

Training workshop on

Analysis of Multivariate Data from Ecology and Environmental Science, using PRIMER v6

The Huntsman Marine Science Centre, St Andrews, New Brunswick, Canada, **30 April - 4 May 2012**

- This five day workshop will cover the statistical analysis of assemblage data (species by samples matrices of abundance, area cover etc) and/or multi-variable environmental data which arise in a wide range of applications in environmental science and ecology, from environmental impact assessments, through fundamental community ecology studies and monitoring of widescale biodiversity change, to biomarker studies and purely physical or chemical analyses
- Based on the PRIMER package v6 (Plymouth Routines In Multivariate Ecological Research), a worldwide standard software tool used in over 7000 SCI-listed papers for analysis of aquatic assemblages and, increasingly, terrestrial, paleontological, microbial and genetic data, also for model output, in ecotoxicology, epidemiology, sociology etc
- The workshop covers definitions of similarity, clustering (CLUSTER), ordination by non-metric multi-dimensional scaling (MDS) and principal components (PCA), hypothesis testing on similarity matrices (ANOSIM) and other permutation tests (RELATE), linking biotic patterns to environmental variables (BEST), identifying species explaining community patterns (SIMPER, BEST), comparison of ordinations (2STAGE), dominance curves and (bio)diversity indices, including measures based on species relatedness (DIVERSE, TAXDTEST). Also: the choice between 50+ (dis)similarity measures, including dispersion-weighted coefficients, 'exploratory' permutation tests for *a priori* unstructured samples (SIMPROF) and optimal biota-environment relationships (including non-metric multivariate regression trees, LINKTREE), tests for dominance curves (DOMDIS), and much else. Also briefly demonstrated will be the PERMANOVA+ add-on to PRIMER6, tackling ANOVA/regression analogues for more complex designs
- The workshop will be led by Prof K R Clarke (PRIMER-E and an honorary fellow of the Plymouth Marine Lab and the Marine Biological Association, UK). Bob Clarke is a researcher in ecological statistics and has worked for many years at PML, where he was responsible for adapting and developing the methods underlying the PRIMER package
- 'Hands-on' lab sessions will use literature case studies and participants are encouraged to bring along some of their own data. They also need to bring a Windows laptop, for which a valid PRIMER v6 licence exists or is bought at the special workshop price. Sharing a laptop is possible (e.g. between a supervisor and student). The emphasis is on practical application and interpretation, the theoretical aspects of the course (e.g. the multivariate statistics) being carefully selected to be that which is simple to describe and understand. **No prior statistical knowledge is assumed**

BOOKING FORM Please register by sending the following information to the organiser, Gerhard Pohle, Associate Director Huntsman Marine Science Centre, at gerhard.pohle@huntsmanmarine.ca (tel: 506 529 1203, fax: 506 529 1212). Current PRIMER licence status can be clarified with Cathy Clarke or Marg Moroney at admin@primer-e.com

Name: Organisation:

E-mail: Address:

Tel: Fax:

Credit card (M/card, Visa only) # expiry 3-digit security #

Course fee (please tick boxes, all prices in **Canadian \$**): [] \$900 all staff [] \$650 full-time students only

Accommodation for 5 nights, double occupancy (\$310), and all meals and breaks (\$290): [] \$600 all staff or students
or 5 nights single⁺ occupancy (\$620), and all meals and breaks (\$290): [] \$910 all staff or students

⁺Subject to availability

PRIMER v6* for: Private sector company: [] \$800 Public sector institution: [] \$600 University staff/student: [] \$400
Upgrading from v5 to v6: [] at 50% of above prices (if upgrading check first with Cathy/Marg that you hold a valid v5 licence)

*These represent a significant discount from the standard list price. Purchase or ownership of a single-user PRIMER v6 licence is required for a PC to be used with PRIMER at the workshop. The only exceptions allowed will be for students using a supervisor's PC, which has a licence, and the student will only use this for all their future work (or a PC covered by a v6 teaching lab licence – details of the latter from Cathy).

PERMANOVA+ add-on to PRIMER6: [] \$460/\$345/\$230 for private/public/university sector (not mandatory for this course).

The above software prices are for collection at the start of the workshop. For prior delivery there is an additional shipping charge - please tick here if required: [] \$40 (for one licence or PRIMER/PERMANOVA+ pair - ask for quote for multiple sets)