

Presenter: **Dr Adam N. H. Smith and Distinguished Professor Marti J. Anderson**

Venue: **ONLINE** (*mirrored at the University of Florida, Austin Cary Forest Campus, Gainesville, FL, USA*)

Dates: **November 16th - 20th, 2020**
(08:30 to 17:30 Eastern Standard Time, UTC – 5 hrs)

**Advanced
PRIMER 7 / PERMANOVA+
Online WORKSHOP**

This **Advanced PRIMER 7 / PERMANOVA+ ONLINE WORKSHOP** will take place over **5 days** (Monday – Friday, 08:30 to 17:30 Eastern 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 or dual boot.

The last day of the workshop (Friday) will be devoted to participants analysing their **own data**. Each individual participant (or a small group of participants, if desired) will be scheduled into a separate one-on-one online consultation with the presenter(s) 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

- This workshop will provide an overview of statistical methods in non-parametric analysis of multivariate data, encapsulated in the software: **PRIMER version 7**. It will cater primarily to those who have some working experience of PRIMER but are keen to learn about the latest developments in version 7. Important new tools include: **shade plots** with flexible ordering & clustering of axes; **coherence plots** to show species displaying statistically distinguishable response patterns; **unconstrained** binary or divisive **flat clustering** (as in *k*-means) along with **SIMPROF** tests; **metric, threshold metric, non-metric** or **combined MDS** in any dimensions; **bootstrap averages** to show variation among averages in metric MDS space; **new plot types** (bar, box, means, line, histogram, scatter, surface, shade) in 2-d or 3-d; **animations** of ordinations captured to video files; multi-factor and multi-variable **segmented bubble plots** in 2-d and 3-d; and much more...
- This workshop will also provide an overview of the methods in the **PERMANOVA+ add-on package** for PRIMER. PERMANOVA+ allows more formal models, tests and predictions for multivariate (or univariate) ecological (and other) data in dissimilarity spaces. Participants will explore partitioning multivariate variation in complex experimental/ sampling designs, including interactions, contrasts, fixed or random effects, crossed or nested (hierarchical) multi-factor mixed models (**PERMANOVA**); tests for homogeneity of dispersions and analyses of beta diversity (**PERMDISP**); multivariate regression and model-selection procedures (**DISTLM**); unconstrained

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

(PCO) or constrained ordinations using distance-based redundancy analysis (**dbRDA**) or canonical analysis of principal coordinates, as well as predictive canonical models (**CAP**).

- As well as covering advanced methods in **PRIMER v7** and **PERMANOVA+**, the core basic multivariate routines (**PCA**, **MDS**, **ANOSIM**, **RELATE**, **BEST**) will also all be touched on briefly, including a review of data pre-treatment tools and definitions of (dis)similarity. Whilst aimed at existing PRIMER users, including those who have been to a previous PRIMER course, the week will be structured so that those who are new to this area will be able to learn much about the core methods. Non-parametric/Semi-parametric statistics and permutation tests make the methods intuitively simple to understand so **no prior background in statistics is assumed**.

Venue: Mirroring by our original host, the University of Florida, Austin Cary Forest Campus

This workshop will be offered **online**, so participants may attend from **anywhere they wish**. For some, however, one of the advantages of a workshop experience is the opportunity to focus and engage with presented material while being *disengaged* from one's usual working or home environment. This workshop was originally scheduled to be hosted by the School of Forest Resources & Conservation, University of Florida, with all sessions to be held at the Austin Cary Forest Campus, 10625 NE Waldo Road, Gainesville, FL 32609, USA. Although the presenter is not expected to attend in person (due to travel restrictions under COVID-19), the original host has graciously agreed to provide a **physical venue** for workshop participants (bringing their own laptop), should they so wish. This online workshop will be fully supported (including wifi), and all sessions will be **mirrored** (live-streamed to a large screen) for registered participants who wish to attend at the original Austin Cary Forest Campus venue.

IMPORTANT: Attendance at the mirroring venue will be subject to any restrictions or closures that may be imposed due to the COVID-19 pandemic and places will be limited. Those wishing to attend at the venue should indicate this on their registration form and the PRIMER-e office will advise regarding availability. Please note that, to avoid forest fires, the venue and surrounding forest campus enforce a strict **NO SMOKING** policy that must be observed by participants. For further local information (e.g., directions, parking, nearby accommodation, etc.), and to opt-in and pay for pre-arranged lunch and tea/coffee breaks, please contact the local organiser, Professor Deb Murie (dmurie@ufl.edu).

Registration fees (USD)*

*New Zealand residents must add 15% GST

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

University of Florida staff members and students 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+. Should you decide to attend the workshop at the Austin Cary Forest Campus venue, then free wifi access there is also included. The registration fee **does not include** tea/coffee breaks or lunches at the venue, other meals, accommodation or the separate (discounted) cost 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 their 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 **November 7th, 2020**. Late registrants will only be accepted if space permits.

About the Lecturers

Dr Adam N. H. Smith (Massey University, Albany, Auckland, New Zealand) is a highly sought-after ecological statistician who specialises in the application of modern statistical methods to ecology and management, including fisheries and marine reserve assessment. Adam obtained his PhD from Massey University and has a wealth of multi-disciplinary experience across multiple sectors. He lectures across a wide range of areas, including both univariate and multivariate statistics, data mining, quantitative ecology and biostatistics. He has been a key consultant to industry and government, having worked as an in-house statistician for the Department of Conservation (DoC) and the National Institute for Water and Atmospheric Sciences (NIWA) in New Zealand. Adam is an enthusiastic and engaging lecturer with a passion for natural environments and for teaching and learning.

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.