1067-60-2193 **Mark Allenby*** (`mark.allenby@pepperdine.edu`), Pepperdine University, 24255 Pacific Coast Highway, Malibu, CA 90263, and **Kym Louie** and **Marina Masaki**. *A Point Process Model for Simulating Gang Violence.*

Gang violence is a prevalent problem in cities across the United States. A way of simulating and predicting occurrences of gang on gang crimes is useful to counteract this problem. In this paper, a point process method is presented to model gang-on-gang crimes. The Hawkes process has historically been used to model earthquake and aftershock occurrences, but has clear application to criminology due to the repeat and retaliatory nature of crimes.

The Hawkes process, a self-exciting point process, is introduced as a temporal model for crimes between gangs. A marked Hawkes process is then used to describe directional rivalry strength between pairs of gangs. This directional Hawkes Process is then expanded to simulate crimes not only temporally but also spatially. Finally, we simulated a multi-gang system using a modified version of the simple branching process generally used to simulate the Hawkes process. This model distributes crimes through space and time, assigns the crime to pair of rival gangs and then directionality within this pair. The parameters of all models were fit using penalized maximum log-likelihood estimation with 1208 gang related crimes between 1999 and 2002 in the policing district of Hollenbeck located in the city of Los Angeles. (Received September 22, 2010)