

# Statistics and R short course

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30 November 2020

## Session 2 - Practical

1. Using the `iris` dataset (type `?iris` to get more information about this dataset) that comes pre-loaded with R, produce the following figures:
  - Produce histograms for each of `Sepal.Length`, `Sepal.Width`, `Petal.Length`, `Petal.Width`. Try using both the `graphics` (base R) and `ggplot2` (tidyverse R) libraries.
  - Produce a bar plot for `Species`.
  - Produce box and whisker plots for each of the 4 continuous variables. Put them all on a single, multi-panel figure.
  - Repeat for just `Sepal.Length` using a violin plot, stratifying by `Species`.
  - Produce a single graph (not multi-panel) that has histograms for `Sepal.Length` for each of the 3 flower species.
  - There are 4 continuous variables. This means there are 6 possible pairs of these. For each such pair, produce a scatter plot of one variable against the other and highlight the different flower species by using a different colour for each species.
  - For one of these 6 scatter plots: estimate the bivariate probability density and add density contour lines to the figure.
2. Install the package `nycflights13`, then load it. This has data on flights that took off in the US during 2013. There are 5 data tables:
  - `airlines`, data on airlines
  - `airports`, data on airports
  - `planes`, data on planes
  - `weather`, hourly weather data at NYC airports for 2013
  - `flights`, data on flights leaving NYC airports during 2013
  - Compute the average delay by destination, then join the `airports` data frame to get the longitude and latitude of delays. Plot this (if you are using `ggplot2`, then the functions `borders()` and `coord_quickmap()` can be useful for a nicer figure).
  - Construct data frames giving average delay per wind speed / temperature / precipitation / visibility. Produce scatter plots of each of these against delay and add an average trend line.