ABSTRACT: Transportation, like many fields, is facing a data deluge: the soaring amount of information being generated by computers, sensors, and people. This will transform the field in ways that are not yet certain. In this talk I will discuss the dimensions along which smartphones, in particular, will change how travel demand data collection and modeling are done and also how they provide new vehicles for targeting travel behavior change. To demonstrate this transforming technology, I will present three closely related research efforts.

First is NetDiary, a system that infers individuals’ travel diaries using location and accelerometer data from their smartphones. With NetDiary we have focused on minimizing respondent burden by curtailing data entry from the respondents and by reducing battery consumption. A primary motivation for lowering the respondent burden is to enable data collection over periods of time much longer than the currently standard 1-2 day household travel survey. Longer periods of observation provide richer information on individual attitudes and orientations toward the transportation system, which are key drivers of travel decisions and yet are at best weakly captured in current models. I will demonstrate this with a travel demand modeling application in which we employed latent class choice models and a six-week longitudinal travel diary from Germany to uncover traveler market segments based on “modality styles”, i.e. predispositions towards a certain mode or set of modes such as an auto-orientation or multimodal-orientation.

Beyond the use of smartphone data for travel demand modeling, smartphones also open the door for scalable approaches of communicating with people regarding their travel and designing tools targeting behavior change. To demonstrate this, I will describe our Quantified Traveler experiment in which we tracked 130 participants’ travel over the course of two weeks and presented them with information and peer comparisons on the time, money, calories, and CO2 they spent traveling. We found the information led to changes in attitudes (towards sustainable transportation) and changes in travel (more walking and less driving).

BIO: Joan Walker’s research focus is behavioral modeling, with an expertise in discrete choice analysis and travel behavior. She works to improve the models that are used for transportation planning, policy, and operations. Professor Walker joined UC Berkeley in 2008 as an Assistant Professor in the Department of Civil and Environmental Engineering and a member of the interdisciplinary Global Metropolitan Studies initiative. She received her Bachelor’s degree in Civil Engineering from UC Berkeley and her Master's and PhD degrees in Civil and Environmental Engineering from MIT. Prior to joining UC Berkeley, she was Director of Demand Modeling at Caliper Corporation and an Assistant Professor of Geography and Environment at Boston University. She is a recipient of the Presidential Early Career Award for Scientists and Engineers (PECASE) – the highest honor bestowed by the U.S. government on scientists and engineers beginning their independent careers.