

# Center for Teaching Old Models New Tricks (TOMNET)

## A USDOT Tier 1 University Transportation Center

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### PROJECT PROPOSAL

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**Title:** Investigating Attitudinal and Behavioral Changes in U.S. Households Before, During, and After the COVID-19 Pandemic

**Principal Investigator:** Deborah Salon, Assistant Professor, School of Geographical Sciences and Urban Planning, Arizona State University

**Co-Principal Investigator:** Ram Pendyala, Professor, School of Sustainable Engineering and the Built Environment, Arizona State University

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## 1. Introduction/Problem Statement

The COVID-19 pandemic has forced rapid, large changes in U.S. households' social dynamics resulting in substantial changes in their behavior. Virtually overnight, a large fraction of U.S. households has transitioned from a reality of long commutes, in-person classes and business meetings, and in-store shopping to one of telecommuting, online classes and business meetings, and online shopping – even for groceries. Many of these changes were happening already, but COVID-19 has pressed the fast-forward button.

In this proposal, we are interested to know, after the threat of contagion is gone, to what extent will American society “go back” to the pre-COVID-19 way of life? Which behavioral changes will be long-lasting, and for whom? How, if at all, are the attitudes that underpinned our American lifestyle shifting in this crisis, and will these shifts be long-term? Moreover, what are the largest impacts of confinement in terms of attitudes and behavior? Over the past month, thought leaders have published widely in the popular press on these topics (e.g., Fulton, 2020), but to our knowledge, no data yet exists that can substantiate or refute their predictions.

## 2. Project Objectives

This project will begin to answer the questions listed above by deploying a nationwide multi-wave survey focused on social dynamics, attitudes, and behavior of American households before, during, and after the COVID-19 pandemic. In the survey, the participants will be told upfront that they will be asked to fill follow up surveys at the 3-month, 6-month, and 9-month marks. Because we expect participants to complete the (initial) survey at different times (in response to reminders), the data collection will, in effect, turn into a virtual continuous data collection protocol; thus, providing valuable longitudinal data that allows the near-continuous tracking of behaviors, attitudes, preferences, and perceptions.

Overall, the data that will be collected in this research project aim to answer four primary questions:

1. How are different socio-economic segments of the U.S. population changing their attitudes and behaviors during the COVID-19 pandemic?
2. To what extent are current (during pandemic) behaviors likely to persist after the pandemic?
3. How do attitudes and perceptions evolve over the course of the COVID-19 pandemic and beyond?

We ask these questions with a focus on attitude and behavior change in the areas of remote working, distance learning, online shopping, online socializing, day-to-day travel patterns, and long distance travel.

### **3. Proposed Methodology and Data**

To answer the research questions posed above, we propose to develop and quickly deploy a national survey. To develop the survey, we will employ a crowd-sourced approach to survey design, calling on experts from a wide variety of disciplines to contribute questions and provide input on the survey questionnaire. This is an unusual approach, but given the unusual situation, we expect that it will yield a high quality survey instrument in a short period of time.

The survey will include retrospective questions about respondent behavior before the COVID-19 pandemic, questions about current behavior, and prospective questions about how respondents expect they will behave after the threat of COVID-19 is gone. Specific questions will be asked about commuting and discretionary travel choices pre-, during, and post COVID-19, as well as long-distance travel. To measure attitudes, respondents will be asked to rate their agreement with statements about overall wellbeing, risk, the economy, the environment, and technology. Preferences about distance working, learning, and shopping will also be collected. In addition, the survey will include a series of questions on socio-demographics (e.g., employment type and status, and household composition) and social connectedness.

Using a combination of Facebook, online (e-mail) data collection, and Qualtrics, we aim to collect at least 5,000 responses, disproportionately stratified across the nation, and distributed across a variety of socio-demographics (e.g., household types, area types, income, race, employment status during COVID-19).

Follow-up waves will be conducted at three-month intervals over the course of nine months to track the evolution of attitudes and behaviors over time. The survey instrument used for subsequent waves of data collection will be adapted to minimize respondent fatigue, adapt to changing conditions, and capture the evolution of behaviors and attitudes over time.

### **4. Work Plan (Project Tasks)**

#### **Task 1: Survey Development and IRB Review**

The team will develop a survey on the topic of respondent behavior before the COVID-19 pandemic, questions about current behavior, and prospective questions about how respondents expect they will behave after the threat of COVID-19 is gone. We will then prepare a protocol and insure that the survey instrument and associated consent documents are approved by the ASU Institutional Review Board.

#### **Task 2: Survey Pretesting and Deployment**

Before full deployment, we will pretest the survey by asking a group of colleagues and friends to take it and provide feedback on ways to improve it. We will then revise the survey according to the pretest suggestions before deploying.

The target population for this study is all U.S. residents, 18 years and older. The goal is to obtain a sample that includes representation from a wide range of socio-demographic subpopulations. As such, we propose a two-pronged participant recruitment strategy – the first of which will be funded with TOMNET resources.

First, we will broadly advertise the survey link via Facebook, Twitter, and email, and invite adults in the U.S. to click on the link and participate in this survey. This recruitment strategy will not initially target specific regions or socio-demographic groups, but it can become more targeted using Facebook's targeting algorithms if we find that the initial strategy yields few responses from a particular subpopulation.

A limitation of this recruitment approach is that we will not reach U.S. residents who are not connected in these ways, and we cannot target our sampling to make sure that we reach particular subpopulations. In addition, Facebook advertisement algorithms target people who are alike, resulting in a potential loss of diversity in the type of participants. To mitigate this issue, we will also pursue a more traditional, targeted sampling and recruitment of participants. We will identify a variety of geographic areas around the country, based on the severity of pandemic, level of lockdown and enforcement, and diversity of land use and socio-economic characteristics. For these areas, the team has budgeted funding (from another source) to purchase a large random sample (at least 150,000) of email addresses from a commercial vendor such as InfoGroup and to use the services of Qualtrics. Further stratification of this random sample should allow contacting those hard to reach individuals who are typically missed in random online surveys.

### **Task 3: Survey Data Cleaning and Dissemination**

We will clean and weight the data (to account for erroneous entries and any inevitable biases) on an ongoing basis while it is being collected so that the data can be posted and disseminated to the broader research community in a timely manner (considering the importance of these data for making better decisions now).

To weight the data, we plan to use enhanced multi-dimensional raking procedures that simultaneously control for population level household and person-level characteristics of interest (e.g., household size and income, age and gender). This weighting procedure is well established and has been extensively applied through the use of the PopGen software package developed by Ram Pendyala (MARG, 2016).

We plan to make these data available to the public and any researchers who would like to analyze them at two-week intervals during the COVID-19 pandemic's confinement period, and at one-month intervals thereafter. Personally identifying information will be removed from the data before sharing publicly. The data will be stored on a special project website as well as on a permanent online repository Harvard's Dataverse, which has the benefit of providing a DOI number that can be used to cite the data. Brief summary reports will accompany disseminated survey data so that the basic trends can be shared with the media and broader community. These data will be important for governments, businesses, property owners, and other stakeholders to better prepare for a post-COVID-19 world. Therefore, a critical aspect of the proposed project is to rapidly disseminate results in near real-time. Sharing summary reports (especially with the media) may also help recruit new participants.

After the project has been completed, a final release of the data will be shared once the complete dataset has been collected, cleaned, and curated for distribution. The data will be accompanied by a full version of the survey instrument, and a description of the data cleaning, weighting, and curation processes. A report that analyzes the main trends captured by the data will also be provided.

## 5. Project Schedule

	2019						2020					
Task	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July
1												
2												→
3												→

As indicated by the arrows, this projects will continue past the 2019-2020 regular TOMNET year.

## 6. Relevance to the Center Theme/Mission

Compared to many other ongoing efforts to track patterns of behavior during the COVID-19 pandemic crisis, this survey is unique in that it gathers rich attitudinal data together with information about lifestyle preferences and perceptions of risk – consistent with the TOMNET mission.

## 7. Anticipated Outcomes and Deliverables

The main deliverable of this project will be a publicly shared dataset that will shed light on how the COVID-19 pandemic might change aspects of life in the U.S. over the long term. We expect to use these data ourselves to perform analysis, but we also expect governments and business organizations to make use of them to help plan for the future.

## 8. Research Team and Management Plan

As described in the proposed methodology section above, this project will call on the expertise and volunteered guidance from a large group of travel behavior experts, as well as experts in related fields. As far as direct team members that are devoting large amounts of time to this project, however, these will include Deborah Salon, Denise Capasso da Silva, Matthew Conway, and Laura Mirtich. Conway is a 3<sup>rd</sup> year PhD student in the School of Geographical Sciences and Urban Planning at ASU, da Silva is a 3<sup>rd</sup> year PhD student in the School of Sustainable Engineering and the Built Environment at ASU, Mirtich is a 2<sup>nd</sup> year undergraduate Honors student, and Salon is both a faculty member in the School and Associate Director of TOMNET.

Salon, da Silva, and Conway will meet regularly to ensure timely delivery of the project. Ram Pendyala – TOMNET Center Director and Professor – will provide expert advice for the team at regular intervals and when needed.

## 9. Technology Transfer Plan

The technology transfer plan for this project includes (1) webinars given during the data collection phase to provide updates on the survey data collection effort and findings, (2) a data and results dissemination website, linked to the actual survey data that is downloadable from an academic repository, and (3) multiple peer-reviewed publications to report results from statistical analyses of these data.

## **10. Workforce Development and Outreach Plan**

The workforce development piece of this proposal is mainly in the inclusion of both graduate and undergraduate students in the core research team, who will develop their survey design and data analysis skills as part of their participation.

The outreach plan is substantial in that we hope to partner with MPOs and other interested organizations across the US to “get the word out” about the survey and encourage participation, as well as to use the data.

## **11. References**

Fulton, W. (2020) Here’s what our cities will look like after the coronavirus pandemic. Rice Kinder Institute for Urban Research, <https://kinder.rice.edu/urbanedge/2020/03/26/what-our-cities-will-look-after-coronavirus-pandemic> (accessed April 13, 2020)

MARG (2016) PopGen: Synthetic Population Generator. *Mobility Analytics Research Group*, <https://www.mobilityanalytics.org/popgen.html> (accessed April 13, 2020)

## 12. Qualifications of Investigators

**DEBORAH SALON, Ph.D.**

**Assistant Professor, School of Geographical Sciences and Urban Planning,**

**Arizona State University, Tempe, AZ 85287-3005. Ph: (480) 965-7475; Email: [deborah.salon@asu.edu](mailto:deborah.salon@asu.edu)**

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### EDUCATION

- University of California at Davis, Davis, CA, USA
  - Ph.D., Agricultural and Resource Economics, May 2006
- Carleton College, Northfield, MN
  - B.A., Physics, June 1994

### PROFESSIONAL EXPERIENCE

- Arizona State University
  - Assistant Professor, School of Geographical Sciences and Urban Planning, 2014-present
  - Graduate Faculty, School of Sustainability, 2016-present
  - Senior Sustainability Scientist, Global Institute of Sustainability, 2014- present
- University of California, Davis, Institute of Transportation Studies
  - Professional Researcher, 2008-2014
- The Earth Institute at Columbia University
  - Post-Doctoral Fellow, 2006-2008

### RELEVANT REFEREED PUBLICATIONS (Total: 26 Refereed Publications)

1. Salon, Deborah. (2015) Heterogeneity in the relationship between the built environment and driving: Focus on neighborhood type and travel purpose. *Research in Transportation Economics*, 52, 34-45.
2. Cook, Jonathan, James Sanchirico, Deborah Salon, and Jeffrey Williams. (2015) Empirical distributions of vehicle use and fuel efficiency across space: Implications of asymmetry for policy analysis. *Transportation Research Part A: Policy and Practice*, 78, 187-199.
3. Salon, Deborah, Marlon Boarnet, Susan Handy, Steven Spears, and Gil Tal. (2012) How do local actions affect VMT? A critical review of the empirical evidence. *Transportation Research Part D* 17(7): 495-508.
4. Salon, Deborah. (2009) Neighborhoods, cars, and commuting in New York City: A discrete choice approach. *Transportation Research Part A: Policy and Practice* 43(2): 180-196.

### RELEVANT RESEARCH PROJECTS (Total Sponsored Research: ~ \$800,000)

- *A Spatial Analysis of Housing and Transportation Affordability in Los Angeles County*, University of California Transportation Center, 2012-2015
- *Quantifying the effect of local government actions on VMT*, California Air Resources Board, 2010-2014

### JOURNAL EDITORIAL ACTIVITIES

- CO- EDITOR OF SPECIAL ISSUE, *RESEARCH IN TRANSPORTATION ECONOMICS* (ELSEVIER), 2015
- EDITORIAL BOARD, *JOURNAL OF TRANSPORTATION GEOGRAPHY* (ELSEVIER), 2016-present
- EDITORIAL BOARD, *TRANSPORTATION RESEARCH PART D* (ELSEVIER), 2017-present

### EDUCATION AND STUDENT ADVISING

- Thesis/Dissertation Major Advisor/Chair: 1 PhD student in progress; 4 MS (Thesis) students completed
- Thesis/Dissertation Committee Member: 2 PhD students completed; 1 PhD student in progress; 6 MS (Thesis) students completed

### 13. Budget Including Non-Federal Matching Funds

Institution: Arizona State University

Project Title: The impact of non-transportation attitudes, preferences, and personality characteristics on residential location and travel choices

Principal Investigator: Deborah Salon

Budget Period: 8/1/2019 - 07/31/2020

CATEGORY	Budgeted Amount from Federal Share	Budgeted Amount from Matching Funds	Explanatory Notes; Identify Source of Matching Funds
Faculty Salaries	\$ 4,556.43	\$ 8,655.61	Salon 5% AY + 0.5 summer month
Other Staff Salaries	\$ -	\$ -	
Student Salaries	\$ 13,000.00	\$ -	PhD student AY + summer salary
Fringe Benefits	\$ 2,002.74	\$ 2,337.01	ERE for above
<b>Total Salaries &amp; Benefits</b>	\$ 19,559.17	\$ 10,992.62	
Student Tuition Remission	\$ 8,500.00	\$ -	PhD student 1 semester graduate tuition
Operating Services and Supplies	\$ -	\$ -	
Domestic Travel	\$ -	\$ -	
Other Direct Costs (specify)	\$ -	\$ -	
Other Direct Costs (specify)	\$ -	\$ -	
<b>Total Direct Costs</b>	\$ 28,059.17	\$ 10,992.62	
F&A (Indirect) Costs	\$ 11,148.73	\$ 6,265.79	
<b>TOTAL COSTS</b>	\$ 39,207.89	\$ 17,258.42	

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

<b>UTC Project Information</b>	
Project Title	Investigating Attitudinal and Behavioral Changes in U.S. Households Before, During, and After the COVID-19 pandemic
University	Arizona State University
Principal Investigator	Deborah Salon
PI Contact Information	deborah.salon@asu.edu
Funding Source(s) and Amounts Provided (by each agency or organization)	TOMNET: \$39,208 ASU, SGSUP: \$17,258
Total Project Cost	\$56,466
Agency ID or Contract Number	
Start and End Dates	3/1/2020-7/31/2020
Brief Description of Research Project	<p>Virtually overnight, a large fraction of U.S. households has transitioned from a reality of long commutes to telecommuting, from in-person to online classes and business meetings, and from in-store to online shopping – even for groceries. Many of these changes were happening already, but COVID-19 has pressed the fast-forward button. After the threat of contagion is gone, to what extent will American society “go back” to our pre-COVID-19 way of life? Knowing the answer to this question is critical for making good business and policy decisions, and in recent weeks, a variety of thought leaders have written predictions of the future.</p> <p>We are conducting a national survey with the goal of using real data to begin to understand what the future may hold. Old habits die hard, as they say, but the disruption of COVID-19 is different from other shocks in that it may actually change habits. Importantly, there are some aspects to our disrupted lives that we may actually want to “keep” because we’ve been introduced to new technologies and ways of interacting that are quite convenient, and actually save time and money. Initial survey results suggest that respondents do expect substantial changes in telecommuting, business air travel, and online shopping that will persist beyond the COVID-19 crisis.</p>
Describe Implementation of Research Outcomes (or why not implemented)	TBD
Place Any Photos Here	

Impacts/Benefits of Implementation (actual, not anticipated)	TBD
Web Links <ul style="list-style-type: none"><li>• Reports</li><li>• Project Website</li></ul>	TBD