, G. (2024, March 1). *Economic Analysis and Review of Commercial Vehicle Road User Charges* [Presentation]. California Transportation Commission.
88. Nambisan, S., Byzyka, J., Islam, K.A. & Gunindi, Z. (2024, March 11-12). *A Study of Electric Vehicles Ecosystem and Energy Demand Forecasts in Nevada*. Pacific Southwest Region University Transportation Center 2024 Congress, University of Nevada, Las Vegas, Las Vegas, NV, United States.

### Research Reports

89. Carlsson, J. (2024). Continuous Approximation Models with Temporal Constraints and Objectives. Pacific Southwest Region University Transportation Center. <https://doi.org/10.25554/QYYS-ZA80>
90. Chen, Q. (2024). Rapid and Accurate Assessment of Road Damage by Integrating Data from Mobile Camera Systems (MCS) and Mobile LiDAR Systems (MLS). *Pacific Southwest Region University Transportation Center*. <https://doi.org/10.25554/9HXW-3Y87>
91. Giuliano, G., & Wei, D. (2024). Implementation of Action 6 of CSFAP Phase 4 Tracking Economic Competitiveness. Pacific Southwest Region University Transportation Center. <https://doi.org/10.25554/GPWH-6P48>
92. Ioannou, P., & Waqas, M. (2023). Systematic and Provably Safe Design Methodology for Connected and Automated Vehicles. *Pacific Southwest Region University Transportation Center*. <https://doi.org/10.25554/4n72-ze78>

93. Jaller, M., & Pahwa, A. (2024). Sketch Planning Tool for Sustainable and Resilient Urban Goods Distribution: User Manual. Pacific Southwest Region University Transportation Center.  
<https://doi.org/10.25554/EQPC-5569>