PRIMER 7
Online Workshop

in Multivariate Analysis for Ecology and other Sciences

PRESENTER: Dr Adam N. H. Smith (Massey University and PRIMER-e)

DATES: 6th – 10th June 2022

TIME ZONE: Central European Summer Time (UTC +2 hrs)

OVERVIEW

This **PRIMER 7 Online Workshop** will take place over 5 days (Monday – Friday, 09:00 – 17:00). The workshop is designed to give a fundamental understanding of how to analyse and gain insights from multivariate data using the software PRIMER version 7. Participants will learn through lectures, demonstrations, and practical experience with the software. The schedule will include a combination of live, online, interactive sessions and time reserved for self-driven study and exploration. Throughout the workshop, there will be plenty of time for asking questions and free-flow discussions with the presenter.

Much of the final day of the workshop (Friday 10th June) will be devoted to a small number of **masterclasses**. During each masterclass, the presenter will work with participants to ***analyse their own data in real time*** in an open, collaborative setting. At the beginning of the workshop, we will ask participants interested in providing data for a masterclass session to send us their data along with a description of the study and some specific research questions. All participants are welcome to attend any/all masterclasses of interest, and constructive questions and discussion will be encouraged from everyone.

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 workshop. All workshop materials, including recordings of online sessions, will be made available to participants for the duration of the workshop 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 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. Groups of participants (e.g., from the same lab or geographical area) may also arrange to share a space to participate in the workshop together.

Please note*: a subsequent online PERMANOVA+ workshop will be held* ***31st October – 4th November 2022****, Central European Time (UTC +1 hr). Details can be found here: https://www.primer-e.com/workshops/.*

WORKSHOP CONTENT

This workshop will provide an extensive overview of statistical methods in non-parametric analysis of multivariate data implemented in the software **PRIMER 7**. It will cater both to those who are **new to PRIMER** and to those who are "**old hands**" but have not yet had a chance to get up to speed with the latest developments in version 7.

Important new tools include: **shade plots** with flexible ordering & clustering of axes; **coherence plots** to show groups of species that display coherent response patterns among samples; agglomerative or **divisive clustering** 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; **2-way versions** of BEST and RELATE; **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; **ANOSIM** extended for **ordered factors** and **3-factor** designs and much more…

In addition to novel tools in PRIMER 7, the core basic multivariate routines will also be fully discussed, e.g. pre-treatment of data; definitions of similarity; clustering; ordination by principal components (**PCA**), non-metric (and metric) multi-dimensional scaling (**MDS**); permutation tests on similarity matrices for structured (**ANOSIM**, **RELATE**) and unstructured (**SIMPROF**) cases; emphasis on species analyses; linking community to abiotic data (**BEST**); biodiversity indices, including **taxonomic distinctness**; and graphical tools for effective presentation of results. Non-parametric statistics and permutation tests make the methods intuitively simple to understand so **no prior background in statistics is assumed**.

WORKSHOP FEES

To ensure that our online workshops are accessible for researchers everywhere, we are pleased to offer ***Global Equitability Pricing*** (GEP). Specifically, customers will receive a percentage discount off our standard US prices for workshop registration and software in direct accordance with the *Price Level Ratio published by the World Bank* for their country of residence. This means that the amount you pay for any of our products (workshop registration fees and/or or software products) ***depends on your country of residence***.

Workshop fees ***for residents of the USA*** are: USD **$880** for Professionals and USD **$580** for full-time Students. However, ***your price*** may well be different. For example,

Country of Residence	**GEP discount (%)**	**Professional Registration** ($USD)	**Full-time Student Registration** ($USD)
USA	0.00%	$ 880.00	$ 580.00
UK	10.31 %	$ 789.27	$ 520.20
Italy	24.29 %	$ 666.25	$ 439.12
Portugal	34.95 %	$ 572.44	$ 377.29
South Africa	57.91 %	$ 370.39	$ 244.12
Mozambique	65.40 %	$ 304.48	$ 200.68

Please consult the ***GEP Table*** at the end of this document to discover the cost for your registration by reference to your country of residence. All prices are in United States dollars ($USD). Registration fees cover access to all workshop materials and live sessions. The registration fee **does not include** the separate (discounted) cost of **time-unlimited** software.

DISCOUNTED SOFTWARE PRICES FOR WORKSHOP PARTICIPANTS

Workshop participants may purchase time-unlimited PRIMER software at ***10% off*** our standard prices. Participants who do not reside in the USA are ***also*** eligible for our ***Global Equitability Pricing*** (GEP). The workshop discount will be applied ***on top of*** the adjusted GEP price appropriate for each individual customer. For example, workshop-discounted prices for a ***single end-user licence*** of **PRIMER 7 with PERMANOVA+** across different sectors are shown below for residents of various countries:

Country of Residence	**GEP discount** (%)	**Commercial licence** ($USD)	**Public licence** ($USD)	**Academic licence** ($USD)	**Student licence** ($USD)
USA	0.00%	$1,350.00	$1,012.50	$675.00	$337.50
UK	10.31 %	$1,210.82	$908.11	$605.41	$302.70
Italy	24.29 %	$1,022.09	$766.56	$511.04	$255.52
Portugal	34.95 %	$878.18	$658.63	$439.09	$219.55
South Africa	57.91 %	$568.22	$426.16	$284.11	$142.05
Mozambique	65.40%	$467.10	$350.33	$233.55	$116.78

All prices are given in US dollars. Note that ***your price*** may well differ from those listed above – **all** discounts for which you are eligible (including, for example, discounts for upgrades from PRIMER 6) will be applied on invoice. If you would like a quotation from us prior to registering for the workshop, please get in touch with us directly at: primer@primer-e.co.nz.

REGISTRATION

To register, please fill out the registration form available on the PRIMER-e website (www.primer-e.com/workshops) and return it directly to primer@primer-e.co.nz to secure your place. The deadline for registration and payment is **28th May 2022**. Late registrants will only be accepted if space permits.

Please get in touch with us directly on primer@primer-e.co.nz if you have any questions, and especially:

- if you would like to ***obtain a quote*** for your registration (with or without software), including all ***discounts*** for which you are eligible;
- if you wish to register ***more than one individual*** from your organisation and pay on a single invoice; or
- if you wish to purchase ***more than one software licence*** at discounted prices on a single invoice.

ABOUT THE PRESENTER

Dr Adam Smith obtained his PhD from Massey University (MU) in Auckland, New Zealand and is currently a Senior Lecturer in Statistics at MU and a Research Associate at PRIMER-e. Adam pecializes in the application of modern statistical methods to ecology and management, including fisheries and marine reserve assessment. Adam has a wealth of multi-disciplinary experience and lectures across a wide range of areas, including 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.

GLOBAL EQUITABILITY PRICING (GEP)

Table of Global Equitability Pricing (GEP) discounts off standard (US) prices for individual countries, based on the *Price Level Ratio published by the World Bank*. Prices shown are for professional or student registration for a single individual to attend our online workshop after applying the GEP percentage discount shown. **All prices are in US dollars ($ USD)**. Prices do not include costs for bank fees or currency conversions. Note that the USA and all countries with a Price Level Ratio ≥ 1.0 relative to the USA are given a discount of 0.00%.

If your country of residence is not listed here, or if you have any other questions, please contact us directly at primer@primer-e.co.nz.

Country	**% Discount**	**Professional** (USD)	**Student** (USD)
Afghanistan	75.63%	$ 214.46	$ 141.35
Albania	62.26%	$ 332.11	$ 218.89
Algeria	70.62%	$ 258.54	$ 170.39
American Samoa	0.00%	$ 880.00	$ 580.00
Andorra	0.00%	$ 880.00	$ 580.00
Angola	71.01%	$ 255.11	$ 168.14
Antigua and Barbuda	23.72%	$ 671.26	$ 442.42
Argentina	59.35%	$ 357.72	$ 235.77
Armenia	67.88%	$ 282.66	$ 186.30
Aruba	24.54%	$ 664.05	$ 437.67
Australia	1.34%	$ 868.21	$ 572.23
Austria	12.69%	$ 768.33	$ 506.40
Azerbaijan	70.84%	$ 256.61	$ 169.13
Bahamas, The	11.85%	$ 775.72	$ 511.27
Bahrain	50.08%	$ 439.30	$ 289.54
Bangladesh	61.26%	$ 340.91	$ 224.69
Barbados	0.00%	$ 880.00	$ 580.00
Belarus	68.26%	$ 279.31	$ 184.09
Belgium	14.19%	$ 755.13	$ 497.70
Belize	31.29%	$ 604.65	$ 398.52
Benin	63.17%	$ 324.10	$ 213.61
Bermuda	0.00%	$ 880.00	$ 580.00
Bhutan	72.87%	$ 238.74	$ 157.35
Bolivia	62.44%	$ 330.53	$ 217.85
Bosnia and Herzegovina	61.37%	$ 339.94	$ 224.05
Botswana	60.34%	$ 349.01	$ 230.03
Brazil	54.19%	$ 403.13	$ 265.70
British Virgin Islands	0.00%	$ 880.00	$ 580.00
Brunei Darussalam	58.17%	$ 368.10	$ 242.61
Bulgaria	59.06%	$ 360.27	$ 237.45
Burkina Faso	63.54%	$ 320.85	$ 211.47
Burundi	64.47%	$ 312.66	$ 206.07
Cabo Verde	51.95%	$ 422.84	$ 278.69

Country	% Discount	Professional (USD)	Student (USD)
Cambodia	65.79%	$ 301.05	$ 198.42
Cameroon	60.26%	$ 349.71	$ 230.49
Canada	10.05%	$ 791.56	$ 521.71
Cayman Islands	0.00%	$ 880.00	$ 580.00
Central African Republic	51.32%	$ 428.38	$ 282.34
Chad	61.68%	$ 337.24	$ 222.26
Chile	47.22%	$ 464.46	$ 306.12
China	39.35%	$ 533.72	$ 351.77
Colombia	63.39%	$ 322.17	$ 212.34
Comoros	57.67%	$ 372.50	$ 245.51
Congo, Dem. Rep.	50.77%	$ 433.22	$ 285.53
Congo, Rep.	45.79%	$ 477.05	$ 314.42
Costa Rica	42.58%	$ 505.30	$ 333.04
Cote d'Ivoire	57.39%	$ 374.97	$ 247.14
Croatia	51.49%	$ 426.89	$ 281.36
Curacao	22.83%	$ 679.10	$ 447.59
Cyprus	30.77%	$ 609.22	$ 401.53
Czech Republic	45.46%	$ 479.95	$ 316.33
Denmark	0.00%	$ 880.00	$ 580.00
Djibouti	40.76%	$ 521.31	$ 343.59
Dominica	37.45%	$ 550.44	$ 362.79
Dominican Republic	59.48%	$ 356.58	$ 235.02
Ecuador	48.60%	$ 452.32	$ 298.12
Egypt, Arab Rep.	71.86%	$ 247.63	$ 163.21
El Salvador	55.30%	$ 393.36	$ 259.26
Equatorial Guinea	60.19%	$ 350.33	$ 230.90
Eritrea	63.72%	$ 319.26	$ 210.42
Estonia	39.28%	$ 534.34	$ 352.18
Eswatini	61.42%	$ 339.50	$ 223.76
Ethiopia	61.36%	$ 340.03	$ 224.11
Faroe Islands	0.00%	$ 880.00	$ 580.00
Fiji	57.92%	$ 370.30	$ 244.06
Finland	4.01%	$ 844.71	$ 556.74
France	16.44%	$ 735.33	$ 484.65
Gabon	53.88%	$ 405.86	$ 267.50
Gambia, The	65.45%	$ 304.04	$ 200.39
Georgia	71.21%	$ 253.35	$ 166.98
Germany	14.84%	$ 749.41	$ 493.93
Ghana	58.39%	$ 366.17	$ 241.34
Gibraltar	0.00%	$ 880.00	$ 580.00
Greece	37.90%	$ 546.48	$ 360.18

Country	% Discount	Professional (USD)	Student (USD)
Greenland	0.00%	$ 880.00	$ 580.00
Grenada	39.09%	$ 536.01	$ 353.28
Guam	0.00%	$ 880.00	$ 580.00
Guatemala	48.01%	$ 457.51	$ 301.54
Guinea	57.62%	$ 372.94	$ 245.80
Guinea-Bissau	62.67%	$ 328.50	$ 216.51
Guyana	64.70%	$ 310.64	$ 204.74
Haiti	59.77%	$ 354.02	$ 233.33
Honduras	55.62%	$ 390.54	$ 257.40
Hong Kong SAR, China	21.80%	$ 688.16	$ 453.56
Hungary	51.94%	$ 422.93	$ 278.75
Iceland	0.00%	$ 880.00	$ 580.00
India	70.55%	$ 259.16	$ 170.81
Indonesia	67.95%	$ 282.04	$ 185.89
Iraq	57.42%	$ 374.70	$ 246.96
Ireland	10.47%	$ 787.86	$ 519.27
Isle of Man	0.00%	$ 880.00	$ 580.00
Israel	0.00%	$ 880.00	$ 580.00
Italy	24.29%	$ 666.25	$ 439.12
Jamaica	49.42%	$ 445.10	$ 293.36
Japan	3.69%	$ 847.53	$ 558.60
Jordan	58.64%	$ 363.97	$ 239.89
Kazakhstan	66.12%	$ 298.14	$ 196.50
Kenya	58.71%	$ 363.35	$ 239.48
Kiribati	30.89%	$ 608.17	$ 400.84
Korea, Rep.	26.98%	$ 642.58	$ 423.52
Kosovo	62.29%	$ 331.85	$ 218.72
Kuwait	37.70%	$ 548.24	$ 361.34
Kyrgyz Republic	76.36%	$ 208.03	$ 137.11
Lao PDR	68.06%	$ 281.07	$ 185.25
Latvia	44.97%	$ 484.26	$ 319.17
Lebanon	60.20%	$ 350.24	$ 230.84
Lesotho	64.20%	$ 315.04	$ 207.64
Liberia	59.16%	$ 359.39	$ 236.87
Libya	65.90%	$ 300.08	$ 197.78
Liechtenstein	0.00%	$ 880.00	$ 580.00
Lithuania	48.37%	$ 454.34	$ 299.45
Luxembourg	2.10%	$ 861.52	$ 567.82
Macao SAR, China	35.02%	$ 571.82	$ 376.88
Madagascar	68.90%	$ 273.68	$ 180.38
Malawi	60.13%	$ 350.86	$ 231.25

Country	% Discount	Professional (USD)	Student (USD)
Malaysia	62.70%	$ 328.24	$ 216.34
Maldives	45.84%	$ 476.61	$ 314.13
Mali	63.27%	$ 323.22	$ 213.03
Malta	34.60%	$ 575.52	$ 379.32
Marshall Islands	3.01%	$ 853.51	$ 562.54
Mauritania	68.18%	$ 280.02	$ 184.56
Mauritius	58.02%	$ 369.42	$ 243.48
Mexico	55.68%	$ 390.02	$ 257.06
Micronesia, Fed. Sts.	0.76%	$ 873.31	$ 575.59
Moldova	65.00%	$ 308.00	$ 203.00
Monaco	0.00%	$ 880.00	$ 580.00
Mongolia	66.88%	$ 291.46	$ 192.10
Montenegro	62.63%	$ 328.86	$ 216.75
Morocco	58.76%	$ 362.91	$ 239.19
Mozambique	65.40%	$ 304.48	$ 200.68
Myanmar	70.79%	$ 257.05	$ 169.42
Namibia	55.12%	$ 394.94	$ 260.30
Nauru	22.10%	$ 685.52	$ 451.82
Nepal	71.18%	$ 253.62	$ 167.16
Netherlands	11.69%	$ 777.13	$ 512.20
New Caledonia	0.00%	$ 880.00	$ 580.00
New Zealand	5.56%	$ 831.07	$ 547.75
Nicaragua	65.79%	$ 301.05	$ 198.42
Niger	55.25%	$ 393.80	$ 259.55
Nigeria	59.57%	$ 355.78	$ 234.49
North Macedonia	65.21%	$ 306.15	$ 201.78
Northern Mariana Islands	0.00%	$ 880.00	$ 580.00
Norway	0.00%	$ 880.00	$ 580.00
Oman	46.07%	$ 474.58	$ 312.79
Pakistan	75.52%	$ 215.42	$ 141.98
Palau	18.61%	$ 716.23	$ 472.06
Panama	54.18%	$ 403.22	$ 265.76
Papua New Guinea	39.05%	$ 536.36	$ 353.51
Paraguay	61.96%	$ 334.75	$ 220.63
Peru	48.42%	$ 453.90	$ 299.16
Philippines	60.68%	$ 346.02	$ 228.06
Poland	54.31%	$ 402.07	$ 265.00
Portugal	34.95%	$ 572.44	$ 377.29
Puerto Rico	8.47%	$ 805.46	$ 530.87
Qatar	43.52%	$ 497.02	$ 327.58
Romania	59.63%	$ 355.26	$ 234.15

Country	% Discount	Professional (USD)	Student (USD)
Rwanda	63.96%	$ 317.15	$ 209.03
Samoa	36.32%	$ 560.38	$ 369.34
San Marino	24.74%	$ 662.29	$ 436.51
Sao Tome and Principe	49.51%	$ 444.31	$ 292.84
Saudi Arabia	56.99%	$ 378.49	$ 249.46
Senegal	57.26%	$ 376.11	$ 247.89
Serbia	60.14%	$ 350.77	$ 231.19
Seychelles	55.54%	$ 391.25	$ 257.87
Sierra Leone	72.13%	$ 245.26	$ 161.65
Singapore	39.31%	$ 534.07	$ 352.00
Sint Maarten (Dutch part)	19.43%	$ 709.02	$ 467.31
Slovak Republic	39.82%	$ 529.58	$ 349.04
Slovenia	36.40%	$ 559.68	$ 368.88
Solomon Islands	13.78%	$ 758.74	$ 500.08
Somalia	64.65%	$ 311.08	$ 205.03
South Africa	57.91%	$ 370.39	$ 244.12
South Sudan	9.32%	$ 797.98	$ 525.94
Spain	29.42%	$ 621.10	$ 409.36
Sri Lanka	72.16%	$ 244.99	$ 161.47
St. Kitts and Nevis	28.94%	$ 625.33	$ 412.15
St. Lucia	28.34%	$ 630.61	$ 415.63
St. Martin (French part)	0.00%	$ 880.00	$ 580.00
St. Vincent and the Grenadines	42.85%	$ 502.92	$ 331.47
Sudan	85.97%	$ 123.46	$ 81.37
Suriname	61.85%	$ 335.72	$ 221.27
Sweden	4.83%	$ 837.50	$ 551.99
Switzerland	0.00%	$ 880.00	$ 580.00
Tajikistan	77.73%	$ 195.98	$ 129.17
Tanzania	61.28%	$ 340.74	$ 224.58
Thailand	60.58%	$ 346.90	$ 228.64
Timor-Leste	58.84%	$ 362.21	$ 238.73
Togo	58.85%	$ 362.12	$ 238.67
Tonga	26.25%	$ 649.00	$ 427.75
Trinidad and Tobago	38.54%	$ 540.85	$ 356.47
Tunisia	67.65%	$ 284.68	$ 187.63
Turkey	69.64%	$ 261.17	$ 176.09
Turkmenistan	53.00%	$ 413.60	$ 272.60
Turks and Caicos Islands	0.00%	$ 880.00	$ 580.00
Tuvalu	10.96%	$ 783.55	$ 516.43
Uganda	64.43%	$ 313.02	$ 206.31
Ukraine	71.46%	$ 251.15	$ 165.53

Country	% Discount	Professional (USD)	Student (USD)
United Arab Emirates	38.39%	$ 542.17	$ 357.34
United Kingdom	10.31%	$ 789.27	$ 520.20
United States	0.00%	$ 880.00	$ 580.00
Uruguay	32.27%	$ 596.02	$ 392.83
Uzbekistan	77.15%	$ 201.08	$ 132.53
Vanuatu	4.51%	$ 840.31	$ 553.84
Vietnam	67.80%	$ 283.36	$ 186.76
Virgin Islands (U.S)	0.00%	$ 880.00	$ 580.00
West Bank and Gaza	43.07%	$ 500.98	$ 330.19
Yemen, Rep.	56.43%	$ 383.42	$ 252.71
Zambia	69.54%	$ 268.05	$ 176.67
Zimbabwe	61.03%	$ 342.94	$ 226.03