



# *EXPERIMENTAL DESIGN and STATISTICS WORKSHOP*

**Experimental Design: Saturday 4 March 2017**  
**Statistics: Thursday 6 – Friday 7 April 2017**

**Presenter: Gordana Popovic**

Gordana is an ecological statistician. Her research focuses on modelling communities of species, to understand how species interact with one another and the environment. She spends much of her time coordinating short courses and providing statistical support to ecologists at the University of New South Wales, in her role as the statistical consultant for the school of Biological, Earth and Environmental Sciences. In her free time she can be found outside in the sun.

These two workshops are designed to run in conjunction with each other, however you may attend just one if you prefer.

## **EXPERIMENTAL DESIGN**

This course will examine the underlying principles of experimental design with a focus on data collection and analyses to explore questions and hypotheses in research.

### OVERVIEW

- Introduction to experimental design- Asking well-defined research questions and understanding biologically meaningful changes
- Properties of the data collected - Variability of data in space and time affects experimental design and analysis
- Randomisation – How to collect data for valid inference
- Control – Importance of comparing to a control group
- Sample size – Determining whether there is enough data to answer the question, is our sampling scheme concentrating data collection in the right places
- Pilot study – Do you need to test your methods in a pilot study

PRACTICAL COMPONENT (using free online tools and Excel)

- How to randomise – Create a sampling scheme
- Simple power analysis – How much data do we need to answer the question

## **STATISTICS**

This course will introduce participants to the R language and RStudio environment. On the first day we start with the basics, how to open R and import data, basic data handling and plotting. We then delve into manipulating datasets to convert between formats (long and wide), subset data and calculate summary statistics (to make tables for reports and manuscripts). We then learn how to quickly create publication ready plots for all data types in R. The second day will showcase R's statistical capabilities. We will revise some basics, like data types, p-values, confidence intervals, and tests like the t-test and chi-square test. We then go on to introduce linear models. These form the basis of all statistical modelling and

can be extended to cover discrete data types (generalised linear models) and more complex experimental designs (mixed models) as well as multivariate models for multi species data. We will introduce the `lm()` function in R, and focus on how to check model assumptions, test a range of hypotheses and understand model outputs.

## ***Where?***

Bronte Room, Hurstville Training Rooms, 124 Forest Road, Hurstville

## ***When***

The Experimental Design Workshop will be held from 9 am – 5 pm Saturday 4 March.

The Statistics Workshop will be held from 9 am – 5 pm Thursday 6 and Friday 7 April.

## ***Costs***

The cost includes workshop attendance, morning tea and afternoon tea (please bring or buy your own lunch).

<b>Workshop</b>	<b>Member</b>	<b>Non-member</b>
Experimental Design	\$175	\$300
Statistics (2 days)	\$400	\$600
Experimental Design and Statistics (3 days)	\$550	\$800

## ***What to bring***

- Paper and pen for taking notes
- **Lunch**
- laptop with web access and Excel

## ***Registration***

### **ONLINE**

You may register and pay on-line at [www.ecansw.org.au](http://www.ecansw.org.au)

### **EMAIL / MAIL**

Email your registration form to [admin@ecansw.org.au](mailto:admin@ecansw.org.au) or

Post your registration form to: Administration Assistant  
Amy Rowles  
Ecological Consultants Association of NSW  
Unit 8, 27 Annie Street, Wickham, 2293

(please also email [admin@ecansw.org.au](mailto:admin@ecansw.org.au) and notify me that you have posted your registration to secure your place)

Direct deposit payment:

**Account Name:** Ecological Consultants Association

**Bank:** Westpac

**Branch:** New Lambton NSW

**BSB** 032-507

**Account No:** 122011

Please email the administration assistant at [admin@ecansw.org.au](mailto:admin@ecansw.org.au) **and** the treasurer at [treasurer@ecansw.org.au](mailto:treasurer@ecansw.org.au) following a successful direct deposit to confirm payment. Please also put your name in the description

Cheques/money orders:

Post to the Administration Assistant along with your registration form

**PLEASE NOTE**

- That this registration also forms an official tax invoice. Ecological Consultants Association of NSW **ABN: 85 213 648 549**
- Registration closes COB 2 March 2017 for the experimental design and 4 April 2017 for the statistics course.
- Refunds will not be issued for a cancellation after the 4 March 2017.

***Contact***

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**Experimental Design and Statistics Workshop Registration**

Name .....

Business Name .....

Address .....

Phone ..... E-Mail .....

Please tick the appropriate box.

<b>Workshop</b>	<b>Member</b>		<b>Non-member</b>	
Experimental Design	\$200	<input type="checkbox"/>	\$300	<input type="checkbox"/>
Statistics (2 days)	\$400	<input type="checkbox"/>	\$600	<input type="checkbox"/>
Experimental Design and Statistics (3 days)	\$550	<input type="checkbox"/>	\$800	<input type="checkbox"/>

Amount Enclosed \$\_\_\_\_\_ Payment type (please circle)    Direct deposit / Cheque

Special dietary requirements .....