

PRIMER 7 Online Workshop



Multivariate Analysis for Ecology & Other Sciences

PRESENTER: Dr Paul J. Somerfield (*Plymouth Marine Laboratory*)
DATES: February 6th -10th, 2023
TIME ZONE: 09:00 - 18:00 *USA Eastern Standard Time (UTC -5 hrs)*

OVERVIEW

This **PRIMER 7 Online Workshop** will take place over 5 days (Monday – Friday, 09:00 - 18:00). The workshop is designed to give a fundamental understanding of how to analyse and gain insights from multivariate data using the software PRIMER 7. Participants will learn through lectures, demonstrations, and practical experience with the software. The schedule will include a combination of live, online lectures and practical sessions and, throughout the workshop, there will be plenty of time for asking questions and free-flow discussions with the presenter.

For much of the final day of the workshop (Friday, February 10th, 2023) participants will be allocated to one of a small number of groups. In each group participants can **analyse their own data in real time** in an open, collaborative setting with support from other participants and the presenter. During these sessions 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.

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**. The core basic multivariate routines in PRIMER 7 will be fully discussed, including: pre-treatment of data; definitions of similarity; clustering; ordination by principal components (**PCA**), non-metric multi-dimensional scaling (**nMDS**); 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 required**.

This workshop 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 explore the 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...

WORKSHOP FEES

Workshop fees *for residents of the USA* are: USD **\$880** for Professionals and USD **\$580** for full-time Students.

For those who do not reside in the USA, we offer [Global Equitability Pricing \(GEP\)](#), which includes a percentage discount off our standard US prices (for online workshop registration and software) in direct accordance with the [Price Level Ratio published by the World Bank](#) for their country of residence. Thus, the workshop fee *depends on your country of residence*. Please consult our table of GEP prices (p. 3 below *et seq.*) to find your price to register for this online workshop. If you would like a quotation from us prior to registering, please get in touch with us directly at: primer@primer-e.co.nz.

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	4.71 %	\$1,543.70	\$1,157.77	\$771.85	\$385.92
Italy	22.61 %	\$1,253.72	\$940.29	\$626.86	\$313.43
Portugal	32.40 %	\$1,095.12	\$821.34	\$547.56	\$273.78
South Africa	51.50 %	\$785.70	\$589.28	\$392.85	\$196.43
Mozambique	62.72 %	\$603.94	\$452.95	\$301.97	\$150.98

All prices are given in US dollars. Note that **your price** will depend on your country of residence. **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 for workshop registration + software prior to registering, 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 **January 27th, 2023**. 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;
- to register **more than one individual** from your organisation and pay on a single invoice; or
- to purchase **more than one software licence** at discounted prices on a single invoice

ABOUT THE PRESENTER

Dr Paul J. Somerfield (Plymouth Marine Laboratory) is a highly cited and sought-after numerical ecologist who has been instrumental in developing and using the methods in PRIMER across many fields, having led and lectured PRIMER courses across the globe for over two decades. With knowledge and broad experience in analysing multivariate datasets of all kinds, Paul has mentored and published with hundreds of scientists and professionals from a wide range of disciplines: marine, freshwater, and terrestrial ecology, oceanography, soil science, forestry, environmental science, microbial ecology, genetics, remote sensing, and modelling.

GLOBAL EQUITABILITY PRICING (GEP)

Table of Global Equitability Pricing (GEP) discounts off standard (US) prices for residents of 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 this 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. All countries with a Price Level Ratio ≥ 1.0 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	75.14%	\$218.77	\$144.19
Albania	58.49%	\$365.29	\$240.76
Algeria	68.72%	\$275.26	\$181.42
Angola	67.51%	\$285.91	\$188.44
Antigua and Barbuda	24.89%	\$660.97	\$435.64
Argentina	54.59%	\$399.61	\$263.38
Armenia	68.08%	\$280.90	\$185.14
Aruba	25.01%	\$659.91	\$434.94
Australia	0.00%	\$880.00	\$580.00
Austria	8.83%	\$802.30	\$528.79
Azerbaijan	66.02%	\$299.02	\$197.08
Bahamas, The	17.21%	\$728.55	\$480.18
Bahrain	51.04%	\$430.85	\$283.97
Bangladesh	62.15%	\$333.08	\$219.53
Barbados	0.00%	\$880.00	\$580.00
Belarus	66.34%	\$296.21	\$195.23

Country	% Discount	Professional (USD)	Student (USD)
Belgium	12.16%	\$772.99	\$509.47
Belize	36.13%	\$562.06	\$370.45
Benin	62.30%	\$331.76	\$218.66
Bermuda	0.00%	\$880.00	\$580.00
Bhutan	73.04%	\$237.25	\$156.37
Bolivia	62.18%	\$332.82	\$219.36
Bosnia and Herzegovina	58.94%	\$361.33	\$238.15
Botswana	58.26%	\$367.31	\$242.09
Brazil	53.17%	\$412.10	\$271.61
Brunei Darussalam	52.38%	\$419.06	\$276.20
Bulgaria	56.43%	\$383.42	\$252.71
Burkina Faso	62.71%	\$328.15	\$216.28
Burundi	70.15%	\$262.68	\$173.13
Cabo Verde	50.97%	\$431.46	\$284.37
Cambodia	66.03%	\$298.94	\$197.03
Cameroon	59.12%	\$359.74	\$237.10
Cayman Islands	0.00%	\$880.00	\$580.00
Central African Republic	49.88%	\$441.06	\$290.70
Chad	56.22%	\$385.26	\$253.92
Chile	43.30%	\$498.96	\$328.86
China	35.07%	\$571.38	\$376.59
Colombia	63.71%	\$319.35	\$210.48
Comoros	54.49%	\$400.49	\$263.96
Congo, Dem. Rep.	52.07%	\$421.78	\$277.99
Congo, Rep.	38.79%	\$538.65	\$355.02
Costa Rica	46.51%	\$470.71	\$310.24
Cote d'Ivoire	56.58%	\$382.10	\$251.84
Croatia	48.53%	\$452.94	\$298.53
Curacao	22.10%	\$685.52	\$451.82
Cyprus	27.63%	\$636.86	\$419.75
Czech Republic	40.40%	\$524.48	\$345.68
Denmark	0.00%	\$880.00	\$580.00
Djibouti	43.24%	\$499.49	\$329.21
Dominica	36.86%	\$555.63	\$366.21
Dominican Republic	58.57%	\$364.58	\$240.29
Ecuador	49.11%	\$447.83	\$295.16
Egypt, Arab Rep.	70.89%	\$256.17	\$168.84
El Salvador	54.40%	\$401.28	\$264.48
Equatorial Guinea	53.32%	\$410.78	\$270.74
Eritrea	63.72%	\$319.26	\$210.42
Estonia	35.34%	\$569.01	\$375.03

Country	% Discount	Professional (USD)	Student (USD)
Eswatini	57.06%	\$377.87	\$249.05
Ethiopia	63.69%	\$319.53	\$210.60
Fiji	57.83%	\$371.10	\$244.59
Finland	1.86%	\$863.63	\$569.21
France	14.21%	\$754.95	\$497.58
Gabon	48.60%	\$452.32	\$298.12
Gambia, The	65.67%	\$302.10	\$199.11
Georgia	70.33%	\$261.10	\$172.09
Germany	12.30%	\$771.76	\$508.66
Ghana	60.42%	\$348.30	\$229.56
Greece	35.21%	\$570.15	\$375.78
Grenada	40.48%	\$523.78	\$345.22
Guatemala	48.56%	\$452.67	\$298.35
Guinea	59.20%	\$359.04	\$236.64
Guinea-Bissau	60.48%	\$347.78	\$229.22
Guyana	61.73%	\$336.78	\$221.97
Haiti	41.98%	\$510.58	\$336.52
Honduras	54.72%	\$398.46	\$262.62
Hong Kong SAR, China	24.73%	\$662.38	\$436.57
Hungary	48.92%	\$449.50	\$296.26
Iceland	0.00%	\$880.00	\$580.00
India	68.94%	\$273.33	\$180.15
Indonesia	66.74%	\$292.69	\$192.91
Iraq	51.50%	\$426.80	\$281.30
Ireland	6.86%	\$819.63	\$540.21
Israel	0.00%	\$880.00	\$580.00
Italy	22.61%	\$681.03	\$448.86
Jamaica	54.25%	\$402.60	\$265.35
Japan	8.51%	\$805.11	\$530.64
Jordan	59.77%	\$354.02	\$233.33
Kazakhstan	64.89%	\$308.97	\$203.64
Kenya	60.05%	\$351.56	\$231.71
Kiribati	30.26%	\$613.71	\$404.49
Korea, Rep.	25.92%	\$651.90	\$429.66
Kosovo	60.80%	\$344.96	\$227.36
Kuwait	47.55%	\$461.56	\$304.21
Kyrgyz Republic	75.86%	\$212.43	\$140.01
Lao PDR	70.59%	\$258.81	\$170.58
Latvia	40.11%	\$527.03	\$347.36
Lebanon	75.02%	\$219.82	\$144.88
Lesotho	56.51%	\$382.71	\$252.24

Country	% Discount	Professional (USD)	Student (USD)
Liberia	56.65%	\$381.48	\$251.43
Libya	74.23%	\$226.78	\$149.47
Lithuania	45.08%	\$483.30	\$318.54
Luxembourg	0.00%	\$880.00	\$580.00
Macao SAR, China	38.45%	\$541.64	\$356.99
Madagascar	68.52%	\$277.02	\$182.58
Malawi	61.25%	\$341.00	\$224.75
Malaysia	61.61%	\$337.83	\$222.66
Maldives	50.67%	\$434.10	\$286.11
Mali	62.49%	\$330.09	\$217.56
Malta	30.30%	\$613.36	\$404.26
Marshall Islands	0.25%	\$877.80	\$578.55
Mauritania	69.19%	\$271.13	\$178.70
Mauritius	60.38%	\$348.66	\$229.80
Mexico	50.46%	\$435.95	\$287.33
Micronesia, Fed. Sts.	1.91%	\$863.19	\$568.92
Moldova	66.01%	\$299.11	\$197.14
Mongolia	64.74%	\$310.29	\$204.51
Montenegro	58.91%	\$361.59	\$238.32
Morocco	57.06%	\$377.87	\$249.05
Mozambique	62.72%	\$328.06	\$216.22
Myanmar	72.68%	\$240.42	\$158.46
Namibia	51.77%	\$424.42	\$279.73
Nauru	18.87%	\$713.94	\$470.55
Nepal	71.30%	\$252.56	\$166.46
Netherlands	8.95%	\$801.24	\$528.09
New Zealand	0.00%	\$880.00	\$580.00
Nicaragua	66.98%	\$290.58	\$191.52
Niger	54.58%	\$399.70	\$263.44
Nigeria	61.81%	\$336.07	\$221.50
North Macedonia	62.49%	\$330.09	\$217.56
Norway	0.00%	\$880.00	\$580.00
Oman	53.45%	\$409.64	\$269.99
Pakistan	73.83%	\$230.30	\$151.79
Palau	12.71%	\$768.15	\$506.28
Panama	54.18%	\$403.22	\$265.76
Papua New Guinea	34.40%	\$577.28	\$380.48
Paraguay	61.36%	\$340.03	\$224.11
Peru	51.84%	\$423.81	\$279.33
Philippines	61.09%	\$342.41	\$225.68
Poland	52.43%	\$418.62	\$275.91

Country	% Discount	Professional (USD)	Student (USD)
Portugal	32.40%	\$594.88	\$392.08
Puerto Rico	8.46%	\$805.55	\$530.93
Qatar	34.48%	\$576.58	\$380.02
Romania	58.03%	\$369.34	\$243.43
Rwanda	66.57%	\$294.18	\$193.89
Samoa	38.65%	\$539.88	\$355.83
San Marino	23.60%	\$672.32	\$443.12
Sao Tome and Principe	44.91%	\$484.79	\$319.52
Saudi Arabia	52.40%	\$418.88	\$276.08
Senegal	57.37%	\$375.14	\$247.25
Serbia	57.00%	\$378.40	\$249.40
Seychelles	55.40%	\$392.48	\$258.68
Sierra Leone	71.59%	\$250.01	\$164.78
Singapore	37.51%	\$549.91	\$362.44
Sint Maarten (Dutch part)	19.42%	\$709.10	\$467.36
Slovak Republic	36.12%	\$562.14	\$370.50
Slovenia	33.06%	\$589.07	\$388.25
Solomon Islands	12.02%	\$774.22	\$510.28
Somalia	65.77%	\$301.22	\$198.53
South Africa	51.50%	\$426.80	\$281.30
South Sudan	9.32%	\$797.98	\$525.94
Spain	26.14%	\$649.97	\$428.39
Sri Lanka	73.00%	\$237.60	\$156.60
St. Kitts and Nevis	30.57%	\$610.98	\$402.69
St. Lucia	31.89%	\$599.37	\$395.04
St. Vincent and the Grenadines	42.97%	\$501.86	\$330.77
Sudan	81.88%	\$159.46	\$105.10
Suriname	71.00%	\$255.20	\$168.20
Sweden	0.00%	\$880.00	\$580.00
Switzerland	0.00%	\$880.00	\$580.00
Tajikistan	79.08%	\$184.10	\$121.34
Tanzania	61.28%	\$340.74	\$224.58
Thailand	62.34%	\$331.41	\$218.43
Timor-Leste	67.00%	\$290.40	\$191.40
Togo	58.31%	\$366.87	\$241.80
Tonga	30.91%	\$607.99	\$400.72
Trinidad and Tobago	43.27%	\$499.22	\$329.03
Tunisia	66.15%	\$297.88	\$196.33
Turkey	68.54%	\$276.85	\$182.47
Turkmenistan	53.00%	\$413.60	\$272.60
Turks and Caicos Islands	0.00%	\$880.00	\$580.00

Country	% Discount	Professional (USD)	Student (USD)
Tuvalu	0.00%	\$880.00	\$580.00
Uganda	64.21%	\$314.95	\$207.58
Ukraine	65.99%	\$299.29	\$197.26
United Arab Emirates	45.65%	\$478.28	\$315.23
United Kingdom	4.71%	\$838.55	\$552.68
United States	0.00%	\$880.00	\$580.00
Uruguay	30.88%	\$608.26	\$400.90
Uzbekistan	76.66%	\$205.39	\$135.37
Vanuatu	0.00%	\$880.00	\$580.00
Vietnam	68.03%	\$281.34	\$185.43
West Bank and Gaza	40.90%	\$520.08	\$342.78
Yemen, Rep.	56.43%	\$383.42	\$252.71
Zambia	69.08%	\$272.10	\$179.34
Zimbabwe	28.93%	\$625.42	\$412.21
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