

PRIMER/PERMANOVA Essentials

A Course in Multivariate Analysis for Ecology & Other Sciences

PRESENTER: Dist. Prof. Marti J. Anderson, *FRSNZ*
DATES: December 14th - 18th, 2026
HOSTED BY: U.S. Geological Survey
VENUE (in person): Washington Water Science Center, Tacoma, WA, USA
or ONLINE: USA Pacific Standard Time (PST = UTC -8 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 Washington Water Science Center, Tacoma, WA, 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+. There will be special emphasis on the [new tools and routines](#) in the latest version of our software: **PRIMER 8**. 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 Pacific Standard Time (PST = UTC -8 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 also 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. (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, and to learn about the latest methods in the new version. 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.
- Tests for homogeneity of multivariate dispersions and comparisons of beta diversity (**PERMDISP**);
- **PERMANOVA** accounting for heterogeneity of dispersions.
- 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 [Washington Water Science Center](#), 934 Broadway, Tacoma, WA 98402. 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: Patrick Moran (pwmoran@usgs.gov). 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 a temporary licence key to use **PRIMER 8 with PERMANOVA+** software (fully functional, for the duration of the course). For **in-person** participants, the fee also includes coffee/tea and snacks during the breaks and free Wi-Fi at the venue. There are a number of nearby cafes where in-person participants can purchase lunch, or they are welcome to bring their own lunch. The registration fee does **not** include accommodation or other meals, or the separate (discounted) cost of purchasing a subscription for PRIMER 8 software.

The **prices to register** are:

<i>Registration fees (in \$USD)</i>	IN PERSON	ONLINE ONLY
EARLY BIRD On or before September 30 th , 2026	USD \$1,090 (\$790 for full-time students)	USD \$930 (\$610 for full-time students)
AFTER September 30 th , 2026	USD \$1,240 (\$890 for full-time students)	USD \$930 (\$610 for full-time students)

All prices are in US dollars (\$USD). Participants who reside in either New Zealand or Australia will also need to pay the relevant goods and services tax (GST), at invoice. Participants may (at the discretion of PRIMER-e) be eligible for a global equity discount on their registration fees (depending on their country of residence), which will be administered at the time of invoicing. Please contact primer@primer-e.com if you would like to apply and learn more.

DISCOUNTED SOFTWARE PRICES FOR COURSE PARTICIPANTS

We are pleased to offer all course participants a discount of **10% off** our standard prices for your initial software subscription. If you would like to receive a quote for a software subscription for **PRIMER 8 with PERMANOVA+** (either a 12-month or 36-month term), please contact our team at primer@primer-e.com. All discounts for which you are eligible (including student discounts, global equity discounts, or recognition discounts for those with existing PRIMER 7 licences, etc.) will be applied to your subscription quote.

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 **November 30th, 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 at primer@primer-e.com if you have any questions, 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); or
- to receive a quote for **a software subscription** at a discounted price.

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.