



GEOVET 2019 Workshop proposal

Title: Bayesian spatial modeling of veterinary data with CARBayes and Nimble

Presenter: Professor Andrew Lawson (MUSC Distinguished Professor and ASA Fellow)

Bio: Dr Lawson is Professor of Biostatistics in the Division of Biostatistics and Bioinformatics, Department of Public Health Sciences, College of Medicine, MUSC and is an MUSC Distinguished Professor and ASA Fellow. He was previously a Professor of Biostatistics in the Department of Epidemiology & Biostatistics, University of South Carolina, SC. His PhD is from the University of St. Andrews, UK and was in Spatial Statistics.

He has over 160 journal papers on the subject of spatial epidemiology, spatial statistics and related areas. In addition to a number of book chapters, he is the author of 10 books in areas related to spatial epidemiology and health surveillance. The most recent of these is Lawson, A.B. et al (eds) (2016) *Handbook of Spatial Epidemiology*. CRC Press, New York, and in 2018 a 3rd edition of *Bayesian Disease Mapping; hierarchical modeling in spatial epidemiology* CRC Press appeared. As well as associate editorships on a variety of journals, he is an advisor in disease mapping and risk assessment for the World Health Organization (WHO). He is founding editor of the Elsevier journal *Spatial and Spatio-temporal Epidemiology*. Dr Lawson has delivered many short courses in different locations over the last 15 years on Bayesian Disease Mapping with Win/OpenBUGS, CARBayes and INLA, Spatial Epidemiology and disease Clustering.

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Learning outcomes: This workshop will provide attendees with background concepts of Bayesian Disease Mapping, an introduction posterior sampling methods and hand-on experience of the use of R packages focused on disease mapping. These will include CARBayes and Nimble, as well as graphics packages for mapping. At the end the participant will have a basic working knowledge and competency using the R packages included. Focus will be on veterinary examples, including FMD in England and zoonotic examples such as Tularemia in Finland.

Background of attendees: Attendees do not require to have previous experience of Bayesian methods, but a basic exposure to statistical ideas (such as P values and regression) would be useful. Experience with GIS could be useful but also not essential.

History of Workshops: I have run many workshops on spatial epidemiology topics over the last 20 years. I run an annual Bayesian Disease Mapping (BDM) course sequence at MUSC and have also run annual versions of this in Copenhagen and Edinburgh (2011-2016). I also ran a 4 day ISCB sponsored BDM course in Iasi Romania (2012) and in CDC Atlanta in 2013. I have previously run a variety of shorter conference courses at Joint Statistical Meetings of the ASA (2004), GISVET (2007), GEOVET 2010, 2013, 2016, ISEE 2012, and the Spatial Statistics conference at Ohio State University 2013. Usually the conference workshops are one or two day and focus on recent developments. Often the focus is on recent software updates. More recent workshops have focused on BDM with INLA and CARBayes.

Attendance numbers have always been good (15-20 for conference workshops; MUSC courses attract 15 each year at full cost)

Workshop Specifications

Prefer **post**-workshop, but can change if necessary

Min number 4-5

Max number 16-20

Duration 2 – day

Accessories: I only use a Windows laptop and travel with an HDMI/RGB adapters. All work that I demo will be on R: CARBayes and Nimble are both R packages. Attendees would be encouraged to attend with laptops and pre-load various R packages.

Proposed cost: \$500/head

Workshop Contents

Day	Time	Topic	presenter	Format
1	9.0 - 10.30	Introduction to BDM: statistical and epidemiological issues	AL	
	10.30- 11.00	coffee		
	11.00 – 12.00	Bayesian spatial modeling		
	12.00 – 1.00	lunch		
	1.00 – 3.00	CARBayes I		
	3.00 – 3.30	coffee		
	3.30 – 5.00	CARBayes II		

2	9.0 - 10.30	Nimble/BUGS intro	AL	
	10.30- 11.00	coffee		
	11.00 – 12.00	Nimble examples		
	12.00 – 1.00	lunch		
	1.00 – 3.00	Advanced examples (CARBayes and Nimble)		
	3.00 – 3.30	coffee		
	3.30 – 5.00	Space-time models		

Focus will be on veterinary examples, including FMD in England and zoonotic examples such as Tularemia in Finland, and Leishmaniasis in Brazil.