Publish Code - From R Markdown to HTML with knitr

{% include toc title="This Lesson" icon="file-text" %}

In the previous tutorials we've learned about the R Markdown format and how to create a report using R Markdown in R Studio. In this tutorial, we will render or `knit` an R Markdown document to a web friendly, `html` format using the R `knitr` package. `knitr` can be used to convert R Markdown files to many different formats including: `HTML`, `PDF`, github markdown (`.md`) and more.

Learning Objectives

At the end of this lesson, you will:

- Be able to produce ('knit') an HTML file from a R Markdown file.
- Know how to modify chuck options to change what is rendered and not rendered on the output HTML file.

What you need

You will need the most current version of `R` and, preferably, `RStudio` loaded on your computer to complete this tutorial. You will also need an R Markdown document that contains a YAML header, code chunks and markdown segments.

Download Lesson data

Install R Packages

- **knitr:** `install.packages("knitr")`
- **rmarkdown:** `install.packages("rmarkdown")`

What Is knitr?

`knitr` is the R package that we use to convert an R Markdown document into another, more user friendly format like html or pdf.

The `knitr` package allows us to:

- Publish & share preliminary results with collaborators.
- Create professional reports that document our workflow and results directly from our code, reducing the risk of accidental copy and paste or transcription errors.
- Document our workflow to facilitate reproducibility.
- Efficiently change code outputs (figures, files) given changes in the data, methods, etc.

> The knitr package was designed to be a transparent engine for dynamic report generation with R – Yihui Xi – knitr package creator

When To Knit: Knitting is a useful exercise throughout your scientific workflow. It allows you to see what your outputs look like and also to test that your code runs without errors. The time required to knit depends on the length and complexity of the script and the size of your data. {: .notice}

How to Knit

```
<a href="{{ site.baseurl }}/images/course-materials/earth-analytics/week-1/intro-knitr-rmd/KnitButton-s
<img src="{{ site.baseurl }}/images/course-materials/earth-analytics/week-1/intro-knitr-rmd/KnitButton-
<figcaption> Location of the knit button in RStudio in Version 0.99.903.
</figcaption>
```

To knit in RStudio, click the **knit** pull down button. You want to use the **knit HTML** option for this lesson.

When you click the **Knit HTML** button, a window will open in your console titled R Markdown. This pane shows the knitting progress. The output (HTML in this case) file will automatically be saved in the current working directory. If there is an error in the code, an error message will appear with a line number in the R Console to help you diagnose the problem.

Data Tip: You can run `knitr` from the command prompt using: `render("input.Rmd", "all")`. {: .notice}

View the Output

```
<a href="{{ site.baseurl }}/images/course-materials/earth-analytics/week-1/intro-knitr-rmd/Rmd-screensh
<img src="{{ site.baseurl }}/images/course-materials/earth-analytics/week-1/intro-knitr-rmd/Rmd-screens
<figcaption> R Markdown (left) and the resultant HTML (right) after knitting.
</figcaption>
```

When knitting is complete, the HTML file produced will automatically open.

Notice that information from the YAML header (title, author, date) is printed at the top of the HTML document. Then the HTML shows the text, code, and results of the code that you included in the RMD document.

Challenge Activity

Add the code below to your `.Rmd` document. Then `knit` to .html format.

```
# load the ggplot2 library for plotting
library(ggplot2)

# download data from figshare
# note that we are downloaded the data into your
download.file(url = "https://ndownloader.figshare.com/files/7010681",
              destfile = "data/boulder-precip.csv")

# import data
boulder_precip <- read.csv(file="data/boulder-precip.csv")

# view first few rows of the data
head(boulder_precip)

# when we download the data we create a dataframe
# view each column of the data frame using it's name (or header)
boulder_precip$DATE

# view the precip column
boulder_precip$PRECIP
```

```
# q plot stands for quick plot. Let's use it to plot our data
qplot(x=boulder_precip$DATE,
      y=boulder_precip$PRECIP)
```

When you `knit` your `.Rmd` file to pdf, the plot you produce should look like the one below. Not so pretty, eh? Don't worry - we will learn more about plotting in a later tutorial!

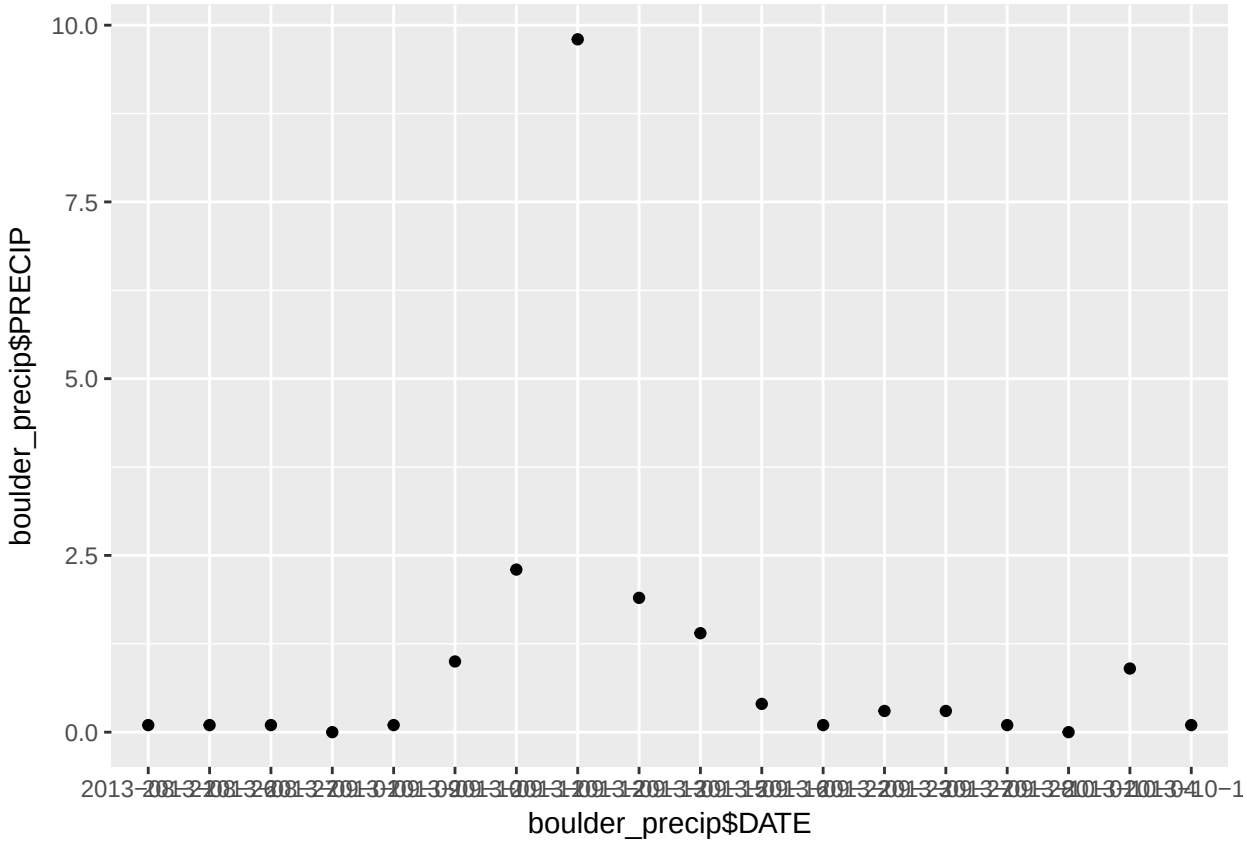

Figure 1: Precipitation over time

Where is the file?

In the steps above, we downloaded a file. However, where did that file go on your computer? Let's find it before we go any further.

```
# what is the working directory?
getwd()

[1] "/Users/lewa8222/Documents/earth-analytics"

# set working dir as a variable
my.dir <- getwd()

# what files are in that working directory?
list.files(my.dir, recursive= TRUE)
```

Is the `boulder-precip.csv` file there?

Data Tip: If you are a frequent user of LaTex, you might find this video from the creator of knitr informational. It introduces R Markdown & knitr in conjunction with LaTex and other formats. {: .notice .warning}