UC ITS Mobility Research Program
Request for Proposals
UCI FY 2019-2020 Research Projects

RFP Issued: May 1, 2019
Proposals Due: May 30 , 2019
Earliest project start date: July 1, 2019
Maximum project duration: up to 12 months

The most up to date version of this RFP will always be available at:
http://www.its.uci.edu/rfp

ITS·IRVINE
INSTITUTE of TRANSPORTATION STUDIES

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I. Description of Funding Opportunity

A. Overview

The UC Institute of Transportation Studies (ITS) receives an annual allocation from the State of California via the Road Repair and Accountability Act of 2017 (SB 1) and the Public Transportation Account (PTA) for the purpose of supporting research, education and outreach activities that directly address and inform transportation engineering, policy, and/or planning issues in California. The majority of the funds received from the State are used to support an annual research program. Research projects are selected through a competitive Request for Proposals (RFP) process. Each ITS branch administers its own RFP. However, the RFP is jointly developed and a similar RFP is used across all four branches.

B. Research Priorities

Priorities for the UC ITS's research program are defined on an annual basis. For this solicitation, research priorities are organized into two tiers. First tier priorities are listed in Appendix A and are identified by SB 1 designated advisors (i.e., the Secretary of Transportation, and the Chairs of the Assembly and Senate Transportation Committees) and the UC ITS Board of Advisors. Second tier priorities are listed in Appendix B and were identified by UC scholars and external stakeholders as part of the UC ITS Innovative Mobility Initiative. Proposals responding to first tier research priorities will receive a higher consideration. The UC ITS Directors reserve the right to withhold funding to be awarded through this solicitation to ensure primary research priorities are adequately addressed.

C. Funding Availability

This solicitation will fund up to approximately $750,000 in grant awards at ITS-Irvine. Eligible project types and award range are presented in Section II. As stated earlier, the UC ITS Directors reserve the right to withhold funding to ensure primary research priorities are adequately addressed.

D. Project / Award Period

The anticipated earliest start date for projects is July 1, 2019, though projects that are intended to start with the fall 2019 academic quarter are permitted. All work must be completed and all funds spent within one year after the project begins. After the project close out date, all remaining funds in the project's account will revert back to the UC ITS research program.

E. Key Activities Schedule

Key activities and deadlines for this solicitation are presented below:

Activity	Date	Time
Solicitation Release	**May 1, 2019**	
Deadline to Submit Proposals	**May 30, 2019**	**11:59 pm**
Notice of Award	**June 29, 2019**	
Earliest Anticipated State Date for Awarded Projects	**July 1, 2019**	
Anticipated Project End Date	**Start + 1 year**	

F. Questions

For questions regarding the RFP's content and/or process, please contact:

Craig Rindt, PhD
Assistant Director for Research Coordination
Institute of Transportation Studies, UC Irvine
949-824-1074
crindt@uci.edu

For questions specific to budget preparation, please contact:

Cam Tran
Chief Administrative Officer
Institute of Transportation Studies, UC Irvine
949-824-6564
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II. Eligibility

A. Eligible Applicants

Eligible lead applicants (PIs) for this RFP include full-time ITS-Irvine Faculty Associates who areeligible to serve as Principal Investigators at UC Irvine. Other researchers, graduate students, and undergraduate students can be included in the proposal with their salary covered in place of the PI's in part or in whole; however, the PI remains responsible for the project. Non-UC researchers, including visiting scholars, are not eligible for funding through this RFP, although

exceptions may be approved if special circumstances warranting the exception are fully explained in the proposal. Interdisciplinary research teams are highly encouraged.

UC ITS is a Multicampus Research Unit and explicitly encourages multicampus collaborations both within the multi-branch UC ITS (Berkeley, Davis, Irvine, UCLA) and at other UC campuses. For collaborative projects, the proposal should outline the work to be completed at each institution, identify the PI at each UC campus, and explain in the scope of work whether each task could or could not be completed without funding from the other campus. Separate budgets should be prepared for each institution. The PI at each ITS branch campus shall submit the full proposal (i.e., describing the complete project and representing the contributions of all partners) and the budget for their campus to the PI's ITS branch as outlined in the RFP for that campus. Partners from campuses outside of the UC ITS must submit the proposal via the process defined in the RFP for non-ITS UC campuses posted at http://www.ucits.org/request-for-proposals/. Contact UC ITS Assistant Director Laura Podolsky (lpodolsky@ucits.org) for more information on the non-ITS UC campus RFP. The decision to fund the collaborative proposal in its entirety or in part will be made by the four UC ITS Directors.

Any project that involves data collection, access to facilities, or cooperation of a private or public entity must include a letter of participation from the entity in the proposal.

PIs with outstanding deliverables on past projects funded through previous RFPs administered by ITS-Irvine (e.g., prior SB1 projects, projects from the 2016 PTA supplement, or PSR-UTC projects) are not eligible to apply.

B. Eligible Projects

Eligible projects must respond to one or more of the research priorities listed in the Appendices. The following project types will be considered:

Project Type	Description	Amount
Research Synthesis	A research synthesis should be a concise summary of existing evidence and identify research gaps for critical policy questions. The synthesis should be prepared for an informed but non-technical audience. The proposal should include at least one meeting with policymakers and practitioners, as well as researchers, as part of the development process. Researchers are encouraged to submit these papers to scholarly journals.	Maximum award $25,000
Translational Project	Translational projects support the application or extension of completed research. Activities supported by translational projects can include real-world testing, website development, implementation activities, tool development, trainings, workshops, and/or development of practice- or policy-oriented outreach materials (e.g., policy briefs, policy proposals, infographics).	Maximum award $50,000
Applied Research Project	Applied research projects close a knowledge gap on an important issue and involves original data acquisition and/or analysis. These projects can be up to 12 months in length and are conducted in coordination with a government agency partner.	Maximum award $80,000

C. Eligible Costs and Budget Guidelines

Applicants must use the budget template provided. The budget should only include direct costs. These costs will vary depending on the project, but include the salaries and fringe benefits of project staff, travel, materials, supplies and miscellaneous costs that are attributed to the project. There is no indirect cost for projects funded through this solicitation (i.e., Facilities and Administrative (F&A) rate is 0%).

Budgets for project proposals may include faculty summer salary for one tenured faculty for up to one month, one assistant professor for up to two months, or one research staff for up to four months. Faculty summer salary may not exceed two months across all SB1-funded projects of which they are a part. Teams of investigators may receive pro-rated shares of these salary levels (e.g., 0.5 months for tenured faculty with two months for researcher). Project budgets must support the PI's involvement in engagement activities. Applied research proposals must include funding for one graduate student researcher (49% time during academic terms – unless students are TAs or have other commitments, and preferably for 3 quarters or 2 semesters, and preferably 100% during the summer). Funding for graduate students is encouraged but not required in research synthesis and translational project proposals. Non-resident tuition is not an allowable expense.

A limited amount of travel for data collection purposes and/or presenting research, materials, and supplies may be included, provided that they are a direct expense related to completing the work. International travel is not allowed. Domestic travel to events and/or meetings outside of California (including the TRB annual meeting) is not an allowable expense unless in exceptional circumstances and only if formally approved by the SB 1 Program Manager at the PI's campus (Craig Rindt, crindt@uci.edu). Proposers are discouraged from budgeting for computers, equipment, support staff, outside consultants, or any salary that goes beyond normal academic or summer compensation. A written justification for all supplies and travel is required.

III. Proposal Organization

The proposal should adhere to the following formatting guidelines:

- Font: 12 pt., Calibri or New Times Roman
- Margins: no less than 1 inch on all sides (excluding headers and footers)
- Spacing: single spaced, with a blank line between each paragraph
- File Format: MS Word or PDF files, excluding the budget which should be submitted as an Excel spreadsheet

Below is a description of each required section of the submission package.

1) **Cover page** – Use template provided in Appendix C.
2) **Project Narrative** – Not to exceed five pages. Include page numbers on each page. The project narrative must include the following subheadings:

- *Problem Statement*: Discuss problem and/or challenge you are proposing to address and how it impacts California's policy priorities. Name specific state policies and/or goals to provide context, if appropriate. (max. 200 words)
- *Proposal Summary:* Provide an overview of the proposed work plan. Describe how you will address the problem and/or challenge described in the problem statement. (max. 300 words)
- *Expected Impact*: Explain how achieving the goals of the project will help advance transportation policy and/or practice in California. Identify public agencies and/or any other outside stakeholders you will be coordinating with and/or that will be involved in your project and potential uses of your research by external partners. (max. 300 words)
- *Research Design (this section is only required for applied research proposals)*: Provide an overview of your research design and methods in sufficient detail so that reviewers can evaluate your approach (max. 1,500 words). In particular:
    - If the study relies on existing data, describe the data to be used and its sources.
    - If the study involves original data collection, explain the methods for collecting data, including site selection, sampling, and measurement methods (e.g., observations, surveys).
    - If the study involves the development of a model, explain the process for developing, as well as validating the model.
    - If the study involves the application of a model, explain the nature of the model in terms of inputs and outputs, as well as its internal workings (briefly, in easily understandable terms).
    - If the study involves scenario testing, explain the process for defining the scenarios.
- *Products and Deliverables:* List and describe all anticipated products and deliverables from the project. A final research report and 2-page Policy Brief are required for all applied research projects and research synthesis projects. Deliverables for translational projects (as well as applied research and research synthesis projects) can include tools, websites, agendas, presentations, video recordings, outlines, draft literature review, working documents, webinars and other types of products. (max. 500 words)

3) **Scope of Work** – The scope of work identifies the tasks required to complete the work. This section should be 1 to 2 page and include a Task Schedule (see Appendix D for scope or work and task schedule example). For collaborative proposals, provide a clear explanation of which tasks will be completed by which partner, and indicate the degree to which tasks are dependent on each other; please use a table to present this information.

All scopes of work must include an engagement task outlining the target audience for the research and how preliminary and/or final results will be communicated to this audience.

4) **Project Budget** – Use the budget template provided; include summary table from "Budget" tab only. For collaborative projects, submit a budget just for those being supported at your home campus; expenses for other campuses should not be included. See Section II Eligibility for more information on eligible project costs.

5) **Budget Justification** - A narrative should preemptively address questions that budget reviewers may have about the amount of personnel costs, equipment expenses, subcontracts, travel, and why these are necessary to accomplish the project's objectives.

6) **Staffing and Collaboration Plan** – Not to exceed one page. The plan must include:

    - Proposed role of each of the research participants, including student participants, and include both budgeted and pro bono time on the project.
    - Project-related collaborations with other UC Irvine researchers, researchers at other ITS and non-ITS UC campuses (if applicable), and/or other organizations.

7) **2-page CV for the Principal Investigator(s)**

8) **References** (Optional) – Proposals can include a separate bibliography of references cited in the proposal.

9) **Letter(s) of support –** No page limit for letters. All proposals (except those exempted as described below)* must include a letter from a state, regional, and/or local agency partner outlining the relevance, timeliness, and need of the proposed research, how the research results will be used by the agency, and what role or involvement (if any) the agency will have in the research. If the PI needs help in identifying a public agency partner, then please contact Craig Rindt (crindt@uci.edu) by May 1st for assistance.
* There are two exemptions to this requirement:

    a) Proposals that respond to a first tier research priority as outlined in Appendix A do not need a letter because a stakeholder has already been identified by the UC ITS, or

    b) Proposals that identify Caltrans, CA Energy Commission or the CA Air Resources Board as a stakeholder/partner do not need a letter but instead will need to provide a statement that includes the name, title, and email for the appropriate person at the agency that the PI intends to work with and an explanation (one paragraph) of why the research is important to the agency, how it will be used by the agency, and how the agency will be engaged in the work.

    Note that letters and statements that do not satisfactorily address the items listed above, particularly agency involvement and utilization of results, will cause

a proposal to not be considered further.

Letter(s) of participation and/or commitment (if applicable) – PIs must provide a letter of support from an outside stakeholder that will be providing data, access to private or public facilities, cooperation of private or public entities, and/or commitment of match funding.

IV. Proposal Submission

Proposals are due no later than May 30, 2019 at 11:59 PM. Proposals must be submitted via this submission form (**https://forms.gle/ViTeC5ALBty7SGsK8**). Note that because this form is accepting file uploads, it requires you to sign in to your google account. All UCI affiliates have access to UCI's G Suite which satisfies this purpose, though a private gmail account will work as well. Applicants without a google account or those having difficulty with the form should contact Craig Rindt for assistance well before the deadline to arrange for submission. Proposals received after the deadline will not be considered.

V. Evaluation and Review Process

Proposals will be evaluated and scored based on responses to the information requested in this solicitation. The following process and criteria will be used to screen and evaluate projects:

1) Submission Screening - Proposals will be reviewed first by program staff for: (1) completeness, (2) meeting eligibility requirements, (3) an explicit link to one or more of the research priorities listed in Appendix A and/or Appendix B, and (2) confirmation that a state, regional, or local government agency in California has expressed interest in the proposed work (if applicable). Proposals that pass initial screening will be evaluated for technical merit as described below.

2) Technical Merit Review - The technical merit of proposals will be reviewed by external reviewers selected for their relevant expertise to the proposal topic. All proposals will be evaluated according to the following criteria:

   - Relevance to research priorities (note: Proposals responsive to first tier priorities will receive the highest rating)

- Level of support from public agency stakeholder and demonstration of how research will inform policy and/or practice (note: Proposals responsive to first tier priorities will receive the highest rating)
- Quality of research design and methodology
- Level of student involvement
- Reasonableness of budget and cost-effectiveness
- Qualifications to perform work
- Match funding and/or potential for attracting larger grant funding
- Prior performance on projects funded through other ITS solicitations (as applicable)
- Level of collaboration, including collaborations across UC ITS and/or other UC institutions, with outside organization, and/or interdisciplinary research teams.

3) Final Selection - Final selection will be based upon the external reviews and responsiveness to program priorities.

VI. Award and Administration Information

A. Award Notice

It is expected that Researchers will be notified by June 29th, 2019 whether or not their research proposal is selected for funding.

B. Award Administration

All funds will be administered and processed by ITS Irvine following established university policies and procedures, and with an account assigned for every project.

C. Grant Agreement Requirements

In accepting a grant award, the PI agrees to the grant guidelines and expectations as outlined in Appendix E. Failure to meet these requirements will jeopardize the PI's consideration for funding in future years.

Appendix A – First Tier Research Priorities for FY 2019-20

1. Informing California's Zero Traffic Fatalities Task Force

AB 2363 (Chapter 650, Statues of 2018) directed the California State Transportation Agency (CalSTA) to convene a Zero Traffic Fatalities Task Force with the goal of producing a report by January 1, 2020, outlining policy recommendations for reducing traffic fatalities to zero. Offer Grembek (Co-Director, SafeTREC, UC Berkeley) serves as the UC ITS representative on this Task Force. CalSTA has requested assistance from the UC ITS to produce research summaries and/or white papers to inform the work of the Task Force. The UC ITS is soliciting proposals for the following list of topics outlined in AB 2363:

- Research on the engineering and legal basis underpinning California's current process and approach for establishing speed limits, centered on the use of the 85th percentile method.
- A study and survey of current practices and processes in California among local governments on establishing speed limits, including assessment of possible variations in use versus legislative and regulatory intent, and use of discretion to reduce speed limits below the limit identified using the 85th percentile method.
- Research to inform alternatives to using the 85th percentile method for determining speed limits.
- A comparative study of how other states and countries establish speed limits on local streets and roads, with specific consideration of urban and rural dimensions.
- Research that informs infrastructure, regulatory, and enforcement options to safely integrate bicycle, pedestrian, and micro-mobility use alongside vehicle use on local streets and roads. Specific areas of interest are potential changes to the State's Vehicle and Streets and Highways codes and/or street design.
- Evaluation of how local bicycle and pedestrian plans and the implementation of these plans affect speed limits set using California's "85th percentile" method.

Note: All proposals received in response to the topics listed above will go through an expedited review process to ensure work can begin as soon as possible so that final products can be delivered by November 1, 2019, and incorporated into CalSTA's final report due to the Legislature by January 1, 2020. The UC ITS will not consider proposals that can not be completed by November 1, 2019. The Task Force may have other needs and requests for research later in the year that the UC ITS will try to respond to and has reserved funding to support. Therefore, please email Offer Grembek (grembek@berkeley.edu) and UC ITS Assistant Director Laura

Podolsky (lpodolsky@ucits.org) to express interest in staying engaged in the Task Force and share your areas of interest / expertise.

2. Transportation and Housing Linkages

The State of California continues to grapple with housing affordability challenges, including understanding the implications of housing affordability on travel behavior and demand. The UC ITS is soliciting proposals for a PI or PIs to serve as the UC ITS representative(s) that will work closely with CalSTA and members of the Transportation and Housing Coordination Workgroup to define and produce research products that will inform ongoing policy discussions related to the linkage between housing affordability and travel behavior and demand. Specific topics CalSTA would like the UC ITS to explore in consultation with the Workgroup are as follows:

- A survey of policies and programs that have been implemented by regional transportation agencies, other states, and other countries to influence local jurisdictions to entitle and developers to construct additional housing units in areas that best leverage existing transportation infrastructure, such as near major transit stations and in areas near jobs.
- A synthesis of research on housing-and-transportation linkages.
- A survey of state, local, and regional housing policy, programs, and regulations that affect transportation outcomes in California. Conversely, a survey of California state, local, and regional transportation policy, programs, and regulations that affect housing outcomes.

A Translational Project that includes synthesis activities that respond to the prompts above as well as time and travel for participation in the Workgroup is encouraged. PIs should plan for approximately 2 - 3 in-person meetings in Sacramento with the Workgroup as well as time to coordinate with other UC housing and transportation experts as needed. This priority area is also well-suited for Research Syntheses proposals for those who do not wish to directly participate in the Workgroup.

UC ITS Assistant Director Laura Podolsky will work closely with the PI(s) as the project progresses. PIs interested in responding to this priority category should reach out to Craig Rindt (crindt@uci.edu) as soon as possible for possible updates and additional information.

3. Goods Movement

The UC ITS is soliciting proposals that respond to the following priorities:

- An inventory and evaluation of state environmental, safety, and labor regulations that impact freight and goods movement in California, with an emphasis on cumulative effects of regulation on the freight sector's economic competitiveness and workforce.
- Evaluation of cost-effective infrastructure investments and/or operational strategies to improve the efficiency of freight movement while also reducing environmental and health impacts in California.
- Evaluation of global best practices in increasing throughput at seaports, with recommendations on actions California government agencies could take to increase throughput.
- An evaluation of current and future trends affecting the goods movement workforce, including recommendations the state can take to assist with workforce development for this sector.
- A white paper discussing the potential labor impacts of vehicle automation and artificial intelligence in the freight and logistics sectors as well as personal transportation.
- Evaluative case studies and/or review of strategies for integrating goods movement into urban planning and design (i.e., land use planning, Complete Streets policies) to support last-mile delivery. This should include a survey of local policies and approaches among cities and counties throughout California and recommendations for how cities and counties can better incorporate urban freight into local planning.

4. Active Transportation

California continues to increase its investment in programs and infrastructure to support active transportation. The State wishes to evaluate and improve its approach to funding, designing, building, maintaining, and operating its multimodal transportation system, including enforcing traffic laws. The UC ITS is soliciting projects that respond to the following priorities. Please see the "Informing California's Zero Traffic Fatalities Task Force" above for more active transportation related topics.

- An inventory and evaluation of the effectiveness of the State's active transportation grant programs and complete streets policies for shifting travel to active transportation modes; and recommendations for improving the effectiveness of the State's active transportation programs and policies.
- Research synthesis on the effectiveness of educational and public awareness strategies on active transportation rates.

- Research on ways to improve project delivery for active transportation projects.

5. Innovative Mobility

The UC ITS is soliciting proposals on the following priorities:

- Guidance on regulatory approaches that address incremental introduction of automation features in an existing vehicle fleet, such as over-the-air software updates that increase the automation capabilities of a vehicle.

- An inventory and study of the roles, jurisdiction, current activities, and interactions between state, regional, and local agencies in the context of innovative mobility (especially connected and automated vehicles and micro-mobility). The study should also identify where agencies may be working at cross purposes and recommendations for institutional arrangements that would facilitate a more coordinated and effective response to the changes occurring in transportation.

- An inventory of the State's current assets related to the development and testing of automated vehicles, traffic management, electrification, and connectivity. Assets include physical facilities (e.g., test sites, on-road testing sites), personnel, data, and research capabilities, as well as policies to support the development and testing of new technologies. As part of this work, identify gaps and opportunities for leveraging investments to spur economic development and innovation as well as increasing collective learning.

- Analysis of the potential labor impacts of vehicle automation and artificial intelligence in the freight and logistics sectors as well as personal transportation.

6. Improving Data Collection and Quality

Quality data is foundational to good research, policy-making, and regulation. The UC ITS is soliciting research proposals on the following priorities:

- Guidance on increasing collaboration among state, regional, and local governments in big transportation data analytics and incorporating continuous data collection and analysis into planning processes, especially with regard to innovative mobility and automated vehicles.

- Approaches to collecting and protecting data from Transportation Network Companies and anonymizing and disaggregating data to inform modeling and decision-making by regional transportation planning associations and metropolitan planning organizations.

- Research to support wide-scale, automated sensing of bicyclists and/or pedestrians without deploying additional infrastructure.

- Guidance for local governments on developing evaluation and data collection plans that will help capture the effects of pilot programs and/or interventions, especially within the context of state-funded grant programs that support active transportation and innovative mobility pilots.

7. Managing Traffic Congestion

The San Francisco County Transportation Authority, the Los Angeles County Metropolitan Transportation Authority, and other public agencies are currently exploring how pricing strategies can be designed, implemented, and managed to reduce traffic congestion, achieve environmental goals, and promote equitable outcomes. To help inform these efforts as well as the larger discussion on the potential role of pricing in California, the UC ITS is soliciting proposals on the following priorities:

- Comparative evaluation of the equity effects of various designs for congestion pricing programs and incentives (e.g., cordon or area-based pricing; parking pricing and regulations; VMT or road-usage pricing; high-occupancy toll lanes; comprehensive, multi-facility pricing).

- Case study evaluation of congestion pricing implementation in other cities (particularly in the U.S.), and lessons learned for California in terms of strategies for meeting program goals and maximizing benefits (particularly to low-income and disadvantaged communities), methods and metrics for studying options, and community engagement strategies to broader stakeholder input, understanding, and support.

- Data collection and analysis of the existing transportation system in terms of its impact on people in different socioeconomic groups, with a focus on areas where congestion pricing has been proposed in the San Francisco Bay Area. Data collection could involve the use of license plate readers, mailing surveys to vehicle owners, and/or alternative methods. The study would be in collaboration with the San Francisco County Transportation Authority and is time sensitive. The study would need to be completed this year.

- Research synthesis on the application of behavioral economics to "nudge" travel behavior.

- Evaluate the use of "design thinking" workshops as a method for improving community engagement as part of transportation planning and policy efforts. The San Francisco

County Transportation Authority would serve as a partner and workshops would be part of the agency's efforts to understand community concerns and input related to pricing strategies.

8. SB 1 Implementation

The Road Repair and Accountability Act of 2017 (SB 1) provides funding for road repair and maintenance as well as support for existing and new programs related to the mobility of passengers and goods movement in the State of California. The UC ITS is soliciting proposals on the following priorities:

- Delivery of technical and educational support to local governments on pavement best practices with a focus on achieving the SB 1 goal of "using advanced technologies and material recycling techniques that reduce the cost of maintaining and rehabilitating the streets and highways, and that exhibit reduced levels of greenhouse gas emissions through material choice and construction method." Translational Project and Research Syntheses would be conducted as part of the City and County Pavement Improvement Center led by UC Davis and UC Berkeley.
- Research to inform the design, delivery, and/or evaluation of the Solutions for Congested Corridors Program.
- Research to inform the design, delivery, and/or evaluation of the Advance Mitigation Program in order to achieve the goals of this program as defined in SB 1.
- Research to inform cost-effective and feasible implementation of the following SB 1 goals:
    - "use advanced technologies and communications systems in transportation infrastructure that recognize and accommodate advanced automotive technologies that may include, but are not necessarily limited to, charging or fueling opportunities for zero-emission vehicles, and provision of infrastructure-to-vehicle communications for transitional or full autonomous vehicle systems;
    - include features in [transportation] projects to better adapt the asset to withstand the negative effects of climate change and make the asset more resilient to impacts such as fires, floods, and sea level rise; and
    - incorporate complete street elements into [transportation] projects, including, but not limited to, elements that improve the quality of bicycle and pedestrian facilities and that improve safety for all users of transportation facilities."

- Research to inform the tracking and achievement of performance metrics outlined in SB 1.

Appendix B - Second Tier Research Priorities for FY 2019-20

Over the past year, the UC ITS has engaged with researchers from across the UC system and external stakeholders from government agencies, non-governmental organizations, and the private sector to gain a better understanding of the challenges and opportunities associated with the accelerated rise of new transportation technologies and innovations. From these efforts, the UC ITS has identified nine priority areas for policy development, research and technical assistance. The UC ITS is soliciting proposals that address critical research questions within each of the nine priority areas as listed below. Note that many of the priorities listed below overlap with "first tier" priorities listed in Appendix A.

1. Integration of Vehicle and Communication Technologies with Transportation Infrastructure

- What infrastructure upgrades and improvements are needed to support the safe deployment of automated vehicles and how should upgrades and investments be prioritized? What are "no regrets" investments that can be made today that will allow transportation agencies to be resilient to technology and other changes that may occur?
- How can private sector innovation and public sector infrastructure investments be better aligned to support the deployment of automated vehicles? What are the opportunities for public-private partnerships?
- What role (if any) does the government have in resolving the debate over what communication technology should be used for connected vehicles (i.e., digital short range communications (DSRC) technology or LTE-V2X short range communications or 5G direct communications)?
- How might fast-charging needs for electric automated vehicles deployed by mobility service companies shift the state's strategy and investment in public charging infrastructure? What will the impacts be on the power grid?
- What are appropriate communication protocols and standards for connected vehicles and connected infrastructure? What are opportunities for vehicles and infrastructure to communicate with non-vehicles, such as bicyclists and pedestrians?

- What are communication and physical requirements when designing an automated, electric vehicle system? What are the gaps in realizing this system and what are the best approaches to filling these gaps? How should the system be evaluated and refined?

2. Travel Behavior and Travel Demand

- Under what conditions would travelers share riders with others? For example, what is the effect of price, time traveled, privacy and security protections, waiting time, and other factors on a traveler's decision to share a ride? And how does this behavior differ across demographic and socio- economic attributes, and for different trips purposes? How might pooled car trips compare to conventional transit, micro-transit, walking, and micro-mobility options, as well as personal car ownership and travel? What are the implications for total vehicle miles traveled at different times and places?

- Under what conditions would car owners give up car ownership? How would these choices vary across demographic and socio-economic groups, and for different land use patterns, climates, and other factors? How does the availability of other modes of travel affect this choice—especially the new demand-responsive and dockless modes?

- What are the leading factors and trends that will shape freight and goods movement? How will the adoption of new transportation and communication technologies ripple through the supply chain and what are implication for the size, location, and amount of warehouses and how goods are moved (i.e., by truck, rail, drone, bicycle)?

- What changes are needed to current planning models and tools to better understand and predict future travel demand? What are current and potentially new sources of data that can be used to better reflect and predict travel demand?

- What are the impacts of different adoption scenarios (e.g., pooled rides vs. individual rides; mobility service company vehicles vs. personal vehicles) on traffic congestion, infrastructure costs, transportation funding, economic productivity, use of other travel modes (e.g., public transportation, walking, bicycling), long-distance travel, and residential location?

- What are the best policy levers for affecting future travel demand to help meet the state's goals related to the economy, social mobility, the environment, and public health?

- How will changes in travel affect the development of cities, influence households' residential location, and development of communities? How can policy makers reduce land use consumption while checking that total vehicle travel and associated environmental impacts are kept in check?

3. Implications for the Environment, Public Health, and Energy Use

- How will the introduction of automated vehicles (under a variety of scenarios and policy approaches) affect VMT, greenhouse gas emissions, air pollution, energy demand, and the use of other travel modes (such as transit, walking, and biking) in California? How can negative impacts be mitigated?

- What tools and models are available and what tools must be developed and/or improved in order to evaluate the environmental and health impacts of shared, electric, connected and automated mobility?

- How will automated and electric travel impact the power grid, greenhouse gas emissions, and additional pollutant emissions as electricity production increases sharply, not only in California, but in the western United States?

- What are opportunities for improving the efficiency and throughput of the transportation system while minimizing emissions with the introduction of automated vehicles (i.e., passenger vehicles and trucks) and other mobility innovations (e.g., scooters, e-bikes)? How do opportunities change based on context (urban, suburban, rural) and the stage of automated vehicle introduction (i.e., in the beginning with a mix of automated vehicles and human-driven vehicles vs. later on when – in some cases – all vehicles will be automated)?

- What are the best policy levers and/or strategies for assuring the automated vehicles and new mobility services are also zero-emission? How can the revolution occurring in transportation assist the transition to cleaner fuels and vehicles?

4. Governance and Regulation

- How should the unique attributes (e.g., vehicle occupancy) and public benefits of new forms of mobility be considered in transportation funding programs? How should transportation funding formulas (especially across modal programs) be restructured in order to support overarching policy goals and be agnostic about service providers? Should public funds be used to subsidize disadvantaged travelers using private services? And if so, then how?

- How might transportation pricing policies be designed in ways that are more acceptable to the traveling public?

- How might electrification of vehicles used by TNCs and other mobility service companies be accelerated? How might behavior of drivers, users, and companies be most

effectively influenced? Does the transition to automated control affect the timing and nature of these policies?

- What are the best policies to support a transition to more affordable, dynamic micro-mobility options, such as scooters, in a way that is safe and best serves the public interest? For example, initial research suggests that e-scooters have similar speed profiles as bicycles. If so, then one strategy might be a massive increase in safe protected "bike" lanes. But how would this be funded and what more needs to be done in terms of safety?

5. *Equity*

- What are the potential barriers to the use of new mobility services among disadvantaged population groups? How might public policies and programs help travelers overcome such barriers?

- To what extent and how do disadvantaged population groups use new mobility services and what are barriers these groups face? How does use and barriers compare with other groups?

- What are the effects of new mobility services on the (a) travel behavior (e.g., mode, trip making) (b) automobile ownership, and (c) residential location of disadvantaged population groups? What are the benefits (e.g., accessibility, employment, activity participation, civic participation) and costs (e.g., expenditures) of new mobility services to disadvantaged population groups? How can policies and programs address the costs?

- How do new mobility services affect neighborhood-level indicators such as air quality, gentrification, spatial inequality? How can policies and programs mitigate the negative effects of these new services on vulnerable communities?

- How are new mobility services distributed across communities particularly with respect to low-income and minority neighborhoods? Do service providers discriminate against certain types of riders (e.g., minorities, disabled, riders who live in particular neighborhoods)? What is the impact of new mobility services on existing fixed-route transit and taxis service for individuals with disabilities? What types of regulations should be put in place to ensure equity outcomes?

- How do diverse stakeholders—including individuals and organizations from low-income and minority communities—collaborate to achieve equitable outcomes with respect to new innovative mobility services? How can existing planning processes be strengthened?

- How effective are existing new mobility programs and policies aimed at addressing the transportation needs of disadvantaged riders (e.g., low-income car sharing, subsidies for the purchase of electric vehicles, use of ride hailing)?

- How is new mobility likely to affect the spatial distribution of wealth and poverty, and access to needed goods and services across communities and income groups? How can public agencies, as they develop programs around innovative mobility, ensure that the benefits of these programs are shared by all Californians?

6. Integration with Other Modes and the Built Environment

- How are people and firms using various forms of new mobility, and how is this affecting their location decisions, as well as the use of incumbent travel modes (e.g., transit, solo driving, walking, and biking)? How would anticipated changes in technology influence such location decisions? What are the implications of these changes for sprawling versus compact development?

- How are new forms of mobility competing for public urban infrastructure, such as streets, curbs, sidewalks, and even airspace? How might these infrastructures be planned and managed more effectively, and dynamically in the years to come? For example, what are opportunities for adaptive re-use of parking spaces?

- What are the implications of new mobility—from scooters to TNCs to automated vehicles—for existing public transit services? For example, under what circumstances and for whom are these new services (1) replacing transit trips in built-up, congested areas where transit works best, (2) replacing transit trips in outlying area where transit works less well, and (3) supporting transit service by providing first- and last-mile connections?

- How can recent major investments in public transit around the state, and commitments in the Statewide Transit Strategic Plan, be better leveraged in an increasingly differentiated mobility environment?

- How can new mobility services and/or partnerships with the private sector help transit agencies overcome intractable challenges transit has faced, including serving low-density areas and addressing first / last mile? What are examples and lessons learned from innovative partnerships between transit agencies, paratransit providers, and shared mobility service providers?

7. Safety

- What surrogate safety and security measures should be included in future policies regarding new mobility initiatives to effectively monitor the impact of the systems on the road users?
- What are the multi-modal safety benefits that can be provided by connected and intelligent intersections and infrastructure?
- What are the risks of reduced situational awareness for a driver using automated technology, such as the potential for increased drowsiness? What is the likelihood of reduced driver situational awareness and what are methods and options to mitigate these risks? What are reasonable expectations regarding the ability of drivers to re-engage attention when human intervention is needed?
- How would new in-vehicle technologies affect the leading causes of fatalities?
- What are the minimal data specifications that are needed to independently and proactively assess the safety of automated vehicles? What level of regulation is desirable? At what level of government are different safety "checks and balances" needed?
- What design, operational, technological, and legal modifications are need to establish a safe system for the large-scale use of micro-mobility innovations, including dockless e-scooters and e-bikes? How can automated vehicles be safely integrated into today's system and what modifications to infrastructure, operations, and design are needed?
- What are the educational and training needs for drivers in regard to automated vehicle capabilities?
- What are the safety implications of a mixed vehicle fleet (i.e., a mix of automated vehicles and human drivers)?
- What are risk management strategies for on-road testing?
- What are standards for vehicle responses in emergency situations?
- What are the principal safety issues associated with the use of platooning such as the reduced visibility of drivers in the following vehicles, and the interaction of passenger cars with truck platoons at highway speeds? What are the potential positive benefits of platooning technologies?

8. Labor, the Workforce, and the Economy

- What are the broad employment groups that may be affected by increases in transportation automation and platform-based ride-hailing in California, specifically commercial drivers, travel-intensive workers (e.g., visiting nurse, repair person) and transportation equipment workers? What is the scale and characteristics of those employed in these groups?

- What is the current portfolio of relevant federal and state policies (e.g., workforce development, vocational/technical education and training, labor standards, and worker representation) for mitigating workforce harms and for helping displaced workers find meaningful and rewarding work? What are policy responses for maximizing and diffusing benefits based on similar technological changes that have occurred?

- What are the current needs, priorities, capabilities, and perceived options for workers in the transportation sector and in transport-intensive career fields?

- What are existing data sources and critical data gaps for tracing and understanding workforce impacts and for measuring the effect of responsive policies?

- What are the potential impacts of automation on transportation workers in passenger travel (e.g., transit, taxi and for-hire, Transportation Network Companies drivers), in the freight sector (e.g., truck drivers, logistics workers, delivery drivers), and those who have driving as a component of their job (e.g., in-home medical care, repair workers)? Over what timeline will impacts occur?

- What jobs and economic opportunities will be created by new transport technology (e.g., fleet managers, dispatchers, vehicle cleaners and maintainers, concierges, in-vehicle service providers, manufacturing-related positions)?

- What are the broader economic impacts of automation in transportation (e.g., reduced costs of goods and shipping, improved economic efficiency, increased effective use of time while traveling, increased commute range, greater job access for disadvantaged populations)?

9. Data Sharing and Management

- How can privacy issues in mobile data be mitigated? How can the data be used for the policy and planning process without revealing confidential business intellectual property or personal information?

- How can mobile data be used to provide real-time control of infrastructure to mitigate congestion, improve transportation impacts on quality of life and boost California economic growth? What are the associated cyber security risks?
- What are the data science algorithms for extracting the most value for transportation and urban planning needs?
- How can the next generation data value chain be designed for cross-agency and public-private partnerships?
- Are policies required to release siloed data for the public good?
- What kinds of data and analytics will best inform the needs of public agencies? What standards can be created to allow datasets to be mergeable across public entities?
- Should new policies in transportation have a mobility data component? How can this data be acquired and measured?
- Who in the ecosystem of transportation planning and governance should be responsible for this data management and analytics role?
- What are the educational and training needs of public agencies (now and in the future) in order to access, use, and process mobility data to inform planning and policymaking?

Appendix C - Cover Page Template

PROJECT TITLE:

PRINCIPAL INVESTIGATOR
Name:
Department:
Phone:
E-mail:
ORCID:

OTHER KEY ACADEMIC PARTICIPANTS
Name:
Department:
Phone:
E-mail:
ORCID:

ABSTRACT (200 word max)

KEY WORDS (provide 5):

RESEARCH PRIORITY ADDRESSED (check one):
___ First Tier Priority
___ Second Tier Priority

SPECIFIC PRIORITY BEING ADDRESSED (copy and paste exact language from RFP):

EXTERNAL STAKEHOLDER INFORMATION (i.e., the signee of your stakeholder letter(s) or key point(s) of contact with the partner agencies and/or organizations identified in your proposal).
Name:
Title:
Affiliation:
Phone:
E-mail:

Total Direct Cost Requested: $_____

Type of Proposal:

___ Research Synthesis

___ Translational Research Project

___ Applied Research Project

Is this a collaborative proposal? If yes, list the PI name, title, and affiliation for each partner university:

What (if any) are other sources of secured and/or anticipated funding supporting the proposed research?

Does the proposed project build upon completed and/or current research projects funded through ITS-administered programs (e.g., earlier SB1, PTA, or UTC-funded research)? If so, then please explain the connection below:

Potential Reviewers: Reviewers cannot have direct involvement in proposed research and cannot be former students or advisors of the PI(s). Include at least two from academia; other reviewers can be practitioners from industry, public sector, or non-governmental organizations:

Name	Title	Institution/Org.	e-mail address

Appendix D - Example Scope of Work and Task Schedule

Task 1: Literature Review

We will begin with a review of the literature…

- Work Product A: Literature Review

Task 2: Additional Task

A brief description of the task

Task 3: Additional Task

A brief description of the task

Task 4: Complete Final Deliverables (required)

We will produce a final report using the SB 1 report template for my campus, policy brief following SB 1 guidance , etc.…

- Work Product B: Final Report
- Work Product C: Policy Brief

Task 5: Engagement Task (required)

We plan to share results of our work with << describe target audience>> by presenting at a meeting, via webinar, briefing, etc.…

- Work Product D: Webinar (just an example)
-

Sample Task Schedule with Work Products

Task	Work Product	Month											
		1	2	3	4	5	6	7	8	9	10	11	12
1	A - Literature Review												
2													
3													
4	B - Final Report C - Policy Brief												
5	C - Webinar												

Appendix E - UC ITS Grant Award Guidelines and Expectations

In accepting funding from the UC ITS Mobility Research Program, the PI agrees to the following requirements and expectations. Failure to meet these requirements and expectations will be considered when deciding future funding awards.

The PI acknowledges that his/her project must address and inform transportation science, engineering, policy, or planning issues in California and must engage public sector partners. The UC ITS Mobility Research Program is supported through funding received from the State of California via the Public Transportation Account and the Road Repair and Accountability Act of 2017 (Senate Bill 1) with the purpose of supporting research, education and outreach activities that directly addresses and informs transportation engineering, policy, and/or planning issues in California. PIs are expected to actively engage policymakers and/or practitioners at all stages of research – beginning, during, and end. The PI is expected to provide the name, title, and affiliation of key public sector partners engaged in the project, and the PI is expected to report on engagement with these individuals as well as other policymakers and/or practitioners as part of semi-annual progress report(s) and at the conclusion of his/her project. Upon request, the PI agrees to provide at least one presentation to share his/her work with practitioners and policymakers either through a UC ITS organized webinar or event, or through an event organized by the PI. The PI is encouraged to reach out to the SB 1 Program Manager at his/her campus and/or the UC ITS Assistant Director Laura Podolsky to request assistance with strengthening the connection of his/her research with policy.

The PI agrees to acknowledge the support provided by the UC ITS and the State of California in all presentations and publications resulting in whole or in part from the PI's research award. Additionally, the PI agrees to not share research results with other funding agencies or firms without full disclosure of the support received from the UC ITS and State of California. The PI agrees to use the following language when acknowledging the support provided by the UC ITS and the State of California:

> *This study was made possible through funding received by the University of California Institute of Transportation Studies from the State of California via the Public Transportation Account and the Road Repair and Accountability Act of 2017 (Senate Bill 1). The contents of this report reflect the views of the author(s), who is/are responsible for the facts and the accuracy of the information presented. This document is disseminated under the sponsorship of the State of California in the interest of information exchange and does not necessarily reflect the official views or policies of the State of California.*

The PI agrees to disclose other proposed or in-kind research funding for a project substantially similar to the project being supported by the UC ITS. The UC ITS will not knowingly support research that is being funded or proposed for funding in whole or in part by other agencies or organizations without a specific agreement for joint funding. Failure to disclose other proposed or in-kind research funding for a project substantially similar to a UC ITS project is grounds for termination of a UC ITS grant. Multiple sponsors are encouraged, but full disclosure is required.

The PI understands that the period of performance for his/her grant award is 12 months. The start and end dates for the PI's grant will be provided by the SB 1 Program Manager at the PI's campus. The PI agrees to submit all final deliverables and products by the end of the grant period. The grant period end date is firm. In the event that the project cannot be completed by the expected end date, a formal request for a no-cost extension must be submitted via email to the SB 1 Program Manager at the PI's campus at least one month prior to the grant end date. Failure of the PI to submit final products on schedule will influence future award decisions.

The PI agrees to use the awarded funding in a manner consistent with the submitted budget. The PI recognizes the following budget guidelines and restrictions:

- Domestic travel to events and/or meetings outside of California is not an allowable expense unless in exceptional circumstances and if formally approved by the SB 1 Program Manager at the PI's campus.
- International travel is not an allowable expense.
- Non-resident tuition is not an allowable expense.
- PIs are discouraged from budgeting for computers, equipment, support staff, outside consultants, and/or any salary that goes beyond normal academic or summer compensation.
- Project budgets must support the PI's involvement in engagement activities.
- Any major budget changes and/or deviations should be approved by the SB 1 Program Manager at the PI's campus and be compliant with UC Policy for State (19900) funds.

The PI agrees to submit a 6-month progress report. The due date for the progress report will be provided by the SB 1 Program Manager at the PI's campus. All progress reports will be submitted online using the link provided to the PI upon receipt of the grant award. The progress report will ask for a high level summary of what was accomplished in the past six months and what the PI plans to accomplish in the next six months. In addition, the PI must fill out and upload a spreadsheet (link to download template) that provides supplementary information about his/her project. The PI will only need to submit one 6-month progress report. However, if the PI does not submit final deliverables by the end of the 12-month grant period, then the PI will be asked to submit an additional 6-month progress report.

The PI agrees to produce a one-page summary, final report, and policy brief for his/her project. Each of these deliverables are described in more detail below:

One-Page Project Summary: A one-page summary of the PI's project will be prepared by UC ITS staff and sent to the PI for review and approval. The PI will not receive an account number until the one-page project summary has been approved. The one-page summary is included in the UC ITS annual report sent to the UC ITS Board of Advisors, the California Legislature, and the UC Office of the President and will also be used to create a profile for the PI's project on the UC ITS website.

Research Report: The PI agrees to deliver a final report as a Word document before the end of the grant term. The report should be complete, original, organized, and accurate. It may take the form and length of a scholarly journal article. The PI agrees to use the report template provided. The folder with report templates for each ITS campus can be accessed here. If the PI would like to use another format, then a formal request must be submitted to and approved by the SB 1 Program Manager. The PI is allowed to use another program other than Microsoft Word to prepare his/her final report; however, the PI is expected to adhere to the style of the template as closely as possible for the body of the report and must use the UC ITS cover page, include the Technical Report Documentation Page (TRDP), and provide the proper acknowledgements of UC ITS and the State of California as described above. The report may be subject to both review by UC ITS staff and external referees. If the report is reviewed, then the PI is required to respond to all questions and suggestions by both the referees and UC ITS staff. Each report will be given a Digital Object Identifier (DOI) upon completion and will be posted on the UC ITS eScholarship repository. ***The PI agrees to not post the report in other locations.*** If the PI would like to share and/or list the report on other websites, then the PI agrees to link to the copy of the report posted on the UC ITS eScholarship repository. Having one location where the report is posted will ensure higher citation rates, help with version control, and make it easier for the UC ITS and the PI to monitor impact (e.g., number of downloads).

***Policy Brief*:** The PI agrees to prepare a two-page policy brief targeted to a policymaker audience. The policy brief should be suitable for an educated but non-technical audience and summarizes the main findings of the research relevant to practice and/or policy. The brief should be submitted as a Word document along with the report. The brief will be finalized through an iterative process with the UC ITS Assistant Director Laura Podolsky and the PI. Guidelines, template and an example can be downloaded here. Additional examples of policy briefs can be found here. Each brief will be given a DOI upon completion and will be posted on the UC ITS eScholarship repository. The posting and sharing requirements for research reports also applies to policy briefs.

The PI agrees to provide and update a statement listing all publications, presentations, inventions, and subsequent grants resulting from the project. Every year for the next three years, the PI will be asked to update the supplementary spreadsheet submitted with the 6-month progress report with information on students who contributed to the project (i.e., graduation status), publications, presentations, inventions, and engagement activities.