

From: Oliver Hooker
Subject: SpatialAnalysisOfMultivariateData.Pierre.Legendre.3-7April2017.UK

"Advances in Spatial Analysis of Multivariate Ecological Data: Theory and Practice"

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This course is being delivered by Prof. Pierre Legendre who is a leading expert in numerical ecology and author of the book titled 'Numerical ecology'

This course will run from 3rd – 7th April at Margam Discovery Centre, Wales.

The course will describe recent methods (concepts and R tools) that can be used to analyse spatial patterns in community ecology. The umbrella concept of the course is beta diversity, which is the spatial variation of communities. These methods are applicable to all types of communities (bacteria, plants, animals) sampled along transects, regular grids or irregularly distributed sites. The new methods, collectively referred to as spatial eigen-function analysis, are grounded into techniques commonly used by community ecologists, which will be described first: simple ordination (PCA, CA, PCoA), multivariate regression and canonical analysis, permutation tests. The choice of dissimilarities that are appropriate for community composition data will also be discussed. The focal question is to determine how much of the community variation (beta diversity) is due to environmental sorting and to community-based processes, including neutral processes. Recently developed methods to partition beta diversity in different ways will be presented. Extensions will be made to temporal and space-time data.

Course content is as follows

Day 1

- Introduction to data analysis.
- Ordination in reduced space: principal component analysis (PCA), correspondence analysis (CA), principal coordinate analysis (PCoA).
- Transformation of species abundance data tables prior to linear analyses.

Day 2

- Measures of similarity and distance, especially for community composition data.
- Multiple linear regression. R-square, adjusted R-square, AIC, tests of significance.
- Polynomial regression.
- Partial regression and variation partitioning.

Day 3

- Statistical testing by permutation.
- Canonical redundancy analysis (RDA) and canonical correspondence analysis (CCA). Multivariate analysis of variance by canonical analysis.
- Forward selection of environmental variables in RDA.

Day 4

- Origin of spatial structures.
- Beta diversity partitioning and LCBD indices
- Replacement and richness difference components of beta diversity.

Day 5

- Spatial modelling: Multi-scale modelling of the spatial structure of ecological communities: dbMEM, generalized MEM, and AEM methods.
- Community surveys through space and time: testing the space-time interaction in repeated surveys.
- Additional module depending on time – Is the Mantel test useful for spatial analysis in ecology and genetics?

Please email any inquiries to oliverhooker@prstatistics.com

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Upcoming courses - email for details oliverhooker@prstatistics.com

1. ADVANCING IN STATISTICAL MODELLING USING R (December 2016, April 2017, December 2017)

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2. SPATIAL ANALYSIS OF ECOLOGICAL DATA USING R (August 2017)

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3. STABLE ISOTOPE MIXING MODELS USING SIAR, SIBER AND MIXSIAR USING R (February 2017)

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4. GENETIC DATA ANALYSIS USING R (TBC)

5. BIOINFORMATICS FOR GENETICISTS AND BIOLOGISTS (July 2017)

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6. APPLIED BAYESIAN MODELLING FOR ECOLOGISTS AND EPIDEMIOLOGISTS (November 2017)

7. INTRODUCTION TO STATISTICS AND R FOR BIOLOGISTS (April 2017)

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8. INTRODUCTION TO PYTHON FOR BIOLOGISTS (TBC)

9. TIME SERIES MODELS FOR ECOLOGISTS AND CLIMATOLOGISTS (TBC)

10. ADVANCES IN MULTIVARIATE ANALYSIS OF SPATIAL ECOLOGICAL DATA (April 2017)

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11. ADVANCES IN DNA TAXONOMY (TBC)
12. INTRODUCTION TO BIOINFORMATICS USING LINUX (TBC)
13. INTRODUCTION TO BAYESIAN HIERARCHICAL MODELLING
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14. LANDSCAPE (POPULATION) GENETIC DATA ANALYSIS USING R (TBC)
15. PHYLOGENETIC DATA ANALYSIS USING R (TBC)
16. MODEL BASED MULTIVARIATE ANALYSIS OF ECOLOGICAL DATA USING R (January 2017)
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17. ADVANCED PYTHON FOR BIOLOGISTS (February 2017)
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18. NETWORK ANALYSIS FOR ECOLOGISTS USING R (March)
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19. GEOMETRIC MORPHOMETRICS USING R (June)
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