

Presenter: Distinguished Professor Marti J. Anderson

Dates: August 9th - 13th, 2021

09:00 - 18:00 USA Eastern Daylight Time (UTC - 4 hrs)

This **PERMANOVA+ ONLINE WORKSHOP** will take place over **5 days**, (Monday – Friday, 09:00 - 18:00), on each day, with **4 scheduled online sessions per day**; two in the morning and two in the afternoon in Eastern Daylight Time (UTC - 4 hrs). Within each scheduled session, there will (generally) be:

- a **live lecture** (typically ~45-60 minutes), including ample opportunity for participants to ask questions;
- a **computer lab** session (to be done by participants on their own, using their own machines); and
- a **live wrap-up/summary**, in which the presenter will go through the computer lab, summarising salient points of interpretation, and also fielding any further questions.

Much of the final day of the workshop (Friday) will be devoted to Masterclass / Own-data sessions, where participants can ask questions, interact with other workshop participants in small (breakout) groups, and also consult one-on-one with the presenter to analyse their own datasets, using the tools learned during the week.

Participants are expected to use their own computer, which must be equipped with secure and reliable internet access, a microphone and a camera, enabling direct communication *via* appropriate video-conferencing software¹ for the duration of the workshop. All workshop materials and recorded lectures will be made available to participants for the duration of the workshop and for four (4) weeks thereafter. Software may be purchased (at a discounted price – see below) *or* a free fully functional (but time-limited) licence will be made available to registered participants for trial use during the. Note that PRIMER is a Windows-only product, so Macs need to run in Windows emulation.

Content

- The workshop will focus on **PERMANOVA+**, an add-on package to PRIMER 7. PERMANOVA+ allows analysis of multivariate data in response to complex designs, using semi-parametric partitioning on the basis of a resemblance measure of choice and with rigorous inferences *via* permutation methods. PERMANOVA+ allows more formal models, tests and predictions for multivariate (or univariate) ecological (and other) systems that are over-parameterised (i.e., have too many variables) or that demonstrate substantial non-normality. Familiarity with the core methods in PRIMER 6 or 7 (e.g., having previously attended a PRIMER workshop) *and/or* some prior knowledge of basic multivariate methods and experimental design is desirable for a PERMANOVA+ workshop.
- Participants will explore: analysis and estimation of components of variation in complex experimental designs, including interactions, covariates, contrasts, fixed or random effects, crossed or nested models, unbalanced designs, environmental impact designs, randomised blocks or repeated measures (**PERMANOVA**); tests for homogeneity of multivariate dispersions and analyses of beta diversity (**PERMDISP**); multivariate regression and model selection procedures (**DISTLM**); unconstrained (**PCO**) or constrained ordinations using distance-based redundancy analysis (**dbRDA**) or canonical analysis of principal coordinates (**CAP**), leave-one-out allocation success for discriminant

¹ PRIMER-e will facilitate access to a secure video-conferencing platform for workshop participants only.

analysis or canonical correlation analyses based on resemblance matrices and the placement of new points into existing predictive canonical models.

Registration fees (USD)*

*New Zealand residents must add 15% GST

PERMANOVA+ WORKSHOP FEES	
Full Registration:	Student Registration:
USD \$ 880	USD \$ 580

The registration fee **includes** workshop materials, and a temporary (fully functional but time-limited) software licence key for PRIMER 7 with PERMANOVA+. The registration fee **does not include** the separate (discounted) costs of time-unlimited software.

Software – discount prices for workshop participants

Participants wishing to purchase software at the discounted prices shown below should indicate this on the registration form. All prices are in USD. New Zealand residents must add 15% GST.

	New PRIMER 7 (USD)	Upgrade PRIMER 6 to PRIMER 7 (USD)	PERMANOVA+ add-on (USD)
Private sector	\$ 800	\$ 400	\$ 400
Public sector	\$ 600	\$ 300	\$ 300
Academic	\$ 400	\$ 200	\$ 200
Full-time student	\$ 200	\$ 100	\$ 100

Contact and Registration

To register, please fill out the **registration form** available for download from the PRIMER-e website (www.primer-e.com/workshops) and return it directly to primer@primer-e.com to secure your place. Places are limited. The **Final Deadline** for registration and payment is **August 1st, 2021**. Late registrants will only be accepted if space permits.

About the Presenter

Distinguished Professor Marti J. Anderson (Massey University and PRIMER-e, *FRSNZ*, Auckland, New Zealand) is an ecological statistician whose work spans several disciplines, from ecology to mathematical statistics. A Fellow of the Royal Society of New Zealand, she holds a Chair in Statistics in the New Zealand Institute for Advanced Study at Massey University and 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. Marti developed all the methods in PERMANOVA+ and especially loves engaging in the dynamic interactions with students, academics and professionals that have become a trademark of the PRIMER and PERMANOVA+ international workshops.