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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 (LBSU); 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 LBSU 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 current total initiated project count for PSR is 38. USC has 14 projects (including 2 regional projects at UCSB and 1 at UCR), LBSU has 1, UCLA has 4, UCD has 10, UCI has 5, and UH has 4.

PSR completed 6 projects during the reporting period. Table 1 lists the completed projects.

Table 1: Projects completed during current reporting period

Partner	Project No.	PI	Title	Funding Source
USC	17-02	Petros Ioannou	Integrated Traffic Flow Control in a Connected Network	USDOT
USC	17-04	Antonio Bento	The Cost-Effectiveness of Alternative Policies for Reducing GHG Emissions in the Freight Sector	USDOT
UCSB	17-05	Konstadinos Goulias	Vertical Equity Statewide Pilot, Data Inventory, and Guidelines for Performance Based Planning	USDOT
UH	17-01	Wendy Meguro	A Primer on Coastal Transportation System Resilience and Adaptation to Sea Level Rise on Oahu Using Living Shorelines and Green Infrastructure	USDOT
UH	17-02	Suwan Shen	Physical Exposure and Social Sensitivity: Estimating Sea Level Rise Impacts to Transportation through Vulnerability Assessment and Social Media Analysis	USDOT
UCD	17-09	Sarah McCullough	White Paper: Socio-cultural and Historical Factors in Active Transportation	USDOT

Requests for Proposals (RFPs)

A mid-year RFP (2a) was issued to allocate remaining funds from Years 1 and 2. From this RFP, 10 projects were selected for funding by Caltrans as match projects (5 at USC, 5 at UCI). We anticipate that the projects will begin in August 2019. PSR consortium members (USC, LBSU, UCD, UCI, UCLA, and UH) issued Year 3 RFPs in early 2019 with closing dates in March and April. Projects will be reviewed in late spring with anticipated start dates in fall 2019 and winter 2020.

Match funding

PSR has the following match funding priority rankings: new funding, match from other existing research projects, and in-kind match. We have focused on obtaining new funding. First, the University of California partners were awarded a new source of state funding, SB1, which increased the California fuel tax by 12 cents per gallon, provides annual funding 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. Second, Caltrans has committed to a 50% match for PSR. Third, USC has obtained research funding from local industry and agencies for specific projects. NAU has continued 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 15 new projects were started during the reporting period. Table 2 lists all new projects.

- USC started 5 projects all funded by Caltrans as match projects.
- UCD launched 5 new research projects during the reporting period, including one white paper and two seed grants.
- UCLA began three projects, all of which are expected to complete by September 2019.
- LBSU started one project.

Table 2: New research projects initiated during current reporting period

Partner	Project No.	PI	Title	Funding Source
LBSU	17-11	James Miles	Evaluation of Autonomous Vehicles and Smart Technologies for Their Impact on Traffic Safety and Traffic Congestion	Caltrans
USC	18-02	Maged Dessouky	Cost-Sharing Mechanisms for Ridesharing	Caltrans
USC	18-04	Marlon Boarnet	Measuring Accessibility Changes for Households Moving Away from Rail Transit Areas	Caltrans
USC	18-06	Petros Ioannou	Connected Autonomous Vehicles: Safety During Merging and Lane Change and Impact on Traffic Flow	Caltrans
USC	18-07	Dan Wei	Socioeconomic Dimensions of Resilience to Seaport and Highway Transportation Network Disruptions	Caltrans
USC	18-10	Cyrus Shahabi	Deep-Learning Traffic Flow Prediction for Forecasting Performance Measurement of Public Transportation Systems	Caltrans
UCD	18-20	Alan Jenn	Charging Infrastructure Development for Transportation Network Company Electrification	USDOT
UCD	18-21	Michael Zhang	Get More Out of Variable Speed Limit Control: An Integrated Approach to Manage Traffic Corridors with Multiple Bottlenecks	USDOT
UCD	18-22	Miguel Jaller	Spatio-Temporal Analysis of Freight Patterns in Southern California	Caltrans
UCD	18-23	Austin Brown	California Climate Change Target Setting White Paper	USDOT
UCD	18-24	Miguel Jaller	Automation, Electrification, and Shared Mobility in Urban Freight: Opportunities and Challenges	Caltrans
UCD	18-25	Susan Pike	Davis Amtrak Station Pilot Project Evaluation: Informing Long Term Solutions to the Davis Amtrak Station Access Barriers	Caltrans
UCLA	18-31	Anastasia Loukaitou-Sideris	Public Transportation Safety Among University Students	Caltrans
UCLA	18-32	Mike Manville	The Opportunity Cost of Parking Requirements: The Case of Silicon Valley Applied Research Projects	Caltrans
UCLA	18-33	Martin Wachs	Promises and Projects: Examining Accountability and Flexibility in LOST Expenditure Plans	Caltrans

Student opportunities for research

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

i. Research dissemination

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

USC held its inaugural “Emerging Scholars Transportation Research Symposium” on March 29, 2019. The Symposium featured dissertation research from 12 student presenters from four PSR partners: UCD, UCI, UCLA, and USC. Prof. Evelyn Blumenberg (UCLA) gave the keynote speech, “Successfully Navigating an Academic Career: Experiences and Lessons Learned,” Prof. Martin Wachs gave the luncheon speech, “Linking Research and Practice: Lessons Learned Over Five Decades,” and Justine Johnson of Ford Smart Mobility delivered the closing address. Over 100 students, faculty, and industry representatives attended the daylong seminar.

UCD hosted the [first webinar](#) of its new GreenLight Webinars series on February 13th with Dr. Fraser Shilling on his PSR research project, “Automated Analysis of Wildlife-Vehicle Conflict Hotspots Using Carcass and Collision Data”. 94 people attended from 4 countries, including 32 from state DOTs, 17 from other U.S. state agencies, and 13 from the private/industry sector. The webinar featured two guest respondents, Nova Simpson, Nevada Department of Transportation, and Richard Bostwick, Maine Department of Transportation, who provided feedback on the research findings and its applicability.

On February 15, 2019, UCD’s Friday seminar, which is in-person as well as webcasted and recorded, featured Dr. Sarah McCullough and findings from her PSR white paper project “Socio-cultural and Historical Factors in Active Transportation.” The audience for these seminars consists of graduate students from the Transportation Technology & Policy Graduate Program, as well as faculty, researchers, and the public. The seminar, titled “Equity, Justice and Sociocultural Research on Bicycling Transportation,” was recorded and is [available to watch](#).

UCI supported the “2nd Annual Irvine Symposium on Emerging Research in Transportation” on January 18-19, 2019, and the “2nd Annual Graduate Symposium on Innovative Mobility” on January 31, 2019.

USC seminars

- Edward Smaglik (NAU). *Addressing Bicycle-Vehicle Conflicts with Alternate Signal Control Strategies*. Feb 20, 2019.
- Gary Painter (USC). *Innovation on Job Accessibility with General Transit Feed Specification*. Jan 23, 2019.
- Sarah E. Brown (USC). *Realizing Diversity and Inclusion in the Workplace*. Oct 9, 2018.

UCD Friday Seminars

- Bernard C. Soriano, Deputy Director of the California DMV. *Autonomous Vehicles in California*. Feb 1, 2019. <https://its.ucdavis.edu/seminar/february-1-2019/>
- Johan Houston, Senior Portfolio Lead with IDEO’s Transportation and Mobility Practice. *The Second System: The Future of Urban Mobility Might Be Smaller and Closer Than We Imagined*. Nov 2, 2018.
- Micheal Coleman, Fiscal Policy Advisor with the League of California Cities. *A Local Transportation Finance Breakdown*. Oct 26, 2018.
- Sarah McCullough, Associate Director of the Feminist Research Institute at UC Davis. *Equity, Justice and Sociocultural Research on Bicycling Transportation*. Feb 15, 2019. <https://its.ucdavis.edu/seminar/february-15-2019/>
- Sondra Rosenberg, Assistant Director for Planning at the Nevada Department of Transportation. *One Nevada Transportation Plan: Long Range Statewide Transportation Planning in a Rapidly Changing Environment*. Jan 25, 2019. <https://its.ucdavis.edu/seminar/january-25-2019/>

UCI seminars

- Bruce Appleyard (SD State). *Measuring & Doing the Right Things in the Era of Driverless Cars: Creating Smart, Livable, & Equitable Streets and Cities with Autonomous Vehicles*. Dec 7, 2018.
- Danielle Kochman, Assistant Transit Planner at San Diego Association of Governments (SANDAG). *Planning for the Future of Mobility*. Jan 31, 2019.
- Marco Pavone (Stanford). *Autonomous Mobility-on-Demand Systems for Future Urban Mobility*. Mar 1, 2019.
- Michael Hyland (UCI). *Autonomous Vehicle-enabled Mobility: Societal Implications and Research Challenges*. Jan 29, 2019.
- Michael MacKinnon, Senior Scientist at the Advanced Power and Energy Program (UCI). *Assessing the Air Quality Impacts of Transportation*. Jan 29, 2019.
- Qi Alfred Chen (UCI). *Ghost Cars and Fake Obstacles: Automated Security Analysis of Emerging Smart Transportation Systems*. Mar 22, 2019.
- Ramin Massoumi, Senior Vice President and General Manager, Iteris, Inc. *The Future of Transportation*. Jan 31, 2019.
- Rani Narula-Woods. Senior Director of Special Projects at the Office of Extraordinary Innovation, LA Metro. *MicroTransit*. Jan 31, 2019.

Transportation Research Board (TRB) conference

The TRB 98th Annual Meeting was held January 13–17, 2019, at the Walter E. Washington Convention Center, in Washington, D.C. Researchers from the PSR consortium presented a range of poster and lectern sessions. PSR-affiliated students and faculty participated in 64 presentations.

Other research presentations

- Austin Stanion (UCLA). Presented his ongoing capstone research at the CARTEEH Transportation, Air Quality, and Health Symposium. Jan 2019.
- Brendan Russo (NAU), E. James, T. Erdmann, E. Smaglik. *Pedestrian and Bicyclist Behavior at Highway-Rail Grade Crossings: An Observational Study of Factors Associated with Violations, Distraction, and Crossing Speeds during Train Crossing Events*. National Rural ITS/ITS Arizona Conference. Fort McDowell, AZ. Oct 2018.
- Cris Aguilar (NAU), B. Russo, A. Mohebbi, S. Akbariyeh. *Analysis of Factors Affecting the Frequency of Crashes on Interstate Freeways by Vehicle Type and Severity Incorporating Weather Prediction Models*. National Rural ITS/ITS Arizona Conf. Fort McDowell, AZ. Oct 2018.
- Cris Aguilar (NAU), B. Russo, A. Mohebbi, S. Akbariyeh. *Analysis of Factors Affecting the Frequency of Crashes on Interstate Freeways by Vehicle Type and Severity Incorporating Weather Prediction Models*. INFORMS Annual Meeting. Phoenix, AZ. Nov 2018.

Media coverage

During the current reporting period, a number of PSR faculty associates were covered in the media. Examples include: Genevieve Giuliano (PBS, various trade magazines), Brian Taylor (*LA Times*), Martin Wachs (*LA Times*), Michael Manville (*LA Times*), Gabriel Kahn (*LAist*), and Mingxuan Yue (KPCC radio).

ii. Plans for next reporting period

The next reporting period is April 1, 2019 through September 30, 2019. We plan to select projects for funding under the Year 3 RFP and start the 10 projects funded under RFP 2a. We anticipate completing 6 projects during the next reporting period. We will also continue the PSR seminar series at USC, UCD, UCLA, and UCI.

PSR will hold its annual congress in Tucson, Arizona on April 8-9, 2019. The congress will be hosted by PSR partner Pima Community College. All PSR partners will have students and researchers in attendance. We will also have presentations and speakers from industry/agency partners in the Tucson area. PSR will release Issue 3 of *Transfers Magazine*.

USC and LBSU will continue planning for our 2019 Smart Freight Week, which features our biennial International Urban Freight Conference (INUF) to be held at Hotel Maya in Long Beach, CA in October.

NAU will award three graduate fellowships. Recipients will be named in the next reporting period. Additionally, two research interns have been hired for Summer 2019. They will work on a variety of research, including bicycle-motor vehicle conflicts, pedestrian safety, and smart region technology.

UCI will continue to administer the faculty research program and to offer student fellowships to support ongoing research into PSR-UTC priorities.

UH will complete two more projects, and will follow up with its researchers to identify what manuscripts they have published and how they have further disseminated the research and if they have done more to enhance the research conducted with the Year 1 funds.

UCD will continue its Friday Seminars during the next reporting period. Fall 2019 seminars will be identified in September. PSR funds will be used to support UCD's Asilomar 2019, the 17th Biennial Conference on Transportation and Energy, with PSR funding. The conference, focusing this year on "Big Ideas, Big Solutions: Future of Mobility", will take place July 9-12, 2019, in Pacific Grove, CA.

UCLA will continue the fellowship capstone program to support high quality student projects. UCLA will host the Steering Committee Meeting to plan the Annual UCLA Lake Arrowhead Symposium.

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

Softskills webinar

LBSU has begun the development of a concept paper, as well as modules for a foundational ("soft") skills curriculum called "Driving the Wheels of Success." The concept paper includes a review of existing approaches to developing foundational skills with a discussion of how they can be customized for the transportation sector(s). The curriculum is designed to introduce and provide opportunities for students to practice the skills that transportation-related employers have identified as the most important personal qualities that they wish to see in today's workforce. The pilot modules in development apply these to the field of logistics. The goal is to assist each student's transition from knowledge acquisition to application in order to increase the student's value when entering the workforce. "Driving the Wheels

of Success" module categories are Personal Development, Communication, and Interpersonal Skills. Once completed, the modules will be tested in courses currently offered through CITT.

PCC has worked collaboratively and extensively with TuSimple, an autonomous trucking technology company, to develop a multidisciplinary program for upskilling drivers to support employment in the emerging autonomous trucking industry. TuSimple has contributed meeting space multiple times and has contributed personnel hours for developing new curriculum and outreach.

UCI awarded 5 Graduate Student Fellowships in January 2019 for the winter and spring quarters.

UCD supported Dr. Austin Brown's attendance at the 2018 UCLA Lake Arrowhead Symposium, "From Public Transit to Public Mobility." UCD also supported the 3 Revolutions Future Mobility Policy Conference March 18-19, 2019 in Davis, CA.

In the Fall 2018 and Winter 2019, UCLA awarded fellowships to 22 incoming and continuing students: 4 PhD Urban Planning Students, 2 MPP, 16 MURP. UCLA also supported 7 students to attend the Transportation Research Board Annual Meeting January 14-17, 2019. In addition, they supported one master's student to present his capstone research at the CARTEEH Transportation, Air Quality, and Health Symposium in January 2019.

USC professional development workshops

- Jon Coleman, Director of Ford Smart Mobility. *The Future of Mobility: Access not Aces*. November 7, 2018. USC.
- Laura Cornejo, Deputy Executive Officer of Countywide Planning at LA Metro. *LA Metro is Changing the Mobility Landscape – Learn What's Next!* January 30, 2019. USC.
- Ronald Milam, Director at Fehr & Peers. *Critical perspective and recent research on the travel behavior implications of disruptive trends and autonomous vehicles*. March 19, 2019. USC.
- Sara E. Brown (USC). *Women at Work-shop*. February 14, 2019. USC.
- Sarah E. Brown (USC). *Realizing Diversity and Inclusion in the Workplace*. October 9, 2018. USC.
- Steven Mateer, Transportation Superintendent of the City of Glendora. *Lunch with Transportation Professional Steven Mateer*. February 6, 2019. USC.
- UCD continued to provide support to the WTS UC Davis Student Chapter.

USC field trips

- Anaheim Regional Transportation Inter-modal Center. March 23, 2019. Anaheim, CA.
- Port of Long Beach Harbor Tour. February 9, 2019. Port of Long Beach, Long Beach, CA.
- Gerald Desmond Bridge Tour. February 21, 2019. Long Beach, CA.

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. We also continue 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.

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 (22 female, 21 are both female and members of underrepresented groups - Hispanic/Latina and Asian/Pacific Islander).

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. We hold one “Get the Job” event each semester; during the reporting period we held two events for a combined audience of 45 participants.

i. Education goals for next reporting period

Geospatial Technology Education: To leverage the benefits of an interdisciplinary approach to geographic information systems (GIS) education, LBSU and PCC will develop an introductory GIS course integrated with PCC’s Associate’s Degree in Logistics and Supply Chain Management. This will be used as a model for possible inclusion in other degree programs as well. A related train-the-trainer initiative to be piloted first at PCC and then later throughout the PSR region, will teach high school and community college instructors how to incorporate geospatial technology and transportation concepts into their curriculum.

Softskills Webinar: LBSU will continue to develop the concept paper and modules for the “Driving the Wheels of Success” curriculum.

Online Commercial Driver’s License Training: In partnership with PCC, LBSU will develop and deploy a webinar series that presents best practices in migrating non-credit courses to the online environment with a focus on opportunities for CDL training. Those webinars will present ways to eliminate barriers to entry for underserved populations: women, veterans, tribal communities, and nonnative English speakers. LBSU’s scope of work will include curriculum development, online coordination, outreach and market to potential webinar participants from the worlds of instructional design as well as trucking, and follow-up evaluations and interviews.

Logistics Peer Exchange: Using its extensive experience in the development of both classroom-based and online logistics programs for audiences that include regional and statewide planning organizations, LBSU will host two virtual peer exchanges each year to allow municipal and MPO-level planners to share best practices on incorporating freight and logistics into local and regional plans. The peer exchanges will include content specific to the regional audience (e.g. cross-border trade logistics in Arizona and California) and will incorporate existing distance-based teaching tools and offer access to leading industry practitioners who will serve as virtual mentors. LBSU’s scope of work will include staging the virtual event, outreach and marketing, organization of panels and moderators, development of handout materials, and dissemination of presentations on the website.

Upon release, Reeb's (LBSU) book, "Empowering the New Mobility Workforce: Educating, Training, and Inspiring Future Transportation Professionals," will be featured in a planned workforce summit co-sponsored by the FHWA-funded National Network for the Transportation Workforce, which includes LBSU's Southwest Transportation Workforce Center, and a special session at the fall 2019 International Urban Freight Conference.

C. Outreach Accomplishments

Administrative accomplishments include finalizing planning for our annual PSR Congress to be held in Tucson, AZ, April 8-9, and holding an Executive Committee meeting in Washington, DC on January 14.

METRANS (USC/LBSU) celebrated its 20th anniversary with a reception and dinner on October 4th, 2018 at USC. Participants included 165 industry and agency executive leaders, faculty and students, and community members comprised of high school and workforce development students and union workers from the Port of Long Beach. The keynote speech was delivered by Randell Iwasaki, Executive Director of the Contra Costa Transportation Authority.



On March 7th, METRANS held a breakfast meeting for its newly established Leadership Council, which is comprised of executive leaders from industry and agency partners including Metrolink, Port of Long Beach, and Nixon Peabody. The topic of the meeting and discussion was autonomous vehicles and smart cities. The meeting was held at USC. PSR-funded faculty researchers participated in the discussion.

UCD supported the California Transportation Foundation's 24th Annual Transportation Education Symposium. Two UC Davis undergraduates participated in the symposium, and with our support, PSR was able to send a mentor: USC Lecturer, Dr. Shahed Rowshan.

UCI hosted two groups of high school students for a presentation on careers in transportation and a demonstration of research into advanced truck classification using inductive loop signature and LiDAR technologies. Visiting high schools included:

- Anaheim Transportation Academy, Anaheim High School. Anaheim, CA. Jan 23, 2019.
- Mark Keppel High School. Alhambra, CA. Mar 21, 2019.

Transfers Magazine: The second issue of *Transfers Magazine* was published online in November 2018. The magazine included four articles and an opinion column representing writers from nearly all of the PSR campuses. The website, www.transfersmagazine.org, features regularly updated blogs with news, research, and events related to transportation from around the world. The next issue is set to release in May 2019. 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 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. 26 issues were published during the reporting period. Students and alums from USC, UCLA, UC Davis and UC Irvine participated as authors of feature stories.

LA Forum on Transportation, Land Use, and the Environment (UCLA): The Downtown Los Angeles Forum took place on March 1, 2019. The event focused on the public sector’s response to the dual trends of emerging new mobility services and declining public transit ridership. It explored the implementation of the strategies discussed at the [October 2018 Arrowhead Symposium](#). 160 guests, including academics and practitioners, attended the LA Forum event.

Lake Arrowhead Symposium (UCLA): UCLA hosted the Lake Arrowhead Symposium on the private invasion of public transit from October 14 to 16, 2018. The theme will be “From Public Transit to Public Mobility.” The event will be attended was attended by over 180 guests including academics, practitioners, and elected officials. UCLA has been meeting with the Lake Arrowhead steering committee since April 2018 to execute this event.

Speaker Series (UCLA): In the fall of 2018, UCLA brought national experts to the UCLA Luskin School to discuss new research and best practices around public transit, transportation finance, innovative mobility, and much more. It took place during Professor Brian Taylor’s Transportation Policy and Planning graduate course, but all events were open to the public. Recordings of most of the speakers on our YouTube channel. UCLA will continue this series in the spring of 2019 in partnership with the UCLA Luskin School of Public Affairs and the UCLA Samueli School of Engineering.

NAU outreach activities

- **AZTrans In-Classroom K-8 Transportation Engineering Outreach Event.** AZTrans faculty Brendan Russo and undergraduate research assistant Emmanuel James presented an introduction to transportation engineering to two classes of 7th and 8th grade students (~60 students total) at Sinagua Middle School in Flagstaff, AZ on October 19th, 2018. The students were enrolled in introductory middle school engineering courses, and the AZTrans presentation included an introduction to the different disciplines of civil engineering, details on the type of work transportation engineers do, and included an in-class activity. For the activity, students worked in groups to calculate their reaction time, and using this value, they calculated the required stopping sight distance if they were designing a high-speed roadway. Students were also introduced to the basic concepts of traffic signal operations.
- **AZTrans Faculty Members Served as Judges at the Marshall Magnet Elementary School’s 32nd Annual Science Fair.** Two faculty members (B. Russo and E. Smaglik) from the NAU Department of Civil Engineering, Construction Management, and Environmental Engineering served as judges for the Marshall Magnet Elementary School’s 32nd annual science fair in March. Judges from NAU evaluated ~40 STEM-related science fair presentations as part of this effort.
- **Kindergarten Class Visited NAU Traffic Lab.** NAU faculty Brendan Russo gave a presentation focused on the field of transportation engineering to a class of approximately 30 kindergarten students who visited the NAU traffic lab in March, 2019.
- **AZTrans Exhibit at the 2019 Flagstaff STEM Celebration.** AZTrans operated an exhibit at the 2019 Flagstaff STEM Celebration, which was held on in March 2019 at the NAU Walkup Skydome. Students from all 28 Flagstaff K-12 schools were invited, and hundreds attended the event. The transportation-focused exhibit operated by AZTrans had equipment set up to show how traffic signal systems work, as well as computers showing traffic simulation software and two traffic-

related games for children ages K-8 to play. The exhibit was staffed by faculty Brendan Russo, graduate student Cris Aguilar, and undergraduate student Emmanuel James.

- NAU used partial PSR funding to bring two students to the 2019 TRB Meeting, exposing these students to the broader areas of transportation and planning.
- Most of NAU's outreach activities included participation from K-8 Native American students.

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:

- State of California, California Department of Transportation, Los Angeles County Metropolitan Planning Authority, South Coast Air Quality Management District, Port of Long Beach, Southern California Association of Governments, Los Angeles World Airports, Bosch LCC, California Foundation, Volvo Research and Education Foundation

The following organizations have established endowments at LBSU to provide scholarships and education opportunities for non-traditional students, who are often not eligible for financial support. Contributions over the reporting period amount to \$9,500 and total contributions amount to \$583,231:

- Los Angeles Transportation Club, Harbor Transportation Club, Harbor Association of Industry and Commerce, and Foreign Trade Association

The Intermodal Association of North America: IANA has designated CITT (LBSU) as one of only nine programs in the country to be part of its scholarship program and the only one focused on professional development offerings. The scholarship money is made available to students on the LBSU campus pursuing degree programs who would also benefit from the logistics industry exposure offered by CITT's Global Logistics Specialist and Marine Terminal Operations Professional programs. A portion of the money also allows students to gain research experience on applied PSR research projects.

Esri (Geographic Information Systems company): During 2018-2019, Esri provided \$45,500 cost match and software licenses for GIS software that is used in all CITT programs, including PSR. The partnership has led to the participation of Esri's Global Transportation Industry Director, Terry Bills, in an episode of CITT's Trade Talks.

B. Other support

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

- **California:** MetroLink; Foothill Transit; Ceres/Yusen Terminals; Port of Los Angeles; Majestic Realty; Los Angeles Transportation Club (LATC); Harbor Transportation Club (HTC); Harbor Association for Industry and Commerce (HAIC); Council of Supply Chain Management Professionals (CSMCP); Long Beach Transit; City of Anaheim; Orange County Transportation Authority (OCTA); California Energy Commission (CEC); Governor's Office of Business and Economic Development (GO-Biz); UC Institute of Transportation Studies (UC-ITS); City of Davis; Amtrak Capitol Corridor; Cool Davis; UC Davis Unitrans; UC Davis Road Ecology Center; UC Davis

Feminist Research Institute; UC Davis Policy Institute for Energy, Environment, and the Economy; City of Anaheim and Orange County Transportation Authority

- **Arizona:** Arizona Board of Regents, PCC Association of Governments, Southern Arizona Anti-Trafficking United Response Network (SAATURN), Northern Arizona University
- **Hawaii:** University of Hawaii
- **Others:** Staff from state DOTs in California, Nevada, Maine, Minnesota, Colorado, and Virginia

Arizona High Tech Freight Corridor: NAU is part of a partnership between the three Arizona universities, investigating the use of I-10 as a high tech freight corridor. The partnership includes a portfolio of seven projects, including safety, efficiency, alternative fuels, and education and outreach, among others. Each project is being conducted by at least two of the three schools, and some involve all three. Outcomes of the partnership include publications, proposals, and dissemination of results through various educational channels (webinars, case studies, and academic modules). This portfolio of projects is funded by the Arizona Board of Regents.

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. Dr. Ian Roark, and our Dean of Applied Technologies, Mr. Gregory Wilson, serve on the committee.

Center for Urban Transportation Research, University of South Florida: UH is in discussion with the CUTR to jointly develop training sessions/courses targeting DOT and transit agency personnel (ensuring consistency with the National Incident Management System and Incident Command System), local governments, etc. CUTR and UH will jointly develop material, and the training course would be both FEMA and FTA certified. The course will be delivered to both FEMA and FTA audiences. UH is also working towards establishing a “point of delivery” (POD) at CUTR to deliver newly certified evacuation planning and strategies course.

City of Phoenix: The city has agreed to fund a task order at NAU focused on improving pedestrian safety through analysis of integrated data sets not typically considered in traffic safety analyses. The project goals include developing statistical models to explore which factors are associated with the frequency and/or severity of pedestrian crashes, and developing a map-based tool to supplement safety efforts.

Council of University Transportation Centers (CUTC): Center Director Genevieve Giuliano (USC) is a past president and past executive committee member. Thomas O’Brien (LBSU) was recently named Vice President of CUTC. Dr. O’Brien serves as PSR lead for the CUTC workforce development efforts.

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. There are several statewide research collaborations taking place through ITS. ITS has provided match funding support to initiate the Year 3 Faculty Research Projects and administer the PSR Publication at UCLA.

Iowa State University: NAU continues to collaborate with ISU to offer a study abroad opportunity. In Summer 2019, B. Russo and E. Smaglik will lead 10 students to the UK for a course entitled Infrastructure Systems Abroad. The group will spend 6 nights in Edinburgh and 6 nights in London visiting infrastructure sites. ISU brings an additional 13 students and 2 faculty to the group.

MetroFreight Center of Excellence: METRANS is the home of the Volvo Foundation for Education and Research (VREF) Center of Excellence on urban freight. MetroFreight seeks to improve the sustainability of goods movement in metropolitan areas around the world. 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 National Center for Sustainable Transportation (NCST) UTC was established in 2013 and renewed 2016. Led by University of California, Davis, consortium partners include METRANS (USC and LBSU); University of California, Riverside; Georgia Institute of Technology; and the University of Vermont. METRANS' role is sustainable freight transport, which links well with MetroFreight. The NCST Director, Susan Handy, also serves as the UC Davis PSR Associate Director, and the NCST Program Manager also serves as the UC Davis PSR Program Manager. This overlap helps to facilitate coordination and collaboration among the UTCs.

New NAU partnerships: NAU is in the infancy of a new partnership with Maricopa Association of Governments (the MPO for the Phoenix Metropolitan Region). NAU is working collaboratively with ASU and UA to develop a white paper regarding smart technologies related to transportation as well as a plan for pilot deployments over the next 5 years. The partner has funded ASU through its on-call for this work. ASU is subcontracting to NAU/UA for each respective share of the work. NAU uses this money to fund an undergraduate research intern, as well as faculty time. NAU is working on developing an IGA to work with MAG to assist with pilot deployments, and evaluation of said deployments.

Southwest Transportation Workforce Center: SWTWC (LBSU) is one of five regional centers in the FHWA-funded National Network for Transportation Workforce (NNTW). The five centers (University of Vermont, University of Memphis, University of Wisconsin, and Montana State University) work together to provide a more strategic and efficient approach to transportation workforce development. SWTWC and its partners provide significant infrastructure and professional capacity in support of workforce development programs for PSR. SWTWC seeks to connect and empower the 21st century transportation workforce through research, education, and industry engagement. SWTWC is led by LBSU, with USC, Texas A&M Transportation Institute (TTI), ICF International, and the National Occupational Competency Testing Institute as partners. The partnership of LBSU and PCC began within the SWTWC, and led to PCC joining the PSR consortium.

The International Center for Trade and Transportation: CITT (LBSU) 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.

The Port of Long Beach and Long Beach Unified School District: These entities partner with CITT (LBSU) on the Academy of Global Logistics (AGL), which serves as a testing ground for many of the tools, programs and workforce initiatives developed through PSR.

TuSimple: PCC has worked collaboratively and extensively with TuSimple to develop a multidisciplinary program for upskilling drivers to support employment in the emerging autonomous trucking industry. TuSimple has contributed meeting space multiple times and has contributed personnel hours for developing new curriculum and outreach.

UCLA Lewis Center for Regional Policy Studies: The Lewis Center provides match support for administrative staff as well as office space, software, and facilities support. The Center was also a large supporter of the UCLA Arrowhead Symposium.

UH partnership for transportation resilience: Through its involvement with the Transportation Research Board's Standing Committee on Emergency Evacuation, UH has partnered with Louisiana State University, Florida Atlantic University, and the Gulf Coast Center for Evacuation and Transportation Resiliency (MarTREC UTC, University of Arkansas) to examine opportunities to increase and improve transportation resilience.

3. Outputs

PSR outputs include publications, reports, papers, presentations, media, and others. Our target for publications is 5 per year. During this reporting period, we have achieved three publications, with a fourth accepted for publication.

A. Publications

Dr. Tyler Reeb (LBSU) has edited a new publication titled "Empowering the New Mobility Workforce: Educating, Training, and Inspiring Future Transportation Professionals." Final editing is in process and the book will be released by Elsevier Publishers and has a targeted release date of summer 2019. The book will give readers a clear sense of the broad range of transformational technologies and socioeconomic trends that leaders in industry, government, and education must address to prepare the new mobility workforce. The book will provide proven methods to prepare the next generation of transportation professionals to design, develop, operate, and maintain the transportation systems of the future. Below are a list of PSR researchers and affiliates who have contributed to the book:

- **Chapter 1:** Dan Sperling (UCD), Professor/Founding Director, ITS-Davis; Austin Brown (UCD), Executive Director; Hannah Safford (UCD), Researcher
- **Chapter 5:** Lee D. Lambert (PCC), Chancellor; Ian R. Roark (PCC), VP of Workforce Development
- **Chapter 9:** Genevieve Giuliano (USC), Professor/Director; Marlon Boarnet (USC), Professor/Chair; Gary Painter (USC), Professor/Director
- **Chapter 11:** Phillip Washington, CEO, LA Metro; Joanne Peterson, Chief of Human Capital & Development Officer, LA Metro
- **Chapter 23:** Dave Stumpo, CEO, American Public Transit Exams Institute (APTREX) and Executive Director for the Southern California Regional Transit Training Consortium (SCR TTC)
- **Chapter 24:** Thomas O'Brien (LBSU), Executive Director, CITT; Scott Jakovich, Project Coordinator for the National Transportation Career Pathways Initiative

Other publications

- Brown, A. (UCLA). *Ridehail Revolution: Ridehail Travel and Equity in Los Angeles*. Diss. 2018.
- Groll, H., E. Zoemann, S. Pratschner, M. Lerch, D. Schuetzenhofer, M. Hofer, J. Blumenstein, S. Sangodoyin, T. Zemen, A. Prokes, **A. F. Molisch (USC)**, S. Caban, "Sparsity in the Delay-Doppler Domain for Measured 60 GHz Vehicle-to-Infrastructure Communication Channels", *2019 IEEE International Conference on Communications Workshops (ICC Workshops): Wireless Communications in High-Mobility* (accepted).
- Shen, S. (UH). *Critical Infrastructure and Urban Resilience in the Face of Climate Change*. "A Handbook of Urban Resilience." Editors: Michael A. Burayidi, John Twigg, Adriana Allen, and Christine Wamsler). **Under review**. Routledge.

- Shen, S. (UH). *Examining the Spatial Patterns of Transportation Vulnerability to Sea Level Rise – A Case Study of City and County of Honolulu, HI*. **Under preparation** for Journal submission.
- Zochmann, E., M. Hofer, M. Lerch, S. Pratschner, L. Bernado, R. Blumenstein, S. Caban, S. Sangodoyin, H. Groll, T. Zemen, A. Prokesch, M. Rupp, **A. F. Molisch (USC)**, and C. F. Mecklenbrauker. “Position-Specific Statistics of 60 GHz Vehicular Channels During Overtaking”, *IEEE Access*, **7**, 14216-14232 (2019).

B. Final reports and research briefs

See Table 1 for a list of the 6 final reports that were completed during the reporting period.

UCLA produced three research briefs as part of its Fellowship program. Graduate student Melissa Sather’s brief focused on how the Riverside Transit Agency (CA) could establish transit partnerships within its service area to maintain service coverage at a lower cost. Two additional briefs by PhD student, Anne Brown, summarized the accessibility and potential biases of ridehail services such as Uber and Lyft. The briefs have been shared at recent events and published to our website.

C. Conference papers

- Anastasiou, Chrysovalantis; Jianfa Lin, Chaoyang He, Yao-Yi Chiang, Cyrus Shahabi (USC). *ADMSv2: A Modern Architecture for Transportation Data Management and Analysis*. **Submitted** to VLDB (Very Large Databases) conference to be held in Los Angeles, CA, Aug 26-30, 2019.
- Wei, Dan; Adam Rose (USC). *A Granular Simulation of Bridge Closures due to a Southern California Scenario Earthquake and its Effects on the Disruption and Recovery of Freight Traffic to and from Ports of Los Angeles and Long Beach*. **Submitted** to the ASCE 2019 International Conference on Sustainable Infrastructure to be held in Los Angeles, CA, Nov 7-9, 2019.

D. Presentations

- Brown, Anne (UCLA). *Equity and Discrimination in Shared Mobility*. UCLA Institute of Transportation Studies 2018.
- Brown, Anne (UCLA). *Equity and Discrimination in Shared Mobility*. Los Angeles Department of Transportation Taxicab Commission. June 2018.
- Brown, Anne (UCLA). Panelist. *Envisioning Transportation Equity in US Cities*. Three Revolutions Conference, Feb 2018.
- Brown, Anne (UCLA). *The Geography of Lyft Trips and Users: Implications for Travel Behavior and Planning*. International Conference on Transportation and Development. Pittsburgh, PA. 2018.
- Fan, Yueyue (UCI). *Stochastic transit demand estimation using APC*. California Transportation Planning Conference. San Diego, CA. Feb 25-27, 2019.
- Giuliano, Genevieve (USC). *Agglomeration Economies and Evolving Urban Form*. Western Region Science Association annual conference. Napa, CA. Feb 12, 2019.
- Giuliano, Genevieve (USC). *Summary of Future Interstate Report*. TRB annual conference. Washington, DC. Jan 16, 2019. Presentation No. P19-21916.
- Giuliano, Genevieve (USC). *The challenges of urban freight: A research perspective*. VREF conference on urban freight. Gothenburg, Sweden. Oct 18, 2018.
- McCullough, Sarah (UCD). *Equity, Justice and Sociocultural Research on Bicycling Transportation*. UCD Seminar, Davis, CA. Feb 15, 2019. <https://its.ucdavis.edu/seminar/february-15-2019/>

- Meguro, Wendy (UH). *Technology and Disaster Risk Reduction*. Pacific Risk Management Ohana (PRiMO) conference. Aug 6-9, 2018.
- O'Brien, Thomas (LBSU). *Addressing Future Needs through Workforce Development*. American Association of Port Authorities' (AAPA) Spring Conference. Washington, D.C. Mar 19-20, 2019.
- O'Brien, Thomas (LBSU). Moderator. *Connect SoCal Goods Movement Forum*. Southern California Association of Governments' (SCAG), Los Angeles, CA. Mar 25, 2019.
- Parker, Cory (UCD). *The Homeless Bicyclist: Informal Mobility in California Cities*. PSR Emerging Scholars Transportation Research Symposium. USC. March 29, 2019.
- Qiang, Yi (UH), Suwan Shen (UH). *Physical Exposure and Social Sensitivity: Understanding Sea level Rise Impacts to Transportation*. Pacific Risk Management 'Ohana. Honolulu, HI. Aug 2018¹.
- Reeb, Tyler (LBSU). *Best Practices in Career Development Addressing Transformational Technology*. U.S. Department of Transportation Volpe Center's ITS Academic Workshop. Tampa, FL. Mar 27-28, 2019.
- Reeb, Tyler (LBSU). Panelist. *Connected and Autonomous Transportation Vehicles Workshop: Workforce Impacts*. Purdue Policy Research Institute. Ideas Festival. Feb 7, 2019.
- Shilling, Fraser (UCD), David P. Waetjen, Kathryn Harrold. *Automating Wildlife-Vehicle Conflict Tracking*. Infra Eco Network Europe Conference, Eindhoven, The Netherlands. Sep 13, 2018¹.
- Shilling, Fraser (UCD), Nova Simpson, Jeffrey Gagnon, Daniel Smith, and Bridget Donaldson. *TRB Webinar: Wildlife-Vehicle Collision Mitigation: Data to Decisions*. Transportation Research Board webinar, Oct 24, 2018. <https://webinar.mytrb.org/Webinars/Details/1231>
- Shilling, Fraser (UCD), Wendy Collinson-Jonkers, Michal Bil, Diemer Vacayie, Florian Heigl, Sarah E. Perkins, Sandra MacDougall. *Workshop: Global wildlife-vehicle conflict reporting systems*. Infra Eco Network Europe Conference, Eindhoven, The Netherlands. Sep 13, 2018¹.
- Shilling, Fraser (UCD). *Automated Analysis of Wildlife-Vehicle Conflict Hotspots Using Carcass and Collision Data*. UCD GreenLight Webinar. Feb 13, 2019. <https://its.ucdavis.edu/webinar/automated-analysis-of-wildlife-vehicle-conflict-hotspots-using-carcass-and-collision-data/>
- Shilling, Fraser (UCD). *Reporting and Analyzing Wildlife-Vehicle Conflict (WVC) at Large-Scales*. ACLIE 2019 African Conference on Linear Infrastructure and Ecology, Kruger National Park, South Africa. Mar 11, 2019.
- Shilling, Fraser (UCD). *Wildlife-Vehicle Conflict: Automated Hotspot Analysis*. 98th Transportation Research Board Meeting, Washington, D.C. Jan 14, 2019.

E. 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:

- ITS-UCLA YouTube channel: <https://www.youtube.com/channel/UCYgWr1zI9uFlip1nwmcKhOQUCLA>
- ITS-UCLA: <http://www.its.ucla.edu>
- UC Davis Feminist Research Institute: <https://fri.ucdavis.edu/>
- UC Davis Policy Institute for Energy, Environment, and the Economy: <https://policyinstitute.ucdavis.edu/>
- UC Davis Road Ecology Center: <https://roadecology.ucdavis.edu/hotspots>

¹ Not reported on previous PPR.

- UCD, ITS-Davis: <https://its.ucdavis.edu/>
- UCLA Lake Arrowhead Symposium: <http://www.uclaarrowheadsymposium.org>

F. New methodologies, technologies or techniques

Contributions from a prior UTC (MAP 21) project were used to facilitate the testing of a machine learning-enabled micro-sensor technology that gathers traffic data as vehicles pass over the street where it is installed. The testing took place on a major street adjacent to LBSU campus and was made possible by Dr. Mozumdar, an LBSU electrical engineering professor who designed and produced the sensor, and by partnering with the City of Long Beach Public Works Department to coordinate the testing.

Suwen Shen's (UH) contribution to "A Handbook of Urban Resilience" (under review by Routledge) will provide critical guidance to policymakers addressing the challenges of climate change.

Cyrus Shahabi and research team (USC) deployed a state-of-the-art model for forecasting traffic in Los Angeles. Spatiotemporal forecasting has various applications in the neuroscience, climate and transportation domains. The team developed a new deep learning framework, Diffusion Convolutional Recurrent Neural Network (DCRNN), that takes into account the spatial and temporal dependencies in traffic flow data. The framework has been tested on the USC Archived Data Management System (ADMS).

G. Other products

Supply Chain Management video: PSR funds were used to develop a 9-minute introduction to supply chain management video specifically designed for a high school audience. The video will be used in PSR programs including PCC logistics courses was first used with classes of students at AGL and will be used in PSR programs including PCC logistics courses. The video is available here:

<https://youtu.be/7U2fqkCB3pc>

New online versions of courses: PCC converted 10 logistics and supply chain management courses to an online format to better serve the broader Tucson area. Enrollment in the LGM program has increased 142% since last spring, in part due to the increased access of online training. PCC has begun the process of converting two commercial driver license (CDL) courses to the online format. Additionally, PCC is developing two transportation related GIS classes. Enrollment in the CDL classes has increased 51% compared to March 2018, partly due to the tractor and trailer branding.

PSR/METRANS News: Published three times yearly, this newsletter summarizes METRANS (USC/LBSU) research, education, and outreach. The publication includes a special insert for **PSR News**, which highlights PSR research and researchers, conferences, events, publications, special interviews, and other newsworthy activities. The newsletter is distributed nationally to university transportation centers and faculty, and to federal, state, and local agencies and private industry. The latest edition of METRANS News included a survey (hard copy and digital versions) to help us determine if we should continue to publish the hard copy, or transition to an online-only format.

E-blasts: CITT at LBSU also produces two monthly e-blasts, one for CITT-specific news and one for METRANS, which includes PSR updates. Each e-blast usually contains three brief articles covering CITT- or METRANS-related awards, presentations, events, and project descriptions as they appear. The e-

blasts essentially function as a more frequent and localized version of METRANS News. They are distributed as e-mails to CITT and METRANS members, partners, and subscribers.

Trade Talks: Dr. Thomas O'Brien of LBSU hosts a quarterly television series called Trade Talks produced by LBSU'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. Two episodes were produced during this reporting period: the January 2019 episode featured Mario Cordero, Executive Director of the Port of Long Beach; and the March 2019 episode featured Stephen Cheung, President of the World Trade Center Los Angeles. Trade Talk episodes have been included as teaching tools in educational programs such as massive open online courses (MOOC). The October 2017 episode featuring Michael Browne was featured in the *MOOC on Sustainable Urban Freight Transport*, available here: <https://www.edx.org/course/sustainable-urban-freight-transport-a-global-perspective>. All episodes here: <https://www.youtube.com/watch?v=D0ouTGwCt0o>

Graduate Symposium on Innovation in Transportation: Held in January at UCI, this symposium provided an opportunity for information exchange between invited speakers from public agencies and private industry to interact with students and researchers. Such events foster a better understanding of real-world problems while also exposing practitioners to the new ideas arising from the research community. The connections established during this event are bearing fruit in the form of new support for research in PSR as well as access to previously unknown datasets held in the public sector.

METRANS YouTube: METRANS (USC/LBSU) has a YouTube channel, where we post videos of seminars and other recorded events. Many of the videos feature PSR-funded researchers and research. Videos are available here: <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.

Urban freight pilot course: CITT (LBSU) hosted an urban freight pilot course, "The Battle for the Curb," in early 2019. The non-credit three-session course trained consultants and public sector workers on how to best respond to the needs of regional and municipal planning agencies as they face growing challenges related to technological innovation, demographic change, and the changing usage patterns for the region's freight transportation system. The pilot helped CITT understand the needs of regional and local planners, which will be used in the development of the MPO-level peer exchange hosted by PSR. Furthermore, PSR students helped to test a mobile, GIS-enabled data collection application that was used for a walk audit activity as part of the course.

Education of public officials, policy-makers through attendance

PSR partners held several events 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.

- UCD’s GreenLight webinar (Feb 13, 2019) with Dr. Fraser Shilling, “Automated Analysis of Wildlife-Vehicle Conflict Hotspots Using Carcass and Collision Data,” was attended by stakeholders from four different countries affiliated with the USDOT, state DOTs, other national and state agencies, non-profit organizations, local and tribal governmental organizations, academia, and the private/industry sector.
- UCLA Lake Arrowhead Symposium (Oct 14-16, 2018): 181 public and elected officials.
- UCLA Downtown Los Angeles Forum (Mar 1, 2019): 100 public and elected officials.

Anne Brown’s (UCLA) dissertation, “Ridehail Revolution: Ridehail Travel and Equity in Los Angeles,” has been extensively covered in the media. It was also presented to numerous officials in the public and private sector including the Los Angeles County Metropolitan Transportation Authority, Metropolitan Transportation Commission, and Southern California Association of Governments.

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 effectiveness of the transportation system

Dr. Yueyue Fan’s (UCD) seed grant research to use an integrative approach to identify the most effective transit resource allocation strategies led to a feasibility study of redesigning an existing transit network service by replacing some fixed-line transit service by shared mobility service.

Dr. Austin Brown’s (UCD) work to compile findings from the Climate Change Policy Modeling (CCPM) forums in 2018—which are one-day workshops with modelers designed to evaluate targets and define pathways to low carbon futures, with policymakers and stakeholders commenting on this work and the implications for making the policies required to achieve the needed outcomes—was shared with key policymaker participants, including key members of state government. Dr. Brown and his research team received feedback that the results will inform the next round of state climate policy.

The report produced by Dr. Jae Hong Kim (UCI) for the project “Transportation Plans: Their Informational Content and Use Patterns in Southern California” offered a notable finding that there is little evidence for the ability of general plans to address new technologies, alternative futures or spontaneous nature of urban development processes. Given the rapidly changing nature of transportation in the face of new mobility options and the impending potential disruption of automated technologies, this finding is a warning regarding the development of general plans in the coming years to better allow communities to adapt to changing mobility. This report has been shared with the sponsors at the Southern California Association of Governments (SCAG) and it is hoped they will offer guidance to municipalities under their jurisdiction. The former director of SCAG, Hasan Ikhtrata, has now moved to the San Diego Association of Governments (SANDAG) and has undertaken a complete reworking of that region’s regional transportation plan including specific consideration of new mobility options and advanced technologies such as automated vehicles. Though the PSR-UTC-funded research was just one of many inputs to Director Ikhtrata, his new approach at SANDAG is one indication that the message is getting through to forward-thinking practitioners.

Impact on the adoption of new practices, or new companies

Dr. Genevieve Giuliano's (USC) Economic Competitiveness project initiated and funded by Caltrans and GO-biz (CA Governor's Office of Business and Economic Development) established targets for increasing the economic competitiveness of the California freight industry. Phase 2 of this project included researching and identifying definitions for "economic competitiveness" and "freight industry"; developing metrics for measuring economic competitiveness; identifying overall targets for economic competitiveness; and, identifying relevant and accessible freight data. GO-Biz convened a working group consisting of freight industry representatives and state agency staff to guide the work of the research team. The working group met on several occasions during 2017 and 2018. This overall effort was aimed at developing economic competitiveness and growth metrics to track the health of the freight sector while implementing the Action Plan. The metrics will assist in evaluating the state strategies proposed by the Action Plan by tracking their economic impact on California's freight industry.

NAU's work in the area of bicycle-motor vehicle conflicts has provided rudimentary numerical guidance for practitioners interested in implementing countermeasures to address this issue at signalized intersections. This is an important step to improving safety of bicycles at signalized intersections as providing empirical guidance is a critical step in these countermeasures gaining widespread deployment.

Dr. Fraser Shilling's (UCD) research developed an automated method for identifying and analyzing hotspots of wildlife-vehicle collisions that can run independently as well as on web-systems that are used to manage WVC data. Working with staff from 6 states—California, Nevada, Maine, Minnesota, Colorado, and Virginia—the tools to aid development of the automated hotspots analysis were piloted, and testing and deployment of several methods for representing both density and statistically-significant clustering of WVC events was completed during the reporting period. The tools are now deployed through a website (<https://roadecology.ucdavis.edu/hotspots>) and used regularly and independently by various states at their discretion. The PI has received feedback from state DOT and Departments of Fish & Wildlife staff that being able to easily map WVC hotspots will increase ease of planning mitigation.

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.

Several of NAU's disseminations have a direct impact on operations. Our TRB paper focused on bicycle-motor vehicle conflicts at signalized intersections is directed squarely at practitioners to provide guidance for when to implement a countermeasure to help avoid such conflicts. NAU's dissemination examining pedestrian behavior at highway-rail crossings identified situations where unsafe pedestrian violations may be more likely and proposed low-cost countermeasures practitioners can consider to reduce such unsafe behavior. NAU's dissemination analyzing traffic safety on tribal lands identified several factors significantly associated with crash injury and fatality outcomes on tribal lands and proposed countermeasures based on the results aimed at reducing these severe crash outcomes.

Sarah McCullough's (UCD) PSR white paper grant, "Socio-cultural and Historical Factors in Active Transportation," developed a framework for better accounting for complex sociocultural forces, including gender, class, and race, in planning, policy, and advocacy. Integrating the recommendations outlined in the forthcoming white paper into advocacy, policy, and planning could lead to greater equity in representation, distribution of resources, and decision-making in promoting bicycling.

UCI's publications have contributed to the body of scientific knowledge in two areas:

1. Ibarra & Saphores (2019) demonstrate the potential positive impact of connected and automated vehicles in port drayage operations---specifically how they can improve freeway operations by increasing throughput through coordination, and
2. Fresquet & Jin (2019) investigate the impact of different bounded acceleration (start-up) and aggressiveness (clearance) effects on the network fundamental diagram in signalized networks, which has implications not only for generalized intersection optimization, but also for the design of automated vehicle control systems that will operate in signalized networks.

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 sections above.

The Port of Long Beach Academy of Global Logistics (AGL) at Juan Rodriguez Cabrillo High School is a partnership of the Port, Long Beach Unified School District and CITT at LBSU. 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. CITT's efforts include the development of integrated project learning topics for AGL teachers, and the design, development and implementation of Teacher Externship activities for Cabrillo High School instructors. The program serves as an outlet for research done by CITT under other grants such as PSR. CITT GIS research assistants coordinated a "GIS Day" for the academy where they introduced the technology and its applications in industry and conducted an activity that familiarized the students with GIS. An instructional video created by CITT introducing the supply chain with a focus on Southern California is used as part of AGL, available at the following link: <https://youtu.be/7U2fqkCB3pc>

The UCLA Lake Arrowhead Symposium provides conference scholarships to attendees from organizations that may be unable to fund professional development opportunities to learn about these transportation issues. The UCLA Downtown Los Angeles Forum encourages attendance by students, general public, and transportation professionals to hear from practitioners and scholars on the latest transportation issues. UCLA admitted numerous masters and PhD students that seek to enter into the transportation profession in the fall of 2018.

6. Changes/Problems

UCD experienced significant delays in receiving its Year 3 funding (FY 2018/2019), which consequently delayed the start of a project that was awarded in 2018. UCD did not receive an executed subaward amendment until April 2, 2019, and as of this progress report is still pending receipt of the Year 3 funds.

UCLA faculty administered research projects funded under this grant did not begin until Oct 1, 2018 due to delays in receiving state funding for these projects.

NAU was able to fund an additional graduate student fellow for AY19-20 because the university provided three tuition waivers.

The GIS program at PCC is in the process of being restructured for a number of reasons. The program was originally intended to be three stackable credit-bearing modules; however, the College no longer uses a module format. The program is in the process of making minor revisions to GIS curriculum that include: developing both in-class and online options, removing module format/language and using standard credit/class format, and working on getting one class updated to include Transportation/GIS info and having a second class developed that is specifically for logistics.

7. Special Reporting Requirements

Nothing to report.