RADS Workshop
Nathia Gali, Pakistan

Imperial College London

Nathan Green, David Jorgesen

Introductions

Imperial College London

Our standing

- Times Higher Education World University Rankings 2019: 9th overall, 3rd in UK
- Times Higher Education World's Most International Universities 2019: 9th in the world
- QS World University Rankings 2019: 8th in the world
- Research Excellence Framework (REF): 1st for high impact research of any UK university
- Reuters Europe's Most innovative universities 2019: 1st in UK, 3rd in Europe
- The Guardian University Guide 2019: 1st for Career Prospects

Imperial College London

Our people

Students

17,054 full-time (2017–18)

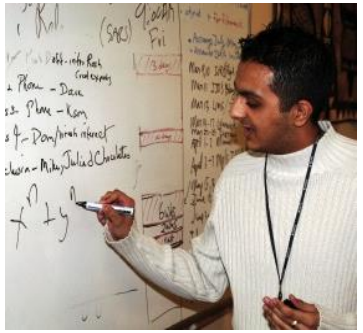
- 9,767 – undergraduate
- 3,812 – taught postgraduate
- 3,475 – research postgraduate
- Students from 132 countries

Staff

- 3,765 academic and research staff
- 3,940 support staff

Alumni

Over 190,000 alumni



Workshop content

- Comfortably use RStudio (a graphical interface for R)
- Fluently interact with R using Rstudio
- Become familiar with R syntax
- Understand data structures in R
- Inspect and manipulate data structures
- Install packages and use simple functions in R
- Visualize data
  - using ggplot2

Timetable

DAY 2 (17-9): Introduction

Pre-reading

- R generation, Significance Magazine

- Introduction to R 10:00-12:00
  - history and motivation
  - R for data analysis
  - RStudio GUI
  - Console, scripts
    - Download example.Rmd
    - Download data.csv
- Basic types 13:00-14:30
  - base
  - dates and times
    - Download example.Rmd
    - Download data.csv
- Data transformation 15:00-16:30
  - Missing values
  - Indexing, sorting, filtering
    - Download example.Rmd
    - Download data.csv

DAY 3 (18-9): Handling data

Pre-reading

- Tidy Data, Wickham
- Data organization in spreadsheets, Broman

- Day 2 recap 9:30-10:00
- Pre-processing/munging 10:00-12:00
  - base: merge, aggregate
  - tidy data: dplyr
  - regular expression
    - Download example.Rmd
    - Download data.csv
- Exploring data 13:00-15:00
  - summary statistics
  - tables and basic plots
    - Download example.Rmd
    - Download data.csv
- Writing data 15:30-16:30
  - Download example.Rmd
  - Download data.csv

DAY 4 (19-9): Outputs

Pre-reading

- How to look at data: A review of John W. Tukey's exploratory data
- Effective visual communication for the quantitative scientist, Van

- Day 3 recap 9:30-10:00
- Plotting 10:00-11:30
  - ggplot2
  - colour themes
    - Download example.Rmd
    - Download data.csv
- Maps 12:00-13:00
  - Download example.Rmd
  - Download data.csv
- Putting it all together 14:00-16:00
  - plots for presentations
  - maps for presentations
    - Download example.Rmd
    - Download data.csv

Course website

https://n8thangreen.github.io/Pakistan-workshop-site/

Pakistan R workshop

Code

You can find all of our workshop information on this site.

When & Where

Date: 16th - 20th September 2019, 08:00-17:30
Location: Pakistan

Set up & Pre-work

To participate in this workshop, you will need to make sure you:

Download R and RStudio

Download the latest versions

- R https://cran.r-project.org/
- RStudio https://www.rstudio.com/products/rstudio/#Desktop

Once R and Rstudio are both installed, if you open RStudio and things have gone according to plan then in the console you will see something like the following:

```
R version 3.6.1 (2019-07-05) -- "Action of the Toes"
Copyright (C) 2019 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.
```

Install Necessary Packages

Open RStudio and paste the following code into your console, then press Enter to run it:

```
# Download packages from CRAN

install.packages(c("devtools", "knitr", "magrittr", "sf", "sp", "rmarkdown", "usethis", "ggplot2", "dplyr", "zoo", "
```

Code of conduct

- Please ask questions
- Be curious
- Make mistakes
- Practices makes perfect
- Have fun!

How to actually learn any new programming concept

Essential

Changing Stuff and Seeing What Happens

O RLY?

@ThePracticalDev