

PRIMER/PERMANOVA Essentials

A Course in Multivariate Analysis for Ecology & Other Sciences

PRESENTER: Dr Adam N. H. Smith
DATES: December 14th - 18th, 2026
TIME ZONE: USA Pacific Standard Time (PST = UTC -8 hrs)

OVERVIEW

PRIMER-e is pleased to announce an **online course** in *Multivariate Analysis for Ecology & Other Sciences* to be held over one week in the USA Pacific Standard Time (PST = UTC -8 hrs) time zone.

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, with online live presentations and Q & A, Monday to Friday, from **8:30 am to 5:30 pm** on each day (USA Pacific Standard Time PST = UTC -8 hrs). Participants will join the course live and online *via* Google Meet. Each day will include a mixture of lectures and computer practical lab sessions to implement the new methods and techniques learned on example datasets.

Participants are expected to use their own computer, equipped with secure and reliable internet access, a microphone, and a camera, enabling direct communication online *via* Google Meet for the duration of the course. All course materials, including recordings of online sessions, will be made available to participants for the duration of the course and for a period of four (4) weeks thereafter.

Software may be purchased at a discounted price (see below), or a **free** fully functional (but time-limited) licence of the software is 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**.

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). The registration fee does **not** include the separate (discounted) cost of purchasing a subscription for PRIMER 8 software.

The **prices to register** are:

	Professionals	Full-time Students
Registration Fees (<i>in USD\$</i>)	USD \$930	USD \$610

All prices are in US dollars (\$USD). Participants who reside in New Zealand will need to pay 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 or

recognition discounts for those with existing PRIMER 7 licences, etc.) will be applied to your subscription quote. Note that we will need your organisation's Tax ID number to create your 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

Adam N. H. Smith has worked with PRIMER-e since 2017 as a Workshop Presenter and Statistical Consultant. Adam obtained his PhD in Statistics from Massey University (MU) in Auckland, New Zealand. He is the Director of Sea Through Science Ltd., providing statistical consulting and marine ecological research services. Adam has extensive experience across a wide range of disciplines, including quantitative ecology, data mining, and biostatistics. He specializes in applying modern statistical methods to biology and ecology and is a key consultant to industry and government for fisheries and marine reserve assessments. As an educator, Adam is known for his enthusiastic and engaging teaching style and his passion for using statistical concepts to learn about our world.