Exurban population growth became one of the largest environmental issues in California during the 1990s. While encompassing only a small portion of the overall growth in housing units statewide, growth far from traditional suburbs often in the form of large-lot estates has had disproportionate impacts on the state's natural habitats. After decades of such development in the deserts of the Los Angeles hinterland and the rolling hills of the Central Coast, the recent rapid exurban growth in the Sierra Foothills east of Sacramento has spurred the political response that motivated this research.

Traditional urban models largely predict the expansion of suburbs based on the trade-off between access to employment and cheap land. Additional factors such school quality have been added but usually one at time in a comparison to this basic tradeoff. Most urban models also use the parcel or an administrative zone as the unit of analysis. The current research is part of a new wave of urbanization models that model urban events for arbitrary grid cells and model change based on observed change in the past. These modifications allow the model to fundamental trade-off between access and land scarcity while incorporating the additional factors expected to promote exurban development. Additionally, the arbitrary pixel structure allows for the analysis of the large areas of land beyond the metropolitan fringe where exurban development occurs.

The current work uses a reduced-form logit model to predict the probability that a hectare pixel in California exurbanizes as function of a variety of drivers. Theoretically, change is assumed to occur because an individual (either a household or a small developer) has found a location that maximizes utility for the exurban resident (either for their own enjoyment or for that of the consumer that purchases the house). The reduced form structure allows for the incorporation of a wide variety of factors known to affect utility.

The dependent variable is built by combining remotely sensed imagery and census data in order to maximize information and spatial resolution. This is especially important because the smallest census zone (the block) is often quite large in exurban areas. By combining the block-level information with remote sensing and other spatial information, the characteristics of housing and its residents can be "migrated" to more precise spatial locations. Once the data is processed, the dependent variable is a hectare of land coded both as binary event (movement above a population density threshold) and an ordinal indicator of density increase. Because the census is a major source of information, the dependent variable measures change between 1990 and 2000. Both of these are then predicted as a function of a variety of drivers of exurbanization.

These drivers describe the situation of each pixel in terms of its overall accessibility, land supply, physical constraints, sociodemographic context, amenities, and recreational accessibility. Overall accessibility factors include the number of jobs of particular types within different driving times, distance to major roads, and distance to medium roads. Land supply is a proxy for land values calculated by assessing the availability of land and the population pressure nearby. Physical constraints include the slope of the land, floodplain status, and soil quality. Sociodemographic variables measure the type of people residing nearby in terms of ethnicity, income, etc. Amenity factors include nearness to the coast or major lakes, amount of canopied vegetation nearby, special

ecological feature or national parks in the vicinity, and attractive viewsheds (i.e. the potential residents can see attractive landscape from the location). Access to recreation is assessed by variables such as nearness to major fishing locations, ski slopes, and off-road vehicle parks.

Many of the accessibility variables above incorporate terms that are imprecise about scale such as “nearness” and “neighborhood”. This is because the interacting scales of attraction to different landscape features are a fundamental but poorly understood component of exurban development. Exurban is still urban in the sense that residents generally have jobs (though they may telecommute some days) and mostly satisfy their material needs at stores (though they may grow some grapes). However, due to cheaper transport, telecommunications, and increased wealth exurban residents are attempting to enjoy the natural landscape at the same time. In modeling, this means that many of the significant accessibility relationships that drive exurbanization are nonlinear in effect: ideal sites are close enough to commercial locations but not so close that their residents have too many neighbors and an unattractive suburban landscape.

Previous work on exurban issues (for the California Resources Agency’s Legacy Project) suggests that both the traditional accessibility factors and the newer environmental factors influence the location of exurban development. The locations developed in such a manner are reasonably close to major and medium-sized metropolitan areas; there are still many portions of the state that are too far away to see this sort of landscape change. However, factors such as high neighborhood canopied vegetative coverage and attractive viewsheds increase the likelihood of exurban growth. Not surprisingly, uniquely Californian features such as the central coastal zone and Yosemite are also strong draws. The talk will provide a quantitative overview of the influence each of these factors has on low-density development and numerous maps to aid in understanding the manner in which these multiple factors interact at various spatial scales. The presentation will conclude with a predictive map that highlights likely future conflicts between exurban population growth and high quality habitat.