Center for <u>T</u>eaching <u>O</u>ld <u>M</u>odels <u>N</u>ew <u>T</u>ricks (TOMNET)

A USDOT Tier 1 University Transportation Center

PROJECT PROSPOSAL 2018 - 2019

Title: Attitudes and Trust in Promoting Use of Collaborative Transportation Services for Community Adaptive Capacity

Principal Investigator: Cynthia Chen, Professor, Department of Civil and Environmental Engineering, University of Washington, Seattle

Co-Principal Investigator: Daniel Abramson, Associate Professor, Department of Urban Design and Planning, University of Washington, Seattle

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1. Introduction/Problem Statement
This proposal describes the **second phase** of a multi-year project:
- 2017 – 2018: Literature review assessing the state of the field regarding incorporating attitudinal information into resilience survey methodologies, development of draft methodology
- **2018 – 2019: Field work to develop and test ideas in case study communities via a community self-assessment survey and community workshops**
- 2019 – 2020: Contribute to and participate in the proposed TOMNET panel survey across sites and communicate findings through presentations and publications
- 2020 – 2021: Further information collection and analysis; continued communication of findings

Background and context: The ubiquitous sensors in our daily lives have promoted the rise of collaborative transportation services. *Collaborative transportation services* require direct collaboration between the people providing and using the service. Examples of such services include ride-sharing, vehicle-sourcing and functional re-purposing of vehicles. The collaborative transportation services noted here differ not only from traditional services that are provided by a central authority (e.g., neither driving alone nor taking transit requires collaboration from other people), but also the emerging services such as Uber/Lyft where the collaborative aspect of the services is taken care of by a third party (e.g., Uber/Lyft companies). Thus, attitudes toward and trust in using such collaborative services are crucial.

Collaborative services have the potential to enhance community *adaptive capacity*. Adaptive capacity, as described in the resilience literature, is the ability of a system (such as a community) to absorb shocks or reconfigure and transform in response to or anticipation of change.[1] The assessment of community-level adaptive capacity has become an important consideration in the field of disaster preparation and mitigation. Understanding adaptive capacity for disaster preparation and mitigation planning is critical given increasingly widespread reliance of communities on *brittle infrastructure,*[2] that is, infrastructure systems that are easily disrupted and susceptible to system-wide failure.

While high-tech transportation and communication systems (e.g., internet, cell phone service, automobile travel) provide flexible options in day-to-day life, they are brittle systems that may not be available during a disaster or other disruption. On the other hand, while low-tech modes such as local FM radio, intranet, or ride-sharing may be available at all times, including during a disaster, they may need enhancement to be useful on an everyday basis, depending on community context. Social trust and social

networks play an important role in providing access to these kinds of flexible resources[3] and thus contribute to higher levels of community adaptive capacity. Social trust also plays a key role in the ability of communities to adapt,[4,5] and should be considered as a factor in disaster preparedness along with more common measures such as availability of resources (e.g., food, water, medicine) and SES.

Disruptions in traditional transportation services that might occur due to a disaster or other external forces could be filled by strategically leveraging latent, locally-based community resources. Such strategies might entail novel combinations of high (advanced) and low (established) technology as well as collaborative services that rely in part on social trust and reciprocal exchange (e.g. ride sharing or time banking). Increasing the availability and usability of collaborative resources has the potential to reduce dependency on traditional transportation and communication networks (e.g., automobile travel, cell phones) that may not be available in the event of a disruption. Furthermore, because collaborative services are dependent on social interaction, we believe they have the potential to enhance local knowledge of existing networked resources and improve social trust within a community.

Place attachment, or the emotional and cognitive experience linking people to places, has been shown to affect people's perceptions of and responses to natural hazard risks.[6] It has also been shown to motivate participation in cooperative efforts to improve one's community,[7] to build connections between individuals within a community,[8] and to enhance social trust.[9] Because our focus is place-based, and because place attachment has been shown to play a role in both social trust and disaster perception and response, we include it as one of our dimensions of study. We give the place-based approach regional significance by implementing the research in strongly contrasting communities on spectra important to regional resilience planning: urban-rural; high-low SES; and connected-isolated with respect to transportation and telecommunications (see *Data collection* in 3. *Proposed Methodology and Data* below).

Problem statement: Collaborative infrastructure systems that leverage social trust are not well-studied, particularly their potential role in building community adaptive capacity even in the absence of a disaster. Accounts of ad-hoc adaptations made by communities facing disaster provide some insight into the importance of flexibility and social cooperation to overcome challenges faced by the failure of brittle infrastructure.[10,11] Though informal, the use of such services has been shown to be extremely valuable and can play a significant role in disaster recovery — communities that can self-organize to redistribute resources and provide services on their own can survive longer (before the arrival of the external help) and recover faster.[12] This research has utility in the realm of emergency planning for transportation and communication system failures. Understanding the ability to substitute modes that rely upon (and potentially build) social trust are important considerations for enabling flexibility – and adaptability – in the infrastructure systems that connect communities to vital health and wellness resources.

In contrast to disaster preparedness approaches that focus on strengthening physical infrastructure, this project adopts a holistic understanding of *community resilience*; that is, one that integrates ecological, engineering, and psycho-social factors[13,14] to inform our approach to understanding adaptive capacity. We also address the issue of scale. Measures of adaptive capacity within the urban planning literature tend to use relatively coarse aggregate data at the city or county level, but we argue that a community-scale approach that takes social trust and place attachment into account is critical because communities are likely to be cut off from outside resources during a disaster and will need to rely upon their own local resources.

We propose to study the ways through which *collaborative transportation and communication services* would potentially enhance community adaptive capacity. Via a pilot sample survey, we will explore how different modes of transportation and communication, combined with local- and transpatial social attributes and resources like social trust and place attachment, enable access to community resources for both disaster preparedness and everyday well-being.

2. Project Objectives

The overarching goal of the longer-term (four-phase) project is to understand, model and develop ways in which communities can leverage unique – and interconnected – physical and social resources of place to enhance their own adaptive capacity. This second phase will build upon our Phase I findings to implement a pilot survey focused on issues of social trust, place attachment, and disaster preparedness and response as relevant to different modes of transportation and communication services. Understanding the interactions among these three aspects of community will provide us with data to inform strategies for enhancing adaptive capacity via collaborative infrastructure in future phases.

Specific goals for the second phase of the project include the following:

- *Understand the interaction between trust, place attachment, and the use of collaborative transportation and communication services (defined as informal transportation services that require collaboration among users).*
- *Understand how collaborative transportation and communication services could help enable community adaptive capacity both on an everyday basis and during times of disruption.*

Building upon information gathered from the pilot survey and community workshops, this project will further define the concept of collaborative infrastructure. The survey and community workshop methodologies are designed to highlight community strengths in an appreciative inquiry approach, engaging community partners in a creative, constructive dialogue about the potential benefits and limitations of collaborative infrastructure in both everyday life and during disaster or other disruption.

3. Proposed Methodology and Data

Data collection. Phase II of the project involves administering the pilot survey, refining the survey instrument based on the pilot, and implementing a broader survey in a wider range of communities with varying degrees of urban-ness and socioeconomic status. The pilot will help us to fine-tune our survey and question design before implementing the survey in the targeted case study communities.

The proposed project seeks to understand the interactions between social trust, place attachment, and participation in collaborative transportation services to help leverage local social networks, match resources (vehicles) and needs (such as need to travel) with each other and promote the provision and use of collaborative transportation services. Two characteristically different types of communities in the state of Washington will be tested. One is the Laurelhurst community, located just east of the University of Washington, which is a mostly white, wealthy community. Laurelhurst will serve as our pilot study community. The second study area will comprise one or two communities on the Pacific coast, relatively isolated cities that face not only frequent flooding but also a variety of social, economic and educational challenges (e.g. poverty, drugs and underemployment). The research team will collect data from these two communities (via surveys and focus groups), develop interventions, and conduct citizen science activities aimed at both engaging communities and generating potential solutions.

The target population for this survey is adult neighborhood residents, that is, members of households that are likely to be involved in decisions about household disaster preparedness. The pilot survey will be administered as a stratified sample survey. Strata will be defined by multifamily vs. single family homes and by areas that participate in organized block watch activities and those that do not, resulting in four total strata. Households will be randomly sampled from each stratum, and one adult from each sampled household will be asked to complete the survey. We expect that levels of disaster preparedness will be higher in single family buildings because homeowners tend to invest more time and effort in equipping their residences for emergency.[15,16] Information gained from the survey will be supplemented with community stakeholder interviews to provide a more complete understanding of the community social structure and availability of local resources.

Data analysis. The survey will consist of four modules focused on 1) access to health care and wellness resources, 2) social trust and place attachment, 3) disaster preparedness and 4) demographic data. The

objectives of the survey are to understand how different people in the community are connected to different resources, to understand community connection to place, to assess levels of trust associated with community networks and resources, and to gauge levels of household disaster preparedness.

The module themes and general question topics are as follows:

Module 1: Access to health care and wellness resources – modes of transportation and communication
   a. What transportation and communication modes do people normally use to access different types of health and wellness resources? (instrumental and emotional social support, medical care)
   b. What additional transportation and communication modes could people use to access these resources if needed?
   c. Are these resources located inside or outside the participant's immediate neighborhood?
   d. How much trust in the reliability of different modes does the participant have during normal times? In a disaster scenario?

Module 2: Social trust and place attachment
   a. Trust in other people (generally speaking)
   b. Trust in neighbors
   c. Willingness to share resources ("stuff," skills, knowledge, services) during normal times
   d. Willingness to share resources during a disaster
   e. Place attachment: identity, resource dependence[17]

Module 3: Disaster preparedness
   a. Do you feel prepared?
   b. Previous disaster experience
   c. List of preparedness items ("stuff")
   d. Access to skills (resource generator)

Module 4: Demographics (per TOMNET standards)

The data provided from the questions above will support the exploration of the following hypotheses:
   H1. Stronger attachment to place helps to enable the use of local resources to support health and wellness. (Modules 1 & 2)
   H2. Brittle modes (modes that are easily disrupted and susceptible to system-wide failure) tend to be used to access more distant health and wellness resources. (Module 1)
   H3. Stronger attachment to place is associated with greater levels of social trust and increased levels of disaster preparedness. (Modules 2 & 3)
   H4. People who have a more diverse social network (access to a variety of "skills" resources) are more willing to share their resources. (Modules 2 & 3)
   H5. Trust in "normal" modes of access is associated with stronger feelings of preparedness (though not necessarily increased levels of preparedness). (Modules 1 & 3)

In addition, we will be able to use the information gathered from Module 3 to assess how prepared communities are for disaster in terms of having adequate supplies and social connections to other people with a diverse set of useful skills. We may also include demographic information gathered in Module 4 (such as household income or vehicle ownership) in our analysis.

We will use a combination of methods to analyze the survey data. For Module 1, we will compute sample proportions for each of the question responses. For Module 2, we will create a set of factors associated with social trust, willingness to share, and place attachment and use them as independent variables in regression models. For Module 3, we will compute sample proportions for the preparedness items question. The social network data gathered from the resource generator in Module 3 will be used in two ways: to create a scale for diversity of networks as well as a proportion of critical skills to which people are connected. These scales, in combination with some variables measured directly in the survey

(e.g., demographic information) will be used as dependent and independent variables in a series of multivariate regression analyses to test the hypotheses described above.

We also propose to hold participatory community workshops focused on the consideration of locally-based scenarios that could inform the use and development of collaborative transportation services. Qualitative data gained from the workshops will help to provide contextual information to compare to the outcomes of the quantitative analysis, and it will help to inform a narrative about the potential for collaborative infrastructure within the case study communities. Scenarios with address both disaster and everyday conditions to explore the potential for collaborative transportation services to aid in achieving long-term community goals in a "citizen science" idea generation activity.

4. Work Plan (Project Tasks)

The 2018 – 2019 project is organized according to the following principal tasks and subtasks:

Task 1: Pilot survey implementation
> 1A. Finalize pilot survey:
> - Complete IRB for pilot survey
> - Pre-test draft survey within research lab
> - Finalize draft survey: questions, design, printing
>
> 1B. Data collection and preliminary analysis
> - Administer pilot survey in partner community
> - Collect survey data; analyze preliminary results
>
> 1C. Survey revision: Revise survey instrument based on pilot and preliminary analysis

Task 2: Stakeholder review workshops
> 2A. Workshop preparation, outreach to community and government partners
> 2B. Hold facilitated workshops, to potentially include: sharing of results from pilot survey; brainstorming session on collaborative infrastructure for resilience and transportation planning
> 2C. Create and disseminate reports documenting workshop discussion and direction

Task 3: Survey implementation.
> 3A. Outreach: Identify additional partner communities that provide contrast to pilot partners so that a range of SES and urban-ness are represented. Meet to discuss survey goals and make context-specific adjustments to the sample design and survey distribution process as needed.
> 3B. Disseminate survey in identified partner communities.

Task 4: Create outreach materials
> 4A. Create project activity for UW Discovery Days, a free, annual, two-day event when UW engineering departments share their work with students, teachers, families and the community.
> 4B. Prepare conference poster and/or presentation (as appropriate, TBD).

5. Project Schedule

Tasks	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
1 Pilot survey	■	■	■	■	■	■	■	■	■			
1A Finalize survey	■	■	■									
1B Data collection				■	■							
1C Survey revision						■	■	■	■			
2 Workshops	■	■	■					■	■			
2A Outreach	■	■						■				

2B Workshop									
2C Report back									
3 Survey									
3A Outreach									
3B Data collection									

6. Relevance to the Center Theme/Mission

Understanding and predicting the behavioral impacts of changes in transportation patterns and technology. Developing a better understanding of attitudes and behavior patterns can help us to understand changes associated with new transportation technologies in the context of potential disasters or other long-term disruptions to social and physical infrastructures. This includes exploring how social (e.g., social networks) and physical (e.g., transportation/communication systems) infrastructures might interact with one another in times of stability as well as disruption.

Integrating attitudinal variables into transportation modeling. Attitudes communicate personal and community values for the present and the future. Using an appreciative inquiry-based survey methodology that focuses on community strengths and values, we aim to better understand community attitudes about priorities and tradeoffs to enable bottom-up planning for the future (vs. traditional top-down, disaster-focused scenarios that tend to highlight vulnerabilities). This includes understanding the potential for sharing and reconfiguring community transportation resources. Additionally, current regional transportation modeling only examines normal day scenarios. This project will enable the connection to use of transportation modes under disastrous situations.

Developing approaches for quantifying the effects of attitudinal variables on transportation choices and outcomes. The attitudinal variables collected through this survey can be integrated into models in future phases of the project. This information will be valuable in context of disaster preparedness planning but for anticipating innovative and practical approaches to uncertainty across multiple possible futures and addressing the long-term struggles of under-served and/or isolated communities.

7. Anticipated Outcomes and Deliverables

Outcomes and benefits. Our research will continue to develop and implement an innovative and scalable methodology that can be widely applied to communities across the U.S. Engaging regional and municipal partners in a workshop to discuss preliminary results and to consider the potential benefits of collaborative infrastructure will help us to shape future phases of the project. Sharing our research results will also contribute to city-wide initiatives to make Seattle and cities around the country more resilient. As a participant in the Rockefeller Foundation-supported 100 Resilient Cities initiative,[18] Seattle is expanding its inter-departmental coordination for emergency preparedness, recovery and mitigation as well as creative approaches to a wide range of chronic threats, from climate change to housing affordability. This project, in all of its phases, is tailored to inform these efforts.

Anticipated products and deliverables. Anticipated products and deliverables from this project include:
- The final survey methodology, which will be tested in a pilot project
- Findings from pilot tests
- A subset of questions about attitudes and resilience to be used in a TOMNET panel survey
- A project poster that can be presented at conferences or other events, such as UW Discovery Days

8. Research Team and Management Plan

Research team and qualifications.
- <u>Prof. Cynthia Chen, Civil & Environmental Engineering, Principal investigator</u>. Prof. Chen's interdisciplinary research focuses on the sustainability and resilience of a city through the lens of

human beings interacting with the physical environment. Her research results facilitate real-time disaster response and recovery efforts and explore three inter-connected themes: travel behavior (human mobility) analysis, resilient infrastructures, and their intersections.

- <u>Associate Prof. Daniel Abramson, Urban Design & Planning, Co-PI</u>. Prof. Abramson's research in urban planning includes a focus on methods of socio-spatial analysis and public participation, including community resilience and adaptive planning in disaster recovery and hazard mitigation. Recent projects include FEMA- and NSF-funded research on new protocols for state agencies and communities to envision earthquake- and tsunami-resilient development.
- <u>PhD student Katherine Idziorek, Urban Design & Planning, research assistant</u>. Katherine's research interests include community resilience and connections between physical and social infrastructures with a specific focus on transportation systems.
- <u>PhD student XIangyang Guan, Civil & Environmental Engineering, research assistant</u>. Xiangyang's research interests involve resilience of infrastructure systems, social media data mining for civil engineering, and modeling the complex dynamics in interdependent infrastructure networks.

Team management and communications plan. Profs. Chen and Abramson will supervise the research work, which will primarily be carried out by Katherine and Xiangyang. This UW internal team will meet every other week to review progress and work completed. The UW team will provide the TOMNET team with quarterly project updates and will seek advising and feedback from the team as needed.

9. Technology Transfer Plan

Publications and presentations. While the second-year phase of this project is focused primarily on survey administration and data collection, we will convene a stakeholder review workshop (see below) to review the draft survey and explore the potential role of collaborative infrastructure in disaster preparedness planning. This review, combined with findings from the pilot study, could lay the groundwork for the development of a publication in the next phase of the project. The project team will create an activity for the UW Discovery Days event as well as conference presentations as appropriate.
Stakeholder Review Workshops. As part of the second phase of this project, we propose to hold 1-2 project-focused workshops with project stakeholders, including members of City and regional governance as well as emergency managers to share preliminary survey results and to get their feedback on the project development and applicability. The workshops will also provide a forum for discussing the potential utility of collaborative infrastructure in both everyday and disaster situations.
Technical assistance. This project is designed to support the City of Seattle's participation in the 100 Resilient Cities Initiative.[18] The project team will meet with staff from the Office of Emergency Management to plan how future phases of this project can contribute to their goals.

10. Workforce Development and Outreach Plan

Outreach to communities. We will use the information we collect from the pilot survey to inform the stakeholder review workshops in this phase of the project. We will share collected survey data (in aggregate form) with our community partners to inform a dialogue about potential context-specific interventions for enhancing community adaptive capacity by leveraging collaborative infrastructure.
Graduate student involvement. This project will support two PhD student as part-time Research Assistants for one year and will comprise the second phase of the research.
Undergraduate student involvement. The project PI will also apply for NSF REU funding to support two undergraduate student research positions for the summer of 2019.
K-12 and teacher involvement. The project team will participate in the UW College of Engineering's Discovery Days in 2019 by creating a hands-on activity about transportation and adaptive capacity.
Enhancement of diversity. The project's values- and asset-based protocol and its focus on understanding diverse social networks can reveal unexpected and often under-appreciated community resources, including multilingualism and other aspects of socio-cultural identity, that support resilience.

11. References

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www.100resilientcities.org/cities/entry/seattles-resilience-challenge

12. Qualifications of Investigators

CYNTHIA CHEN

Professor, Department of Civil and Environmental Engineering

University of Washington (UW), Seattle, WA 98195-5740 Email: qzchen@uw.edu

Education
Ph.D., Civil and Environmental Engineering, University of California, Davis, 2001.
M.S., Transportation, New Jersey Institute of Technology, 1995.
B.A., Nan Kai University, Tianjin, China, 1992.

Selected Employment History
Professor, Department of Civil and Environmental Engineering, University of Washington, Seattle, 2016-present

Associate Professor, Department of Civil and Environmental Engineering, University of Washington, Seattle, 2009-2016

Assistant Professor, Department of Civil Engineering, City College of New York, 2003-2009

Postdoctoral Research Fellow, Department of Civil and Environmental Engineering, University of California, Davis, 2002-2003.

Fields of Interest and Expertise
(1) Travel behavior/human mobility analysis; (2) Resiliency of infrastructure networks and community resilience; (3) Modeling of socio-physical systems for resiliency and sustainability

5 Recent Relevant Publications
1. Wang, F. and Chen, C. (2018). On data processing required to derive mobility patterns from passively-generated mobile phone data. *Transportation Research Part C*, 87, 58-74. DOI: 10.1016/j.trc.2017.12.003.
2. Guan, X.; Chen, C.; and Work, D. (2016) Tracking the Evolution of Infrastructure Systems and Mass Responses Using Publically Available Data. PLoS ONE 11(12): e0167267. doi:10.1371/journal.pone.0167267
3. Chen, C.; Ma, J.; Susilo, Y.; Liu, Y and Wang*, M. (2016) The promises of big data and small data for travel behavior (aka human mobility) analysis. Transportation Research Part C, 68, 285-299.
4. Guan, X.; Chen, C. (2014) Using social media data to understand and assess disasters. *Natural Hazards* 74, 837-850.
5. Chen, C.; Neal, D. and Zhou, M. (2013) Understanding the Evolution of a Disaster—A Framework for Assessing Crisis in a System Environment (FACSE). *Natural hazards* 65(1), 407-422.

Recent Honors, Grants, and Awards
NSF, CMMI-CIS/IMEE, "Inferring failure propagation patterns from post-disaster disruptions data", $285k, PI, 2015-2018.

NIH, "3-population 3-scale social network model to assess disease transmission, $1,106k, MPI, 2015-2020.

DOE TRANSNET, "The connected traveler: a framework to reduce energy use in transportation", 275k, co-PI, 2016-2018

DANIEL BENJAMIN ABRAMSON
Associate Professor, Department of Urban Design and Planning
University of Washington (UW), Seattle, WA 98195-5740 Email: abramson@u.washington.edu

Education
Ph.D., Urban Planning, Tsinghua University, April 1998.
M.C.P., Urban Studies and Planning, Massachusetts Institute of Technology, June 1992.
M.Arch., Architecture, Massachusetts Institute of Technology, June 1992.
B.A., European History, Harvard University, Magna Cum Laude, June 1985.

Selected Employment History
Asst./Assoc. Professor, Department of Urban Design and Planning, UW, 2001-present.
Postdoctoral Research Fellow and Lecturer, School of Community and Regional Planning Centre for Human Settlements, University of British Columbia, 1998-2001.

Selected Fields of Interest and Expertise
(1) Community resilience and adaptive planning in disaster recovery and hazard mitigation; (2) Periurban and rural responses to rapid urbanization

5 Recent Relevant Publications
Abramson, D. (2017) "The Uses of Planning History in China," in *The Routledge Handbook of Planning History*, edited by Carola Hein (Routledge): 260-272.
Abramson, D. (2016) "Periurbanization and the Politics of Development-as-City-Building in China: a Case for a Social-Ecological Perspective," *Cities.* In press, corrected proof, available online 5 January 2016.
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Abramson, D. & Y. Qi (2011). "'Urban-rural Integration' in the Earthquake Zone: Sichuan's Post-Disaster Reconstruction and the Expansion of the Chengdu Metropole," *Pacific Affairs 84*(3), 495-523.

Selected Recent Honors, Grants, and Awards
Bullitt Foundation, Thought Leadership and Innovation in Applied Urban Sustainability Research, Scholarship and Action grant for "Building Community Adaptive Capacity." PI with Cynthia Chen and John Scott, Co-PIs. $97,896. Funding approved, April 2018.
UW Jackson School of International Studies Area and International Studies grant for "New Urban-Rural Relations in Asia: Trans-Pacific Perspectives on Resilient City-Regions." PI. $55,000, 2015-2016.
NSF Hazards SEES Award#1331412, "Magnitude 9 Earthquake Scenarios – Probabilistic Modeling, Warnings, Response and Resilience in the Pacific Northwest." Co-PI with John Vidale (PI), Jeff Berman, Ann Bostrom, and Alison Duvall. $2,937,478. 2013-2017, no-cost extension to August 2019.
UW College of Built Environments interdepartmental research cluster seed fund for Resilience in the Built Environment. Convener and Co-PI. $35,000. 2013-2016.

13. Budget Including Non-Federal Matching Funds

Institution: University of Washington Seattle
Project Title: Attitudes and trust in promoting use of collaborative transportation services for community adaptive capacity
Principal Investigator: Cynthia Chen
Budget Period: 8/1/2018 - 07/31/2019

CATEGORY	Budgeted Amount from Federal Share	Budgeted Amount from Matching Funds	Explanatory Notes; Identify Source of Matching Funds
Faculty Salaries			
Cynthia Chen	7,151	8,592	0.5 summer month support. 0.6 academic months applied to cost share.
Daniel Abramson	4,721	9,673	0.5 summer month support. 1.02 academic months applied to cost share.
Other Staff Salaries			
Student Salaries	22,644		One 9-month student at 50% FTE
Fringe Benefits	7,123	4,548	24.9% for faculty; 18.4% for student
Total Salaries & Benefits	41,638	22,813	
Student Tuition Remission	17,238	14,999	3 academic quarters of support for the graduate student on the project. 3 academic quarters of non-resident tuition waiver applied to cost share.
Operating Services and Supplies			
Domestic Travel	2,194		Attend workshops organized by the center and conferences
Permanent Equipment (specify)			
Other Direct Costs (specify)	10,000		Publication costs, dataset purchases and computational costs
Total Direct Costs	71,070	37,812	
F&A (Indirect) Costs	29,877	12,661	MTDC: 55.5%
TOTAL COSTS	100,947	50,473	

Grant Deliverables and Reporting Requirements for UTC Grants (November 2016)

Exhibit F

UTC Project Information	
Project Title	Attitudes and trust in promoting use of collaborative transportation services for community adaptive capacity
University	University of Washington, Seattle
Principal Investigator	Cynthia Chen
PI Contact Information	qzchen@uw.edu; 206-543-8974 (office)
Funding Source(s) and Amounts Provided (by each agency or organization)	USDOT (RITA) and UW for matching fund
Total Project Cost	$151,470 (including matching funds)
Agency ID or Contract Number	
Start and End Dates	8/1/2018 - 07/31/2019
Brief Description of Research Project	The overarching goal of the longer-term (four-phase) project is to understand and model ways in which we can leverage unique – and interconnected – physical and social characteristics of place to enhance community adaptive capacity in response to disruptions. This second phase (one-year) is focused on finalizing and implementing the survey instrument developed in the previous year, which assesses community adaptive capacity in terms of social trust, use of transportation networks, and disaster preparedness. Between the pilot data collection and the full survey launch, the team will hold 1-2 stakeholder review workshops to review the initial data and to engage local, municipal and regional stakeholders in a dialogue about the potential benefits of collaborative infrastructure to help connect our work to ongoing regional transportation and resilience planning initiatives.
Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	
Impacts/Benefits of Implementation (actual, not anticipated)	
Web Links • Reports • Project Website	