

From: Oliver Hooker
Subject: Spatial analysis of ecological data using R, Scotland, 7-12 August 2017

Spatial analysis of ecological data using R

Delivered by Prof. Jason Matthiopoulos, Dr. James Grecian

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_spatial-2Danalysis-2Ddecological-2Ddata-2Dusing-2Dr-2D&d=CwIF-g&c=Ngd-ta5RYsqeUsEDgxcqYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8h8Jzb2HxZT0AqoiqLvxfeeATyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueu7i9cq7xkVvc&s=SayxrL0hedAnbKR915nSE419Vg7YsSq122YNgteFw&e=spae05/

This course will run from 7th – 12th August 2017 at SCENE field station, Loch Lomond national park, Scotland

The course will cover the concepts and R tools that can be used to analyse spatial data in ecology covering elementary and advanced spatial analysis techniques applicable to both plants and animals. We will investigate analyses appropriate to transect (e.g. line surveys, trapping arrays), grid (e.g. occupancy surveys) and point data (e.g. telemetry). The focal questions will be on deriving species distributions, determining their environmental drivers and quantifying different types of associated uncertainty. Novel methodology for generating predictions will be introduced. We will also address the challenges of applying the results of these methods to wildlife conservation and resource management and communicate the findings to non-experts.

Course content is as follows

Day 1: Elementary concepts

Module 1 Introductory lectures and practical; this will cover the key questions in spatial ecology, the main types of data on species distributions, concepts and challenges and different types of environmental data, concepts and challenges; useful concepts from statistics; Generalised Linear Models
Module 2 GIS tools in R: Types and structure of spatial objects in R, generating and manipulating spatial objects, projections and transformations, cropping and masking spatial objects, extracting covariate data and other simple GIS operations in R, optionally plotting simple maps

Day 2: Overview of basic analyses

Module 3 Density estimation, Spatial autocorrelation, Smoothing, Kernel Smoothers, Kriging, Trend-fitting (linear, generalised linear, generalised additive models)
Module 4 Habitat preference, Resource selection functions, MaxEnt: What's it all about? Overview and caveats related to Niche models

Day 3: Challenging problems

Module 5 Analysing grid data, Poisson processes, Occupancy models, Use-availability designs
Module 6 Analysing telemetry data, Presence-only data, Spatial and serial autocorrelation, Partitioning variation by mixed effects models

Day 4: Challenging problems

Module 7 Analysing transect data, Detection functions for point and line transects, Using covariates in transect models. Afternoon for catch up and/or excursion

Day 5: Challenging problems

Module 8 Advanced methods, Generalised Estimation Equations for difficult survey designs, Generalised additive models for habitat preference, Dealing with boundary effects using soap smoothers, Spatial point processes with INLA

Day 6: Delivering advice

Module 9 Prediction, Validation by resampling, Generalised Functional Responses for species distribution, Quantifying uncertainty, Dealing with the effects of population density
Module 10 Applications, designing protected areas, thinking about critical habitat, Representing uncertainty

Please email any inquiries to oliverhooker@prstatistics.com or visit our website www.prstatistics.com

Please feel free to distribute this material anywhere you feel is suitable

1. MODEL BASED MULTIVARIATE ANALYSIS OF ECOLOGICAL DATA USING R

(January 2017) #MBMV

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_model-2Dbase-2Dmultivariate-2Danalysis-2Dof-2D&d=CwIF-g&c=Ngd-ta5RYsqeUsEDgxcqYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8h8Jzb2HxZT0AqoiqLvxfeeATyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueu7i9cq7xkVvc&s=_6Ex_ycHt89brGip50PEmpmjeuAhu9sxYxXtA9Z2TY&e=abundance-data-using-r-mbmv01/

2. ADVANCED PYTHON FOR BIOLOGISTS (February 2017) #APYB

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_advanced-2Dpython-2Dbiologists-2Dapyb01_&d=CwIF-g&c=Ngd-ta5RYsqeUsEDgxcqYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8h8Jzb2HxZT0AqoiqLvxfeeATyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueu7i9cq7xkVvc&s=bqeMy0ztrvb4meYuvfsFIP8KNZMvKJabm15t6o-Wlk00&e=

3. STABLE ISOTOPE MIXING MODELS USING SIAR, SIBER AND MIXSIAR USING R

(February 2017) #SIMM

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_stable-2Disotope-2Dmixing-2Dmodels-2Dusing-2Dr-2D&d=CwIF-g&c=Ngd-ta5RYsqeUsEDgxcqYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8h8Jzb2HxZT0AqoiqLvxfeeATyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueu7i9cq7xkVvc&s=HXLnymvFqIglZy09arVZIGm0Z9D7A8KtaDdGpt_pK98&e=simm03/

4. NETWORK ANALYSIS FOR ECOLOGISTS USING R (March 2017) #NTWA

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_network-2Danalysis-2Ddecological-2Dntwa01_&d=CwIF-g&c=Ngd-ta5RYsqeUsEDgxcqYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8h8Jzb2HxZT0AqoiqLvxfeeATyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueu7i9cq7xkVvc&s=jjReldjnxCCxts_dKE0N2eGuqYfj1JWCvRhnlpL8o&e=

5. ADVANCES IN MULTIVARIATE ANALYSIS OF SPATIAL ECOLOGICAL DATA

(April 2017) #MVSP

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_advances-2Din-2Dspatial-2Danalysis-2Dof-2D&d=CwIF-g&c=Ngd-ta5RYsqeUsEDgxcqYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8h8Jzb2HxZT0AqoiqLvxfeeATyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueu7i9cq7xkVvc&s=4wyFCUw72dCH9Aht0egn3pRiPYKuScBKQP-KcVP8&e=multivariate-ecological-data-theory-and-practice-mvsp02/

6. INTRODUCTION TO STATISTICS AND R FOR BIOLOGISTS (April 2017) #IRFB

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_introduction-2Dto-2Dstatistics-2Dand-2Dr-2D&d=CwIF-g&c=Ngd-ta5RYsqeUsEDgxcqYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8h8Jzb2HxZT0AqoiqLvxfeeATyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueu7i9cq7xkVvc&s=WZPDJNidM2-6Hz3oXsopTwiQfsW56g4ndV-CoxJQcE&e=biologists-irfb02/

7. ADVANCING IN STATISTICAL MODELLING USING R (April 2017) #ADVR

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_advancing-2Dstatistical-2Dmodelling-2Dusing-2Dr-2D&d=CwIF-g&c=Ngd-ta5RYsqeUsEDgxcqYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8h8Jzb2HxZT0AqoiqLvxfeeATyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueu7i9cq7xkVvc&s=Yzrx8LbDREkerMmMyR30XPHY0MMrtJLmieISrtfmAWw&e=advr05/

8. INTRODUCTION TO BAYESIAN HIERARCHICAL MODELLING (May 2017) #BHM

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_introduction-2Dto-2Dbayesian-2Dhierarchical-2D&d=CwIF-g&c=Ngd-ta5RYsqeUsEDgxcqYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8h8Jzb2HxZT0AqoiqLvxfeeATyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueu7i9cq7xkVvc&s=SL592a0ekmbuzPZnrHLPNdGqXfVzKZbrO2DPOHGI&e=

modelling-using-r-ibhm02/

9. GEOMETRIC MORPHOMETRICS USING R (June) #GMMR

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_geometric-2Dmorphometrics-2Dusing-2Dr-2Dgmmr01_d=CwIF-g&c=Ngd-ta5yRysqeUsEDgxcqsYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8ihJzb2HxZT0AqoiqLvxfeeTyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueuJ7i9cq7xkVvc&s=r844XXi4m0zOWnFZqijq_fRhOCQzqV51WOz1bDBC9I&e=

10. MULTIVARIATE ANALYSIS OF SPATIAL ECOLOGICAL DATA (June 2017) #MASE

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11. BIOINFORMATICS FOR GENETICISTS AND BIOLOGISTS (July 2017) #BIGB

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_bioinformatics-2Dfor-2Dgeneticists-2Dand-2D&d=CwIF-g&c=Ngd-ta5yRysqeUsEDgxcqsYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8ihJzb2HxZT0AqoiqLvxfeeTyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueuJ7i9cq7xkVvc&s=4SouC00eenCuMbYuzH7J52vUNKmRS0f1iz0X_yYR0&e=biologists-bigb02/

12. SPATIAL ANALYSIS OF ECOLOGICAL DATA USING R (August 2017) #SPA

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13. ECOLOGICAL NICHE MODELLING (October 2017) #ENMR

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_ecological-2Dniche-2Dmodelling-2Dusing-2Dr-2D&d=CwIF-g&c=Ngd-ta5yRysqeUsEDgxcqsYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8ihJzb2HxZT0AqoiqLvxfeeTyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueuJ7i9cq7xkVvc&s=7XWvahrRW1SMgen-21u7NZeHjR3pv6kPLRmx6POkUso&e=enm01/

14. APPLIED BAYESIAN MODELLING FOR ECOLOGISTS AND EPIDEMIOLOGISTS

(November 2017)

https://urldefense.proofpoint.com/v2/url?u=http-3A__www.prstatistics.com_course_applied-2Dbayesian-2Dmodelling-2Decologists-2D&d=CwIF-g&c=Ngd-ta5yRysqeUsEDgxcqsYYY1Xs5ogLxWPA_2Wlc4&r=e2OJ1azRf8ihJzb2HxZT0AqoiqLvxfeeTyN59ZLol&m=29MCwC7KFB9V9taQDWitF2YPGXuvueuJ7i9cq7xkVvc&s=kzrz87_inQE3BNZT2JbhXk0EA_eqNVYr9QajHNo-o&e=epidemiologists-abme03/

15. GENETIC DATA ANALYSIS USING R (October TBC)

16. INTRODUCTION TO BIOINFORMATICS USING LINUX (October TBC)

17. LANDSCAPE (POPULATION) GENETIC DATA ANALYSIS USING R (November TBC)

18. PHYLOGENETIC DATA ANALYSIS USING R (November TBC)

19. INTRODUCTION TO METHODS FOR REMOTE SENSING (December 2017 TBC)

20. ADVANCING IN STATISTICAL MODELLING USING R (December 2017 TBC)

21. INTRODUCTION TO PYTHON FOR BIOLOGISTS (December 2017 TBC)

22. DATA VISUALISATION AND MANIPULATION USING PYTHON (December 2017 TBC)

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