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

- $\cdot\,$ 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?

- · 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?
- · Tools for keeping track of what you do, how you do it, designed to *minimize error*

- · 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?
- · Tools for keeping track of what you do, how you do it, designed to minimize error
- I'll give general advice that should apply for most, and then the tools I use for the specific problem

WRITING IS GROSS

· Academic writing is messy

WRITING IS GROSS

- 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

- 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 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 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
- 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 like emacs, but it can be a hassle to get set up

- · If you write using plain text, you'll want an editor
- I like 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 like 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 like 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 like 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 like 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:

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



REPRODUCE

 $\boldsymbol{\cdot}$ 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>
```

• 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

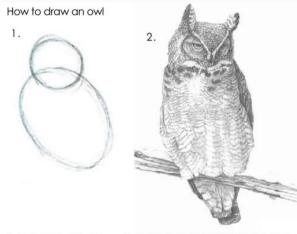
- · Run data analysis in R, write with r/markdown, track with git, etc
- It's complicated but
- Everything is free
- · Everything is open-source and runs on Linux, Mac, and Windows
- · Your work can be done in a portable, documented, reproducible way

- · 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