

Center for Teaching Old Models New Tricks (TOMNET)

A USDOT Tier 1 University Transportation Center

PROJECT PROPOSAL: 2019-2020

Title: Combining Disparate Surveys Across Time to Study Satisfaction with Life

Principal Investigator: Patricia L. Mokhtarian, Susan G. and Christopher D. Pappas Professor, School of Civil & Environmental Engineering, Georgia Institute of Technology

Co-Principal Investigator: Giovanni Circella, Senior Research Engineer, School of Civil & Environmental Engineering, Georgia Institute of Technology

Co-Principal Investigator: Kari E. Watkins, Professor, School of Civil & Environmental Engineering, Georgia Institute of Technology

1. Introduction/Problem Statement

In 2011, the United Nations General Assembly passed a resolution recognizing happiness and well-being as a fundamental human goal, and followed this up in 2013 by establishing an official International Day of Happiness. These actions attracted much attention from the international community, and especially from those within academia, generating a surge of popular news and academic pieces on well-being and its variants. However, psychologists and social scientists have been studying happiness and subjective well-being (SWB) for decades based on large-scale longitudinal surveys. For example, Harvard Medical School's Study of Adult Development is the longest-running study of adult life (ongoing since 1939), and focuses on well-being during adulthood (McLaughlin et al., 2010; Waldinger et al., 2007). The World Values Survey (WVS) is another well-known longitudinal study, originating in 1981, spanning almost 100 countries, and spawning numerous contributions to the SWB literature due to its open availability (Kim, 2018; Sarracino, 2010). Other established sources of longitudinal well-being data include the British Social Attitudes Survey (BSA; Dean and Phillips, 2015), the European Social Survey (ESS; Welsch and Kuehling, 2017), the U.S. General Social Survey (GSS; Ifcher and Zarghamee, 2014), and the International Social Survey Program (ISSP; Levin, 2014).

These large-scale longitudinal studies have allowed researchers to model the effects of general variables such as demographic characteristics, and selected values and behaviors on SWB. However, because these longitudinal surveys are broad in nature, they do not facilitate the examination of SWB within specific contexts or with the help of more diverse explanatory variables. As a result, researchers within assorted fields have taken to studying SWB using cross-sectional surveys, which are more commonly available and facilitate investigation from specific perspectives (e.g., effects of health, occupation, etc. on well-being). A number of scholars have used cross-sectional surveys to examine the impacts of transportation, especially commuting, on well-being (Mokhtarian, 2019; De Vos et al., 2013; Dickerson et al., 2014; Lorenz, 2018; Martin et al., 2014; Smith, 2017; Sweet and Kanaroglou, 2016).

In this proposed study, we plan to combine the longitudinal and cross-sectional approaches to studying well-being, creating a fused dataset that includes common variables from five travel-behavior-oriented cross-sectional surveys conducted across a 27-year period. The PI of this study was heavily

involved in all five of these surveys, while a co-PI was heavily involved in the most recent three. Accordingly, each survey includes an identical SWB question, as well as numerous other common variables across the individual datasets. Since these surveys were originally designed to serve travel behavior modeling purposes, the development of this fused dataset will allow a unique examination of SWB within a transportation context.

Despite the continuity of some design factors across the five cross-sectional surveys, there are inevitable inconsistencies stemming from question wording differences and evolving survey design techniques over the years. In this study, we will demonstrate an approach for addressing and ameliorating such inconsistencies using a combination of survey fusion and model development techniques. As such, one contribution of this work will be to provide an evolution of variables, in this case, SWB, over time. Accordingly, this study will both: (1) provide a detailed examination of SWB from general as well as transportation-oriented perspectives; and (2) provide an example of combining cross-sectional survey datasets for longitudinal studies.

2. Project Objectives

This project aims to (1) combine the common variables from multiple surveys conducted across a range of times (nearly 30 years) and places (within California) to obtain a large repeated cross-sectional sample; (2) use the combined sample to analyze changes in self-reported subjective well-being (satisfaction with life) across time and differences related to geography and demography; (3) assess the influence of transportation-related variables on subjective well-being; and (4) assess whether respondents recruited via commercial online opinion panels are notably different in their satisfaction with life than other, more randomly-sampled, respondents.

The latter objective is particularly pertinent in view of the modern tendency – in transportation surveys no less than in others – to rely on opinion panel-based respondents because of decreasing response rates obtained from more conventional methods. While an opinion panel-based sample can often be “made to order” and then weighted to be representative of the general population on common demographic characteristics, there is very little evidence on how representative such samples might be with respect to *less* common characteristics, such as attitudes (Blasius and Brandt, 2010; Fan and Yan, 2010; Szolnoki and Hoffmann, 2013). Accordingly, this study will offer valuable insight into that important question.

3. Proposed Methodology and Data

The proposed study will fuse the data from five California-based, transport-oriented cross-sectional surveys covering a 27-year period from 1992 to 2018. These five surveys were selected for this specific analysis from a larger pool of 11 possible cross-sectional surveys involving the project PI (and often one of the co-PIs). Among the remaining six surveys, four of them did not contain the satisfaction-with-life (SWL) question, which is the key dependent variable in this study; two of the surveys were implemented outside California. **TABLE 1** provides an overview of key characteristics for the surveys. Each of the five surveys obtained SWL measurements by asking respondents to rate the statement “I am generally satisfied with my life” using a five-point Likert-type response scale ranging from strongly disagree (1) to strongly agree (5). Studies have shown that single-item measures of life satisfaction perform similarly to the multi-item measures (Atroszko et al., 2017; Cheung and Lucas, 2014; Jovanović, 2016; Diener, 1984).

TABLE 1. Overview of cross-sectional surveys that comprise the fused dataset

Year	Survey focus	Location	Sampling method	Completion channel	Response rate ¹	Working sample size ² (N)
1992	Telecommuting ^a	Southern California	Convenience sampling (at a single employer)	Paper	44%	601
1998	Positive travel utility ^b	Northern California	Simple, address-based, random sampling within three diverse neighborhoods	Paper	24%	1,317
2011	Travel-based multitasking ^c	Northern California	Convenience sampling (on-site physical distribution, university staff and student emails, other online); simple random sampling, email addresses within study areas (InfoGroup), address-based (ListGiant); quota sampling, online opinion panel (Survey Analytics);	Paper, online	5% ³	2,415
2015	Mobility choices of millennials and Gen X ^d	California	Quota sampling, online opinion panel	Online	46%	1,155
2018	Impacts of emerging technologies and transportation trends ^e	California	Stratified random sampling, address-based; quota sampling, online opinion panel; convenient sampling, recall of respondents from 2015 survey	Paper, online	7.01%	2,026

¹ For initial samples, which have been filtered for the purposes of this study.

² For the purposes of this study; comprises workers who commute.

³ Composite across the methods for which a rate could be computed; in some cases the denominator was unknown or (e.g., in the case of links posted to a website) not applicable.

^a Mokhtarian and Salomon (1996).

^b Curry (2000).

^c Neufeld and Mokhtarian (2012).

^d Circella et al. (2016).

^e Circella et al. (2019).

We plan to estimate two separate generalized ordered logit models for satisfaction with life. The first of these models will use the fused dataset across all five surveys, while the second model will use a reduced version of the fused dataset that includes three of the five surveys (1998, 2011, and 2015). The model utilizing all five surveys will be called the *contextual model*, since it allows the examination of context variables such as time, region and sampling method. The reduced model will be called the *attitudinal model* since it allows an examination of attitudinal variables. We will estimate both models because most attitudinal variables are either not shared or are more likely to have wording differences across surveys, and thus by using the reduced dataset for the second model, we will be able to keep five transport-related attitudinal variables in that version of the model (TABLE 2).

TABLE 2. Common attitudinal variables across surveys

Attitudinal variable	Survey	Survey statements
Like large yard	1998	I like to have a large yard at my home.
	2011	I like the idea of living somewhere with large yards and lots of space between homes.
	2015	I like the idea of living somewhere with large yards and lots of space between homes.
Car is a symbol	1998	To me, a car is a status symbol.
	2011	I (would) like to own a car that impresses other people.
	2015	To me, owning a car is a symbol of success.
Don't mind being stuck in traffic	1998	Getting stuck in traffic doesn't bother me too much.
	2011	Getting stuck in traffic doesn't bother me much.
	2015	Getting stuck in traffic does not bother me that much.
Travel is wasted time	1998	Travel time is generally wasted time.
	2011	Time spent traveling is generally wasted time.
	2015	The time I spend commuting is generally wasted time.
Commute is stressful	1998	My commute is a real hassle.
	2011	My commute is stressful.
	2015	My commute is stressful.

The GOL model specification can be written as follows:

$$P(Y_i > j) = g(\alpha_j, X_i\beta_j) = \frac{\exp(\alpha_j + X_i\beta_j)}{1 + \{\exp(\alpha_j + X_i\beta_j)\}}, \quad j = 1, 2, \dots, M - 1, \quad (1)$$

where Y_i represents the life satisfaction of respondent i ; α_j is the constant term associated with response j ; X_i is a vector of explanatory variables; β_j is the corresponding vector of coefficients associated with response j (some, but not necessarily all, elements of which may be equal across some values of j); and M is the number of life satisfaction categories, which is five in this study; $\alpha_j + X_i\beta_j$ can be interpreted as the observed propensity for life satisfaction. GOL models are different from OL models in that they allow variation of β_j for specific j s; otherwise, the model specifications for GOL and OL models are identical. The probability of each rating category is:

$$\begin{aligned} P(Y_i = 1) &= 1 - g(\alpha_1, X_i\beta_1) \\ P(Y_i = j) &= g(\alpha_{j-1}, X_i\beta_{j-1}) - g(\alpha_j, X_i\beta_j) \quad j = 1, \dots, M - 1 \\ P(Y_i = M) &= g(\alpha_{M-1}, X_i\beta_{M-1}) . \end{aligned} \quad (2)$$

4. Work Plan (Project Tasks)

The work plan involves the following tasks:

Task 1: Literature review.

We will monitor the literature on satisfaction with life/subjective well-being for the duration of the project. In addition, we will follow literature in related areas, including data fusion and the incorporation of attitudes in travel demand models.

Task 2: Assemble the dataset.

This will require compiling a careful inventory of the variables in each survey, including the topic addressed by the variable (e.g. attitude, travel behavior, demographic trait) and the exact wording of each question and response category to enable comparisons across surveys. For example, age and/or income categories may not match across all surveys. Where the wording of a question and/or its response categories/format varies across surveys, a determination will have to be made as to whether the differences can be disregarded, reconciled, or necessitate dropping the question from the common pool. The reconciliation process will take additional time. Monetary items (notably household or personal income) will need to be converted to a common year to control for inflation. The outcome of this task will be a pooled sample with items that are common (or presumed/reconciled to be common) across surveys, as well as meta-data variables indicating survey year, region, macroeconomic indicators such as GDP per capita and unemployment rate for the year/region combination, and sampling method (specifically whether the respondent was recruited via an online opinion panel or not – otherwise generally random address-based sampling).

Task 3: Find and interpret the best generalized ordered logit models of satisfaction with life.

We will investigate a number of specifications based on conceptual considerations and statistical testing. On near-final models, we will conduct the parallel lines test to see whether the model coefficients are essentially equal across SWL response categories, in which case the simpler ordinal logit formulation is empirically justified (Williams, 2016). We will analyze the final models for their behavioral and potentially policy implications, as well as comparing them with other studies of SWL in the literature. We will pay particular attention to the influence of transportation attributes and sampling method on SWL.

Task 4: Document the results for dissemination.

We will prepare a paper for submission to a high-quality peer-reviewed journal. In addition, we plan to present the paper at one or more professional conferences (see Section 7).

5. Project Schedule

	Task Name	Month											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Literature review												
2	Assemble the dataset												
3	Find and interpret the best generalized ordered logit models of satisfaction with life												
4	Document the results for dissemination												

6. Relevance to the Center Theme/Mission

The proposed project effectively contributes to the TOMNET mission, by exploring ways of fusing data from multiple sources to enrich the insight that can be obtained from any single source. The lessons learned in this study can be applied to potentially merge other surveys having a substantial number of common variables. An anticipated follow-on to this study would use machine learning methods to impute variables from one survey dataset to another, thereby further expanding the set of variables that are common across surveys and allowing even deeper and broader insights to be obtained. Accordingly, the project is situated very well within the TOMNET nexus of using machine learning (among other methods) to incorporate attitudinal information into conventional travel demand models.

7. Anticipated Outcomes and Deliverables

In terms of *research outcomes/benefits* of this study, the novel compilation of data sources will provide new insights into the evolution of subjective well-being across time, including the role of transportation in that well-being. In addition, it will provide a rare and useful look at whether/ how survey respondents who are recruited via commercial opinion panels differ from those recruited more conventionally, especially via random address-based sampling. Accordingly, we expect this work to contribute to the well-being, transportation, and survey research literatures.

With respect to *tangible outcomes/deliverables*, we expect to produce a paper to be submitted to a peer-reviewed journal, and also to present this work at one or more conferences, such as the 2021 Annual Meeting of the Transportation Research Board.

8. Research Team and Management Plan

Principal Investigator *Patricia Mokhtarian* is an internationally-known travel behavior scholar, who has specialized in measuring and modeling attitudes and incorporating them into models of travel-related behaviors. In particular, she either directed or was substantively involved with the design, administration, and prior analysis of the survey data to be used in this project. She will be responsible for the overall direction of the project, and will be directly engaged with its ongoing progress. Co-PI *Kari Watkins* is a rising star in travel behavior research, specializing in transit planning and operations, traveler information, mode choice, and complete streets design. Co-PI *Giovanni Circella* is a seasoned, thoughtful, and rigorous travel behavior scholar, who was responsible for two of the surveys to be used in this project. He will provide substantive input and coordination at all stages of the project. One-page CVs for these project leaders appear after the budget.

In addition, *one PhD student* will be responsible for the day-to-day execution of substantive project tasks. Further, a *PhD candidate who is funded by an Eisenhower Fellowship* will be part of the team at no cost to the project, thereby leveraging project funds to offer a whole that will be greater than the (budgeted) sum of its parts.

The project team will meet weekly for in-depth reports on progress and tactical planning. All members are local, so communication will be straightforward, of course supplemented by e-mail during inevitable absences. An internal project website will serve as a working repository for literature, presentations prepared by the project, data, and analyses. Milestone products, including papers, presentations, and reports will be provided to the central TOMNET repository

9. Technology Transfer Plan

The project leadership has proven track records of scholarly productivity and research dissemination. In July 2019, we will prepare a paper to be submitted for presentation at the Annual Meeting of the Transportation Research Board in January 2020, and for publication in a peer-reviewed journal. Based on past history, we expect multiple opportunities to present project findings throughout the life of the study and beyond, and we will seek out and volunteer for such opportunities as appropriate.

10. Workforce Development and Outreach Plan

The PI and one of the co-PIs for the proposed project are women, as are the two PhD students (one funded; one on fellowship) associated with the project. The entire leadership team is devoted to the careful mentoring of female graduate students, including with respect to career-life balance, a major reason why female PhD students do not choose academia (Mason et al., 2009). Research has shown that mentoring and positive role models can make a big difference in the attraction of women to STEM fields (Hill et al., 2010). This project will contribute heavily to the professional development of these two female PhD students, who in turn are already serving as role models to other women.

11. References

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12. Qualifications of Investigators

PATRICIA L. MOKHTARIAN

Susan G and Christopher D Pappas Professor, School of Civil & Environmental Engineering
Georgia Institute of Technology, Atlanta, GA 30332-0355 Email: patmikh@gatech.edu

Education

PhD, Industrial Engineering/Management Sciences, Northwestern University, 1981
MS, Industrial Engineering/Management Sciences, Northwestern University, 1977
BA (summa cum laude), Mathematics, Florida State University, 1975

Employment and Professional Experience (last 25 years)

Susan G and Christopher D Pappas Professor (2016-present) / Professor (2013-2016), School of Civil & Environmental Engineering, Georgia Institute of Technology
Full (1999-2013)/Associate (1996-1999)/Assistant (1990-1996) Professor, Department of Civil & Environmental Engineering, University of California, Davis
Chair and Graduate Adviser (1997-2013), Interdisciplinary Graduate Group in Transportation Technology and Policy, University of California, Davis
Acting Director (1999-2000) / Associate Director for Education (2001-2013), Institute of Transportation Studies, University of California, Davis

Fields of Interest and Expertise

(1) Attitude measurement and survey design; (2) Statistical/econometric analysis of transportation data; (3) Impacts of information/communications technology on travel; (4) Attitudes toward travel; (5) Activities conducted while traveling; (6) Impacts of the built environment on travel behavior

5 Recent Relevant Publications (not already cited in the proposal)

Mokhtarian, P.L. (2018) The times they are a-changin': What do the expanding uses of travel time portend for policy, planning, and life? *Transportation Research Record*, 2672(47), 1-11.
Kim, S.H., & Mokhtarian, P.L. (2018). Taste heterogeneity as an alternative form of endogeneity bias: Investigating the attitude-moderated effects of built environment and socio-demographics on vehicle ownership using latent class modeling. *Transportation Research A*, 116, 130-150.
Mishra, G.S., Mokhtarian, P.L., Clewlow, R.R. & Widaman, K.F. (2019). Addressing the joint occurrence of self-selection and simultaneity biases in the estimation of program effects based on cross-sectional observational surveys - Case study of travel behavior effects in carsharing. *Transportation*, 46, 95-123. <http://dx.doi.org/10.1007/s11116-017-9791-1>
Lee, R.J., Sener, I.N., Mokhtarian, P.L., & Handy, S.L. (2017). Relationships between the online and in-store shopping frequency of Davis, California residents. *Transportation Research A*, 100, 40-52.
Garikapati, V.M., Pendyala, R.M., Morris, E.A., Mokhtarian, P.L., & McDonald, N. (2016). Activity patterns, time use, and travel of millennials: A generation in transition? *Transport Reviews*, 36(5), 558-584.
Mokhtarian, P.L. & van Herick, D. (2016). Quantifying residential self-selection effects: A review of methods and findings from applications of propensity score and sample selection approaches. *Journal of Transport and Land Use*, 9(1), 7-26.

Graduate Student Supervision/Advising

Graduated: 12 PhDs (including 2 women), 23 MSs (6); **Current (Co-)Supervision:** 6 PhDs (2)

Recent Honors and Awards

Invited speaker, endowed or distinguished/eminent lecture series, 7 occasions (2014-2018)
Invited keynote speaker at 6 international conferences (2014-2017)
Sustained Research Award, School of Civil and Environmental Engineering, Georgia Tech (2015)

GIOVANNI CIRCELLA, PhD

Senior Research Engineer, Civil and Environmental Engineering

Georgia Institute of Technology, Atlanta, GA 30332-0355 Email: gcircella@gatech.edu

Education

Ph.D., Infrastructure Engineering and Transportation Planning, Politecnico di Bari, Jul 2008.
M.Sc., Agricultural and Resource Economics, University of California, Davis, Sep 2009.
M.Sc. + B. Sc. (Italian Laurea, summa cum laude), Civil Engineering (Transportation), Politecnico di Bari, Apr 2004.

Employment and Professional Experience (last 25 years)

Senior Research Engineer, School of Civil and Environmental Engineering, Georgia Institute of Technology, Nov 2016 – present (75% appointment).

Assistant Professional Researcher, Institute of Transportation Studies, University of California, Davis, Oct 2015 – present (25% appointment).

Research Engineer, School of Civil and Environmental Engineering, Georgia Institute of Technology, Nov 2013 – Nov 2016 (75% appointment).

Post-Doc Researcher, Institute of Transportation Studies, UC Davis, Oct 2009 – Sep 2015.

Fields of Interest and Expertise

(1) Personal attitudes and travel behavior analysis; (2) Discrete choice modeling; (3) Travel survey methods and data collection; (4) Transportation planning; (5) Transportation demand modeling and forecasting; (6) Statistical analysis of transportation data; (7) Sustainability and energy; (8) Shared mobility; (9) Information communication technologies and transportation

5 Recent Relevant Publications

1. Dong, Z., Mokhtarian, P.L., Circella, G., & Allison, J. (2015). Estimation of changes in rail ridership through an onboard survey: Did free wi-fi make a difference to Amtrak's capitol corridor service? *Transportation*, 42(1), 123-142.
2. Guzman, L. A., De La Hoz, D. & Circella, G. (2015). Evaluation of synergies from transportation policy packages using a social welfare maximization approach: A case study for Madrid, Spain. *Case Studies on Transport Policy*, 3(1), 99–110.
3. McFadden, A. J., Circella, G., Haydu, B., & Linesch, N.J. (2014). Impact of proposed land use and transportation investments on future travel patterns in California. *Transportation Research Record, Journal of the Transportation Research Board*, 2430, 207-215.
4. Circella G., Mokhtarian, P.L., & Poff, L.K. (2012). A conceptual typology of multitasking behavior and polychronicity preferences. *International Journal of Time Use Research*, 9(1), 59-107.
5. Ye, L., Mokhtarian, P.L., & Circella, G. (2012). Commuter impacts and behavior changes during a temporary freeway closure: The Fix I-5 Project in Sacramento, California. *Transportation Planning and Technology*, 35(3), 341 – 371.

Graduate Student Supervision/Advising

Graduated: 1 MS, 1 PhD; **Current Supervision:** 4 PhDs (including 2 women)

Honors and Awards

Keynote Speaker, Trailways 80th Annual Meeting and Conference, Fort Myers, FL, Feb 2016.
Fulbright Fellowship, University of California, Davis, 2006-2007.
Erasmus Scholarship, Universidad Politecnica de Valencia, Spain, 2013.
Research Award, City of Bari, Italy, for the Best Research Thesis, 2006.

KARI EDISON WATKINS, PH.D., P.E.

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Education

Ph.D., Civil and Environmental Engineering, University of Washington, 2011
M.S., Civil and Environmental Engineering, University of Connecticut, 2003
B.C.E., Civil and Environmental Engineering, Georgia Institute of Technology, 1997

Employment and Professional Experience (last 25 years)

Georgia Institute of Technology, Atlanta, GA
Associate Professor, Civil & Environmental Engineering, Georgia Tech, 2017-present
Frederick Law Olmsted Junior Professor, Civil & Environmental Engineering, 2016-present
Assistant Professor, Civil & Environmental Engineering, Georgia Tech, 2011-2017
Research Assistant, Civil & Environmental Engineering, University of Washington, 2007-2011
Senior Transportation Engineer, Wilbur Smith Associates, 1998-2007

Fields of Interest and Expertise

(1) Transportation planning; (2) Transit planning and operations; (3) Traveler information;
(4) Mode choice decision making; (5) Complete streets design

5 Recent Relevant Publications

1. Brakewood, C., & Watkins, K. (2016). "A Method for Conducting Before-After Analyses of Transit Use by Linking Smart Card Data and Survey Responses" in *Public Transport Planning with Smart Card Data*, edited by F. Kurauchi and J. Schmocker, CRC Press.
2. Kressner, J., Carragher, M., & Watkins, K. (2014). "A household-level comparison of targeted marketing data and self-reported survey data" *Transportation Research Board 2014 Annual Meeting*.
3. Misra, A., & Watkins, K. "Modelling cyclist route choice using revealed preference data – an age and gender perspective", *Transportation Research Record*, accepted.
4. Brakewood, C., Macfarlane, G., K. Watkins, K. (2015). The impact of real-time information on bus ridership in New York City. *Transportation Research Part C*, 53, pp.59-75.
5. Berrebi, S., Hans, E., Chiabaut, N., Laval, J., Leclercq, L., & Watkins, K. (2018). "Comparing Bus Holding Methods using Real-Time Predictions", *Transportation Research Part C*, Vol. 87.

Graduate Student Supervision/Advising

Graduated: 4 PhDs (includes 2 women), 24 Masters; **Current Supervision:** 4 PhDs (includes 2 women)

Recent Honors and Awards

Council of University Transportation Centers New Faculty Award (2017) and Wootan Award for Best Dissertation in Transportation Policy and Planning (2012)
Three time National Academy of Engineers Frontiers of Engineering invitee: Attendee at Indo-American (2012); Speaker at Euro-American (2013); Co-Chair at Japan-America (2016)
Top 40 under 40, Mass Transit Magazine (2013)

13. Budget Including Non-Federal Matching Funds

Institution: Georgia Institute of Technology

Project Title: Combining Disparate Surveys across Time to Study Satisfaction with Life

Principal Investigator: Patricia L. Mokhtarian

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	\$16,260	\$26,750	Georgia Tech faculty salary
Other Staff Salaries	–		
Student Salaries	\$28,800		
Fringe Benefits	\$6,717	\$7,972	Georgia Tech faculty overhead
Total Salaries & Benefits	\$51,778	\$34,722	
Student Tuition Remission	\$24,991		
Operating Services and Supplies	\$250		
Domestic Travel	\$1,500		
Other Direct Costs (specify)			
Other Direct Costs (specify)			
Total Direct Costs	\$78,519	\$34,722	
F&A (Indirect) Costs	\$30,939	\$20,069	Georgia Tech faculty salary
TOTAL COSTS	\$109,458	\$54,791	

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

Exhibit F

UTC Project Information	
Project Title	
University	
Principal Investigator	
PI Contact Information	
Funding Source(s) and Amounts Provided (by each agency or organization)	
Total Project Cost	
Agency ID or Contract Number	
Start and End Dates	
Brief Description of Research Project	
Describe Implementation of Research Outcomes (or why not implemented)	
Place Any Photos Here	
Impacts/Benefits of Implementation (actual, not anticipated)	
Web Links <ul style="list-style-type: none"> • Reports • Project Website 	