

# Discovering Latent Structure in Point Process Data

A DISSERTATION PRESENTED  
BY  
SCOTT WARREN LINDERMAN  
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Thesis advisors: Professors Leslie G. Valiant and Ryan P. Adams   Scott Warren Linderman

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ABSTRACT

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THIS IS THE DEDICATION.

# Acknowledgments

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# 0

## Introduction



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# Background

## 1.1 PROBABILISTIC MODELING

### 1.1.1 GENERATIVE GRAPHICAL MODELS

### 1.1.2 BAYESIAN INFERENCE

### 1.1.3 MODEL COMPARISON

## 1.2 POINT PROCESSES

### 1.2.1 THE POISSON PROCESS

### 1.2.2 THE HAWKES PROCESS

### 1.2.3 THE NONLINEAR HAWKES PROCESS

## 1.3 TIME SERIES MODELS

### 1.3.1 HIDDEN MARKOV MODELS

### 1.3.2 DYNAMICAL SYSTEMS MODELS

### 1.3.3 AUTOREGRESSIVE MODELS

# 2

## Hawkes Processes with Latent Network Structure

# 3

## Nonlinear Hawkes Processes with Latent Network Structure

# 4

## Dynamic Network Models

# 5

## Latent State Space Models for Point Processes

# 6

## Bayesian Inference with Neural Circuits

# 7

## Conclusion





Some extra stuff

## References

