PRIMER/PERMANOVA Essentials

A Course in Multivariate Analysis for Ecology & Other Sciences

PRESENTER: Marti J. Anderson (Distinguished Professor *Emerita*, FRSNZ)
DATES: June 8th - 12th, 2026
HOSTED BY: Graduate School of Oceanography, University of Rhode Island
VENUE (in person): Bay Campus, University of Rhode Island, USA
or ONLINE: USA Eastern Daylight Time (UTC -4 hrs)

OVERVIEW

PRIMER-e is pleased to announce a **hybrid course** (offered *in person* and **online**) in *Multivariate Analysis for Ecology & Other Sciences* to be held over one week at the Graduate School of Oceanography, Bay Campus, University of Rhode Island, USA

This 5-day course will cover *the essentials* – a suite of core non-parametric methods implemented in PRIMER software, as well as several key semi-parametric methods encapsulated in PERMANOVA+. Sessions will run daily, Monday to Friday, from **8:30 am to 5:30 pm** on each day. Online participants will join the course live in USA Eastern Daylight Time (EDT, UTC -4 hrs). Each day will include a mixture of lectures and computer lab sessions to implement the new methods and techniques learned on example datasets. Participants will have the opportunity to discuss and analyse their own data in consultation with the presenter. Those who register to attend in person **are expected to bring their own laptop to the venue**. A *free* fully functional (but time-limited) licence of our latest software, **PRIMER 8 with PERMANOVA+**, will be made available to registered participants for trial use during the course. At the completion of the course, participants will receive an offer for a special discount on software subscriptions. (Note that PRIMER is a Windows-only product, so Macs need to run in Windows emulation.) This course will cater both to those who are new to multivariate analysis and to those who are familiar with PRIMER methods but would like a refresher regarding the latest techniques and approaches. This course is designed for scientists and research practitioners; it will emphasise the achievement of a conceptual understanding of multivariate methods, with demonstrations of how to implement these methods in the software and interpret results. No prior background in statistics is required.

OUTLINE of TOPICS

The topics covered in this course shall include:

- Properties of multivariate data (summary statistics, shade plots, histograms, draftsman plots, etc.);
- Pre-treatment options (transformations, normalization, standardization, & dispersion weighting);
- Measures of resemblance: distance, similarity and dissimilarity (Euclidean, Bray-Curtis, Jaccard, Sorensen, etc.);
- Cluster analysis (**CLUSTER**), including tests for significant structure within clusters (**SIMPROF**) to permit non-arbitrary classifications of samples or variables (species);
- Ordination *via* projection: principal components analysis (**PCA**); principal coordinate analysis (**PCO**);
- Ordination to preserve inter-sample relationships *via* non-metric, metric or threshold metric multi-dimensional scaling (**MDS**, **mMDS**, **tmMDS**);

- Relating biotic to abiotic data, including tests of association between resemblance matrices (**RELATE**), and finding optimal subsets of environmental (or other) variables that generate a 'best' match to patterns among samples based on species variables (**BEST - BIOENV**);
- Non-parametric permutation test for differences among *a priori* groups of samples (analysis of similarities (**ANOSIM**), and ordination of **bootstrap averages**;
- Finding important variables (**SIMPER** and **BEST – BVSTEP**);
- Diversity measures (**DIVERSE**); Taxonomic distinctness; Taxonomic resemblance
- Partitioning variation; tests for centroid differences among groups (**PERMANOVA**), including one-way and two-way cases, tests of interactions, constructing *a priori* contrasts and pairwise tests. Accounting for heterogeneity of dispersions.
- Tests for homogeneity of multivariate dispersions and comparisons of beta diversity (**PERMDISP**);
- Complex multi-factor experimental designs, identifying **fixed and random factors** that are **nested or crossed** with one another (**PERMANOVA**);
- **Multivariate control charts** for detecting unusual observations in space or time (e.g., monitoring).
- Fitting multivariate response data (e.g., species) to continuous predictor variables (e.g., environmental), including model selection (**DISTLM**) and visualising fitted variation using dissimilarity-based redundancy analysis (**dbRDA**);
- Graphical tools for effective presentation of results, including **matrix displays** and a variety of plot types, **animations** of ordinations captured to video files, centroid plots, bubble plots and multi-variable **segmented bubble plots**.

VENUE

All sessions will be held live online and in person at [Graduate School of Oceanography, Bay Campus](), University of Rhode Island, 215 South Ferry Road, Narragansett, USA. Online participants will join the course *via* Google Meet. For further local information or if you have questions regarding logistics at the venue, please contact the local host: Kristy Lewis ([kristy.lewis@uri.edu]()). For information regarding registration or any other course-related matters, contact the PRIMER-e admin team directly ([primer@primer-e.com]()).

REGISTRATION COSTS

The cost for registration **includes** all course materials, and – for in-person participants – coffee/tea and snacks during breaks, lunch, free Wi-Fi, and a temporary licence key to use **PRIMER 8 with PERMANOVA+** software (fully functional, for the duration of the course), *but not* accommodation, other meals, or the separate cost to purchase an annual subscription to the software (offered at discounted prices for workshop participants, see below).

The **prices to register** are:

Registration fees (in $USD)	IN PERSON	ONLINE ONLY
EARLY BIRD On or before April 30th, 2026	USD $1,190 ($890 for full-time students)	USD $930 ($610 for full-time students)
AFTER April 30th, 2026	USD $1,340 ($990 for full-time students)	USD $930 ($610 for full-time students)

All prices are in US dollars ($USD). Note that GST will be applied for New Zealand residents.

DISCOUNTED SOFTWARE PRICES FOR COURSE PARTICIPANTS

We are pleased to offer <u>all</u> course participants (attending online or in person) a **special discounted price** of *10% off* our standard price to purchase an annual subscription for **PRIMER 8 Software**. Details regarding this discount offer will be provided to participants at the end of the course.

REGISTRATION

To register, please fill out the registration form available on the [PRIMER-e website](#) and return it directly to primer@primer-e.com to secure your place. The deadline for registration and payment is **Monday, May 25th, 2026**. Late registrants will only be accepted if space permits. Unfortunately, we cannot permit you to attend the course unless the payment for your registration has been *received in full* by PRIMER-e *prior* to the commencement of the course. Please get in touch with us directly if you have any questions primer@primer-e.com, and especially if you would like:

- to *obtain a quote* for your registration;
- to register *more than one individual* from your organisation and pay on a single invoice (please include separate registration forms for each individual participant).

ABOUT THE PRESENTER

Marti J. Anderson is the [Director of PRIMER-e (Quest Research Limited)](#), a Fellow of the Royal Society of New Zealand and Distinguished Professor *Emerita* in the New Zealand Institute for Advanced Study (NZIAS) at Massey University in Auckland. Her core research is in community ecology, biodiversity, multivariate analysis, experimental design and resampling methods, with a special focus on developing novel statistical methods for ecology. She has developed all of the statistical methods in PERMANOVA+ and especially enjoys engaging in the dynamic interactions with students, academics and professionals that have become a trademark of the PRIMER/PERMANOVA+ international courses, shedding new light on multivariate data.