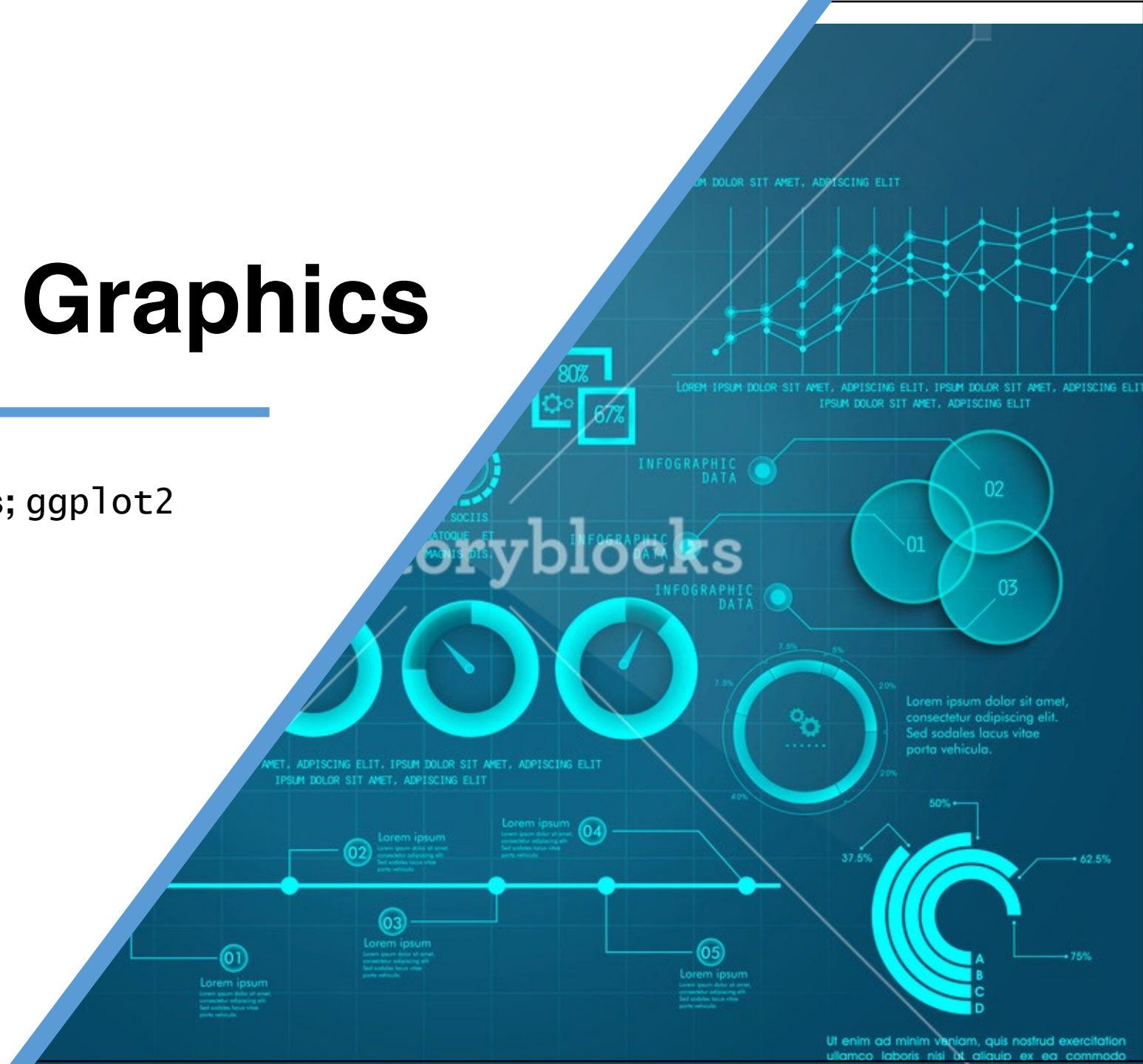
Introduction to Graphics

Publication Quality Figures; `ggplot2`

Dr Josh Hodge



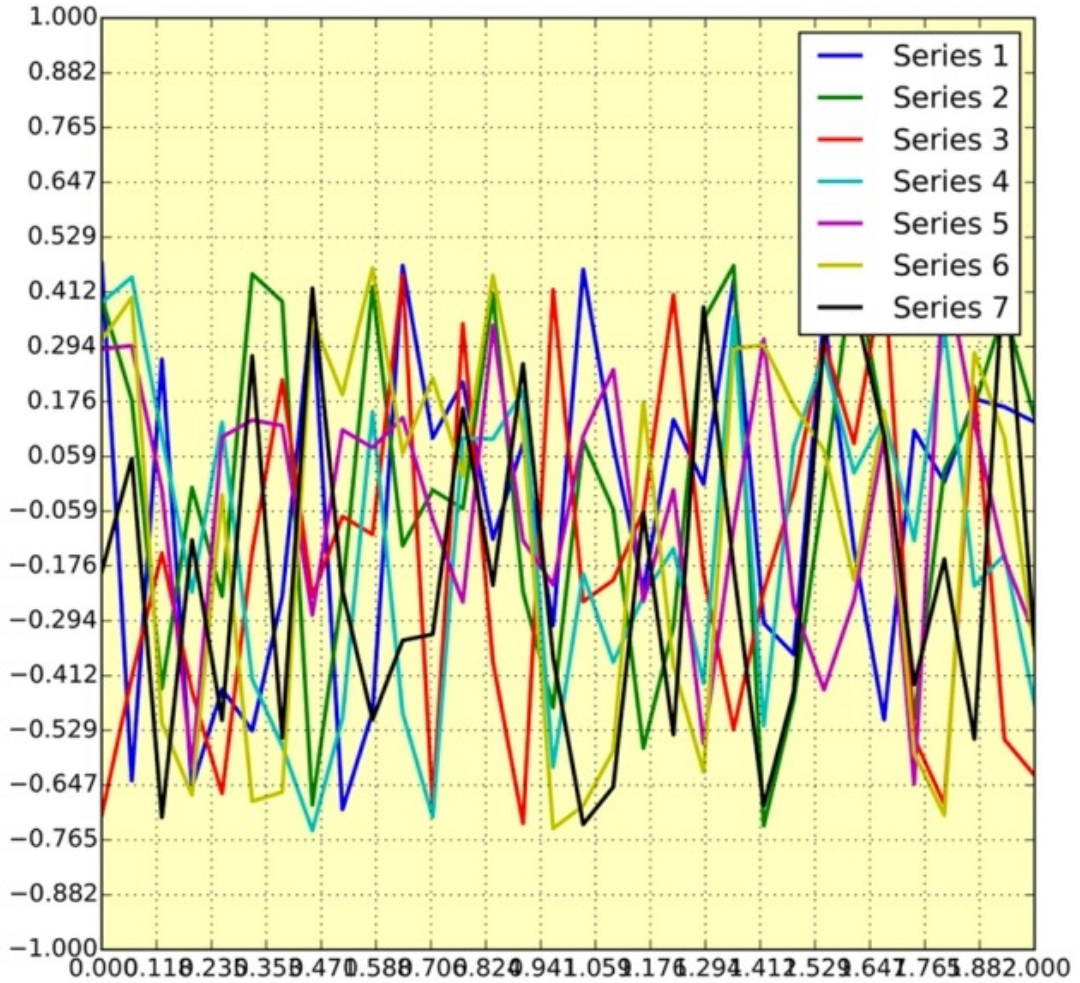
Intended Learning Outcomes

By the end of this session students will be able to:

- Create a variety of plots in ggplot2
- Manipulate plot elements to create desired figure
- Save the completed figures to their working directory

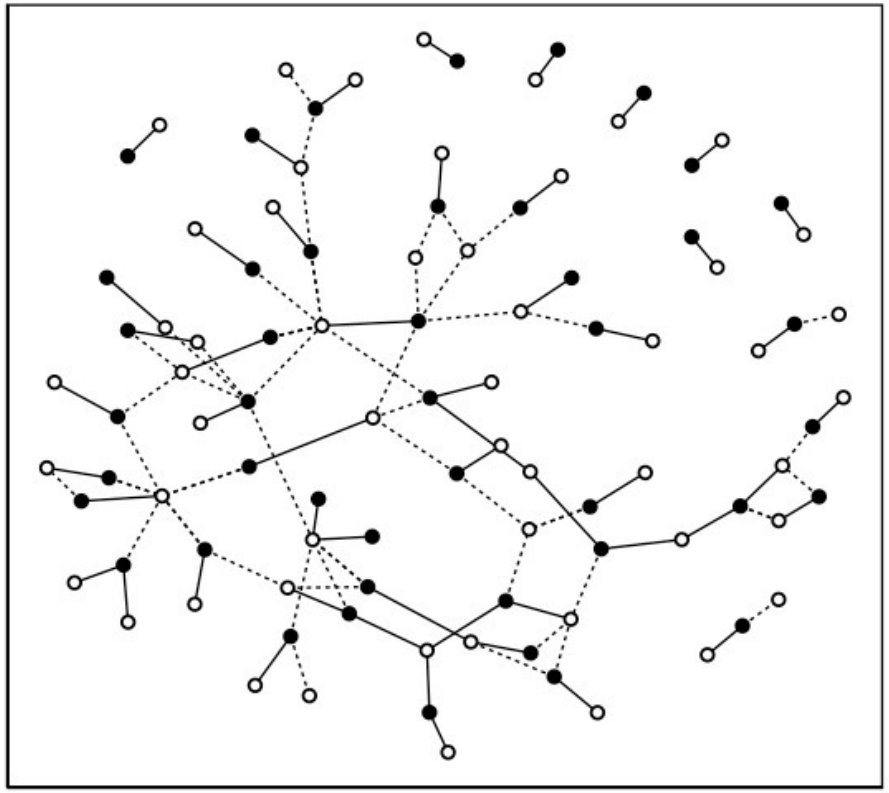
Publication Quality Figures

- Appropriate plot to supplement the text
- Attractive to reader
- Font type and size
- Colour choice
- Legends and labels



- Ten Simple Rules for Better Figures
- The importance of stupidity in scientific research

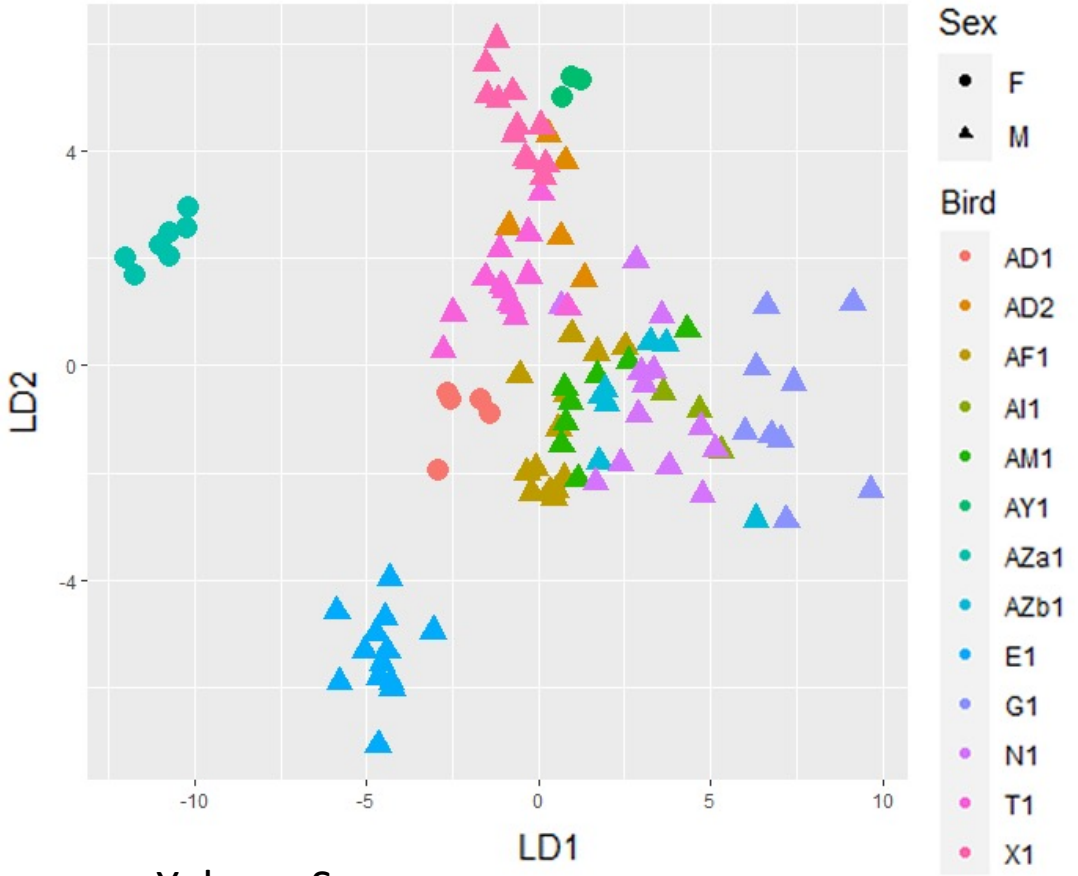
Examples from our GTA's



Jamie Dunning

Reproductive Decisions of Sparrows:

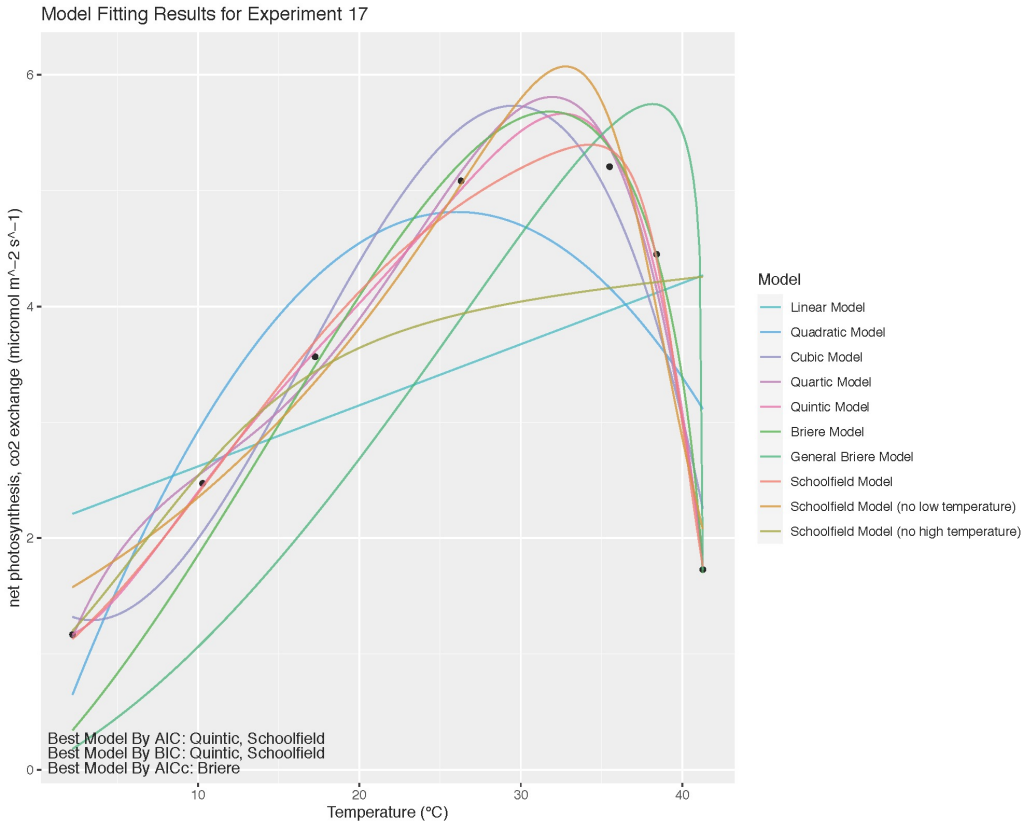
White nodes = females, black = male ; solid lines = social pairs and dotted = extra-pair copulations

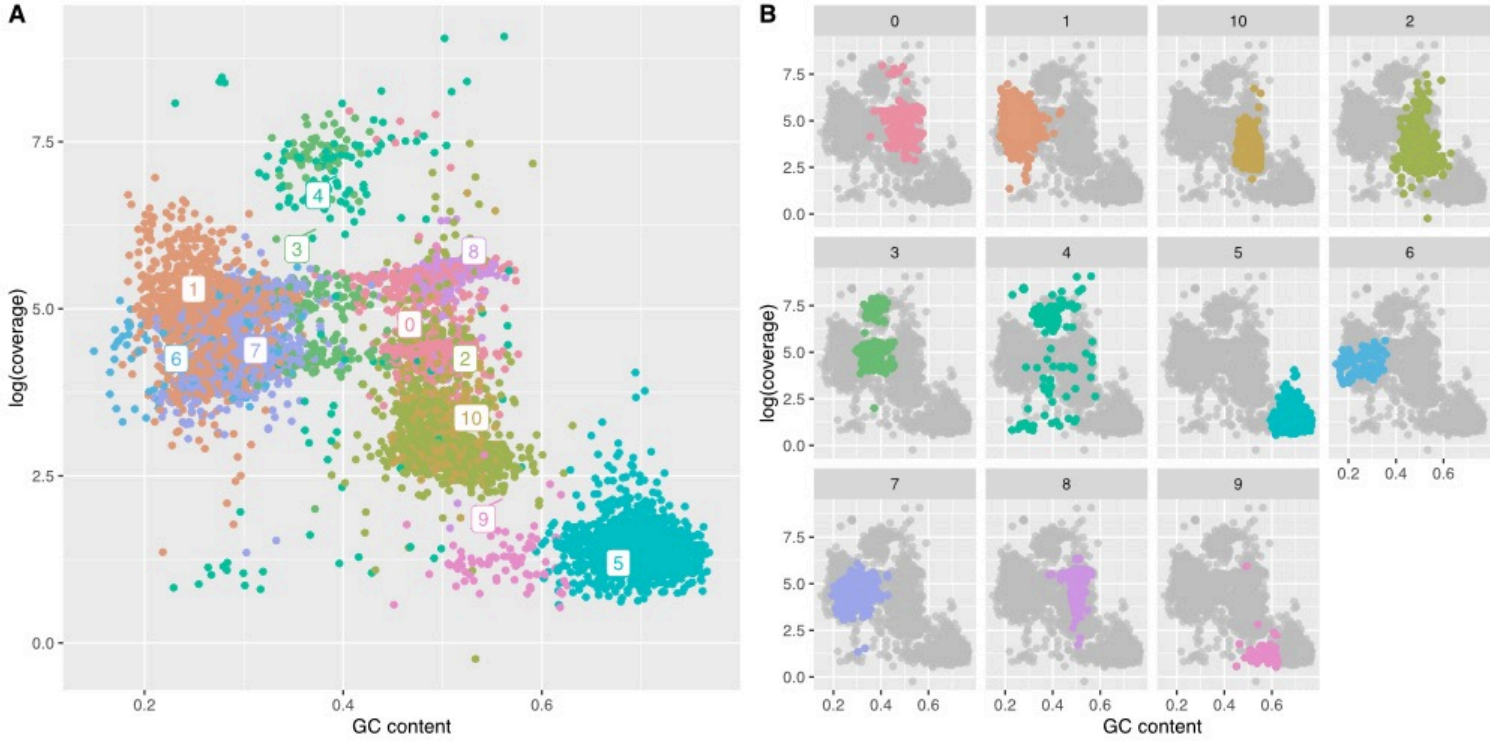


Yuheng Sun

Linear Discriminant Analysis of Birds:

Examples from our GTA's





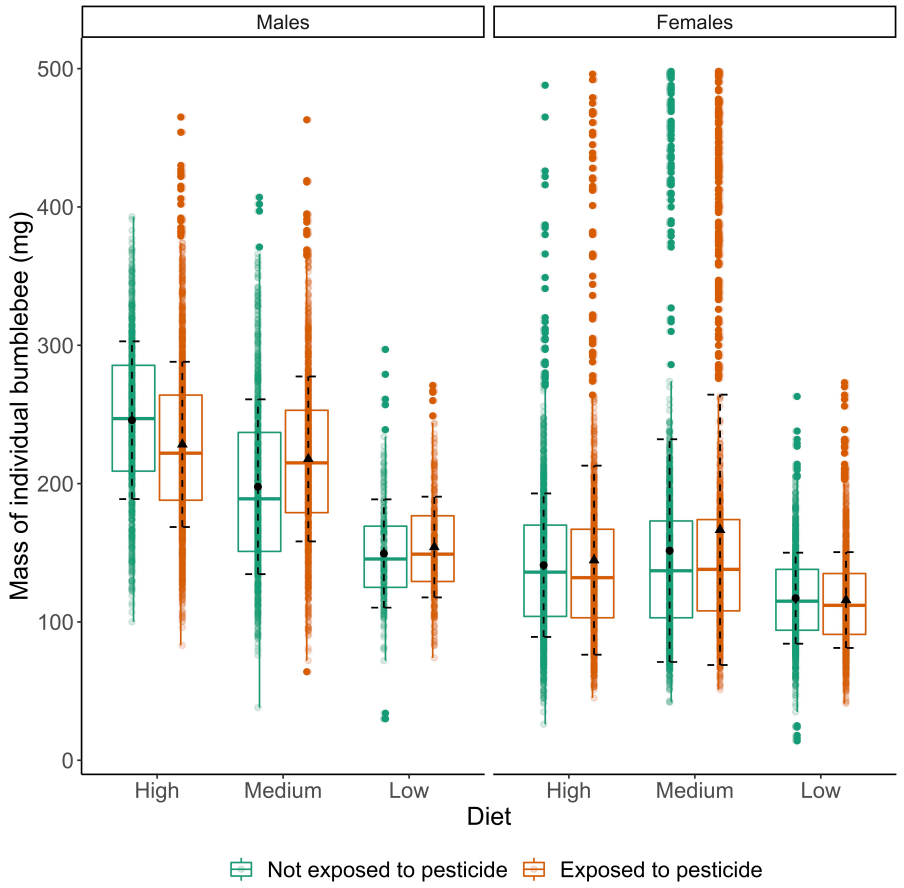
Acaia Tang

Model Fitting for Photosynthesis~Temperature

Theo Llewellyn

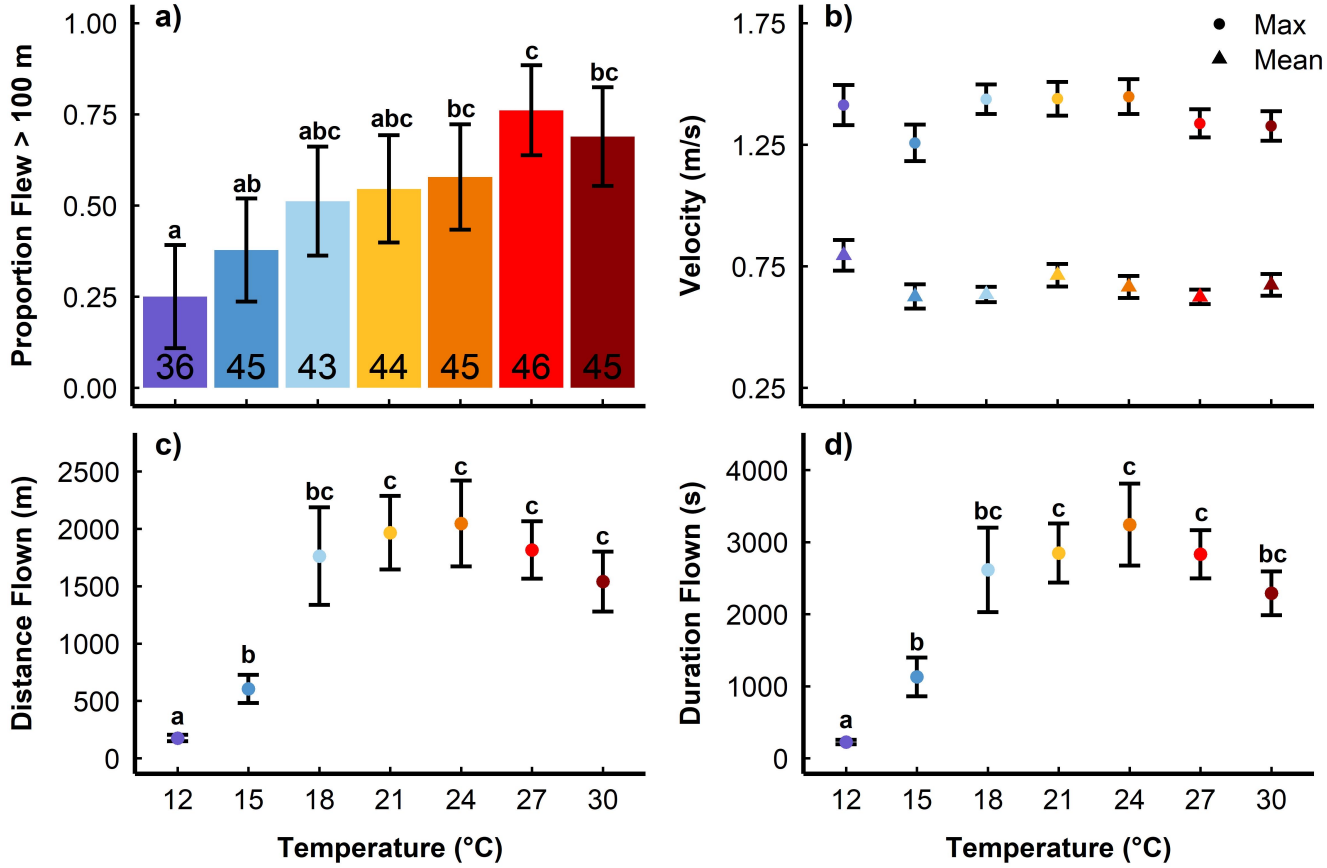
Metagomic Analysis of Symbiont Genomes

Examples from our GTA's



Ana Rodrigues

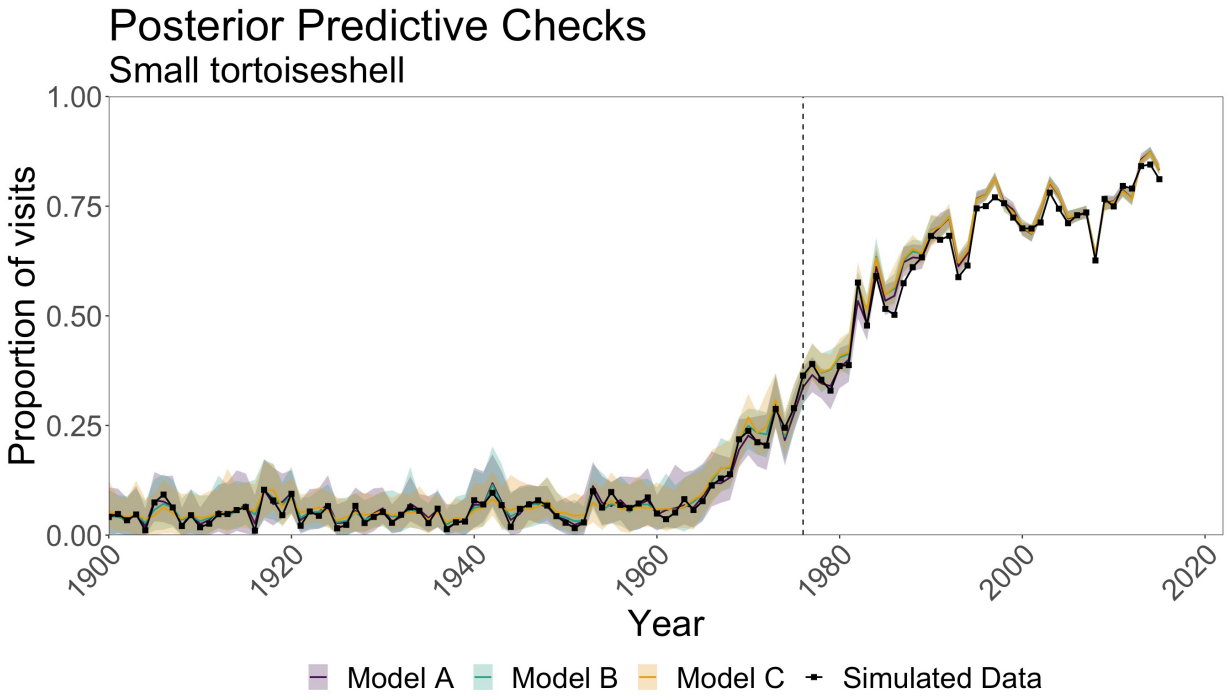
Mass of bumblebees by sex, diet and pesticide



Danny Kenna

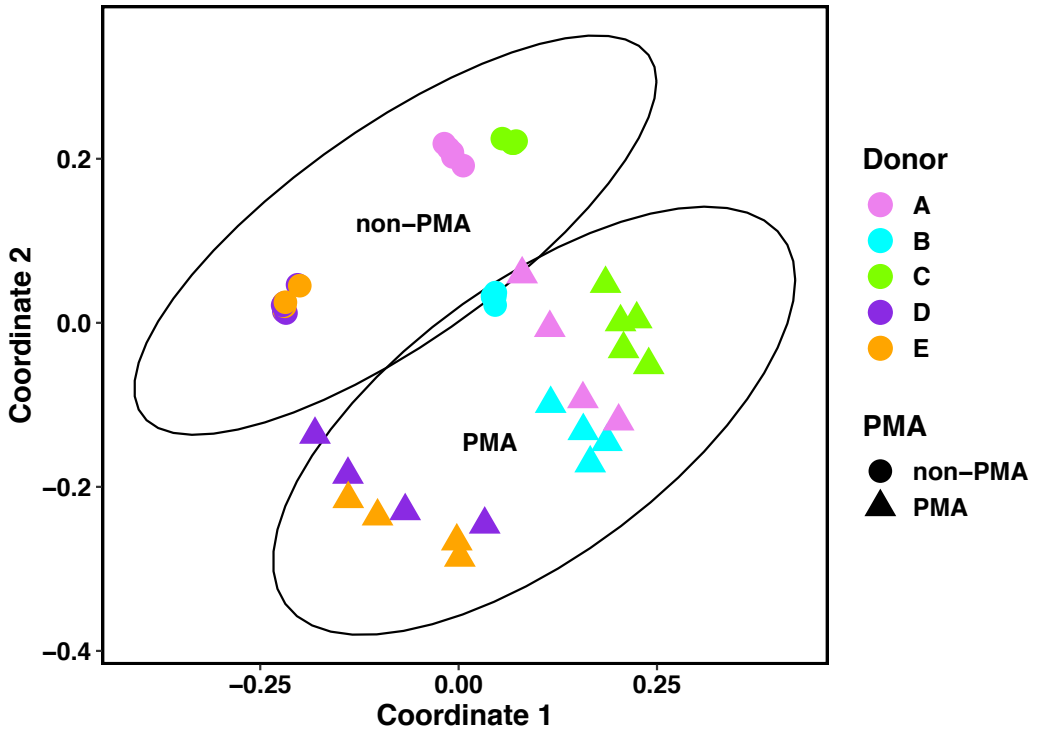
Bee Flying Stats by Temperature

Examples from our GTA's



Galina Jönsson

Time series modelling



Thomas Lilley

PCoA of Saplings

ggplot2


ggplot2:
Build a data
MASTERPIECE
THEMES
GEOMS
aes
fill
color
ggplot
ggAnimate
plotly
HORST '18

ggplot2

```
install.packages("ggplot2")
library("ggplot2")
?ggplot2
```

- Types of plots:
  1. Univariate
     - dotcharts, histograms and boxplots
  2. Bivariate
     - Scatterplots

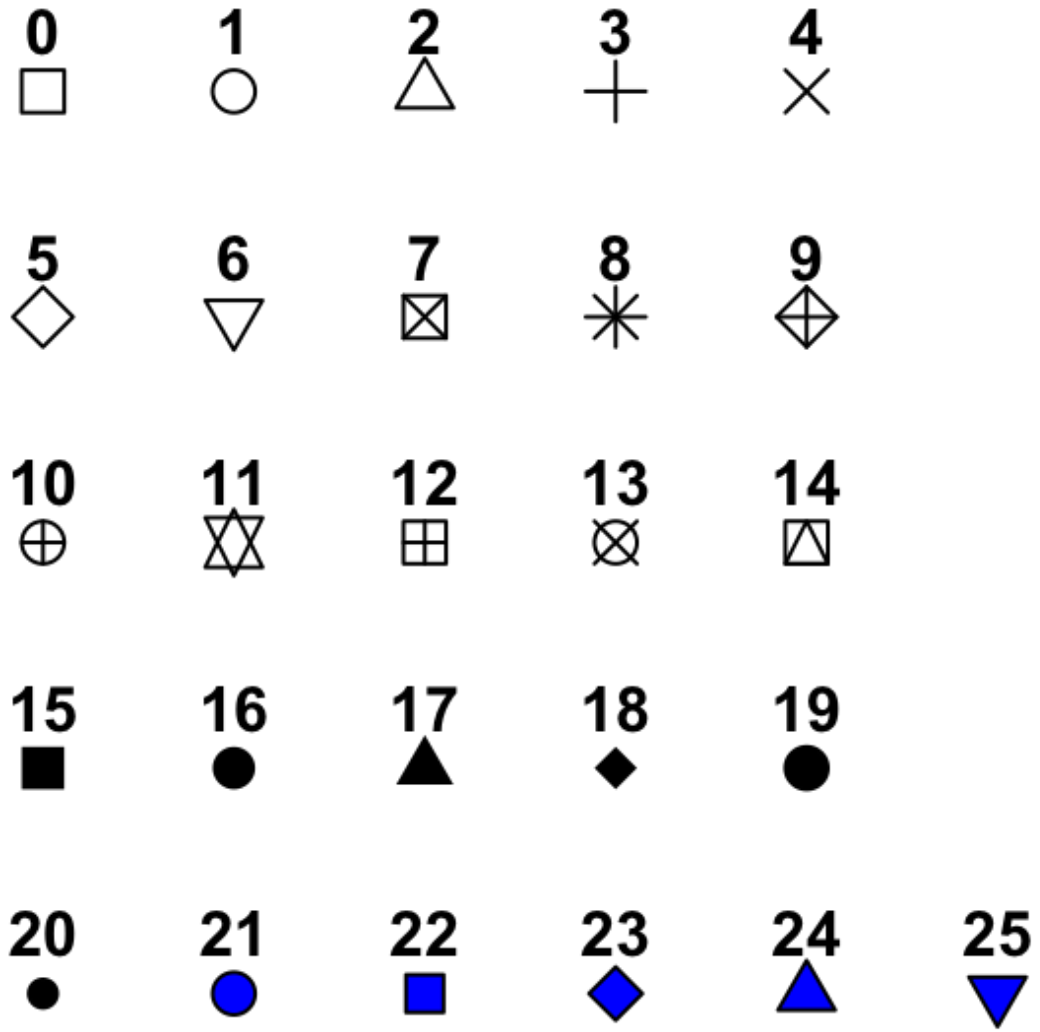
Basic ggplot2

```
plot<-ggplot(data, aes(x=, y=))+
    geom_XXXXX
```

- Consists of three elements:
  1. `data` is the dataframe
  2. `aes` is the aesthetics – x and y variables, control color or size or shape.
  3. `geom` defines the type of graphics you want – histogram etc

To barchart or not barcharts

Point Characters and Colours



Printing and Saving

- Assign plot to an object
  - `graph1<-ggplot(…)`

```
pdf("barchart.pdf")
print(graph1)
dev.off()
```

- Graph is now in the working directory

What's Next?

- Practical session
- Feedback
- Application to novel datasets
- One group from A, B, C and D will nominate themselves to talk about their code and graphs
- A final point

Science and stupidity

The importance of stupidity in scientific research

Martin A. Schwartz
Department of Microbiology, UVA Health System, University of Virginia, Charlottesville, VA 22908, USA
e-mail: maschwartz@virginia.edu

Accepted 9 April 2008
Journal of Cell Science 121, 1771 Published by The Company of Biologists 2008
doi:10.1242/jcs.033340

One of the beautiful things about science is that it allows us to bumble along, getting it wrong time after time, and feel perfectly fine as long as we learn something each time. No doubt, this can be difficult for students who are accustomed to getting the answers right.

Final Course Survey

- MS Forms on Blackboard

- So I can see the progress parts of the course that still need refining.

- Comment boxes on the course and my teaching (positive and negative)