



## Semi-Annual Progress Report #7

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## 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 Long Beach State University (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 METRANS Transportation Center, the entity that houses the PSR UTC.

The regional UTC must reach beyond the consortium, offering connections to all transport stakeholders within the region. In order to fulfill its goal, the PSR:

- Established a region-wide advisory council of government, academic, and industry leaders to provide guidance on all aspects of the center's activities
- Executes a research program informed by the needs of the region
- Is establishing a web-based clearinghouse for degree and non-degree curricula
- Develops training and workforce development programs transferable across the region
- Holds an annual Region 9 Congress to share research and best practices
- Conducts a comprehensive program of information dissemination, technical assistance, and communications

### 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 derived from the transportation needs assessment conducted during the proposal preparation process: 1) technology for improved mobility, 2) improving mobility for disadvantaged populations, 3) improving resilience and protecting the environment, and 4) managing mobility in high growth cities and regions.

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. Its purpose is to promote broader participation across the states and territories, in keeping with the purpose of a regional UTC.

The total research project and white paper count for PSR is 85. USC has 34 projects, CSULB has 2, UCLA has 8, UCD has 16, UCI has 12, UH has 5, and NAU has 1. Additionally, we have 4 regional projects at UC

Santa Barbara and 3 at UC Riverside. PSR partners have now completed a total of 29 research projects and white papers.

PSR completed 9 projects and issued 9 reports during the reporting period (see [Table 1](#)).

**Table 1:** Projects completed during current reporting period

Partner	Project No.	PI	Title	Funding Source
USC	17-04	Antonio Bento	The Cost-Effectiveness of Alternative Policies for Reducing GHG Emissions in the Freight Sector	DOT
USC	17-09	Gary Painter	Examining the Geography of Opportunity through a New Public Transit Opportunity Index	DOT
USC	18-06	Petros Ioannou	Connected Autonomous Vehicles: Safety During Merging and Lane Change and Impact on Traffic Flow	Caltrans
UCSB	18-09	Konstadinos Goulias	An Analysis of Accessibility, Social Interaction, and Activity-Travel Fragmentation in California	DOT
UCD	18-24	Miguel Jaller	Automation, Electrification, and Shared Mobility in Urban Freight: Opportunities and Challenges	Caltrans
UCLA	18-31	Anastasia Loukaitou-Sideris	Public Transportation Safety Among University Students	Caltrans
UCLA	18-33	Martin Wachs	Balancing Accountability and Flexibility in California’s Local Option Sales Tax	Caltrans
USC	18-SP93	Hilda Blanco	Developing a Strategic Sustainability Plan for Long Beach Transit	LB Transit
USC	MF-5.4c	Gen Giuliano	The Spatial Dynamics of Amazon Lockers in LA County	VREF

**Requests for Proposals (RFPs)**

PSR issued a coordinated RFP 4 in early 2020 and received 35 proposals. The proposals were reviewed during the end of the last and the beginning of this reporting period. We selected 14 projects for funding in the total amount of \$1,385,863. In addition to USDOT funding, match funding was available from Caltrans. Project start dates range from mid-2020 to early 2021.

**Match funding**

PSR has the following match funding priority rankings: new funding, match from other existing research projects, and in-kind 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. 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 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.

**New projects**

A total of 11 new projects were started during the reporting period. [Table 2](#) lists the new projects and their funding sources.

**Table 2:** New research projects initiated during current reporting period

Partner	Project No.	PI	Title	Funding Source
USC	20-02	Cyrus Shahabi	Freight Volume Modeling on Major Highway Links	DOT
USC	20-03	Marlon Boarnet	Displacement and Commuting in the San Francisco Bay Area and Beyond: An Analysis of the Relationship Between the Housing Crisis, Displacement, and Long Commutes	Caltrans
USC / UCD	20-07	Maged Dessouky / Michael Zhang	Making HOT lanes benefit every traveler---design, pricing, and analysis	DOT
USC	20-09	Petros Ioannou	Highway Safety and Traffic Flow Analysis of Mixed traffic with Connected and Non-Connected Vehicles	DOT
CSULB	20-13	Gwen Shaffer	Using artificial intelligence to improve traffic flows, with consideration of data privacy principles	DOT
UCSB	20-15	Konstadinos Goulias	A Before-After Intervention Experiment and Survey for the Crenshaw/LAX Metro Line	DOT
USC	20-17	Ketan Savla	Data-driven Feedback Control of Urban Traffic Systems with Performance Guarantees	DOT
USC	20-19	Geoff Boeing	Race, Class, and the Production of and Exposure to Vehicular Pollution in Los Angeles	DOT
UCR	20-20	Kanok Boriboonsomsin	Evaluating System-Level Impacts of Innovative Truck Routing Strategies	DOT
USC	20-21	Cyrus Shahabi	Large-scale and Long-term Forecasting of Performance Measurement of Public Transportation Systems	Caltrans

**Student opportunities for research**

Student support is an important component of research project selection. USC, CSULB, and UCD require that research projects include student support.

USC student Jane Fang worked with Professor Genevieve Giuliano as PI to turn her class project into a funded research project (MF-5.4c “The Spatial Dynamics of Amazon Lockers in Los Angeles County”). The project was funded by the Volvo Research and Education Foundation and was counted as a match project for PSR. The final report was published on the PSR website.

In addition to the faculty-sponsored research projects, UCI supported a total of 11 quarterly graduate research fellowships with PSR funds. These were awarded to 9 different students (two students received fellowships in both spring and fall 2020). Student projects cover 4 distinct PSR Topic Areas including

managing freight demand and its impacts, smart infrastructure and vehicles, technology and mobility, and managing passenger demand.

UCD awarded a dissertation research grant to Sarah Grajdura for her work, “Decision support system to evaluate strategies for no-notice wildfire events.”

NAU used PSR summer intern money to pay for an intern to support Dr. Gehrke’s research on the social and trip-level determinants of pooled ride-hailing services. The paper resulting from the project has been submitted to TRB.

In Spring 2020, UCLA produced 19 graduates who received PSR funding: 1 PhD Environmental Science & Engineering, 15 MURP, 3 MPP. As a result, 19 student capstone projects were produced with the support of PSR funding. Significant findings from the capstone projects include:

- Katherine Stiegemeyer (MURP ’20): working with Investing in Place, a transportation advocacy nonprofit, this research analyzed the budgeting process in Los Angeles, and specifically the role of transportation funding in this process. The research aimed to inform community-based organizations working to advocate for budget priorities outside of city government.
- Mark Hansen (MURP ’20): this project examined how the expansion of the network of bus lanes in Los Angeles can alleviate slow bus speeds. This report examined bus performance along 75 miles of peak-hour parking restriction (PHPR) corridors to determine whether bus lanes could improve travel times for riders and increase net person throughput.

### **Student conference support**

NAU continued supporting undergraduate and graduate transportation students through paid internships, fellowships, and outreach activities. Because of the lack of conference travel due to Covid, some of these dollars were repurposed to undergraduate research interns.

CSULB Research Assistant Nick Roy presented his research report, “Port Drayage Disruptions,” at the Statewide Student Research Competition hosted virtually by CSU East Bay on April 24th, 2020. His work on this project was the subject of a presentation as part of an undergraduate student research competition held at CSULB in February 2020. His first-place finish meant that he became the university’s representative for a similar competition to be held across the 23 campuses of the CSU system. This competition has been postponed due to Covid.

### **Administrative accomplishments**

Due to Covid, all METRANS staff and researchers at USC and CSULB continue working remotely and will continue to do so for the foreseeable future. METRANS drafted a research continuity plan that provided for remote work for all PSR research, education and technology transfer activities. Staff and researchers were able to establish VPNs at home to allow access to files on university servers. Team meetings and outreach events are held using Web conferencing software. The continuity plan has allowed researchers to continue making timely progress toward project deadlines.

CSULB hired Natalie Reyes in the role of Project Manager for Communications and Reporting. Her onboarding process began in this reporting period. Natalie has started building digital communications capacity, coordinating website redesign, and maintaining communications metrics. Her position is a joint appointment with METRANS.

i. Research dissemination

Dissemination of our research results takes place via research reports and research briefs, scholarly publications, popular publications, conference presentations, and media.

METRANS cosponsored a webinar, “Traffic Trends and Safety in a COVID-19 World,” with TRB on June 2. The presenters were Mena Lockwood (VDOT), Daniel Carter (NCDOT), and Fraser Shilling (UCD). The webinar focused on the impacts of COVID-19 on traffic crashes and overall highway safety conditions. The event brought in over 1,100 attendees. PSR researcher Shilling presented on “Changes in traffic conditions and crashes in California during regional and statewide stay-at-home orders.” The recorded webinar is available at <http://www.trb.org/Calendar/Blurbs/180648.aspx>.

Dr. Sarah Reboloso McCullough (UCD) shared insights on how to prioritize equity in transportation in uncertain times as part of a Caltrans Planning Horizons webinar titled “Moving from Equity to Justice in Transportation in a Time of Crisis.” McCullough presented preliminary findings from her PSR-funded project, “Assessing the Impact of Equity Work in Active and Sustainable Transportation,” with her graduate student researcher C. Sequoia Erasmus. In the research, McCullough and Erasmus are using qualitative interviews with Black, Indigenous, and other professionals of color in the transportation field, to document and outline challenges they faced as well as propose solutions the transportation sector could implement. The recorded webinar is available to watch at <https://youtu.be/G1Lk7A6lmzI>.

At the ITS-Davis 3 Revolutions Future Mobility Program Deep Dive in September 2020, an online workshop, Dr. Alan Jenn presented on his PSR research, “Charging Infrastructure Development for Transportation Network Company Electrification.” The Deep Dive is an opportunity for industry sponsors of the 3 Revolutions Future Mobility Program to get updates on the program’s research, this year focusing on COVID-19, Ridehailing, and Micromobility.

Jean-Daniel Saphores’ (UCI) project, “What Explains Recent Trends in Southern California Bus Ridership?” was presented at the International Conference on Transportation and Health in June 2020.

UCLA researchers Madeline Brozen and Anastasia Louikaitou-Sideris presented their PSR funded-research project “Public Transportation Among University Studies” at the 2020 InterActions LA Conference on April 3, hosted by the UCLA Lewis Center for Regional Policy Studies. The project was featured as the keynote presentation and set the context for the overall theme of the conference: “Uplifting Women’s Safety in Transportation.” UCLA ITS supported this event with non-PSR funds. The research team produced [this summary video](#) and disseminated to the networks of the UCLA Lewis Center for Regional Policy Studies, UCLA ITS, and the UCLA Luskin School of Public Affairs.

**Media coverage**

During the current reporting period, a number of PSR faculty associates were covered in the media. Examples include Genevieve Giuliano (USC) in NPR, *Financial Times*, *Los Angeles Times*; Marlon Boarnet (USC) *Los Angeles Times*, KJZZ, Center for American Progress; Karl Kim (UH) in *Honolulu Star*, Hawaii Public Radio; Brian Taylor (UCLA) in *Los Angeles Times*, Fast Company; Susan Handy (UCD) in *Los Angeles Times*; Martin Wachs (UCLA) in *Los Angeles Times*, Streetsblog Los Angeles; Gary Painter (USC) in *Houston Chronicle*, *The Desert Sun*, *Boulder Weekly*; Michael Manville (UCLA) in *Bloomberg*, KCRW, *The San Diego Tribune*; Anastasia Loukaitou-Sideris (UCLA) in Daily Beast, *Long Beach Post*, KPCC; and Tridib Banerjee (USC) in *Los Angeles Times*.

ii. **Plans for next reporting period**

The next reporting period is October 1, 2020 through March 31, 2021. We plan to award over \$1M in funding from our RFP 5. We have 51 active projects that we will continue to manage. We anticipate completing 16 projects during the next reporting period.

METRANS will hold its next semi-annual Advisory Board meeting on November 6. Additionally, METRANS will hold its next Industry Outlook event on October 1. The event features a panel of three executive leaders from major transportation agencies in Los Angeles: Michael Christensen, Deputy Executive Director, Operations and Maintenance, Los Angeles World Airports; Mario Cordero, Executive Director, Port of Long Beach; Phillip A. Washington, Chief Executive Director, Los Angeles Metropolitan Transportation Authority. The discussion will focus on the impact of COVID-19 and will be moderated by PSR and METRANS Director Genevieve Giuliano.

UH is working to develop a FEMA training course based on the findings in Oceana Francis' PSR project, "Stormwater Drainage Design and Best Management Practices with Applications to Roadways and Climate Change." Additionally, UH will pursue funded research, particularly focused on transportation during the COVID-19 period. One project of interest is related to paratransit services in Honolulu.

NAU will continue supporting undergraduate and graduate students through paid internships and fellowships (which result in peer-reviewed presentations and publications), and support for conference travel, as well as engage in outreach activities.

UCI will continue planning for ISERT 2021 as well as the ongoing research seminar series and graduate colloquium. Planning for the regular spring component of the seminar series was disrupted by Covid. The team is working to adapt to a virtual format.

Planning has continued for the upcoming UCLA Lake Arrowhead Symposium on the Transportation - Environment - Land Use Connection set to take place October 18–20. The theme will be "California's Climate Crossroads." The event will be attended by over 180 guests including academics, practitioners, and elected officials. UCLA has been meeting with the Lake Arrowhead steering committee since October 2019 to execute this event.

**B. Educational Accomplishments**

PSR's education goal is to foster education and training to produce the next generation of academic scholars, professionals, and skilled workers. PSR seeks to:

- Attract large numbers of the best students from non-traditional transportation fields – especially those from underrepresented groups – into transportation careers through personal and targeted recruitment from high-schools, community colleges, and universities
- Expand and enhance the multidisciplinary aspects of our transportation education programs, and student exchanges among campuses
- Conduct a comprehensive workforce development program

USC, UCD, UCI, and UCLA continued their respective research seminars, which have converted to webinars due to Covid.

**USC seminars**

- Konstadinos Goulias (UCSB), “Taxonomy of Daily Travel and Time Use Patterns Using Sequence Analysis to Explore Schedule Fragmentation and Gender Roles,” September 24, 2020.

#### **UC Davis seminars**

- James Corless, Chief Executive Officer, Sacramento Area Council of Governments. “The Future of Transportation: Making the Sacramento Region a Lab for Mobility Innovation.” June 3, 2020.
- Michael Williams, Owner of Michael Williams Company. “Edge Lane Roads: A New Type of Shared Road for All Vulnerable Roads.” June 11, 2020.

#### **UC Irvine seminars**

- Behdad Kiani (UCD), “ZEV Vehicle Adoption for a 2045 Emission Free Transportation Sector in California and High Renewable Energy Penetration.” July 29, 2020.

#### **Student awards**

Sixteen PSR students were recently awarded California Planning Foundation scholarships. The California Planning Foundation (CPF) was established by the American Planning Association (APA) California Chapter in 1970, with the goal of furthering the planning profession within the state of California. Recipients were selected based on academic performance, financial need, commitment to increasing diversity within the profession, and an intent to contribute to the planning profession in California after graduation. The recipients are:

- **Outstanding Student Award, Runner-Up (\$3,000):** Carline Hua (UCI)
- **Diversity in Planning Award (\$3,000):** Laura Elaine Daza-Garcia (UCLA)
- **Richard H. Weaver Scholarship (\$2,000):** Alejandro Gonzalez (UCLA)
- **California Planning Roundtable (CPR) Memorial Scholarship (\$1,000):** Gerrlyn Gacao (UCLA)
- **David Wilcox Scholarship (\$1,000):** Matt Phillips (UCLA)
- **Ken Milam Scholarship (\$1,000):** Reaghan Murphy (USC)
- **Paul Wack Sustainability Scholarship (\$1,000):** Irene Takako Farr (UCLA)
- **Virginia Viado Memorial Scholarship (\$1,000):** Khristian Decastro (UCLA)
- **Los Angeles Section Scholarship (\$1,000 each)**
  - Sabrina Alonso (USC)
  - Danielle Dirksen (USC)
  - Serena Lin (USC)
  - Daniel Luu (UCLA)
  - Edgar Mejia (UCLA)
  - Lena Rogow (UCLA)
- **Orange Section (\$1,000 each)**
  - John Maldonado (UCI)
  - Veronica Morones (UCI)

#### **USC Student Awards**

- **Adylbek Abdykalikov (IPPAM):** USC Order of Arete, IPPAM Outstanding Capstone Project Award, IPPAM Distinguished Academic Performance Award
- **Elise Adreon (BS, ISE):** Women’s Transportation Seminar Los Angeles (WTS-LA) Scholarship
- **Sabrina Alonso (MUP):** California Planning Foundation Scholarship—Los Angeles Section
- **Jared Bendifallah (MUP):** American Public Transportation Association (APTA) Cowen Scholarship

- **Alina Borja** (MUP): Social and Community Planning Comprehensive Exam Prize
- **Samitra Dabade** (MUP): Price Summer Internship Scholarship
- **Sue Dexter**: (PhD, UPD) Pacific Southwest Region Doctoral Student of the Year Award
- **Danielle Dirksen** (BS): Pacific Southwest Undergraduate Student of the Year Award; California Planning Foundation Scholarship—Los Angeles Section.
- **Kareem El-Sisi** (BS): Etzioni Bianchi Memorial Community Service Award. Dean’s Senior Merit Award; California Planning Foundation Scholarships
- **Allison Fischer** (BS, ISE): Women’s Transportation Seminar Los Angeles (WTS-LA) Scholarship
- **Alexander Freedman** (MUP): Lowdon Wingo Award for Exemplary Academic Achievement in Planning and Development
- **Lynnete Guzman** (MUP): Women’s Transportation Seminar Los Angeles (WTS-LA) Scholarship
- **Geneva Hesner** (MUP): Dean’s Merit Scholar
- **Aishwarya Sambasivan Iyer** (MS, CE): Viterbi School of Engineering Service Award
- **Joan Lee** (BS): Women’s Transportation Seminar Orange County (WTS-OC). Scholarship
- **Yi Li** (MS, CE): Women’s Transportation Seminar Los Angeles (WTS-LA) Scholarship
- **Zhaoyang Li** (MS, CE): Women’s Transportation Seminar Los Angeles (WTS-LA) Scholarship
- **Serena Lin** (MUP): California Planning Association Foundation Scholarship – Los Angeles Section; WTS-Orange County Chapter Scholarship
- **Dongyang Lin** (MUP): California Planning Foundation Scholarship, USC Asian Pacific Alumni Association Scholarship
- **Zakhary Mallett** (PhD): American Public Transportation Association Scholarship (won the award twice, 2019 and 2020), Railway Association of Southern California Scholarship
- **Beatris Megerdichian** (MUP): Pi Alpha Alpha Honor Society
- **Reaghan Murphy** (MUP): Price School Outstanding First Year Award; California Planning Foundation Ken Milan Scholarship
- **Aristotelis Papadopoulos** (PhD, EE): Myronis Endowed Fellowship
- **Kavina Yashang Patel** (MUP): Transportation Comprehensive Exam Prize; Dean’s Certificate of Merit; APA California Scholarship in honor of Frank Wein; California Planning Foundation Scholarship
- **Isabel Qi** (MUP): Dean’s Certificate of Merit; California Planning Roundtable (CPR) Memorial Scholarship, California Planning Foundation Scholarship
- **Victoria Urenia** (MUP): California Planning Roundtable (CPR) Memorial Scholarship; Virginia Viado Memorial Scholarship; California Planning Foundation Scholarship
- **Beisen Ussenov** (IPPAM): IPPAM Distinguished Academic Performance Award
- **Codi Weisz** (BS, CE): Women’s Transportation Seminar (WTS-LA) Ava Doner Memorial Scholarship; USC merit-based Trustee Scholarship from Viterbi School of Engineering; County of Los Angeles Women of Achievement Award

During its 31st Annual Transportation Awards, the California Transportation Foundation recognized UCLA ITS’ study on Bay Area Transit Ridership. [“What’s Behind Recent Transit Ridership Trends in the Bay Area?”](#) won the 2019 “Organized Research Program of the Year” award [not previously reported]. The report analyzed ridership across eight transit agencies in the Bay Area from 2008-2018. Though this project was not directly supported by PSR funds, Jacob Wasserman contributed research related to his

PSR-funded 2019 capstone project “A Time and a Place for Every Rider?: Geographic and Temporal Changes in Bay Area Transit Ridership” This project was also led by Professor Brian Taylor, Director of the UCLA ITS.

A research project by Katelyn Stangl (UCLA, MURP '19) entitled [“Parking? Lots! Parking Over the Minimum in Los Angeles,”](#) was honored with the American Planning Association Los Angeles’ 2020 award for academic excellence for work conducted as part of her master’s capstone project. Stangl’s research set out to help pave the way for parking minimum reform by investigating why a developer would build over parking minimums.

Two UCLA urban planning students won second place in the APA Transportation Planning Division’s 2020 student paper competition: Katherine Stiegemeier and Sam Speroni. Additionally, 6 students (3 supported by PSR) won American Public Transportation Foundation Scholarships: Doug Arseneault, Benjamin Bressette, Tamara Mahadi, Edgard Meija, Nataly Ruiz, and Julene Paul.

ITS-Davis continued to provide support to the WTS UC Davis Student Chapter. PSR undergraduate student assistant Sonia Anthoine is also serving as President of the WTS at UC Davis Student Chapter for 2020-2021.

Progress has been made with establishing the relationship with Toastmasters, and the California State University Long Beach (CSULB) legal team is currently reviewing a Non-Disclosure Agreement (NDA) between the two organizations. The NDA must be agreed upon and signed prior to the discussion and/or revelation of Toastmasters’ curriculum. The specific objectives of the strategic relationship between CSULB and Toastmasters is to offer CSULB students and potentially the entire CSU system, classes based on Toastmasters’ curriculum in communications, including speech writing and various methods of speech delivery methods, not limited to public speaking.

In September 2020, UCLA welcomed a new transportation faculty member to the UCLA ITS community. Jiaqi Ma joins the UCLA Samueli School of Engineering as Associate Professor of Civil and Environmental Engineering. He will also lead the UCLA ITS New Mobility program area.

**FED Talks (UCLA):** UCLA continues to assemble professors and graduate students to discuss and present new research and best practices around public transit, transportation finance, innovative mobility, infrastructure, housing, and much more. The talks were attended by students, faculty, staff, and partners of the institute and PSR research. Featured Talks:

- “Public Transportation Among University Students” presented by Madeline Brozen Deputy Director the UCLA Lewis Center for Regional Policy Studies.
- “UCLA ITS COVID-19 Research Initiative” led by Juan Matute, Deputy Director, UCLA ITS.
- “COVID-19 & State-Generated Transportation Revenues” led by Martin Wachs, UCLA ITS.

**Data Hack Night:** UCLA offers an introductory workshop in data science using Python for transportation researchers. In the summer of 2020, these workshops were conducted monthly. The workshops were hosted by second year student Eric Dasmalchi, who also studied and built his expertise during the 2019-20 workshops. UCLA did not use PSR funds to produce this workshop, but students receiving PSR funds attended and will incorporate new skills into their capstone projects.

**NAU fellowships:** NAU continued supporting undergraduate and graduate transportation students through paid internships, fellowships, and support for conference travel, as well as engage in outreach activities. During this period, one fellowship was awarded.

### **Professional development opportunities**

PSR partners with WTS Los Angeles (WTS-LA) and WTS Orange County (WTS-OC) to facilitate and sponsor membership and attendance at WTS events and with WTS-LA to promote student participation in the transportation resume book. PSR Associate Director of Education and Professional Development Victoria Deguzman is the WTS-LA chapter University Liaison and a WTS-OC Mentor, and conducts outreach for both chapters to high schools and institutions of higher learning throughout the greater LA region; a graduate-level transportation student at USC serves as the WTS-LA and WTS-OC chapter Student Liaison. USC also continues to offer career services to students interested in a transportation related career, and facilitate connections with students and industry. NAU, PCC, UCI, UCLA, and UH provide numerous professional development opportunities for students and professionals in the transportation field through lectures, conferences, workshops, and internships.

**Get the Job:** This professional development speaker series was launched at USC during 2018 to meet the demand for specific job-seeking guidance that could not be met by our practitioner lunch series and mentor programs alone. It is designed to provide a small group environment in which students receive advice from active practitioners on securing employment.

**METRANS Mentor Program:** In this program at USC, transportation practitioners (mentors) guide students to make informed career decisions and to develop into well-rounded professionals. 29 students were mentored during the reporting period.

### **iii. Workforce development**

On May 12, PCC held a webinar on “Implementing Online Training Best Practices.” PCC Provided best practices and a demonstration of the online TDT 118 class. The event was sponsored by the National Association of Publicly Funded Truck Driving Schools.

PCC delivered a virtual workshop series of the Autonomous Vehicle Driver and Operations Specialist certificate program sponsored by the US DOT Intelligent Transportation Systems Professional Capacity Building. The webinar demonstrated the alignment between DOT staffing needs and current community college graduates. Also identified opportunities to enhance Intelligent Transportation Systems education to close the gap between education and workforce needs.

PCC is working extensively with industry and local workforce partners to ensure that individuals impacted by Covid have the ability to enroll in programs like Autonomous Vehicles and Logistics. PCC is currently in the process of contracting with an online platform in order to support both local and national enrollment for the programs supported through PSR.

**Southern California Workforce Development Needs Assessment for Supply Chain and Transportation Industries:** This CSULB needs assessment identifies existing and future workforce skills gaps for middle-skill occupations in southern California’s supply chain and transportation chain industries. A series of surveys and interviews were conducted with industry, education, and training partners from the five-county region of southern California. The team identified the following competencies for industry, education, and training: critical employability skills, digital literacy skills, and front and back office skills.

The critical employability skills that were especially highlighted include: critical thinking, collaboration, and customer service skills. Various digital literacy skills identified include knowledge of Microsoft Office programs as well as adaptability to new mobile applications. As the industry undergoes rapid contextual changes, the survey respondents indicated a need for immediate training to be able to ensure a smooth transition and prevent any supply-chain complications.

**Caltrans Freight Academies:** These four-day workshops give Caltrans participants a broad overview of the supply chain and the role that Caltrans plays in goods movement. They will also understand the roles played by various actors and identify possible partners for goods movement activities, armed with examples of successful collaborative planning efforts. The workshops normally consist of lectures, activities, guest speakers, and site visits. During the reporting period, the team developed the curriculum and GIS visualization activity, arranged virtual site visits, and scheduled guest lecturers. The academies were originally scheduled to be held in April, but they have been rescheduled to be held on December 1-3, 8, and 10. The CSULB team revised the academy outline for virtual delivery and continues to engage in curriculum development and workshop preparation.

**Academy of Global Logistics (AGL):** Based at Cabrillo High School, this is a partnership of the Port of Long Beach, Long Beach Unified School District and two units at CSULB's College of Professional and International Education: CITT and the Office of Professional and Workforce Development. As an integrated approach to workforce development, it uses a Small Learning Community approach to combine academic curriculum with industry-relevant training and information, informed by research, to support academic and career development. AGL builds on the Long Beach College Promise by introducing high school students to career opportunities in global trade and logistics and showing them how to prepare for those careers through a wide range of training and education programs including certificates, certifications, and degrees offered by Long Beach City College and California State University, Long Beach. Students in AGL are invited to take part in PSR-sponsored events.



Figure 1. AGL students at the 2019 I-NUF Conference in Long Beach CA

**AZTrans:** NAU supports STEM outreach activities which provide exposure to transportation to K-12 students and members of the public. AZTrans graduate student Emmanuel James operated a transportation-focused exhibit at a STEM celebration which took place at an Arizona Diamondbacks game in July 2019 (not reported in previous SAPR). AZTrans also operated an exhibit at the 2019 NAU Science and Engineering Day (which was part of the Flagstaff Festival of Science) entitled “Behind the Scenes: How Our Roadways are Designed & Operated” on Saturday, September 21, 2019. Participants had the opportunity to examine equipment and software used in real-world traffic engineering applications in order to provide safe and efficient transportation of people and goods.

i. **Education 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. We will continue the PSR seminar series at USC, UCD, UCI, and UCLA. Seminars will be available only as webinars due to Covid.

**Softskills Webinar:** The curriculum will be developed jointly between CSULB faculty and staff and Toastmasters beginning in early 2021. The classes are projected to be offered as a small demonstration project in Summer 2021, and potentially campus-wide in 2022. Industry partners will be invited to participate, and an industry focused program will be developed to encourage their in-house training efforts be branded with the CITT/Toastmasters joint curriculum. For multi-national companies, this branded training could be offered virtually throughout their international locations to employees whether working at corporate headquarters or remotely at home or field offices.

**Commercial Driver's License (CDL) Training:** PSR goals accomplished for this reporting period include organizing and promoting a webinar to promote the Pima Community College District's innovative online truck driving training. The focus on PCC's online trucking is part of a webinar planned for October 27th hosted by the National Network for the Transportation Workforce, a coalition of regional transportation workforce centers which includes CSULB. During that webinar Thomas O'Brien and Tyler Reeb will discuss critical transportation workforce and mobility issues impacting the southwest region.

Missy Blair (PCC), Advanced Program Manager/Certified MSF Rider Coach & Traffic Survival School instructor, will discuss how the PCC team transitioned all non-driving training into an online format. Blair will also discuss PCC's autonomous trucking certificate.

**Roadmaps and Story Maps for Public Outreach (CSULB)**

This training program will consist of three distinct components:

1. A White Paper on the use of GIS story maps in public sector outreach efforts is in the development stages. The white paper will outline best practices in the public sector regarding outreach and how GIS story maps can support that outreach for employees and officials who are not GIS technicians but need communications tools to engage with stakeholders
2. Materials for a virtual workshop will be developed for the public sector on using GIS and incorporating into public sector outreach.
3. The virtual workshop will be conducted as a means of testing best practices for public sector outreach with state DOT and MPO employees across the PSR region as participants.

The project team will continue researching how the public sector is engaging with the public at large and identifying the challenges and successes they are facing. In addition, the project lead will continue to develop plans for the GIS workshop for the public sector. In the time of Covid, with all work being remote, tools that will better support workers in maintaining connection and disseminating information to the public is an essential part of responsible transportation system management.

**C. Outreach Accomplishments**

METRANS hired a communications firm to conduct an audit and draft a strategic plan to assess the effectiveness of its existing communications efforts and to provide suggestions on how to better utilize its resources to maximize outcomes. The plan will be presented to the METRANS Advisory Board on November 6th.

METRANS held its semi-annual Advisory Board meeting on April 3, 2020 via video conference. The meeting was well attended by senior leaders from the Center's industry and agency stakeholders. The meeting allowed METRANS to provide updates on its research, education and outreach activities. Two PSR research projects were presented to the board. Additionally, the meeting allowed for discourse between the Center and its stakeholders, which will inform future Center activities and efforts. METRANS Advisory Board members are listed on its website: <https://www.metrans.org/advisory-board>

Tyler Reeb (CSULB) organized and hosted three webinars in partnership with the Eno Center for Transportation: "Empowering a Resilient Transit Workforce," "The State of Transportation and Mobility Workforce," and "Promoting Resiliency Across the Global Supply Chains." A total of 1,120 people participated.

CITT at CSULB releases Center Updates, which are bimonthly e-blasts released on the second and fourth Mondays of every month. Each e-blast contains brief articles covering relevant awards, presentations, events, and project descriptions as they appear. The focus is on the freight sector and on education and workforce development. They are distributed as e-mails to industry and education partners as well as partners in government.

**Transfers Magazine:** The fifth issue launched in May 2020, consisting of four articles and an opinion column representing writers with ties to two PSR campuses (UCLA, UCD). The issue included an editor's note from new editor-in-chief, associate professor Michael Manville, to discuss how the pandemic has impacted many of the transportation topics discussed in the issue (e.g., a call for more ridesharing). The website <http://www.transfersmagazine.org/>, which also features regularly updated blogs with transportation-related news, research and events, had more than 20,000 page views during this six-month period, which is 5% less than it was a year ago. Most of our web traffic comes immediately after publishing an issue; however, issue 5 came out around the same time that national attention shifted toward police brutality and systemic racism. The editorial team decided to suspend promotion of the new issue. Editing is currently underway for the next issue set for November 2020, with articles under consideration from even more PSR campuses (Hawaii, USC and UCLA). 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.



**METRANS News/PSR News:** The former METRANS tri-annual print newsletter has now transitioned to a monthly digital publication that is released on the first Monday of every month. This digital version summarizes METRANS research, education, and outreach, including coverage of PSR projects and activities. It is distributed to UTCs and faculty throughout the U.S., to federal, state, and local public agencies, and to industry. The redesign efforts have increased interest among subscribers, which can be noted in the 6.43 percentage-point increase in the average click rate (4.13% in April to 10.56% in September). Recent newsletters have included in-depth articles relating to research projects and researcher spotlights.

**Logistics Peer Exchange:** CSULB compiled a list of potential participants from their network of municipal and MPO-level planners. Ongoing conference attendance, site visits, and research on best practices in logistics planning and distance-based learning is ongoing and will inform the webinar content.

**METRANS on the Move:** This is a weekly e-newsletter written and produced by USC students with staff guidance. Over 3,000 subscribers receive this weekly publication containing transportation news, and notice of transportation events and opportunities, such as conferences, seminars, webinars, scholarships, internships, and job listings. Twenty-six issues were published during the reporting period. Students and alums from USC, UCLA, UC Davis and UC Irvine participated as authors of feature stories.

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

METRANS will hold its next Advisory Board meeting on November 6th. The meeting will be held virtually due to restrictions brought on by Covid.

METRANS and CITT at CSULB will hold their annual Town Hall event on October 6. The focus of the event will be an assessment of how the supply chain responded to the COVID-19 pandemic.

UCLA will hold its annual Lake Arrowhead Symposium online in October. The theme was changed from “California’s Climate Crossroads” to “Not Back to Normal: Mapping a Just Transportation Recovery from COVID-19.” The event will be attended by over 500 guests including academics, practitioners, and elected officials. UCLA has been meeting with the Lake Arrowhead steering committee since October 2019 to plan and produce this event.

Within the next reporting period, CSULB will continue focusing its efforts on increased social media engagement. The team will concentrate its efforts on achieving similar follower growth rates on Twitter and Instagram as well as continuing its growth trend on LinkedIn. Pending a communications audit for METRANS channels, the Project Manager in Communications will reassess objectives and activities in digital communications. CSULB will continue to recruit research assistants as necessary for ongoing PSR research and programs. Specifically, they will seek a Multimedia Assistant to increase the team’s capabilities in multimedia production.

## 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

The following organizations provide match funding for PSR projects:

- Bosch LCC, California 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)

CSULB works with several external transportation-related trade and industry associations. Three of these (Los Angeles Transportation Club, Harbor Transportation Club, Harbor Association of Industry and Commerce) have established endowments that are used to provide scholarships for educational opportunities in professional development programs. These are important resources for non-traditional students pursuing non-credit programs who are often not eligible for other kinds of financial support.

CSULB has been designated as one of only ten programs in the country to be part of the Intermodal Association of North America (IANA) scholarship program and the only one focused on professional development offerings. The IANA scholarship money is made available on a competitive basis to students on the CSULB campus pursuing degree programs who would also benefit from the logistics industry exposure offered by CITT's Global Logistics Professional and Marine Terminal Operations Professional programs. A portion of the money also allows both undergraduate and graduate students on campus to gain research experience on applied research projects being undertaken by CITT, including those that are part of the PSR research program.

## 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 Unitrans; 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, Nevada, Maine, Minnesota, Colorado, and Virginia

**Council of University Transportation Centers (CUTC):** Thomas O'Brien (CSULB) completed his tenure as president of CUTC. Center Director Genevieve Giuliano (USC) is a past president and past executive committee member.

**Institute of Transportation Studies (ITS):** ITS is the University of California transportation research institute. It has branches at UC Berkeley, UC Davis, UC Irvine, and UCLA. ITS is funded in-part by the state of California, as well as by Caltrans research contracts. ITS provides PSR match funding.

**MetroFreight Center of Excellence:** METRANS is the home of the Volvo Research and Education Foundation (VREF) Center of Excellence on urban freight. It is an international consortium that includes the University Transportation Research Center (Region 2 UTC), Institute of Science and Technology for Transport (IFSTTAR), and the Korean Transport Institute (KOTI). MetroFreight has greatly expanded our international linkages, and offers many opportunities for collaboration and partnerships.

**National Center for Sustainable Transportation:** The NCST UTC was established in 2013 and renewed 2016. Led by University of California, Davis, consortium partners include METRANS (USC and CSULB); University of California, Riverside; Georgia Institute of Technology; and the University of Vermont. METRANS' role is sustainable freight transport, which links well with MetroFreight.

**Southwest Transportation Workforce Center:** SWTWC and its partners provide significant infrastructure and professional capacity in support of workforce development programs for PSR. SWTWC is led by CSULB, with USC, Texas A&M Transportation Institute (TTI), ICF International, and the National Occupational Competency Testing Institute as partners.

**The Center for International Trade and Transportation:** CITT (CSULB) acts as a media sponsor, using its media and social media channels to announce events and other opportunities to a network of students and industry and government partners.

**TuSimple:** Autonomous trucking company TuSimple works closely with PCC's transportation programs and was one of the key partners in developing and promoting the new Autonomous Vehicle Driver and Operations Specialist certificate program. TuSimple offers priority hiring to the program graduates.

**UCLA Lewis Center for Regional Policy Studies:** Deputy Director, Madeline Brozen is a researcher on the PSR research project, "Public Transportation Among University Students." The Lewis Center also provides workspace and matching funds researchers and staff at the UCLA Institute of Transportation Studies.

**Velodyne Lidar:** The company has provided a donation of two LiDAR units that are supporting current graduate student fellowship and faculty research projects at UCI.

### C. Collaborations

CITT also partners with the Port of Long Beach and Long Beach Unified School District on the Cabrillo HS Academy of Global Logistics (AGL), which serves as a testing ground for many of the tools, programs and workforce initiatives developed through PSR.

NAU has begun to establish a partnership with Oregon State University. They are currently collaborating on two research projects funded by the Oregon Department of Transportation. One of the projects also includes Portland State University as a partner.

UH is exploring potential collaboration with Louisiana State University, Department of Civil and Environmental Engineering, Gulf Coast Center for Evacuation and Transportation Resiliency, Maritime Transportation Research and Education Center (MarTREC) on matters related to evacuation and traffic impacts when examining disaster impacts to regions.

UCD collaborates with the UC Davis Policy Institute for Energy, Environment, and the Economy.

**Arizona Institute of Automated Mobility (IAM):** The IAM was established 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, UofA, and ASU), government agencies, and private industry. NAU has secured funding for two research projects from the IAM: one is a collaboration with all IAM members, and the other is a collaboration between NAU and UofA.

**Arizona Technology Park:** PCC partners with the University of Arizona Technology Park in a Smart Vehicle Innovation Team (SVIT), which seeks to bring economic developers and academic researchers together to attract autonomous vehicle manufactures to southern Arizona.

**Florida Atlantic University:** UH and FAU are engaged in collaborative research on the use of visualizations to improve the understanding of sea level rise Impacts to transportation. Collaborators are developing and testing visualizations in both Florida and Hawaii.

**Maricopa Association of Governments:** NAU continues to work on two separate pilot evaluation projects: one of an adaptive-like technology, the other a novel method of improving preemption for emergency vehicles. NAU is also providing input on other pilots being completed by the University of Arizona. This is all part of a Master Services Agreement with MAG.

### 3. Outputs

PSR outputs include publications, reports, papers, presentations, media, and others. Our target for peer-reviewed publications is 5 per year. During this reporting period, we have exceeded our target. For a list of the publications, conference papers, and presentations, see [Appendix A](#). See [Table 1](#) for a list of the 9 final reports that were published during the reporting period.

#### D. 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/>
- 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/channel/UCYgWr1zI9uFlip1nwmcKhOQUCLA>
- UCLA ITS: <http://www.its.ucla.edu>
- UCLA Lake Arrowhead Symposium: <http://www.uclaarrowheadsymposium.org>
- UH website (includes posts on PSR research): <https://ndptc.hawaii.edu>

### **E. New methodologies, technologies or techniques**

Antonio Bento (USC) assembled comprehensive ‘big-data’ to study the question: What are the benefits, in terms of GHG emissions and pollution, from removing excessive vehicles from freeways and roads at different locations and times of the day? The PI utilized 1) a rich network of detectors on LA freeways that measure speed and flow in real-time (PEMS), 2) novel and unexploited data from Aclima that measures real-time concentrations of various local air pollutants (including, NO, NO<sub>2</sub>, Ozone, Black Carbon), and 3) weather data. Bento is applying standard econometric techniques along with innovative data visualization and machine learning methods to develop practical tools for policymakers to A) infer the relationship between traffic congestion and pollution, and B) identify hot-spots and targets for policy interventions that maximize both reductions in congestion and pollution. While others have estimated engineering/simulations models, Bento’s approach offers several advantages, namely: 1) combined econometrics and machine learning, 2) visual displays of the relationship between traffic volumes and pollution across different locations and times, and 3) allows for the measurement of the effects of past hours traffic on pollution in the following hours, as well as the effects of traffic on accumulated pollution over several hours of the day.

Cyrus Shahabi, Yao-Yi Chiang and their research team at USC have developed a data-driven, deep learning approach for traffic flow prediction and bus arrival time estimation. They also built a system that uses the traffic predictions for forecasting various performance metrics for public transportations in Los Angeles (e.g., bus arrival times). The system demonstrates the overall approach in an area near downtown Los Angeles and shows that incorporating traffic flow predictions can help to forecast short-term bus arrival times accurately (e.g., in the next few hours). They have deployed the developed technologies on the USC IMSC cloud, which can be accessed on the IMSC ADMS website (<https://adms.usc.edu/app>). Their collaborators in Caltrans and LA Metro have provided positive feedback on the web dashboards.

Stephen Ritchie’s (UCI) LiDAR project is developing truck classification algorithms using infrastructure-based LiDAR. The project has performed site evaluations in the vicinity of Hemet, CA, and a LiDAR installation at the southbound I-15 Mountain Pass truck scale, which will capture all truck traffic entering California from Nevada (Figure 2). The team has developed a preliminary LiDAR-based truck body classification model using the data collected at San Onofre using a device that was installed pre-Covid. The project has employed novel approaches to leveraging relatively low resolution (and therefore

lower cost) LiDAR data to achieve high fidelity classification performance. Classification of on-road truck activity is critical for the development of the next generation of vocation-specific truck travel demand models, particularly in light of the role that trucking activity has on environmental, equity, and economic outcomes. The ongoing relationship with Velodyne LiDAR, fostered in part due to the resources provided by PSR UTC, is likely to continue reaping research benefits.



*Figure 2. LiDAR installation on I-15 for a PSR project under PI Stephen Ritchie (UCI).*

Wenlong Jin's (UCI) project has developed systematic methods for detecting the periodicity in traffic data on signalized roads from both flow-based and trajectory-based models. From this, network fundamental diagrams are calibrated for such periodic states and will be used to evaluate the impacts of connected and autonomous vehicles. The initial work on this project resulted in a paper that will be presented at the 2021 TRB Annual Meeting.

Michael Hyland's (UCI) PSR project focuses on dynamic and anticipatory routing models for shared vehicles using bi-criteria path-finding. The research team has been developing the mathematical models and proposed solution algorithms in order to develop a state-of-the-art dynamic vehicle routing and path-finding policy for shared-ride vehicles. Data collection and model building is underway for the cities of Irvine and Anaheim to test the proposed models, algorithms, and policies. The research team is also working with Caltrans to identify larger networks in Southern California for further testing.

Although not yet funded by PSR, UH has been examining with its partners the development and use of 360 imaging (similar to Google Street View) and AI/machine learning applications for disaster damage assessment and transportation infrastructure management. Further research may be funded by PSR.

## **F. Other products**

**Trade Talks:** Dr. Thomas O'Brien of CSULB hosts a quarterly television series called Trade Talks produced by CSULB's Advanced Media Production services and distributed through a regional cable network including all 23 campuses of the California State University system. The episodes are also available on YouTube. Trade Talk episodes have been included as teaching tools in educational programs such as

massive open online courses (MOOC). All episodes can be viewed on YouTube:

<https://www.youtube.com/playlist?list=PL1POu-XNkt4k1RZv9NG3HROnbKYBQgpjb>

**METRANS YouTube:** METRANS (USC/CSULB) has a YouTube channel, where videos of seminars and other recorded events are posted. Many of the videos feature PSR-funded researchers and research. Videos are available online: <https://www.youtube.com/playlist?list=PLFF4D4389AC445594>

## 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. Examples include the full-scale consideration of a new technology technique, or practice, or the passing of a new policy, regulation, rulemaking, or legislation.

The AQMD ZEV Markets project under PI Genevieve Giuliano (USC) was presented to AQMD, and at the California Environmental Dialogue. The project was funded to assist AQMD in developing policies to advance deployment of zero and near-zero emission heavy duty trucks.

Giuliano's (USC) economic competitiveness project works directly with Go-Biz and an industry working group to implement the economic competitiveness provisions of the California Sustainable Freight Action Plan. Metrics to measure economic competitiveness of California freight sector have been developed.

Andrew Molisch (USC) is the Chief Science Advisor of a startup on smart mobility, which is pilot testing a few algorithms that were inspired in part by past research supported by METRANS and UTC funds.

The Climate Smart Transportation and Community Consortium research is aimed at informing policy. Dr. Giuliano (USC) and her team are working directly with LA Metro on transit service options, and will be sharing findings with cities to promote solutions to the identified safety problems.

Kanok Boriboonsomsin (UCR) developed a strategy to reduce the impact of truck emissions on disadvantaged communities through his PSR project. His research has been enhanced and applied in California as part of a research project for the California Air Resources Board.

Dr. Sarah McCullough's PSR report, "Making Bicycling Equitable: Lessons from Sociocultural Research," was cited in a July 29, 2020, BBC article on "[Will COVID-19 make urban cycling more inclusive?](#)" This citation provided further reach for the report and the researchers' findings and additional public access to the information.

A previous PSR project which resulted in the white paper, "California Climate Change Target Setting: A Workshop Report and Recommendations to the State of California Based on the Third California Climate Policy Modeling Dialogue and Workshop," has informed the research team's study for the California EPA to develop scenarios for a carbon-neutral transportation system for California by 2045.

### Education of public officials, policymakers through attendance

One major goal we have is the education of public officials and policymakers through attendance at PSR events. Our annual target for events is 150 attendees from public agencies and private industry. This year, we have surpassed our target with a total of 338 public official/policymaker and 485 industry attendees at PSR events.

Through the calendar year ending on September 30, 2020, PSR partners held several events (see previous sections of this report) in which public and elected officials participated. These events increased attendees' understanding of personal and commercial mobility options, the effects of the rise in private mobility on city and regional planning sectors, and awareness of New Mobility options.

All PSR researchers whose work is funded by Caltrans present their research findings to Caltrans personnel upon completion of their projects. For a list of Caltrans-funded projects that were completed during the reporting period, see [Table 2](#).

Genevieve Giuliano (USC) presented testimony on Assembly Bill No. 1112 to the state senate committee. The bill would regulate dockless scooters and bikes.

NAU's work with the Maricopa Association of Governments as independent evaluators for Smart Region Pilot deployments, contributes to the body of knowledge through independent assessment of novel smart transportation technologies. Additionally, NAU continues to work with the City of Phoenix to help address their pedestrian safety problem through development of a map-based tool to better understand where, when, how, and why pedestrian injuries and fatalities occur. This work has the potential to impact the field of pedestrian safety, which is particularly important given pedestrian fatalities have increased substantially over the last decade.

Two active NAU projects funded by the Oregon Department of Transportation will provide operational procedures and guidance for identifying vehicle detectors that are not performing properly, and guidance for deployment of countermeasures to reduce bicycle/motor vehicle conflicts at signalized intersections. Both of these will provide new methods for solving these types of problems across the Oregon state system, and will also be scalable to other jurisdictions. NAU faculty have also recently undertaken research toward developing a bicycle routing engine capable of measuring bike network connectivity and destination accessibility. This research carries the potential to serve as an important decision-making tool for active transportation planners looking to quantify the benefits of a new bike facility beyond ridership metrics and evaluate the relative contribution of various network configurations.

NAU's unsponsored research on ridesharing activity offers new insights into the various factors responsible for individuals using more efficient pooled service options and the traditional travel modes that ridesharing users are foregoing. These findings are critical to planning agencies who do not have access to private ride-hailing data, as they look to generate policies and conditions that favor the use of pooling rather than single-party trips and curb public transit ridership declines as a result of ride-hailing. This work builds on a recently published study in *Journal of Transport Geography*, which used publicly available Uber Movement data in an unintended and novel way to illustrate the previously unreported multi-year expansion of popular ride-hailing services in Boston, San Francisco, and Washington, DC.

**Critical Issues in Trucking Workforce Development White Paper:** This CSULB white paper identifies research opportunities focused on workforce development for the trucking industry, particularly in response to truck driver shortages. Interviews were conducted with key national and state trucking

industry leaders. Implications for policy and practice include developing marketing, training, and retention strategies specific to new workforce entrants and creating more accurate messaging to the public about the future of trucking industry jobs. The white paper garnered a great deal of attention, becoming one of the most downloaded publication on the MTI website. The most recent metrics in mid-October indicate that it has been downloaded 179 times.

On May 13th and 20th, 2020, LA Metro's Goods Movement Planning Team invited CITT to participate in a special online series on key strategies and initiatives for the draft Goods Movement Strategic Plan. These draft strategies and early action initiatives focused on Equity, Workforce Development, Urban Deliveries, Rail Partnership Program and Countywide Clean Trucks and have been informed by discussions with stakeholders over the last twelve months. CITT provided input, support, and leadership in helping Metro develop a focus for its workforce-related efforts.

PSR Director Giuliano and PhD Candidate Sue Dexter (USC) participated in the LA Metro Clean Trucks Task Force to develop a plan for implementing a clean trucks program in Los Angeles County.

## 5. Impacts

PSR defines an impact as that which has an effect on 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. Therefore, performance with respect to outcomes and impacts are likely to be more a matter of judgement than of quantifiable metrics. Our contributions are judged by the PSR Advisory Council, and measured as significant or not significant.

### Impact on the body of scientific knowledge

All of PSR's research products are made [available to the public](#). These products have an immeasurable impact on the body of scientific knowledge.

The tool developed by Dr. Fraser Shilling (UCD), et al, from his PSR project, "Automated Analysis of Wildlife-Vehicle Conflict Hotspots Using Carcass and Collision Data," is serving as the basis for a new project funded by the Pew Charitable Trust with five western states.

Professor Jin's (UCI) completed project, "Green driving on a two-way street," has extended the common finding from existing research that eco-driving strategies aiming to reduce vehicle emissions could increase congestion for relatively dense traffic. His work has demonstrated for the first time that the new green driving strategy can improve both mobility and environmental impacts by dynamically updating vehicles' advisory speed limits for all congestion levels.

### Impact on the adoption of new practices

Utilizing the effort of a USC graduate student researcher, Marley Randazzo, METRANS presented a report on Employee Transportation Demand Management to Lauren Armstrong, Executive Director of the Maui County Metropolitan Planning Organization on April 10, 2020. The report will be used as a foundational document to support work on setting a "new normal" for commuting in Maui County.

PI Anastasia Loukaitou-Sideris's (UCLA) work has informed LA Metro's efforts to [understand](#) and plan for gender discrepancies in public mobility experience. Metro Los Angeles is an emerging national leader in gender-informed transit planning.

Sarah McCullough's (UCD) Caltrans Planning Horizons webinar presentation, and many other activities she has led on transportation equity, has informed Caltrans staff and other government personnel in the revolution of mobility justice and consideration of equity issues in the transportation industry.

The results of UH's research on sea level rise are bringing greater awareness of the impacts of climate change to coastal roads and transportation systems. UH's suggested approaches and techniques to mitigate damage from sea level rise, such as the use of green infrastructure and natural based features, have been disseminated to Hawaii's state transportation agencies.

### **Impact on transportation workforce development**

Training courses and certificate programs have increased the expertise of transportation professionals. PSR carries out an extensive workforce development program as described in previous sections.

The National Disaster Preparedness Training Center (NDPTC) at UH trains approximately 5,000 first responders and other state and local governmental agency personnel annually across the United States and its territories. UH's PSR-funded research produces outcomes that can be converted into certified FEMA training and provides valuable information for practitioners on maintaining the safety and security of the transportation infrastructure in the United States.

CSULB's efforts for AGL include the development of integrated project learning topics for teachers and coordination for all industry engagement. The program serves as an outlet for research done by CSULB under other grants such as PSR.

NAU continues to conduct K-12 STEM outreach activities aimed at educating students about the field of transportation engineering with the goal of fostering interest in this field as a career.

The Impact of PCC's programing is primarily through relationship building with industry partners and the development of new programs that allow enrolled students to qualify for advanced jobs that pay sustainable wages. The development of industry aligned programs increases access to new educational and career opportunities and increases equity in the College's offerings. Autonomous Vehicle Driver and Operations Specialist and Logistics programs both provide students with access to industry driven curriculum that prepares them for careers in fields that pay well and provide access to continuous learning opportunities. Logistics is completely online, which has increased access to the program and allows students to take classes during times that work best for them.

ITS-Davis provides 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.

## **6. Changes/Problems**

### **Changes in approach and reasons for change**

Covid has caused disruptions for many PSR activities. Fortunately, most activities are proceeding as planned, with most activities being changed from in-person to virtual. Digital technologies have enabled research and administrative teams to continue working. Classes, seminars, and training sessions have been moved to online formats.

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

Many research projects were delayed by the pandemic and the switch to remote work. COVID-19 related restrictions have had the most impact on projects that involve laboratory work or any type of field data collection. These projects have been identified and granted no-cost time extensions. Project expenses previously allocated to travel budgets have largely been reallocated to other budget items, especially student support.

**Change of primary performance site location**

Most PSR UTC partner campuses remain at limited capacity. Accordingly, most faculty and staff have been working remotely as of mid-March. Additionally, most events have been switched from in-person to online only. We will continue to work remotely until the restrictions are lifted.

**7. Special Reporting Requirements**

Nothing to report.

## 8. Appendix A

### A. Publications

#### Peer-reviewed publications

1. Boarnet, Marlon G., R. W. Bostic, S. Rodnyansky, E. Burinskiy, A. Eisenlohr, HT Jamme, R. Santiago-Bartolomei (2020). Do high income households reduce driving more when living near rail transit? *Transportation research part D: transport and environment*, 80. <https://doi.org/10.1016/j.trd.2020.102244>
2. Jaller, M., Otero-Palencia, C., and Pahwa, A. (2020) Automation, electrification, and shared mobility in urban freight: opportunities and challenges. *Transportation Research Procedia*. <https://doi.org/10.1016/j.trpro.2020.03.158>
3. Jamme, H.-T., Rodriguez, J., Bahl, D., & Banerjee, T. (2019). A Twenty-Five-Year Biography of the TOD Concept: From Design to Policy, Planning, and Implementation. *Journal of Planning Education and Research*, 39(4), 409-428. <https://doi.org/10.1177/0739456X19882073>
4. Koc, E., Cetiner, B., Rose, A. Soibelman, L., Taciroglu, E., and Wei, D. 2020. "CRAFT: Comprehensive Resilience Assessment Framework for Transportation Systems in Urban Areas," *Advanced Engineering Informatics* 46: <https://doi.org/10.1016/j.aei.2020.101159>: 1-20.
5. Luan Tran, Min Y. Mun, Matthew Lim, Jonah Yamato, Nathan Huh, Cyrus Shahabi. DeepTRANS: A Deep Learning System for Public Bus Travel Time Estimation using Traffic Forecasting. *PVLDB*, 13(12): 2957-2960, 2020. DOI: [doi.org/10.14778/3415478.3415518](https://doi.org/10.14778/3415478.3415518)
6. McBride, E. C., Davis, A. W., & Goulias, K. G. (2019). Fragmentation in Daily Schedule of Activities using Activity Sequences. *Transportation Research Record*, 2673(4), 844-854.
7. McBride, E. C., Davis, A. W., & Goulias, K. G. (2020). Exploration of Statewide Fragmentation of Activity and Travel and a Taxonomy of Daily Time Use Patterns using Sequence Analysis in California. *Transportation Research Record*, 0361198120946011.
8. McBride, E. C., Davis, A. W., & Goulias, K. G. (2020). Sequence analysis of place-travel fragmentation in California. In *Mapping the Travel Behavior Genome* (pp. 371-398). Elsevier.
9. Nam, Daisik, R. Lavanya, R Jayakrishnan, I. Yang, WH Jeon (2020). A Deep Learning Approach for Estimating Traffic Density Using Data Obtained from Connected and Autonomous Probes. *Sensors*, 20(17), <https://doi.org/10.3390/s20174824>
10. Saphores, Jean-Daniel, L. Xu (2020). E-SHOPPING changes and the state of E-grocery shopping in the US evidence from national travel and time use surveys. *Research in Transportation Economics*, <https://doi.org/10.1016/j.retrec.2020.100864>
11. Shao, Yihuan, Maged Dessouky (2020). A routing model and solution approach for alternative fuel vehicles with consideration of the fixed fueling time. *Computers & Industrial Engineering*, 142, 1-38. <https://doi.org/10.1016/j.cie.2020.106364>
12. Wei, D., Chen, Z., and Rose, A. 2020. "Evaluating the Role of Resilience in Recovering from Major Port Disruptions," *Papers in Regional Science*, DOI: 10.1111/pirs.12553: 1-32.
13. Yang, Lixing, Zhen Di, Maged Dessouky, Ziyou Gao, Jungang Shi (2020). Collaborative optimization of last-train timetables with accessibility: A space-time network design based approach. *Transportation Research Part C: Emerging Technologies*, 114, 572-597.

#### Other publications

1. Cáñez, J. (2020). The Pedestrian Battle of Los Angeles. doi:10.17610/T6N300 Retrieved from <https://escholarship.org/uc/item/9h56t06z>
2. Chrysovalantis Anastasiou, Min Y. Mun, Luciano Nocera, Cyrus Shahabi. Predictive Routing: A Real-World Implementation of On-The-Fly Traffic Forecasting at Scale. Technical Report. 2020
3. Davis, A. W., McBride, E. C., & Goulias, K. G. (2020). Environmental correlates of travel behavior from a destination attractiveness and activity timing perspectives. In *Mapping the Travel Behavior Genome* (pp. 83-102). Elsevier.
4. Dembo, M. (2020). Off the Rails: Alternatives to Policing on Transit. doi:10.17610/T6XK56 Retrieved from <https://escholarship.org/uc/item/1zp7d0ms>
5. Goulias K.G. & E. C. McBride (2019) *Exploring Fragmentation in Daily Rhythms of Activity and Travel Based on Place-Time Sequence Analysis*. December 9–11, 2019. [not previously reported]
6. Halls, C. (2020). The Effect of Bus lane Management Techniques on Operator Experience, Safety, and On-Time Performance. doi:10.17610/T6P309 Retrieved from <https://escholarship.org/uc/item/1h710137>
7. Hansen, M. (2020). Need for Speed: Opportunities for Peak Hour Bus Lanes Along Parking Corridors in Los Angeles. UCLA: Institute of Transportation Studies. Retrieved from <https://escholarship.org/uc/item/7fv44138>
8. Hansen, M. (2020). Need for Speed: Opportunities for Peak Hour Bus Lanes Along Parking Corridors in Los Angeles. UCLA: Institute of Transportation Studies. Retrieved from <https://escholarship.org/uc/item/7fv44138>
9. Hu, S., M. Dessouky, N. Uhan, and P. Vayanos (USC) "Cost-Sharing Mechanism Design for Ride-Sharing", working paper.
10. Huerta, G., Geannopoulos, A., Nyang, B., & Shen, Y. (2020). Complete Streets for Culver City. doi:10.17610/T6HC75 Retrieved from <https://escholarship.org/uc/item/57p9w9kp>
11. Jaller, M., Otero, C., Pourrahmani, E., & Fulton, L. (2020). Automation, Electrification, and Shared Mobility in Freight. *UC Davis: Institute of Transportation Studies*. <http://dx.doi.org/10.7922/G2RV0KZB> Retrieved from <https://escholarship.org/uc/item/91h9v9zm>. Research Report. Published by institute. Acknowledges federal support.
12. Jaller, M., Fulton, L., Otero, C., & Pourrahmani, E. (2020). Research Brief: Automation, Electrification, and Shared Mobility in Freight. *UC Davis: Institute of Transportation Studies*. Retrieved from <https://escholarship.org/uc/item/17v510z7>. Research Brief. Published by institute.
13. Juarez, Z. (2020). The Movement Towards Mobility Justice in Los Angeles: Building a Framework Grounded in Popular Education & Community Knowledge. doi:10.17610/T6RW2M Retrieved from <https://escholarship.org/uc/item/12k791n6>
14. Loukaitou-Sideris, A., Brozen, M., Ding, H., Pinski, M., & Siddiq, F. (2020). Public Transit Safety Among University Students. UCLA: The Ralph and Goldy Lewis Center for Regional Policy Studies. Retrieved from <https://escholarship.org/uc/item/9wf3r12k>
15. Marks, J. (2020). Changing Plans: Flexibility, Accountability, and Oversight of Local Option Sales Tax Measure Implementation in California. UCLA: Institute of Transportation Studies. Retrieved from <https://escholarship.org/uc/item/3cw80127>
16. McBride, E. C., Davis, A. W., & Goulias, K. G. (2020). Sequence analysis of place-travel fragmentation in California. In *Mapping the Travel Behavior Genome* (pp. 371-398). Elsevier.

17. O'Brien, T., Reeb, T., Matsumoto, D., Sanchez, D. (CSULB) "Critical Issues in Trucking Workforce Development: white paper." California State University Transportation Consortium (CSUTC). April 2020.
18. Ruvolo, M. (2020). Access Denied? Perceptions of New Mobility Services Among Disabled People in San Francisco. doi:10.17610/T6DK5J Retrieved from <https://escholarship.org/uc/item/6jv123qg>
19. Shen, S., Kim, K. 2020 Assessment of Transportation System Vulnerabilities to Tidal Flooding in Honolulu, Hawaii. Transportation Research Record. <https://doi.org/10.1177%2F0361198120940680>
20. Sims, M. (2020). Decision Making Frameworks: Streetscape Cooling Interventions. doi:10.17610/T6WK5W Retrieved from <https://escholarship.org/uc/item/7qr125bt>
21. Speroni, S. (2020). School Transportation Equity for Vulnerable Student Populations through Ridehailing: An Analysis of HopSkipDrive and Other Trips to School in Los Angeles County. doi:10.17610/T6530N Retrieved from <https://escholarship.org/uc/item/077181dh>
22. Stiegemeyer, K. (2020). Whose Budget is it Anyway? Demystifying the City of Los Angeles Transportation Budgeting Process. UCLA: Institute of Transportation Studies. Retrieved from <https://escholarship.org/uc/item/9hw833mb>
23. Yahata Ekman, A. (2020). Meeting Travel Needs: Becoming Reacquainted with a Community's Unmet Travel Needs. UCLA: Institute of Transportation Studies. Retrieved from <https://escholarship.org/uc/item/446367xt>

## B. Conference papers

1. Boriboonsomsin, K., Luo, J., Wang, C., and Barth, M. (UCR). "Use of Connected Vehicle Technology to Reduce Human Exposure to Traffic-Related Air Pollutants." Presented at the 1st Transportation, Air Quality, and Health Symposium, Austin, TX, February 20. [not previously reported]
2. Davis, A. W., McBride, E. C., & Goulias, K. G. (2020). Environmental correlates of travel behavior from a destination attractiveness and activity timing perspectives. In *Mapping the Travel Behavior Genome* (pp. 83-102). Elsevier. Goulias. presentation at the 15<sup>th</sup> International Conference on Travel behavior Research July 2018 UCSB ([iatbr2018.org](http://iatbr2018.org))
3. Ioannou, Petros (USC). *Traffic Flow Control in a Connected Environment*, Presented at *ITSC 2020 Virtual Conference*, September 20-23, 2020.
4. K. G. Goulias, A. W. Davis, and E. C. McBride (UCSB). Presented at the 8th Symposium of the European Association for Research in Transportation hEART 2019. Budapest, September 4-6, 2019. [not previously reported]
5. Luo, J., Wang, C., Barth, M., and Boriboonsomsin, K. (UCR). "Vehicle Routing to Mitigate Human Exposure to Traffic-Related Air Pollutants." Proceedings of the 21st International IEEE Conference on Intelligent Transportation Systems, Maui, HI, November 4-7. [not previously reported]
6. Parkhomenko. "How Do Cities Change When We Work from Home?" Presentation at: AREUEA Virtual Seminars (July 2020). Forthcoming presentation at: Annual Meeting of the American Economic Association (January 2021)
7. Parkhomenko. "Zoning and the Density of Urban Development." Forthcoming presentations at: Meeting of the Urban Economics Association (October 2020); SED meetings in Barcelona (June 2021)

8. Pooladsanj, M., K. Savla, P. Ioannou, (USC) "Vehicle Following over a Closed Ring Road under Safety Constraint." 2020 IEEE Intelligent Vehicles Symposium.
9. Presentation at the Collaborative Transportation Workshop of Intelligent Transportation Conference, September 19, 2020. Title: Mixed Freight Dynamic Routing Using a Co-Simulation optimization Approach, by P. Ioannou and P. Chen
10. Russo, B.J. and S. Gehrke, (NAU) "Recent Research on Bicycle Facility Planning and Safety", Lectern presentation at the 2020 Arizona Roads and Streets Conference. September 2020.
11. Russo, B.J., (NAU) "Analysis of Pedestrian Safety in Phoenix Considering Roadway, Land Use, and Census Data", Lectern presentation at the 2020 Arizona Roads and Streets Conference. September 2020.
12. Wei, D., Koc, E., Rose, A., and Soibelman, L. "Socioeconomic Dimensions of Resilience to Seaport and Highway Transportation Network Disruptions," presentation to Caltrans, October 5, 2020.

### C. Presentations

1. Giuliano, Genevieve (USC). ZEVs in Trucking. Los Angeles Business Council, Sustainability Summit, September 15, 2020.
2. Ioannou, Petros (USC). "Connected Autonomous Vehicles: Safety During Merging and Lane Change and Impact on Traffic Flow." Presented at USC's 10th Annual Electrical Engineering Research Festival.
3. Ioannou, Petros (USC). Plenary Talk: "Safe Merging and Lane Changes of Autonomous Connected Vehicles in Traffic Congested Environments." EWGT 2020: The 23rd Euro Working Group on Transportation, Paphos, Cyprus. September 16-18, 2020.
4. Jenn, Alan. "Optimizing charging infrastructure buildout for TNC electrification." 3 Revolutions Future Mobility Program Deep Dive, online workshop. 9 Sept 2020.  
<https://app.box.com/s/iesv9teiro9zzkgsenyjn5apme9hc1n2/file/719010726502>
5. McCullough, Sarah, and C. Sequoia Erasmus. "Moving From Equity to Justice in Transportation in a Time of Crisis." Caltrans Planning Horizons Seminar/Webinar, 29 July 2020. Online.  
<https://youtu.be/G1Lk7A6lmzI>