

# 空间广义线性混合效应模型及其应用

## 毕业答辩

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## Outline 目录

1. Introduction (Motivations and goals)
2. Literature reviews
3. Geostatistical model (SGLMM)
4. Computing details and simulations
5. Real data analysis (Applications)
6. Discussion

## 背景

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# Frameworks, Packages and Softwares I

**R:** geoR geoRglm spatial PrevMap  
Ribeiro Jr and Diggle (2016); Christensen and Ribeiro Jr (2015); Ripley (2015); Giorgi and Diggle (2016)

**Stan:** Stan <sup>1</sup> interfaces with R (RStan) ,Python (PyStan) ,  
MATLAB (MatlabStan) and more  
Gelman et al. (2015); Bob et al. (2017)

**PyMC3:** Probabilistic programming in Python using PyMC3  
Salvatier et al. (2016)


**JAGS:** Just **A**nother **G**ibbs **S**ampler <sup>2</sup>  
Bayesian hierarchical models using Markov chain Monte Carlo (MCMC)

**BUGS:** Bayesian inference **U**sing **G**ibbs **S**ampling , such as  
winBUGS, OpenBUGS

**R-INLA:** Integrated **N**ested **L**aplace **A**pproximations  
Rue et al. (2009, 2016); Gómez-Rubio and Rue (2017)

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<sup>1</sup><http://mc-stan.org/>

<sup>2</sup>[https://en.wikipedia.org/wiki/Just\\_another\\_Gibbs\\_sampler](https://en.wikipedia.org/wiki/Just_another_Gibbs_sampler) 

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<https://github.com/Cloud2016>



- Bob, C., Andrew, G., Matthew, H., and et al. (2017). Stan: A probabilistic programming language. *Journal of Statistical Software*, 76(1):1–32.
- Christensen, O. F. and Ribeiro Jr, P. J. (2015). *geoRglm: A Package for Generalised Linear Spatial Models*. R package version 0.9-8.
- Gelman, A., Lee, D., Guo, J., and et al. (2015). Stan: A probabilistic programming language for bayesian inference and optimization. *Journal of Educational and Behavioral Statistics*, 40(5):837–840.
- Giorgi, E. and Diggle, P. J. (2016). Prevmap: an r package for prevalence mapping.(in press). *Journal of Statistical Software*.
- Gómez-Rubio, V. and Rue, H. (2017). Markov chain monte carlo with the integrated nested laplace approximation. *ArXiv e-prints*.
- Ribeiro Jr, P. J. and Diggle, P. J. (2016). *geoR: Analysis of Geostatistical Data*. R package version 1.7-5.2.

- Ripley, B. (2015). *spatial: Functions for Kriging and Point Pattern Analysis*. R package version 7.3-11.
- Rue, H., Martino, S., Chopin, N., and et al. (2009). Approximate bayesian inference for latent gaussian models by using integrated nested laplace approximations. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, 71(2):319–392.
- Rue, H., Martino, S., Lindgren, F., Simpson, D., and et al. (2016). *INLA: Functions which Allow to Perform Full Bayesian Analysis of Latent Gaussian Models using Integrated Nested Laplace Approximations*. R package version 0.0-1468872408.
- Salvatier, J., Wiecki, T. V., and Fonnesbeck, C. (2016). Probabilistic programming in python using pymc3. *PeerJ Computer Science*, 2(55).