# BEST PRACTICES FOR THE POLITICAL SCIENTIST

J. Alexander Branham

Fall 2016

# INTRO

 $\cdot\,$  We're going to talk about things that aren't taught or talked about very often

- We're going to talk about things that aren't taught or talked about very often
- $\boldsymbol{\cdot}$  How are you going to organize and manage your work?

- · We're going to talk about things that aren't taught or talked about very often
- How are you going to organize and manage your work?
- Academic writing is messy

- · We're going to talk about things that aren't taught or talked about very often
- How are you going to organize and manage your work?
- Academic writing is messy
  - Keep track of the paper, figures, tables, references, cross-references, analysis, appendix, etc

• You want a system that keeps a record of your actions as you:

- · You want a system that keeps a record of your actions as you:
  - Edit text

- You want a system that keeps a record of your actions as you:
  - Edit text
  - · Analyze data

- You want a system that keeps a record of your actions as you:
  - Edit text
  - · Analyze data
  - Present results

- You want a system that keeps a record of your actions as you:
  - Edit text
  - Analyze data
  - Present results
  - Do the above reproducibly

- $\boldsymbol{\cdot}$  You want a system that keeps a record of your actions as you:
  - Edit text
  - Analyze data
  - · Present results
  - Do the above reproducibly
- We'll focus on free, open-source tools that enable this behavior and work on Linux,
   Mac, and Windows

# RECORD

• You can use **version control** to keep track of changes to a file/folder/project

- · You can use version control to keep track of changes to a file/folder/project
- The best version control systems let you easily see what has changed, when it changed, and who changed it

- · You can use **version control** to keep track of changes to a file/folder/project
- The best version control systems let you easily see what has changed, when it changed, and who changed it
  - Word's "track changes" feature on steroids

- · You can use **version control** to keep track of changes to a file/folder/project
- The best version control systems let you easily see what has changed, when it changed, and who changed it
  - Word's "track changes" feature on steroids
- Gets rid of paper.doc, paper2.doc, paper-commented.doc, paper-FINAL.doc, paper-FINALFINAL.doc

- · You can use version control to keep track of changes to a file/folder/project
- The best version control systems let you easily see what has changed, when it changed, and who changed it
  - Word's "track changes" feature on steroids
- Gets rid of paper.doc, paper2.doc, paper-commented.doc, paper-FINAL.doc, paper-FINALFINAL.doc
- git is the best version-control system it combines the benefits of "track changes" with that of backups

· Git is a formal distributed version control system

- · Git is a formal distributed version control system
- $\boldsymbol{\cdot}$  It is an easy way to keep track of all the revisions you have saved

- · Git is a formal distributed version control system
- It is an easy way to keep track of all the revisions you have saved
- · You only have *one* version of a file at any one time

- · Git is a formal distributed version control system
- It is an easy way to keep track of all the revisions you have saved
- · You only have *one* version of a file at any one time
- You can see the entire history of a file easily

- · Git is a formal distributed version control system
- It is an easy way to keep track of all the revisions you have saved
- You only have one version of a file at any one time
- You can see the entire history of a file easily
- · You can see exactly what changed in each new commit

- · Git is a formal distributed version control system
- It is an easy way to keep track of all the revisions you have saved
- · You only have *one* version of a file at any one time
- You can see the entire history of a file easily
- · You can see exactly what changed in each new commit
- There are many different GUIs so you don't have to deal with the command line

- · Git is a formal distributed version control system
- It is an easy way to keep track of all the revisions you have saved
- · You only have *one* version of a file at any one time
- You can see the entire history of a file easily
- · You can see exactly what changed in each new commit
- There are many different GUIs so you don't have to deal with the command line
  - Rstudio can also do most things

- · Git is a formal distributed version control system
- It is an easy way to keep track of all the revisions you have saved
- You only have one version of a file at any one time
- You can see the entire history of a file easily
- · You can see exactly what changed in each new commit
- · There are many different GUIs so you don't have to deal with the command line
  - Rstudio can also do most things
- ((show example git history))

• Makes it easy to collaborate - no emailing files back and forth, no need to send an email so that you don't clobber coauthor's changes in dropbox

- Makes it easy to collaborate no emailing files back and forth, no need to send an email so that you don't clobber coauthor's changes in dropbox
- But mainly for yourself!

- Makes it easy to collaborate no emailing files back and forth, no need to send an email so that you don't clobber coauthor's changes in dropbox
- But mainly for yourself!
- You'll generate a documented record of your actions that is also a backup of your project (dissertation?) at every stage of development

- Makes it easy to collaborate no emailing files back and forth, no need to send an email so that you don't clobber coauthor's changes in dropbox
- But mainly for yourself!
- You'll generate a documented record of your actions that is also a backup of your project (dissertation?) at every stage of development
- When you return to your code six months from now, you won't have to wonder what it is or what you were thinking

• Github is the most popular online git service

- Github is the most popular online git service
  - · There are many others, such as Gitlab

- Github is the most popular online git service
  - · There are many others, such as Gitlab
- Each project gets a repository ("repo")

- · Github is the most popular online git service
  - · There are many others, such as Gitlab
- Each project gets a repository ("repo")
- Each repo is version-controlled (using git)

- · Github is the most popular online git service
  - · There are many others, such as Gitlab
- Each project gets a repository ("repo")
- Each repo is version-controlled (using git)
- Default is open-source (public)

- · Github is the most popular online git service
  - · There are many others, such as Gitlab
- Each project gets a repository ("repo")
- Each repo is version-controlled (using git)
- Default is open-source (public)
- · You can make repos private (for a fee students for free, though)

## **GITHUB**

- · Github is the most popular online git service
  - · There are many others, such as Gitlab
- Each project gets a repository ("repo")
- Each repo is version-controlled (using git)
- Default is open-source (public)
- · You can make repos private (for a fee students for free, though)
- This file is a part of my "math-camp" repo here

## **GITHUB**

- Github is the most popular online git service
  - · There are many others, such as Gitlab
- Each project gets a repository ("repo")
- Each repo is version-controlled (using git)
- Default is open-source (public)
- You can make repos private (for a fee students for free, though)
- · This file is a part of my "math-camp" repo here
  - · Feel free to fork-edit-pull request any changes!

# EDIT TEXT

 $\boldsymbol{\cdot}$  What if we write an article now that gets famous?

- What if we write an article now that gets famous?
- $\cdot\,$  20 years later, some grad student wants to extend our work

- What if we write an article now that gets famous?
- $\cdot$  20 years later, some grad student wants to extend our work
- How did we make Figure 1?

- What if we write an article now that gets famous?
- $\cdot$  20 years later, some grad student wants to extend our work
- How did we make Figure 1?
- · Non-plain text files may be unusable 20 years from now

- · What if we write an article now that gets famous?
- $\cdot\,$  20 years later, some grad student wants to extend our work
- How did we make Figure 1?
- · Non-plain text files may be unusable 20 years from now
- $\cdot$  Bonus: plain text files are usually much smaller than their Word/pdf counterparts

· If you write using plain text, you'll want an editor

- If you write using plain text, you'll want an editor
- $\cdot$  I recommend emacs, but it can be a hassle to get set up

- · If you write using plain text, you'll want an editor
- I recommend emacs, but it can be a hassle to get set up
  - $\boldsymbol{\cdot}$  Working with R use ESS, rmarkdown use poly-mode

- If you write using plain text, you'll want an editor
- I recommend emacs, but it can be a hassle to get set up
  - · Working with R use ESS, rmarkdown use poly-mode
- · Other alternatives:

- · If you write using plain text, you'll want an editor
- I recommend emacs, but it can be a hassle to get set up
  - · Working with R use ESS, rmarkdown use poly-mode
- · Other alternatives:
  - · Sublime Text

- · If you write using plain text, you'll want an editor
- I recommend emacs, but it can be a hassle to get set up
  - · Working with R use ESS, rmarkdown use poly-mode
- · Other alternatives:
  - · Sublime Text
  - · Vim

- · If you write using plain text, you'll want an editor
- I recommend emacs, but it can be a hassle to get set up
  - · Working with R use ESS, rmarkdown use poly-mode
- · Other alternatives:
  - · Sublime Text
  - · Vim
  - · RStudio (for R analysis)

#### MARKDOWN

# Markdown

You can use markdown to write plain text that [contain links](https://google.com). Markdown can also manage your references and bibliography [@wlezien1995].

#### MARKDOWN - MATH

As a quick aside, we can also write really nice math in markdown. Inline math goes between single dollar signs: (\$\beta = 3\$) and display math uses double dollar signs:

$$\frac{1}{3} x = \pi$$



 $\boldsymbol{\cdot}$  It's hard to reproduce a lot of research

- · It's hard to reproduce a lot of research
- You'll sometimes have to modify a table in a paper months (years) later due to a reviewer or whatever

- · It's hard to reproduce a lot of research
- You'll sometimes have to modify a table in a paper months (years) later due to a reviewer or whatever
- · How did you produce that figure/table the first time?

- It's hard to reproduce a lot of research
- You'll sometimes have to modify a table in a paper months (years) later due to a reviewer or whatever
- How did you produce that figure/table the first time?
- · Solution: Integrate code and paper with rmarkdown

## RMARKDOWN

Rmarkdown lets you put code inside your markdown document like so:

```
'''{r}
x <- c(1, 2, 3)
mean(x)
'''</pre>
```

 $\cdot\,$  Run data analysis in R, write with r/markdown, track with git, etc

- · Run data analysis in R, write with r/markdown, track with git, etc
- It's complicated but

- Run data analysis in R, write with r/markdown, track with git, etc
- · It's complicated but
- Everything is free

- · Run data analysis in R, write with r/markdown, track with git, etc
- It's complicated but
- Everything is free
- Everything is open-source and runs on Linux, Mac, and Windows

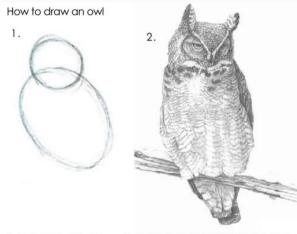
- Run data analysis in R, write with r/markdown, track with git, etc
- It's complicated but
- Everything is free
- · Everything is open-source and runs on Linux, Mac, and Windows
- · Your work can be done in a portable, documented, reproducible way

- · Run data analysis in R, write with r/markdown, track with git, etc
- It's complicated but
- Everything is free
- · Everything is open-source and runs on Linux, Mac, and Windows
- · Your work can be done in a portable, documented, reproducible way
- These programs work well with each other

# **SETUP**

How to install and setup this stuff?

# **SETUP**



How to install and setup this stuff?

1. Draw some circles

2. Draw the rest of the fucking owl