



PERMANOVA+ Online WORKSHOP
November 2nd-6th, 2020
Pacific Standard Time, USA (UTC – 8 hrs)

Presenter: Distinguished Professor Marti J. Anderson
Venue: ONLINE
Dates: November 2nd - 6th, 2020 (08:30 to 17:30 Pacific Standard Time, UTC – 8 hrs)

This **PERMANOVA+ ONLINE WORKSHOP** will take place over **5 days** (Monday – Friday, 08:30 to 17:30 *Pacific Standard Time* on each day), with **4 scheduled online sessions per day** (2 in the morning and 2 in the afternoon) for Monday-Thursday, and a series of “own-data” consultation sessions on Friday. 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.

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

The last day of the workshop (Friday) will be devoted to participants analysing their **own data**. An **online booking form** will be made available early in the week for individual participants (or small groups) to book a separate one-on-one consultation with the presenter on the Friday (including data/document sharing, if desired) to discuss their own data or projects, obtain advice and assistance with data analysis, and/or to ask additional questions.

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

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

Registration fees (USD)***New Zealand residents must add 15% GST*

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

U.S. Geological Survey staff members are eligible for a 33% discount on the above registration prices.

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

Note: *Participants who have registered for a PRIMER 7 workshop within the last 12 months will be eligible for a 10% discount on the registration fees for this online PERMANOVA+ workshop.*

Software – discount prices for workshop participants

Participants wishing to purchase PRIMER 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.primere.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 **October 24th, 2020**.

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.