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Chuntian Wang*, Department of Mathematics, The University of Alabama, Tuscaloosa, AL 35487-0350, and **Yuan Zhang, Andrea L Bertozzi** and **Martin Short**. *Stochastic-Statistical Modeling of Criminal Behavior*.

Residential crime is one of the toughest issues in modern society. A quantitative, informative, and applicable model of criminal behavior is needed to assist law enforcement. We have made progress to the pioneering statistical agent-based model of residential burglary (Short et al., Math. Models Methods Appl., 2008) in two ways. (1) In one space dimension, we assume that the movement patterns of the criminals involve truncated Levy distributions for the jump length. Furthermore (2), in two space dimensions, we used the Poisson clocks to govern the time steps of the evolution of the model, rather than a discrete-time Markov chain with deterministic time increments used in the previous works. Poisson clocks are particularly suitable to model the times at which arrivals enter a system. Introduction of the Poisson clock not only produces similar simulation output, but also brings in theoretically the mathematical framework of the Markov pure jump processes, e.g., a martingale approach. The martingale formula leads to a continuum equation that coincides with a well-known mean-field continuum limit. Moreover, the martingale formulation together with statistics quantifying the relevant pattern formation leads to a theoretical explanation of the finite size effects. (Received June 29, 2020)