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## Bayesian Spatiotemporal Modeling and Mapping of Infectious Diseases

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# *Stelingen Behorende bij het Proefschrift*

## **Bayesian Spatiotemporal Modeling and Mapping of Infectious Diseases**

Methodology and Application to Dengue Disease in Bandung City and Covid-19 in West Java, Indonesia

### **I Gede Nyoman Mindra Jaya**

1. Mapping is the Alpha and Omega of spatial analysis.
2. An introduction to Tobler's first law of geography provides an adequate introduction to spatial statistics, and vice versa.
3. Complex spatial models are easier to analyse by means of Bayesian statistical methods than by frequentist methods (This thesis).
4. A limited number of observations and a lack of convergence in distribution in the early stages of a disease outbreak can be adequately handled by applying Bayesian statistical methods (This thesis).
5. The fusion spatiotemporal model integrates data from multiple sources into a single model framework, allowing more data to be used and improving statistical efficiency (This thesis).
6. Varying coefficient models have become popular in spatiotemporal research as they are easy to estimate and interpret (This thesis).
7. Identifying spatiotemporal hotspots is a basic strategy for establishing a cost-effective early warning system (This thesis).
8. The popularity of the pure model in time series analysis and the ignorance of it in spatial econometrics is an indicator of the limited cooperation between the practitioners of both fields (This thesis).
9. When the objectives of a spatiotemporal analysis are forecasting or mapping, a pure model with structured and unstructured spatial and temporal random effects and their interaction, but without covariates, is sufficient (This thesis).
10. The spatiotemporal pure model is an adequate and easy to use solution to spatiotemporal confounding (Azevedo et al., 2020; Jaya, Folmer, and Lundberg, 2022, under review).
11. Joint modelling of the risks of COVID-19 incidence, intensive care admission, and death tends to outperform individual modelling in terms of misclassification of spatiotemporal units (Jaya, Folmer, and Lundberg, 2022, under review).
12. Everything should be made as simple as possible, but not simpler (Albert Einstein, 1933).
13. The pure model meets the law of parsimony, i.e. Ockham's razor.
14. The latent Gaussian Model is a flexible statistical model for modelling a wide range of complex phenomena, including spatial statistics and econometrics (Rue, Martino, and Chopin, 2009).
15. A PhD is the preliminary step towards making a scientific contribution, not the end of a climb.
16. *Eda ngaden awak bisa, yadin ririh, enu liu pelajahin.* Do not be arrogant, even if you are smart, because there is still much to learn (Balinese proverb).