Social Equity in Regional Transportation Planning:

Developing a New Methodology for Analyzing Potential Displacement

Pre-proposal to the California Air Resources Board's Research Division
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Institute of Urban & Regional Development
University of California, Berkeley
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[X] Research includes human subjects (application for exemption not yet submitted).

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In collaboration with

Association of Bay Area Governments (ABAG)/Metropolitan Transportation Commission (MTC)
Southern California Association of Governments (SCAG)

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Abstract

As regions across California finalize their first Sustainable Communities Strategies (SCS), communities are increasingly concerned about how new transit investment and related new development around transit stations will affect the lives of existing residents, particularly low-income communities of color. Surprisingly little is known about the relationship between transit-oriented development and social equity, in part because of the challenge of studying displacement. This research project will fill this gap by examining the relationship between TOD and displacement in California, modeling past patterns of neighborhood change in the vicinity of transit stations and TOD – as well as in the absence of such transit-related investment -- and using the results to develop a predictive model to examine the likely outcomes around TODs. We will then translate this into a tool that will help practitioners quantify the potential magnitude of displacement under different investment scenarios and market conditions, using either regional models or off-model approaches. The project will also identify anti-displacement strategies in use and examine their effectiveness in different neighborhood contexts.

Several innovations distinguish our approach from previous and related work. First, we use a mixture of quantitative and qualitative data and methods to compensate for the inadequacy of existing secondary datasets. For instance, it is possible to examine station areas with census data, but not TOD per se. To compensate, we supplement neighborhood-level census data with parcel-level and address-based data on property transactions, building permits, building characteristics, and affordable housing subsidies, along with field observations. Second, we examine various types of displacement within transit station areas, combining census data with address-level data on demolitions, condo conversions, and loss of subsidized housing. Finally, although there is data on transit investment by city or region, there is no comprehensive, city-based inventory of TOD- or displacement-related policies available. Thus, we use key informant interviews with planners and officials from relevant municipal agencies to develop a typology of policies supporting TODs and mitigating displacement.

This project focuses on the San Francisco Bay Area and Los Angeles County, both strong market regions with transit investment and some TOD, which may create displacement pressures. We will conduct the research in collaboration with SCAG and MTC/ABAG, with whom we have already collaborated in analyses for the Sustainable Communities Strategy. Both agencies are contributing matching funds to the project. SCAG brings an anticipated $250,000 to the project from its grant through the California Strategic Growth Council (from Prop 84 funds) to significantly enhance and transform CalLOTS, a parcel-based database and mapping tool. MTC/ABAG intends to contribute an anticipated $100,000 match through the Bay Area Regional Prosperity Plan (subject to approval by its Project Steering Committee). Our strong working relationships with the regional agencies will help facilitate the development of the assessment methodology, a tool to be incorporated into future SCS scenario modeling.

Overview

As regions across California finalize their first Sustainable Communities Strategies (SCS), communities are increasingly concerned about how new transit investment and related new development around transit stations (henceforth transit-oriented development, or TOD) will affect the lives of existing residents, particularly low-income communities of color.[1] Locals are likely to benefit from improved mobility, neighborhood revitalization, lower transportation costs, and other amenities that spill over from the new development (Cervero et al. 2004). However, more disadvantaged communities may fail to benefit, if the new development does not bring appropriate housing and job opportunities, or if there is gentrification that displaces low-income and/or minority residents (Northeastern University 2010, Chapple 2009).

Surprisingly little is known about the relationship between transit-oriented development and social equity. The advocacy literature has focused largely on the importance of affordable housing near transit stations to reduce transportation cost burdens for low-income households (CTOD 2004; Great Communities Collaborative 2007). A recent UC-Berkeley conference on TOD and social equity (sponsored by UCTC) highlighted several equity issues, including the potential for displacement, the lack of land value increases for transit station areas in low-income neighborhoods, the general focus on housing rather than jobs in TODs, and the air quality issues associated with transit and TOD adjacent to highways (see http://communityinnovation.berkeley.edu/2010-TODsocialequity.html). However, many participants concluded that research was too nascent to draw definitive policy conclusions.

One reason for the relative lack of research on equity issues related to TOD is the challenge of studying displacement. A couple of recent studies have found a strong link between station areas and gentrification; however, due to the lack of appropriate data, they did not explicitly examine displacement (Northeastern University 2010, Chapple 2009).[2] A number of studies (e.g., Vigdor 2002, Freeman & Braconi 2004, Freeman 2005, Newman & Wyly 2006, McKinnish, Walsh & White 2010, Gould Ellen & O'Regan 2011) have examined the relationship between gentrification and displacement, mostly finding that rather than displacing low-income households, gentrification induces them to remain in the neighborhood. However, most of these studies neglect to examine the role of private or public investment in spurring gentrification, examining it as a purely demographic phenomenon, i.e., the influx of higher-income households into low-income neighborhoods. They also generally fail to examine the possibility that rather than rent increases pushing households out, the key displacement mechanism is discrimination preventing minority households from moving in.

[1] We define TOD here broadly to include any form of development, from new construction to rehabilitation of older structures, within a one-half mile radius of a fixed-rail transit station.

[2] We define gentrification as a process of neighborhood change that encompasses economic change in the form of both real estate investment and increases in household income, as well as demographic change in the form of increases in educational attainment.

This research project will examine the relationship between TOD and displacement in California, modeling past patterns of neighborhood change in the vicinity of transit stations and TOD – as well as in the absence of such transit-related investment -- and using the results to develop a predictive model to examine the likely outcomes around TODs. We will then translate this into a tool that will help practitioners quantify the potential magnitude of displacement under different investment scenarios and market conditions, using either regional models or off-model approaches. The project will also identify anti-displacement strategies in use and examine their effectiveness in different neighborhood contexts.

Several innovations distinguish our approach from previous and related work. First, we use a mixture of quantitative and qualitative data and methods to compensate for the inadequacy of existing secondary datasets. For instance, it is possible to examine station areas with census data, but not TOD per se. To compensate, we supplement neighborhood-level census data with parcel-level and address-based data on property transactions, building permits, building characteristics, and affordable housing subsidies, along with field observations. Second, we examine various types of displacement within transit station areas, combining census data with address-level data on demolitions, condo conversions, and loss of subsidized housing. Finally, although there is data on transit investment by city or region (for instance, the Center for Transit-Oriented Development's database), there is no comprehensive, city-based inventory of TOD- or displacement-related policies available. Thus, we use key informant interviews with planners and officials from relevant municipal agencies to develop a typology of policies supporting TODs and mitigating displacement.

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Our team has strong expertise on this topic. Chapple has pioneered research on gentrification and affordable housing in TODs, and recently advised MTC/ABAG on the affordable housing allocation for the Sustainable Communities Strategy. She specializes in translating academic work into decision-making tools for policymakers, and as part of the Great Communities Collaborative has provide technical assistance to over twenty cities in the Bay Area on linking affordable housing and transit. Chatman has published on smart growth strategies relating to travel patterns, the economy, immigration, and mortgage policy. He leads a concurrent ARB research project on the economics of smart growth. Loukaitou-Sideris has collaborated with SCAG, LA Metro, and Caltrans on a series of transit studies including studies of TOD along light rail lines in LA County. Paul Ong has conducted extensive research on spatial inequality related to neighborhoods, housing and transportation, and has advised the Bureau of the Census, California EDD, and other agencies on data design. He has worked with HCD to evaluate effects of TOD on commute distance and with Southern California Association of Non-Profit Housing to develop baseline info around TODs. Waddell researches the impacts of land use regulations and transportation investments on outcomes such as spatial patterns of real estate development and prices, travel behavior, emissions, and resource consumption. He is currently working with MTC to apply his UrbanSim land use model, a software-based simulation system for supporting planning and analysis of urban development, to analyze the impacts of alternative land use and transportation policies for the Bay Area Sustainable Communities Strategy. We will also rely on the excellent doctoral and master's students at UC Berkeley and UCLA for research assistance.

Previous Research

Transit investment and TOD may result in either direct displacement (when new development replaces older housing units) or indirect displacement, which may occur as property values in the area increase due to its new desirability. Indirect displacement may be voluntary, if property owners elect to sell their residences (typically for a profit), or involuntary, occurring in any of three forms: (1) economic, in which housing becomes prohibitively costly (because of high rent or, outside of California, property tax increases); (2) physical, in which the landlord evicts the tenant or induces departure through harassment or persuasion; and (3) exclusionary, in which low-income and/or minority households no longer have the opportunity to move into the neighborhood (Marcuse 1986).

Although there is a rich literature on gentrification, researchers have generally struggled to link it to displacement, and few studies focus on transit investment. The principal barrier to studying the relationship between gentrification and displacement is the lack of appropriate data to determine the extent of mobility and displacement. Without panel data, it is not possible to understand the nature of turnover in a neighborhood (i.e., whether neighborhood household income changes are occurring to existing residents or newcomers). But even when datasets such as the American Housing Survey (the confidential panel version) or the Panel Survey of Income

Dynamics allows tracking of individual households, their responses to questions about reasons for moving are not precise enough to measure displacement (e.g., there is no answer option for "the landlord raised the rent"). Although studies have found that anywhere from three to 23 percent of all movers have been displaced in any given year, the consensus is that it is less than ten percent of all moving households (Freeman & Braconi 2004, Lee & Hodge 1984, Newman & Wyly 2006, Schill & Nathan 1983).

Thus, most academic studies have used mobility rates as a proxy for displacement, examining how both exit and entry rates of low-income households change as the neighborhood's household income increases. Looking at neighborhood departures, all of these studies have found that low-income residents are disproportionately likely to **remain** in the neighborhoods experiencing income gains (Freeman 2005; Gould & O'Regan 2011; McKinnish, Walsh, & White 2010; Vigdor 2002). The evidence on entry rates is more suggestive of displacement (of the exclusionary type): higher-income and/or white households tend to be more likely to take up residence in gentrifying neighborhoods (Freeman 2005; Gould & O'Regan 2011; McKinnish, Walsh, & White 2010). Although this suggests the possibility of racial/ethnic discrimination, research has not yet tackled this issue.

Why is gentrification not associated with displacement in these studies? Gould & O'Regan suggest that existing residents experience income gains which allow them to remain. It is possible that local income increases come from new economic opportunities in the neighborhood (Freeman 2006). Since low-income residents often desire to stay in the gentrifying neighborhood as it gains new amenities, households may develop coping strategies (such as doubling up) which enable them to stay (ibid.). A third possibility is that there is displacement, but since it occurs to such a small share of all movers, it does not affect overall mobility rates. One other issue is how gentrification is measured in almost all of these studies (with the exception of Freeman) – as income change rather than private or public investment. However, an influx of capital into a neighborhood might have much stronger impacts on resident stability than simply higher-income households moving next door.

Transit neighborhoods may be particularly susceptible to gentrification and/or displacement because the proximity of a neighborhood to transit may increase its desirability and leads to price escalation (CTOD 2008). Studies have found that properties in close proximity to a station often experience a value premium effect and enjoy higher values than properties without transit access (Al-Mosaind 1993; Landis et al. 1995; Gruen 1997; Cervero et al. 2002; Cervero 2002; Kilpatrick et al. 2007). However, Landis et al. (1994) found that neighborhoods in close proximity to a new transit station in San Jose saw decreases in property values, while Gatzlaff and Smith (1993) argued that proximity to Miami's metro rail stations did not have any significant effect on housing values. These studies are from different time periods, reflecting different contexts, market cycles and even congestion conditions, so they should be considered more as snapshots than definitive findings.

At the same time, many of these neighborhoods are more diverse than neighborhoods without transit, home to a disproportionate share of lower-income renters and people of color (CTOD, 2007), who may be more vulnerable to rising real estate prices. Examining the location of affordable housing units in 20 US metropolitan areas, Harell et al. (2009) found that a substantial number of affordable apartments are located within close proximity to transit. However, more than two-thirds of the federal subsidies that keep these apartments affordable will expire within the next five years. Of the total number of federally assisted housing units in Los Angeles, 51 percent are within ¼ mile of transit. Most of these units have contracts expiring by 2014 (Harell et al. 2009).

Few studies have systematically examined gentrification in transit neighborhoods and those report varying results: Some transit neighborhoods gentrify; others experience little change, and some attract poorer rather than wealthier residents (Northeastern University 2010). Studying neighborhoods in the Bay Area, Chapple (2009) argued that gentrification is not as common as typically perceived. She found that only 7.3% of Bay Area census tracts gentrified between 1990 and 2000; however, 83% of the gentrifying tracts were located within half a mile from a transit station. Studying 14 cities in which new rail transit was built between 1970 and 2000, Kahn (2007) found that gentrification took place in transit neighborhoods of some cities but not in others. Neighborhoods with new "walk-and-ride" stations were more likely to experience gentrification, while neighborhoods close to park-and-ride stations often experienced poverty increases. In Chicago, Lin (2002) found evidence of gentrification in the form of rising property values closer to transit stations but only during certain years. Examining 42 transit neighborhoods in 12 US metropolitan areas, another study found that the most predominant pattern of change was one in which housing became more expensive, neighborhood residents wealthier, and vehicle ownership more common. Indeed, median household income increased more than in the surrounding metro area in more than three-fifths of the studied neighborhoods; median gross rent increased faster than in their metro areas in nearly three-quarters of the neighborhoods; while home prices increased in 88% of the neighborhoods. The escalation of median housing prices in the transit neighborhoods was greater than the escalation of home prices in the metro area (Northeastern University 2010).

No research to date has examined the gentrification effects of specific transit-oriented developments, rather than transit neighborhoods more broadly. This is perhaps because TODs are more likely to develop in affluent areas than in inner city neighborhoods, and typically build market-rate units (Loukaitou-Sideris and Banerjee 2000, Loukaitou-Sideris 2010, Soursomian 2010). This gap also reflects the difficulty of combining neighborhood- and site-level data for these analyses.

Thus, the addition of a new station may attract more high-priced housing and eventually result in a different socio-demographic profile. However, such change does not take place in all transit-adjacent neighborhoods. More research is necessary to examine which transit

neighborhoods are more likely to experience gentrification and displacement, and what strategies can mitigate negative effects on low-income households. This research should examine carefully (1) the extent of both mobility and stability of low-income residents; (2) the potential for various forms of displacement; and (3) the types of TODs and transit investment associated with different patterns of mobility and displacement.

Scope of Work

Task 1 – Literature review

A literature review will revisit the literature on gentrification and displacement in order to identify the key variables associated with transit-induced neighborhood change as well as the different ways to understand and measure displacement. We will also examine the literature on the relationship between transit investment and property values, with specific reference to the types of fixed-rail transit investment supported in the Sustainable Community Strategies across the state.

Task 2 – Analyze historic patterns of neighborhood change in transit neighborhoods

In this task we will examine how transit investment and market factors have reshaped the socio-economic and physical profiles of the neighborhoods surrounding fixed-rail transit stations, compared to neighborhoods without such transit investment. We plan to examine neighborhood change over a 30-year period, from 1980 to 2010. This task involves seven discrete subtasks: building a census tract-based neighborhood database, building a parcel-level database, developing typologies of TOD/investment and displacement types, modeling neighborhood mobility, modeling displacement, modeling neighborhood change, and verifying findings on the ground ("groundtruthing").

Task 2.A. Develop neighborhood database. We will use the most recent 5-year American Community Survey (ACS) estimates to develop a tract-based time series with data on housing and demographic characteristics of transit and non-transit neighborhoods (areas within a one-half mile radius of a fixed-rail transit station). We will use the Neighborhood Change Database to reconcile tract boundaries from 1980 to 2010. If large margins of error (common in the ACS) render tract-level data unusable, we will aggregate data based on a typology of station areas (e.g., based on neighborhood income or TOD type).

Task 2.B. Build parcel-level database. We will develop a longitudinal panel of the built environment in transit neighborhoods based upon county assessor's data on sales, HUD and HCD data on subsidized housing units, city data on building permits, demolitions, code violations, and condo conversions, and other data as available. To the extent possible, we will also link geocoded housing discrimination complaints filed with the California Department of Fair Employment and Housing and with HUD. The database will also include address-based data on local amenities and

jobs where available. Although our target is to build a comprehensive database for our two study regions, we may only succeed in completing the database for sub-areas with excellent data availability (for instance, San Francisco County). We will focus efforts on building parcel-level databases for priority development areas outside of the core cities, where the MPOs plan to target future investment under the Sustainable Communities Strategies.

This database will help us develop proxies for different types of displacement, as in the following:

Displacement type	***Sales***	***Permits -new***	***Permits -rehab***	***Permits -demo***	***Condo conversions***	***Code violations***	***Rent-own conversions***	***Subsidized housing***
Economic	*x*	*x*	*x*					*x*
Physical	*x*			*x*	*x*	*X*	*x*	*x*
Exclusionary	*x*	*x*		*x*	*x*		*x*	*x*

Task 2.C. Develop typologies of TOD/investment and displacement. In this subtask we use cluster analysis to develop two typologies. The first typology will classify station areas by the type of new development attracted (from large-scale new construction to rehabilitation of single-family homes) and transit investment. Depending on data availability, this latter data would include the different phases of investment (planning vs. implementation), the type of investment (e.g., transit vs. joint development), and the amount. The second typology will classify displacement, most likely based on neighborhood entry and exit patterns, by racial/ethnic and income groups.

Task 2.D. Model neighborhood mobility. Here we build a model that analyzes mobility for station areas controlling for income and housing price appreciation levels. The dependent variable will come from one of the ACS mobility variables (year householder moved into unit or geographical mobility (same house, same place) in the past year). Given that this variable only measures in-moves, this mobility analysis will focus on exclusionary displacement. Using the ACS PUMS data, we will also estimate in-moves by racial/ethnic and income group at the PUMA level, creating a factor to calibrate ACS tract-level data. The analysis will be at the aggregate level (tract/neighborhood); however, we will also investigate the feasibility of integrating a household-level mobility analysis using the California Household Travel Survey, which has data on when households arrived in the neighborhood. From this model we expect to understand how in-moves vary by neighborhoods with different levels and types of transit investment.

Independent variables analyzed are likely to include the following:

- Life cycle (age, gender, marital/family status)
- Race/ethnicity
- Household income
- Household rent burden
- Tenure
- Market conditions (vacancy rates, price increases, housing conditions)
- City or subregion

- Rent regulations
- Level and type of amenities, such as parks, grocery stores, services, etc.
- Job growth
- TOD type (from Task 2C)
- Parcel-based variables on sales, permit activity, demolitions, conversions, and subsidized housing

Task 2E. Model neighborhood displacement. In this subtask we develop a multinomial logit model to analyze the displacement types developed in Task 2C. These models will include most of the independent variables from the models in Task 2D. Given data availability constraints, this model would likely focus only on the cities and counties where we have succeeded in building the parcel-based database.

Task 2F. Model neighborhood change. Given the shortcomings of the data available to analyze mobility and displacement, a third set of analyses would look at changes in neighborhood composition by income classes, racial/ethnic groups, and rent burden. This analysis of neighborhood change would help provide context for the specific findings on mobility and displacement (Tasks 2D and 2E).

Task 2G. Groundtruth results. Given the challenges in modeling displacement, it will be important to verify the results in the field, based on observation and interviews. In this task we will select three neighborhoods in each region (San Francisco Bay Area and Los Angeles County) determined by the models to have experienced disproportionate displacement rates. Interviews of key informants at community-based organizations and neighborhood councils, and city planning and building departments, as well as observations in the neighborhoods, will help establish whether displacement has indeed occurred. The types of data that might be obtained through this type of research include, among others, eviction, rent increases, rent burden increases, landlord harassment, local arson, and changes in city services.

Task 3 – Develop tools for analyzing potential displacement impacts in SCS

We will explore parallel strategies for addressing tool development in the Northern and Southern California contexts, given investments already made in the UrbanSim and PECAS modeling frameworks being used within the State of California.

In the Bay Area we will build on the UrbanSim model application developed for the MTC/ABAG's Sustainable Communities Strategies project, and develop a series of enhancements to create a reusable tool for analyzing potential displacement impacts in SCS, and to assess the differential effects of alternative policy interventions. Due to the opportunity to build on a substantial existing investment by the MTC in this project, and two years of effort to build the database and models for the Bay Area, we will develop this prototype tool and apply it initially within the Bay Area. It will be designed in a way that can be replicated in a straightforward way in other metropolitan regions within California and elsewhere. The UrbanSim application runs at a parcel level on the over 2 million parcels in the 9-County Bay Area, and includes demand-side models that simulate households move and location choices, as well as the real estate

development choices of developers, subject to local zoning regulations and financial policies such as development impact fees or subsidies.

In the Southern California Association of Governments region we will build on the PECAS model application. The SCAG PECAS model has been developed to simulate the spatial economic system, with a detailed parcel level representation of land and buildings, and had been applied to SCAG 2012 RTP/SCS process. The model represents residential rent and preferences by combining regional accessibility and interaction with neighborhood attributes, parcel level attributes and parcel proximity measures. Some of the detailed rent and neighborhood impact factors have been established using limited estimations; Task 2 of this project will use the SCAG data to build on these existing estimations, with a specific focus on social impacts and displacement. In Task 3, these estimations will enrich the SCAG PECAS model and add data and confidence to the prototype tool developed for application elsewhere in California.

Task 3A. Refine the UrbanSim household mobility model to address displacement directly. The current implementation of the microsimulation household mobility probability in UrbanSim uses a rate-based Monte Carlo simulation to generate a move probability for each household as a function of the household income, and the age of the head of household. These rates are derived from Current Population Survey data. This task would augment this rate-based model to more realistically reflect moves that are triggered by rent increases and associated cost burdens, as well as from condo conversions and other changes to the housing stock associated with redevelopment associated with TOS and transit investments. We will analyze the rent burden profiles of renting households by income and other characteristics such as presence of children, to identify a probability distribution of moving that is consistent with available data. We will also incorporate a household location choice model if developed within Task 2, to better reflect factors influencing location choices between locations inside and outside of TOD and transit-proximate locations.

Task 3B Inventory anti-displacement policies within Bay Area. At least five cities within the Bay Area have rent control policies. Others may have a variety of other anti-displacement policies. The most influential of these will be inventoried, and encoded in UrbanSim to reflect the intent of these policies on modifying the results of changes in market conditions on the rent burdens imposed on renters.

Task 3C. Incorporate housing affordability into real estate development models. In both of the models, return on investment for developers ("Pro Forma") guides the selection from amongst alternative development possibilities on each parcel of land being analyzed. These models provide a strong analytical foundation to assess the costs to developers of imposing affordable housing requirements. This task seeks to enhance the development models in both UrbanSim and PECAS to more explicitly introduce affordable housing requirements as a policy input, along with various anti-displacement policies, in order to be able to more effectively quantify the changes in profitability arising from such policies. An important aspect of this approach is that it enables the estimation of the size of subsidy required to offset the added cost to developers from such

inclusionary policies, in order to make the project 'pencil out', or become sufficiently profitable to have a reasonable prospect of obtaining financing and becoming a viable development.

Task 3D. Calibrate UrbanSim and PECAS based on observed data. Once the models described above are updated, a final step of calibration is proposed to ensure that the predictions from the models when applied in combination, produce results that are consistent with our best available observational data, and the results of the models of neighborhood change and displacement in Task 2. The current PECAS model in the SCAG region includes a representation of displacement, with household's preferences for housing types and sensitivity to housing prices related to income and household structure, and housing prices dependent on zonal level accessibility and supply/demand relationships and parcel level proximity measures. These interrelated aspects of the PECAS model will be compared to the statistical estimations in Task 2, and the PECAS model will be adjusted in response to the findings from Task 2. Similar adjustments will be made to the UrbanSim model. A detailed plan for this model assessment component will be developed once Task 2 is nearing completion and there is sufficient information to determine what data are available for this effort.

Task 3E. Test tool in simulations of alternative policy strategies. Once the model enhancements in Tasks 3A-D are completed, we propose to develop two to three alternative scenarios, involving different TOD and transit investment packages along with suitable zoning, and affordable housing requirements, in order to assess the impacts of these alternatives on the nature and price of housing that would likely result from these scenarios, given the market characteristics of each location. The PECAS model has an integrated composite utility measure that takes into account the full effect of location and transportation choices on all household segments. These will be investigated by segment and by location to provide numerical monetized measures of the social impacts (including displacement) of policy in a single future year.

Task 3F. Develop an off-model displacement assessment methodology. We will identify neighborhood indicators that significantly predict types of neighborhood change associated with displacement in models developed in Tasks 2D-F, as related to different levels and types of transit investment. In order to facilitate assessment of displacement risk by city or regional agency staff in a simple spreadsheet analysis, we will construct these indicators from readily available, tract-level ACS data. We will calibrate these indicators to the extent possible with the findings of the UrbanSim and PECAS models, in particular their pro forma models which indicate market pressure. Working closely with SCAG and MTC/ABAG staff, we will test the methodology and suggest ways to incorporate it into SCS planning processes. In the Bay Area, this model will target Communities of Concern and contribute to the Regional Early Warning System that is part of the Bay Area Regional Prosperity Plan.

Task 4. Identify strategies to minimize displacement from transit investment and TOD.

This task will begin with a literature review of policy tools, regulatory interventions, capital improvements and implementation strategies (e.g. station master plans, regional housing needs assessments, inclusionary housing, economic development incentives, zoning strategies, etc.)

necessary to deliver more equitable patterns of transit-complementary development in the different types of station areas.

Based upon the literature review, we will identify strategies which have succeeded in minimizing displacement despite pressures from transit investment and TOD. Next, the analysis from Task 2 will help identify neighborhood cases where stability has been higher than expected. After verifying the results in the field, we will select six cases (three in each region), likely varying case selection according to type of transit investment or TOD. We will carefully select cases which have policies in place already specifically to minimize displacement or promote stability.

Cities that have been successful at fostering inclusive TOD are likely to be utilizing not just innovative policy tools but also more informal activities to leverage development. Interviews will help identify the array of formal strategies, political coalitions, and negotiations that come together to minimize displacement in certain places.

Task 5: Produce final report

We will produce a two-part final report. The first part will explain our research methods and findings, with a short executive summary (to be printed and distributed widely). The second part will consist of a short and useful guidance document, designed to be user-friendly for two audiences: (1) MPO and COG staff who seek to measure potential displacement impacts under different Sustainable Communities Strategy scenarios; and (2) local jurisdictions that implement land use policies and regulations. We will seek feedback from our interviewees on its usefulness, and will make changes to reflect their feedback.

A work schedule is on the next page, followed by a budget and two-page CVs for the principals.

Social Equity in Regional Transportation Planning (UCB/UCLA/SCAG/MTC/ABAG)
Work Schedule

Task	Sub task	Description	7-13	8-13	9-13	10-13	11-13	12-13	1-14	2-14	3-14	4-14	5-14	6-14	7-14	8-14	9-14	10-14	11-14	12-14	1-15	2-15	3-15	4-15	5-15	6-15
1		Literature review																								
2	A	Develop neighborhood database																								
2	B	Build parcel-level database																								
2	C	Develop typologies of TOD/investment and displacement																								
2	D	Model neighborhood mobility																								
2	E	Model neighborhod displacement																								
2	F	Model neighborhood change																								
2	G	Groundtruth results																								
2	H	Develop relationships for PECAS																								
3	A	Refine UrbanSim																								
3	B	Inventory anti-displacement policies																								
3	C	Incorporate housing affordability into pro forma models																								
3	D	Calibrate UrbanSim and PECAS																								
3	E	Test tool in simulations																								
3	F	Develop off-model assessment methodology																								
4		Identifiy strategies to minimize displacement																								
5		Produce draft final report																								
5		Produce final report																								

Budget

Task	Labor	Employee Fringe Benefits	Subs, Consultants	Equipment	Travel Subsist	EDP	Copy Print	Mail Phone Fax	Materials and Supplies	Analysis	Misc.	Overhead	Total
1	$ 11,202	$ 6,079	$ -	$ -	$ 350	$-	$ -	$ -	$ 250	$ -	$ -	$ 1,788	$ 19,668
2	$ 112,016	$ 60,788	$ 10,000	$ -	$ 3,500	$-	$ -	$ -	$ 2,500		$ 40,000	$ 22,880	$251,684
3	$ 88,957	$ 44,913	$ 40,000	$ -	$ 2,000	$-	$ -	$ -	$ 1,000	$ -	$ -	$ 17,687	$194,557
4	$ 67,209	$ 36,473	$ -	$ -	$ 2,100	$-	$ -	$ -	$ 1,500	$ -	$ -	$ 9,194	$116,477
5	$ 33,605	$ 18,236	$ -	$ -	$ 1,050	$-	$ 4,000	$ -	$ 750	$ -	$ -	$ 5,764	$ 63,405
	$ 312,989	$166,489	$ 50,000	$ -	$ 9,000	$-	$ 4,000	$ -	$ 6,000	$ -	$ 40,000	$ 57,314	$645,792

Curriculum Vitae
Karen Chapple

ACADEMIC POSITIONS

Associate Professor, City and Regional Planning, July 2007-present

Associate Director, Institute for Urban & Regional Development, July 2010-present

Visiting Scholar, Urban Institute, January 2013-present

Acting Director, Institute for Research on Labor & Employment, Augus 2010-June 2011.

Faculty Director, Center for Community Innovation

University of California, Berkeley: July 2006 – present

Theodore Bo Lee and Doris Shoong Lee Chair of Environmental Design, July 2006-June 2009.

Assistant Professor, City and Regional Planning, July 2001-June 2007

University of California, Berkeley

Visiting Assistant Professor, City and Regional Planning

University of Pennsylvania: July 2005-June 2006

Assistant Professor of Planning and Public Affairs

Humphrey Institute of Public Affairs, University of Minnesota

January 2000-June 2001.

EDUCATION

Ph.D., City & Regional Planning, University of California—Berkeley, 2000.

M.S.C.R.P., Pratt Institute, 1994.

B.A. (*Phi Beta Kappa, Magna Cum Laude*), Urban Studies, Columbia University, 1989.

SELECTED GRANTS

U.S. Department of Housing & Urban Development. "Investing in Institutions, Investing in Community: An Examination of the Eastern Bayview/Alice Griffith Comprehensive Transformation Plan." Chapple PI with co-PIs J.Corburn and M. Hutson, $131,000, 2012-14.

California Air Resources Board. "The Economic Costs and Benefits of Smart Growth Policies." Chatman PI with co-PIs Chapple and R. Crane, $330,000, 2012-14.

Annie E. Casey Foundation. "Big Ideas for Job Creation in a Jobless Recovery." Chapple PI, $100,000, 2011-13.

University of California Transportation Center. "TOD, infill housing, and car share: A feasibility study." Chapple PI, $59,000, 2010-2011.

San Francisco Foundation. "Technical Assistance for the Great Communities Collaborative Supporting Mixed-Income TODs in the Bay Area." Chapple PI, $250,000, 2006-2013.

California Public Utilities Commission, "California Needs Assessment of Workforce Issues in the Green Economy." Chapple PI with co-PI M. Reich, $1,126,000, 2010.

Economic Development Administration, "Innovating the Green Economy in California Regions." Chapple PI & co-PI Hutson, $206,000, 2008-09.

Association for Bay Area Governments, "Development without Displacement." Chapple PI, $30,000, 2008-2009.

University of California Transportation Center, "Why Build Affordable Transit-Oriented Development? A Toolkit for Educating Residents about TODs and

Housing in the Bay Area." Chapple PI, $42,000, 2008-2009.

MacArthur Foundation, "Building Resilient Regions," M.Weir (PI), with M. Pastor, K. Foster, R. Pendall, K.Chapple, N. Hill, A. Fung, John Mollenkopf, and T. Swanstrom, $3,200,000, 2006-2010.

Center for Housing Policy, "Making Do: How Working Families Trade-off Housing and Transportation Expenditures and the Implications of that Tradeoff for Families and Communities." M.Wachs PI with co-PIs Chapple, Cervero, Landis, and Blumenberg, $200,000, 2005-2006.

Brookings Institution Census 2000 Project Grant, "The Implications of Job Sprawl for Job Accessibility." Chapple PI, $6,200, 2002-2003.

SELECTED REFEREED ARTICLES

Chapple, K. 2013, forthcoming. The highest and best use? Urban industrial land and job creation. *Economic Development Quarterly*.

Chapple, K. and E. Goetz. 2011. Spatial justice through regionalism?:The inside game, the outside game, and the quest for the spatial fix in the U.S. *Community Development: Journal of the Community Development Society*.

Chapple, K., S. Jackson, and A. Martin. 2011. Concentrating Creativity: The Planning of Formal and Informal Arts Distrcts. *City, Culture and Society* 1,4: 225-234.

Chapple, K., C. Kroll, T. W. Lester, and S. Montero, 2011. Innovation in the Green Economy: An Extension of the Regional Innovation System Model? *Economic Development Quarterly* 25,1:5-25.

Chapple, Karen and T. William Lester. 2010. The Resilient Regional Labour Market: The U.S. Case. *Cambridge Journal of Regions, Economy & Society* (Jan).

Chapple, Karen and Carrie Makarewicz. 2010. Is Infill Bad for Business in California? *Access* 34.

Chapple, Karen and Shannon Jackson. 2010. Arts, neighborhoods, and social practices: Towards an integrated epistemology of community arts. *Journal of Planning Education and Research* (June).

Goetz, E. & Chapple, K. 2010. "You Gotta Move: Advancing the Debate on the Record of Dispersal." *Housing Policy Debate* 20(2).

Chapple, K. 2006. "Overcoming Mismatch: Beyond Dispersal, Mobility, and Development Strategies." *Journal of the American Planning Association* 72(3): 322-336.

Chapple, K., Thomas, J.V., Belzer, D., & Autler, G. 2004. "Fueling the Fire: Information Technology & Housing Price Appreciation in the SF Bay Area and the Twin Cities." *Housing Policy Debate* 15(2):347-83.

SELECTED REPORTS AND OTHER PUBLICATIONS

Chapple, K., J.Wegmann, A. Nemirow, & C. Dentel-Post. 2011. *Yes in My Backyard: Mobilizing the Market for Secondary Units*. IURD Working Paper.

Machell, Erin, Troy Reinhalter, and Karen Chapple. 2009. *Building Support for Transit-Oriented Development: Do Community-Engagement Toolkits Work?* Berkeley, CA: Institute of Urban and Regional Development.

Chapple, Karen. 2009. *Mapping Susceptibility to Gentrification: The Early Warning Toolkit*. Berkeley: Institute of Urban and Regional Development.

Education

Ph.D., Urban Planning, 2005, University of California, Los Angeles

Master in Public Policy, 1997 (Outstanding Thesis Award), Harvard University

B.A., Individual Studies: The English Language, 1991 (High Honors), University of California, Berkeley

Academic Appointments

Assistant Professor, 2008–present, Department of City and Regional Planning, College of Environmental Design, University of California, Berkeley

Assistant Professor, 2005–2009, Urban Planning and Policy Development Program, Edward J. Bloustein School of Planning and Public Policy, Rutgers University

Peer-Reviewed Journal Articles

Chatman, Daniel G., Nicholas Tulach and Kyeoungsu Kim. 2012. Evaluating the economic impacts of light rail by measuring home appreciation: A first look at New Jersey's River Line. *Urban Studies* 49 (3): 467-487. DOI: 10.1177/0042098011404933.

Chatman, Daniel G. and Robert B. Noland. 2011. Do public transport improvements increase agglomeration economies? A review of literature and an agenda for research. *Transport Reviews* 31 (6): 725-742. DOI: 10.1080/01441647.2011.58790.

Chatman, Daniel G. and Niels Voorhoeve. 2010. The transportation credit mortage: A post-mortem. *Housing Policy Debate* 20 (3): 355–382.

Chatman, Daniel G. and Nicholas Klein. 2009. Immigrants and travel demand in the US: Implications for transportation policy and future research. *Public Works Management and Policy* 13 (4): 312–327.

Chatman, Daniel G. 2009. Residential self-selection and non-work travel: Evidence using new data and methods. *Environment and Planning A* 41 (5): 1072–1089.

———. 2008. Deconstructing development density: Quality, quantity and price effects on household travel. *Transportation Research A* 42 (7): 1009–1031.

Boarnet, Marlon, Randall Crane, Daniel G. Chatman, & Michael Manville. 2005. Emerging planning challenges in retail: The case of Wal-Mart. *Journal of the American Planning Association* 71(4): 433-449.

Chatman, Daniel G. 2003. How workplace land use affects personal commercial travel and commute mode choice. *Transportation Research Record* 1831: 193-201.

Crane, Randall and Daniel G. Chatman. 2003. Traffic and sprawl: Evidence from US commuting, 1985 to 1997. *Planning and Markets*, 6 (1): 14-22.

Book Chapters

Chatman, Daniel G. and Nicholas Klein. 2011. Immigrants and automobility in the US: The role of spatial and occupational factors. In *Auto motives: Understanding car use*, edited by K. Lucas, E. Blumenberg and R. Weinberger. Bingley, UK: Emerald Group Publishing Ltd.

Crane, Randall and Daniel G. Chatman. 2004. Traffic and sprawl: Evidence from US commuting, 1985 to 1997. In *Urban sprawl in Western Europe and the United States*, edited by C. Bae and H. Richardson. Aldershot, Hampshire, UK: Ashgate.

Reports (selected)

Chatman, Daniel G., Andrea Broaddus, Matt Klein, and Cheryl Young. 2012. *Are movers irrational? A pilot study of the happiness, commuting, housing, and social lives of undergraduates before and after a move*. Working paper, University of California Transportation Center, 56 pp. August 16.

Chatman, Daniel G., Robert B. Noland, et al. 2012. *Methodology for determining the economic development impacts of transit projects*. Project H-39, Transit Cooperative Research Program, Transportation Research Board, National Academies. 372 pp (2 vols). March 2.

Chatman, Daniel G., Nicholas Klein, and Stephanie DiPetrillo. 2010. *The impact of demographic changes on transit patterns in New Jersey*. Trenton, NJ: New Jersey Department of Transportation, 139 pp + appendices.

Chatman, Daniel G., Stephanie DiPetrillo, et al. 2010. *Economic development benefits of new transit service: RiverLINE*. Trenton, NJ: New Jersey Department of Transportation, 115 pp + appendices.

Chatman, Daniel G. and Stephanie DiPetrillo. 2010. *Eliminating barriers to transit-oriented development*. Trenton, NJ: New Jersey Department of Transportation, 75 pp.

Chatman, Daniel G. 2006. *Transit-oriented development and household travel: A study of California cities*. Sacramento: California Department of Transportation.

Research Grants (selected)

2012–14 Principal Investigator. *The Economic Costs and Benefits of Smart Growth Policies*. Calfornia Air Resources Board. $330,000.

2010–13 Principal Investigator. *Psychological Economics, Travel Behavior, Residential Location Choice, and Sustainability: Possible New Rationales for Policy Intervention.* University of California Transportation Center. $158,796.

2011–12 Principal Investigator. *Evaluating the Effectiveness of Congestion-Priced Parking in California*. Multicampus Research Programs and Initiatives, Institute of Transportation Studies. $89,000.

2010–12 Principal Investigator. *An Exploration of Fixed-Guideway Transit Criteria Revisited*. Transit Cooperative Research Program, National Academy of Sciences. $500,000

2008–11 Principal Investigator. *Methodology for Determining the Economic Development Impacts of Transit Investments*. Transit Cooperative Research Program, National Academy of Sciences. $500,000

2008-10 Principal Investigator. *The Impact of Demographic Changes and Immigration on Transit Patterns in New Jersey*. New Jersey Department of Transportation. $286,000.

2007-09 Principal Investigator. *Economic Benefits of New Transit Service: RiverLINE*. The New Jersey Department of Transportation and the University Transportation Research Center, Region II. $317,000.

2007-09 Principal Investigator. *Eliminating Barriers to Transit-Oriented Development*. The New Jersey Department of Transportation. $159,000.

2002-06 Principal Investigator. *Transit-Oriented Developments and Travel in California.* California Department of Transportation. $355,000.

ANASTASIA LOUKAITOU-SIDERIS

Professor and Associate Dean UCLA, Luskin School of Public Affairs

EDUCATION: Ph.D. Urban & Regional Planning, University of Southern California

SELECTED PUBLICATIONS (Last 5 years)

Loukaitou-Sideris, A., Higgins, H., Cuff, D, and Oprea, D. (2013). "Up in the Air: Urban Design for Light Rail Station in Highway Medians" *Journal of Urban Design,* forthcoming.

Loukaitou-Sideris, A. (2012). "Addressing the Challenges of Urban Landscapes: Normative Goals for Urban Design," *Journal of Urban Design,* 17(4): 467-484.

Linovski, O. and Loukaitou-Sideris, A. (2012). "Evolution of Urban Design Plans in the United States and Canada: What Do the Plans Tell Us about Urban Design Practice?" *Journal of Planning Education and Research.* doi: 10.1177/0739456X12454174

Loukaitou-Sideris, A., Cuff, D., Higgins, H., and Linovski, O. (2012). "Impact of High Speed Rail Stations on Local Development—A Delphi Survey," *Built Environment*, 38(1): 32-51.

Loukaitou-Sideris, A and Soureli, K. (2012). "Cultural Tourism as an Economic Development Strategy in Ethnic Communities" *Economic Development Quarterly,* (26): 50 - 72.

Loukaitou-Sideris, A., Brozen, M., Callahan, C. (2012). *Reclaiming the Right-of-Way: A Toolkit for Implementing and Designing Parklets.* Los Angeles: UCLA Lewis Center.

Loukaitou-Sideris, A., Cuff, D, Higgins, T., Wei, W. (2012). *Planning for Complementarity: An Examination of the Role and Opportunities of First-Tier and Second-Tier Cities along the HSR Network in California.* San Jose, CA: Mineta Transportation Institute Report 11-17.

Banerjee, T. and Loukaitou-Sideris, A. (Eds.) (2011). *Companion to Urban Design.* London: Routledge.

Ehrenfeucht, R. and Loukaitou-Sideris, A. (2010). "Planning Urban Sidewalks: Infrastructure, Daily Life, and Destinations," *Journal of Urban Design*, 15(4): 459-471.

Loukaitou-Sideris, A. and Sideris, A. (2010). "What Brings Children to the Park? Analysis and Measurement of the Variables Affecting Children's Use and Physical Activity," *JAPA*, 76(1): 89-107.

Loukaitou-Sideris, A. (2010). "A New-Found Popularity for TODs? Lessons from Southern California," *Journal of Urban Design*, 15(1): 49-68.

Loukaitou-Sideris, A. and Ehrenfeucht, R. (2009). *Sidewalks: Conflict and Negotiation over Public Space*, MIT Press.

Loukaitou-Sideris, A. and Fink, C. (2009). "Addressing Women's Fear of Victimization in Transportation Settings: A Survey of US Transit Agencies," *Urban Affairs Review*, 44: 554-587.

Loukaitou-Sideris, A. with Bornstein, A., Fink, C., Samuels, L. (2008). *How to Ease Women's Fear of Transportation Environments: Case Studies and Best Practices.* San Jose, CA: MTI: Report 08-08.

Cherry, C., Loukaitou-Sideris, A., and Wachs, M. (2008). "Subway Station Design and Management: Lessons from Case Studies of Contemporary Terrorist Incidents," *JAPR* 25(1): 76-90.

Loukaitou-Sideris, A., Liggett, R., and Sung, H.G. (2007). "Death on the Crosswalk: A Study of Pedestrian – Automobile Collisions in Los Angeles," *JPER* 26(3): 338-51.

Grodach, C. and Loukaitou-Sideris, A. (2007). "Cultural Development Strategies and Urban Revitalization: Survey of U.S. Cities" *International Journal of Cultural Policy*,13(4):349-70

Loukaitou-Sideris, A. and Eck, J. (2007). "Crime Prevention and Active Living," American *Journal of Health Promotion*, 21(4): 380-389.

Ehrenfeucht, R. and Loukaitou-Sideris, A. (2007). "Walking on the Pavement: A Pre-Automobile History of Sidewalks, Los Angeles, CA 1880-1920. *Journal of Historical Geography*, 33(1): 104-124.

FUNDED RESEARCH (Last 5 years)

Andrew W. Mellon Foundation for "The Urban Turn: Collective Life in Megacities of the Pacific Rim." (with D. Cuff, D. Favro, and T. Presner). (2013-16)
Sound Body Sound Mind Foundation for "The Impact of Physical Education Class Structure and Environment on Students' Competence, Confidence, and Fitness Levels: (2012-13).
UCTC for "A comparative Analysis of Pedestrian and Bicyclist Safety around University Campuses (2012-13)
Gilbert Foundation for "Parklets for Los Angeles," (2011-12)
UCTC Sustainable Transportation program for "Noise and Air Pollution Exposures for Transit Riders on Freeway and Non-Freeway Light Rail Station Platforms (with Houston) (2011-12)
Caltrans for "Planning for HSR in Southern California Communities" (2010-12).
Mineta Transportation Institute for "Planning for Complementarity: An Examination of the Role and Opportunities of First-tier and Second-tier Cities along the HSR Network in California," (2010-11).
UCTC for "Up in the Air: New Urban Designs for LRT Stations in Highway Medians" (2010-11).
IRLE, "The Informal City: The Rise of Unregulated Work and Living in America," (with Mukhija) (2010-11)
Haynes Foundation "Tracks of Change: Guiding Development around Southern California High-Speed Rail Stations," (with D. Cuff) (2009-10).
Mineta Transportation Institute for "How to Ease Women's Fear of Transportation Environments: Case Studies of Best Practices" (2008-09).
Haynes Foundation for "What Brings Children to the Park." (2008-09).
UCTC for "Design and Policy Responses to Women's Fear of Victimization in Transportation Settings" (2006-7).

SELECTED PROFESSIONAL AND CONSULTING EXPERIENCE

Project for Public Spaces; Ontario Council for Graduate Studies, Canada; Transportation Research Board; Transportation Management and Design, Inc.; Southern California Association of Governments; Los Angeles Neighborhood Initiative ' South Bay Cities Council of Governments; Tehama County; Greek Secretariat of Research and Technology; Greek Ministry of National Education and Religious Affairs; Portuguese Foundation of Science and Technology.

PAUL M. ONG, UCLA Professor

Public Affairs, Asian American Studies, and Institute of the Environment and Sustainability

EDUCATION: Ph.D. University of California, Berkeley (Economics, 1983)

SELECTIVE COMMUNITY/PROFESSIONAL SERVICE:

Race and Ethnic Advisory Committee, U.S. Bureau of the Census, 1995-2002.

Member, Census Data for Transportation Planning, TRB and NRC, 2003-2005.

Advisory Committees, South Coast Air Quality Management District, 2005-11

GAO Advisory Panel on HUD CDBG Allocation Formula, 2006-07

Consultant on Fair Housing, Ca. Housing and Community Development, 20011-12

SELECTIVE PUBLICATIONS:

Paul M. Ong and J. Eugene Grigsby III, "Race and Life-Cycle Effects on Home Ownership in Los Angeles, 1970 to 1980," Urban Affairs Quarterly, 1988, 23(4):601-615.

Research Group on the Los Angeles Economy (Paul Ong, PI), The Widening Divide: Income Inequality and Poverty in Los Angeles, UCLA GSAUP, 1989, 256 pages.

Brian Taylor and Paul Ong, "Spatial Mismatch or Automobile Mismatch? An Examination of Race, Residence, and Commuting in the U.S. Metropolitan Areas," Urban Studies, 32(9):1453-1474, November 1995.

Paul Ong, "Work and Car Ownership Among Welfare Recipients," Social Work Research, 20(4):255-262, December 1996.

Paul Ong and Evelyn Blumenberg, "Job Access, Commute, and Travel Burden Among Welfare Recipients," Urban Studies, 35(1):77-93, 1998.

Evelyn Blumenberg and Paul Ong, "Job Accessibility and Welfare Usage: Evidence from Los Angeles," Journal of Policy Analysis & Management, 17(4):639-657, 1998.

Paul Ong, "Subsidized Housing and Work Among Welfare Recipients," Housing Policy Debate, 9(4):775-794, 1998.

Paul M. Ong, "The Widening Divide Revised: Inequality in the Labor Market," The State of the Region 2000: The Region at the Dawn of the 21st Century, Los Angeles, CA: Southern California Association of Governments, May, 2000, pp. 37-43.

Paul Ong and Elena Soohoo Ong, "Undercounting Commuters," Report Series, Report No. 07, Washington, D.C.: U.S. Census Monitoring Board, Presidential Members, February 2001.

Evelyn Blumenberg and Paul Ong, "Cars, Buses and Jobs: Welfare Recipients and Employment Access in Los Angeles, TRB Record, no. 1756, 2001, pp. 22-31.

Paul M. Ong, "Car Ownership and Welfare-to-Work," Journal of Policy Analysis and Management, Vol. 21, No. 2, Spring 2002, pp 255-268.

Paul Ong and Doug Houston, "Transit, Employment, and Women on Welfare," Urban Geography, 23(4):344-364, 2002.

Daniel Baldwin Hess and Paul Ong, “Traditional Neighborhoods and Auto Ownership,” Journal of the Transportation Research Board Record, no. 1805, 2002, pp. 35-44.

Paul Ong, James Spencer, Michela Zonta, Todd Nelson, Douglas Miller and Julia Heintz-Mackoff, “The Economic Cycle and Los Angeles Neighborhoods; 1987-2001,” Report to the John Randolph Haynes and Dora Haynes Foundation. Los Angeles: UCLA Ralph and Goldy Lewis Center for Regional Policy Studies, March 2003, 110 pages.

James Spencer and Paul Ong. “An Analysis of the Los Angeles Revitalization Zone,” Economic Development Quarterly, Vol. 18 No. 4, November 2004, pp. 368-383.

Douglas Houston, June Wu, Paul Ong and Arthur M. Winer, “Structural Disparities of Urban Traffic in Southern California,” Journal of Urban Affairs, 26(5):565-592, 2004.

Paul Ong and Douglas Miller, “Spatial and Transportation Mismatch in Los Angeles,” Journal of Planning Education and Research, 25(1):43-65, 2004.

Shannon McConville and Paul Ong, "The Trajectory of Poor Neighborhoods in Southern California, 1970-2000," in Alan Berube, Bruce Katz, and Robert E. Lang, editors, Redefining Urban and Suburban American, Brookings Institution Press, 2005, pages 173-194.

Paul Ong and Anastasia Loukiatou-Sideris, editors, Jobs and Economic Development in Minority Communities, Temple University Press, 2006.

Paul Ong and Michael Stoll, “Redlining or Risk: A Spatial Analysis of Auto Insurance Rates in Los Angeles" Journal of Policy Analysis and Management, 26(4):811-829, Autumn 2007.

Paul Ong and Matthew R. Graham, “Social, Economic, Spatial, and Commuting Patterns of Dual Jobholders, U.S. Census Bureau, Longitudinal Employer–Household Dynamics Technical Paper No., TP-2007-01, April 2007, 24 pages.

Matthew R. Graham and Paul Ong, “Social, Economic, Spatial, and Commuting Patterns of Informal Jobholders, U.S. Census Bureau, Longitudinal Employer–Household Dynamics Technical Paper No., TP-2007-02, April 2007, 24 pages.

Paul Ong and Matthew R. Graham, “Social, Economic, Spatial, and Commuting Patterns of Self-Employed Jobholders, U.S. Census Bureau, Longitudinal Employer–Household Dynamics Technical Paper No., TP-2007-03, April 2007, 31 pages.

Paul Ong and Deirdre Pfeiffer, “Spatial Variation In Foreclosures In Los Angeles,” Ziman Center Working Papers, number 2008-22, 2008.

Paul Ong, et al., Analysis of Impediments to Fair Housing, California Department of Housing and Community Development, 2012, 703 pages.

Paul Waddell

Education

- B.S., Marine Sciences, Texas A&M University, 1979.
- M.S., Human Ecology, University of Texas School of Public Health at Houston 1981.
- Ph.D., Political Economy, University of Texas at Dallas, 1989.

Appointments

- Department of City and Regional Planning, University of California Berkeley, 2011–present. Professor and Chair.
- Department of City and Regional Planning, University of California Berkeley, 2009–present. Professor and Vice Chair.
- Daniel J. Evans School of Public Affairs and Department of Urban Design and Planning, University of Washington, Seattle, 1997 – 2009. Professor (from 2004).
- Director, Center for Urban Simulation and Policy Analysis, University of Washington, Seattle, 2000–2009.
- Director, Ph.D. Program in Public Policy and Management, University of Washington, Seattle, 2006–2009.
- Visiting Professor, Swiss Federal Institute of Technology (ETH), Zürich, 2005.
- Visiting Professor, Centre National de la Recherche Scientifique, Paris, 2004–2005.
- Director, Interdisciplinary Ph.D. Program in Urban Design and Planning, University of Washington, Seattle, 2000–2004.
- Adjunct Professor in Department of Geography, University of Washington, Seattle, 1998–2009.
- Adjunct Professor in Department of Civil and Environmental Engineering, University of Washington, Seattle, 1998–2009.
- Associate Professor, School of Social Sciences, University of Texas at Dallas, 1996–1997.
- Assistant Professor, School of Social Sciences, University of Texas at Dallas, 1989–1996.
- Technical Director, Bruton Center for Development Studies, University of Texas at Dallas, 1989–1997.

Five Publications Related to Proposal

1. Waddell, Paul, "Integrated Land Use and Transportation Planning and Modeling: Addressing Challenges in Research and Practice," *Transport Reviews* Vol. 31, No. 2, 2011, pp 209 229.
2. Ševčíková, H., A. Raftery and P. Waddell, "Uncertain benefits: Application of Bayesian melding to the Alaskan Way Viaduct in Seattle," *Transportation Research Part A: Policy and Practice*, Vol. 45, pp 540-553.
3. Lee, Brian, Paul Waddell, Liming Wang and Ram Pendyala, "Re-examining the Influence of Work and Non-work Accessibility on Residential Location Choices with a Micro-analytic Framework," *Environment and Planning A*, Vol. 42, No. 4, 2010, pp 913-930.
4. Waddell, Paul, Liming Wang, Billy Charlton and Aksel Olsen, "Integration of a Parcel-Level Land Use Model and an Activity-Based Travel Model," *Journal of Transportation and Land Use*. Vol. 3, No. 2, 2010, pp 65-84.
5. Vanegas, Carlos, Daniel Aliaga, Pascal Müller, Paul Waddell, Ben Watson, Peter Wonka, Modeling the Appearance and Behavior of Urban Spaces, *Computer Graphics Forum*, Vol. 28, No. 2, 2009, pages 1–18.

Five Other Publications

1. Vanegas, Carlos, Daniel Aliaga, Bedrich Bene, Paul Waddell, "Interactive Design of Urban Spaces using Geo- metrical and Behavioral Modeling," *ACM Transactions on Graphics (TOG)*, also ACM SIGGRAPH Asia, 2009, 28(5): 10 pages.
2. Lee, Brian and Paul Waddell, "Residential Mobility and Location Choice A Nested Logit Model with Sampling of Alternatives," *Transportation*, Vol. 37, Issue 4, 2010, pp 587-601.
3. Kim, Hyungtai, Paul Waddell, Venky Shankar, and Gudmundur Freyr Ulfarsson, "Modeling Micro-Spatial Em- ployment Location Patterns: A Comparison of Count and Choice Approaches," *Geographical Analysis*, 2008, Vol. 40, pp. 123-151.
4. Ševčíková, Hana, Adrian Raftery and Paul Waddell. "Assessing Uncertainty in Urban Simulations Using Bayesian Melding," *Transportation Research Part B: Methodology* 41, 6, 2007, pages 652–659.
5. Waddell, Paul, Gudmundur F. Ulfarsson, Joel Franklin and John Lobb. "Incorporating Land Use in Metropolitan Transportation Planning", *Transportation Research Part A: Policy and Practice* Vol. 41, 2007, pages 382–410.

Synergistic Activities

- Vice Chair, Department of City and Regional Planning, University of California, Berkeley, 2009–present.
- Faculty Coordinator, Evans School Ph.D. Program in Public Policy and Management, 2006–2008.
- Director of the Interdisciplinary Ph.D. Program in Urban Design and Planning, University of Washington, 2000–2004.
- Director, Center for Urban Simulation and Policy Analysis, University of Washington
- Supervision of the development of UrbanSim, and Open Source simulation system for evaluating land use, transportation and environmental policies.

Recent Collaborators

- Daniel Aliaga (Purdue University), Marina Alberti (University of Washington), Bedrich Benes (Purdue Uni- versity), Alan Borning (University of Washington), Brian Lee (University of Vermont), Yi-Chang Chiu (Ari- zona State University), Mark Hickman (University of Arizona), Hyungtai Kim (Korean Development Institute), Karthik Konduri (Arizona State University), Ram Pendyala (Arizona State University), Sana, Bhargava (Ari- zona State University), Hana Ševčíková (University of Washington), Venky Shankar (Penn State University), Gufmundur Ulfarsson (Washington University), Carlos Vanegas (Purdue University), Liming Wang (University of California, Berkeley), Xin Ye (Arizona State University).