

**University of California, Irvine
Statistics Department
Obsidian Security Seminar**

***Markov-Modulated Hawkes Processes
for Sporadic and Bursty Event Occurrences***

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(Bldg. #314 on campus map)**

Modeling event dynamics is central to many disciplines. Patterns in observed event arrival times are commonly modeled using point processes. Such event arrival data often exhibits self-exciting, heterogeneous and sporadic trends, which is challenging for conventional models. It is reasonable to assume that there exists a hidden state process that drives different event dynamics at different states. In this talk, I present a Markov Modulated Hawkes Process (MMHP) model for learning such a mixture of event dynamics and develop corresponding inference algorithms. Numerical experiments using synthetic data and data from an animal behavior study demonstrate that MMHP with the proposed estimation algorithms consistently recover the true hidden state process in simulations, and separately captures distinct event dynamics that reveal interesting social structures in the real data.

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