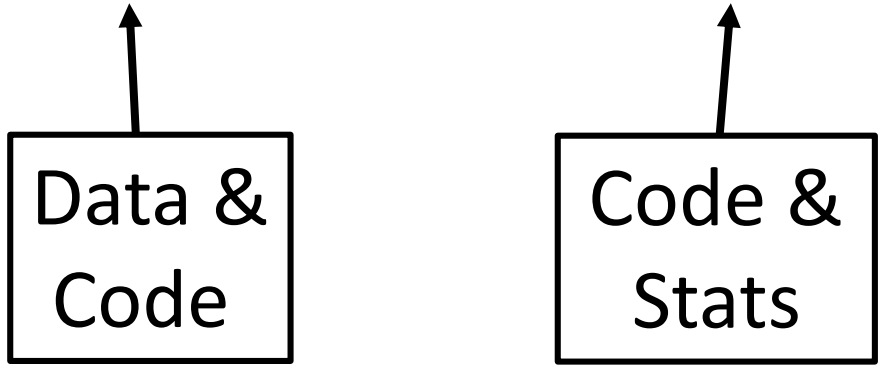
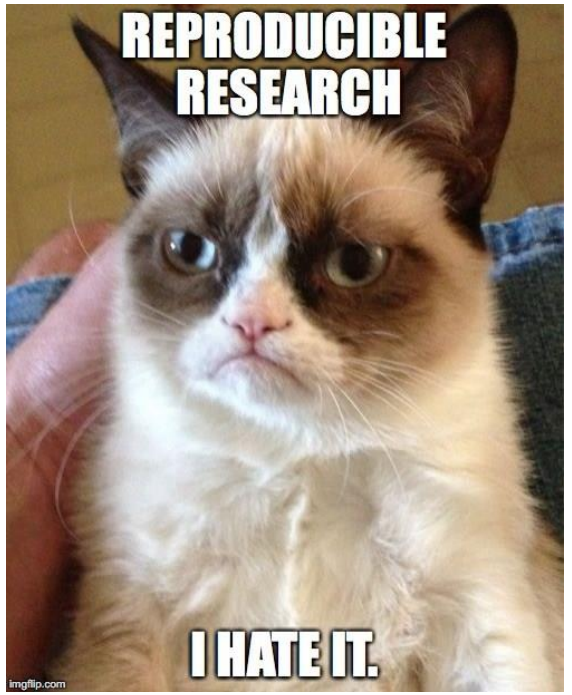
Reproducible Research

Reproducible = Accessible + Readable



Why make your research reproducible?



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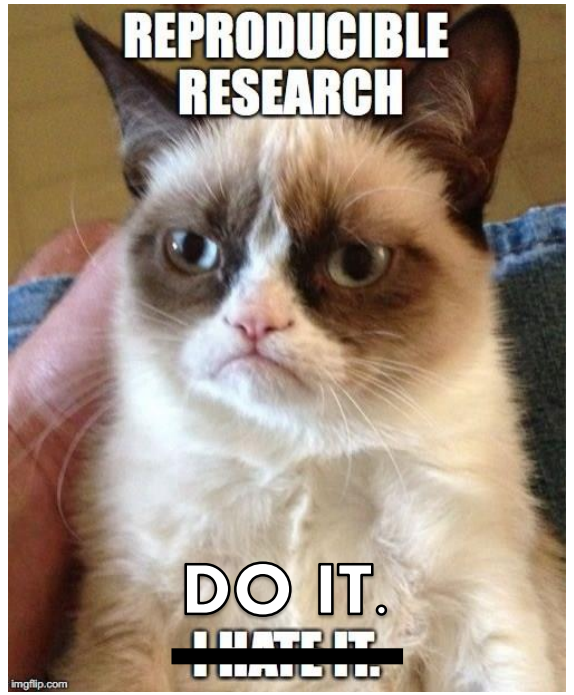

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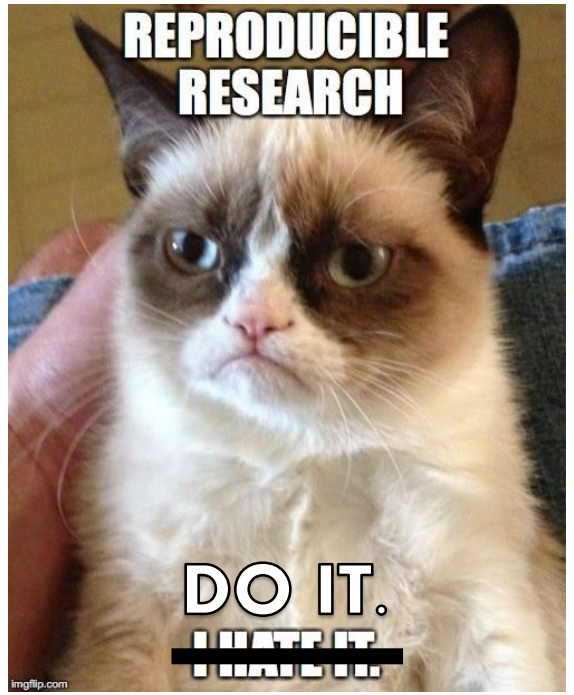

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- Share progress with advisor
- Scientific progress – no need to reinvent the wheel
  - Record statistical decisions, analysis pipelines
  - Share progress and products with the lab

Why make your research reproducible?

- Build collaborations and increase the impact of your science
  - Shared code – examples: Ross Cunning, Hollie Putnam, Murat Eren

jrcunning **Ross** **Cunning**

Follow

Coral reef conservation research @SheddAquarium. Bioinformatics, stats, modeling, data viz, open science, Rstats. Formerly @CoralReefFuturesLab, @GatesCoralLab

Chicago, IL

hputnam **Hollie** **Putnam**

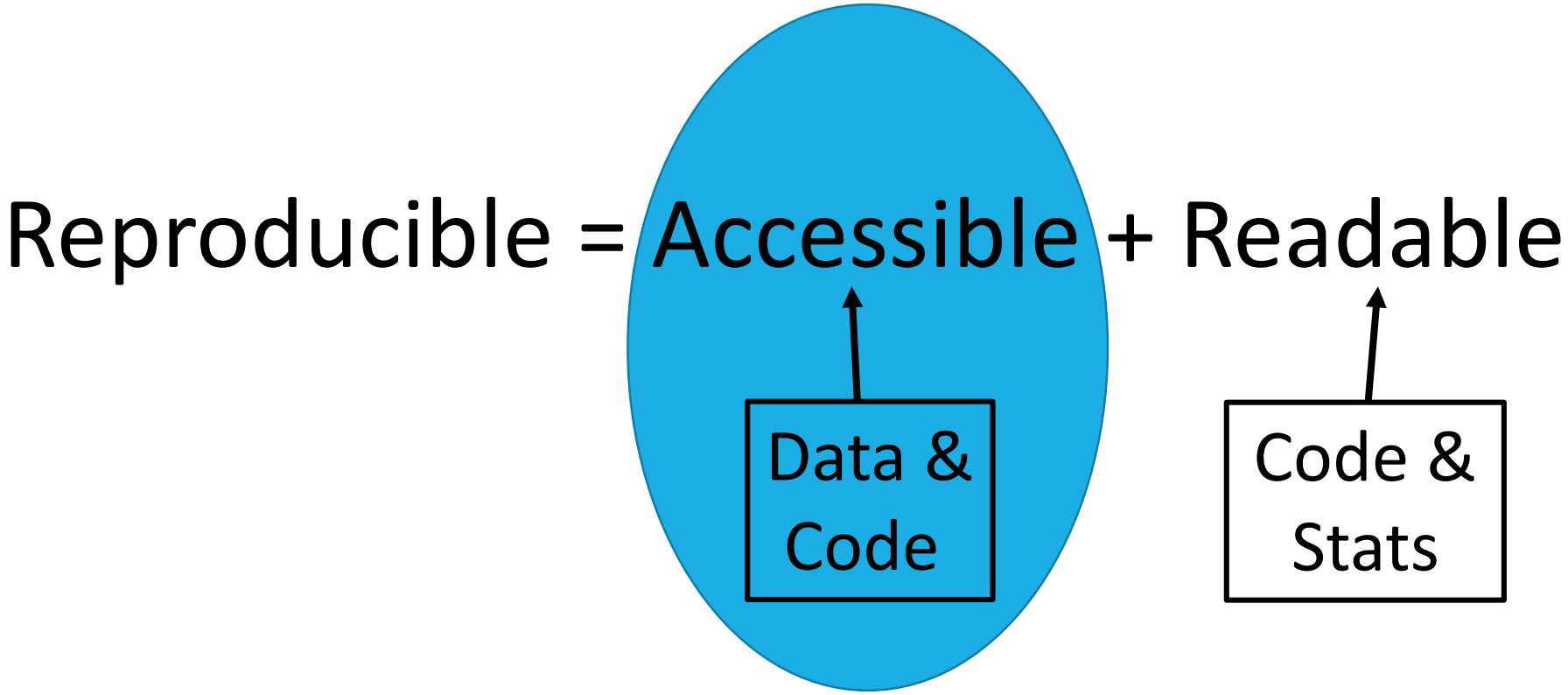
Follow

Rhode Island hputnam@uri.edu

Meren Lab

Meren Lab

University of Chicago http://merenlab.org meren@uchicago.edu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Accessibility: Tools and Strategies

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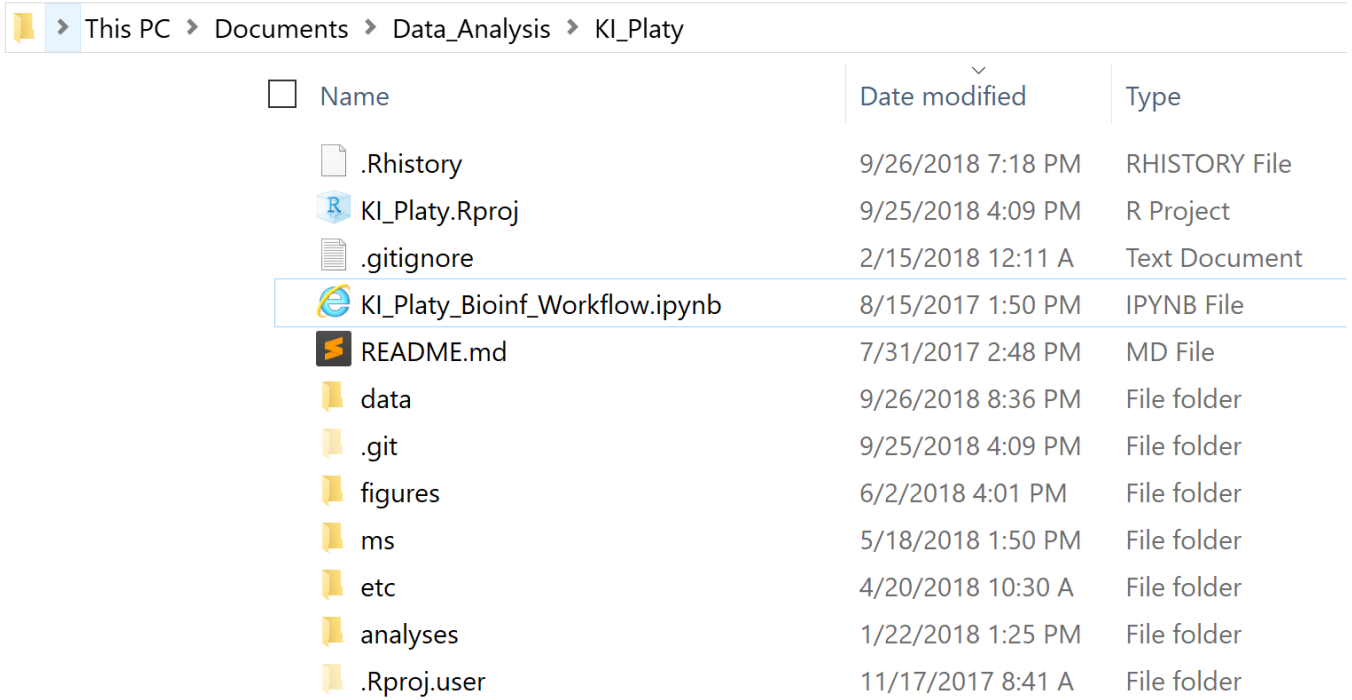

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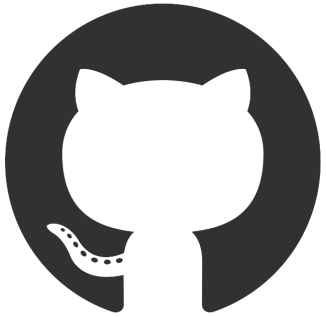
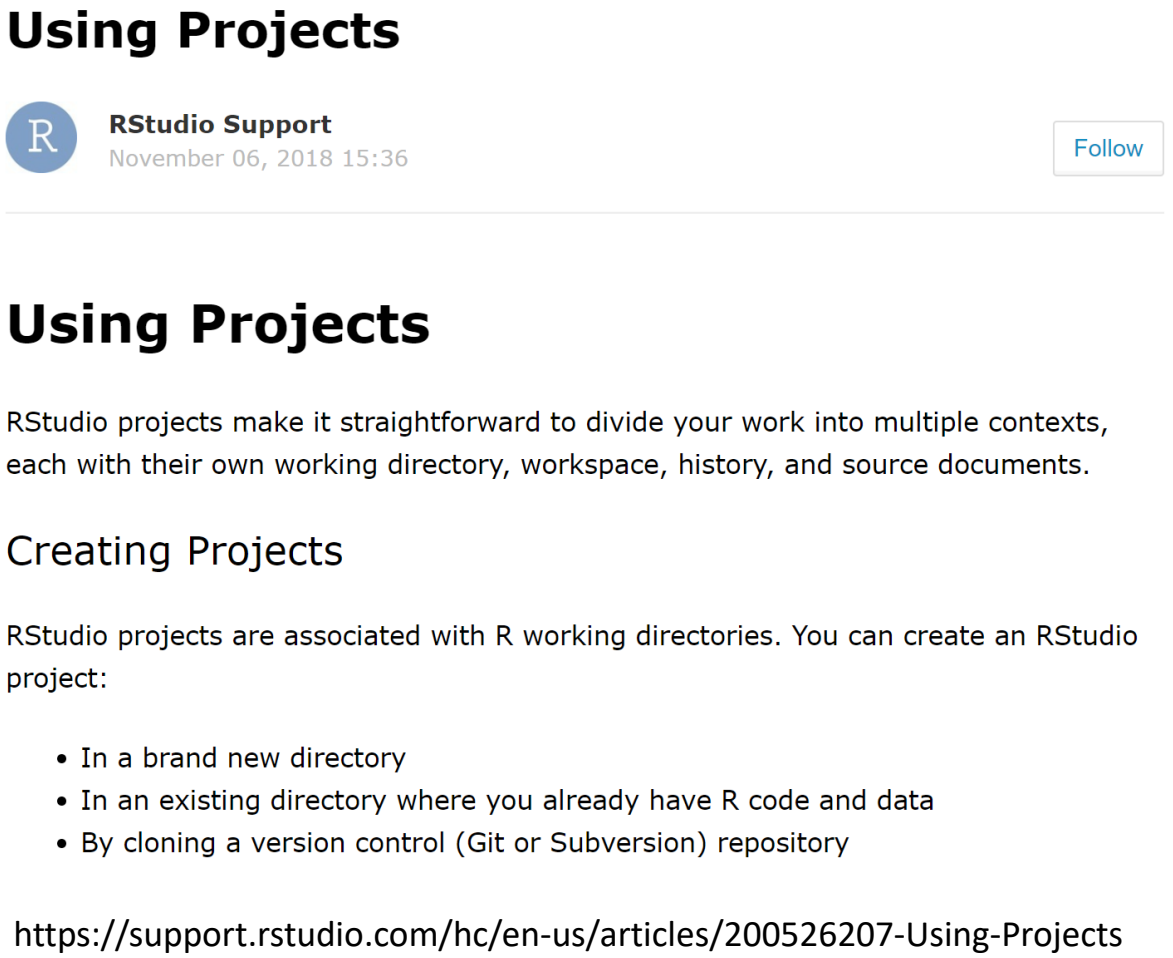
   - Extremely specific README files
   - Preserve raw data set, process data and make changes in R
   - Make data available online: GitHub, Gen Bank, publish online, etc.



Accessibility: Tools and Strategies

3. R Projects
   - Pick up where you left off



Using Projects

RStudio Support
November 06, 2018 15:36

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Using Projects

RStudio projects make it straightforward to divide your work into multiple contexts, each with their own working directory, workspace, history, and source documents.

Creating Projects

RStudio projects are associated with R working directories. You can create an RStudio project:

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https://support.rstudio.com/hc/en-us/articles/200526207-Using-Projects

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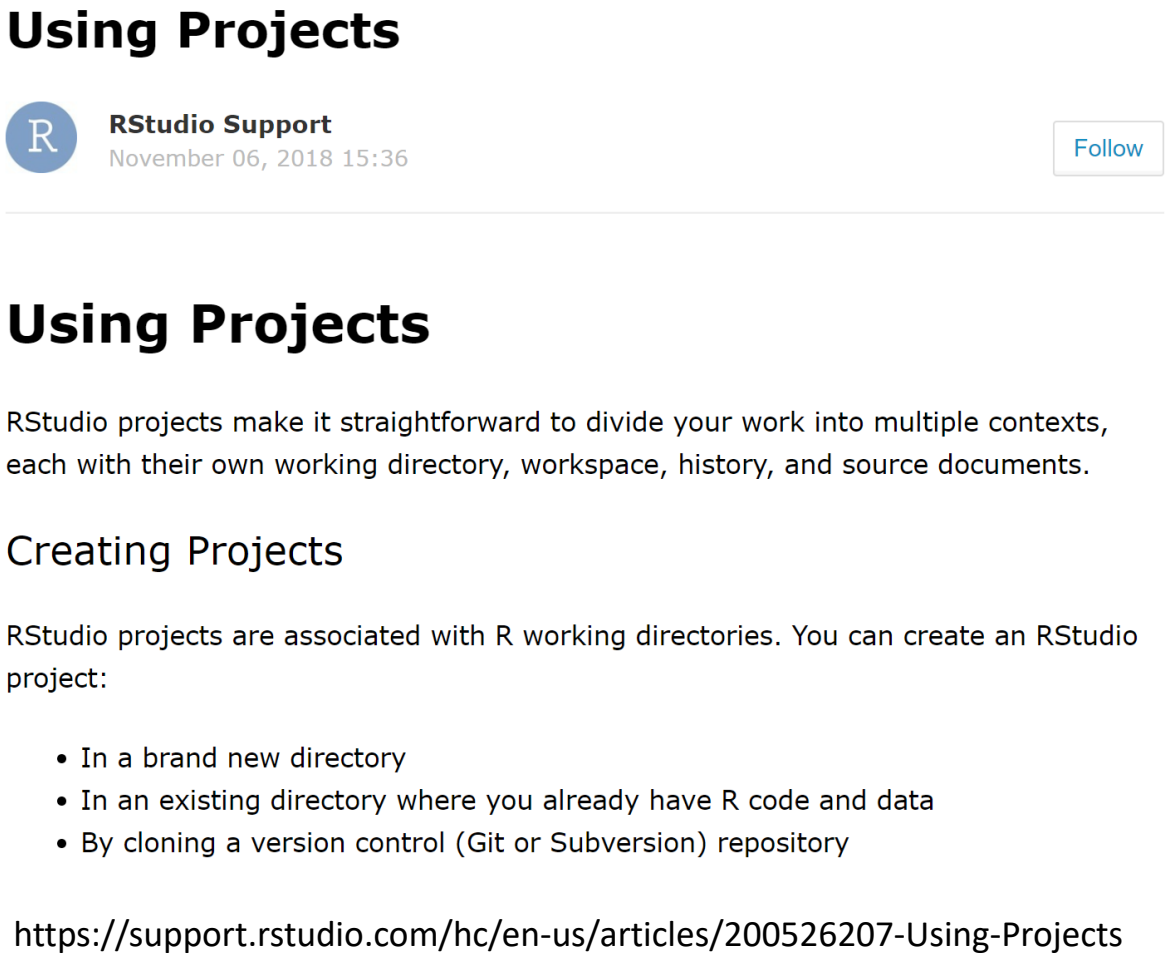

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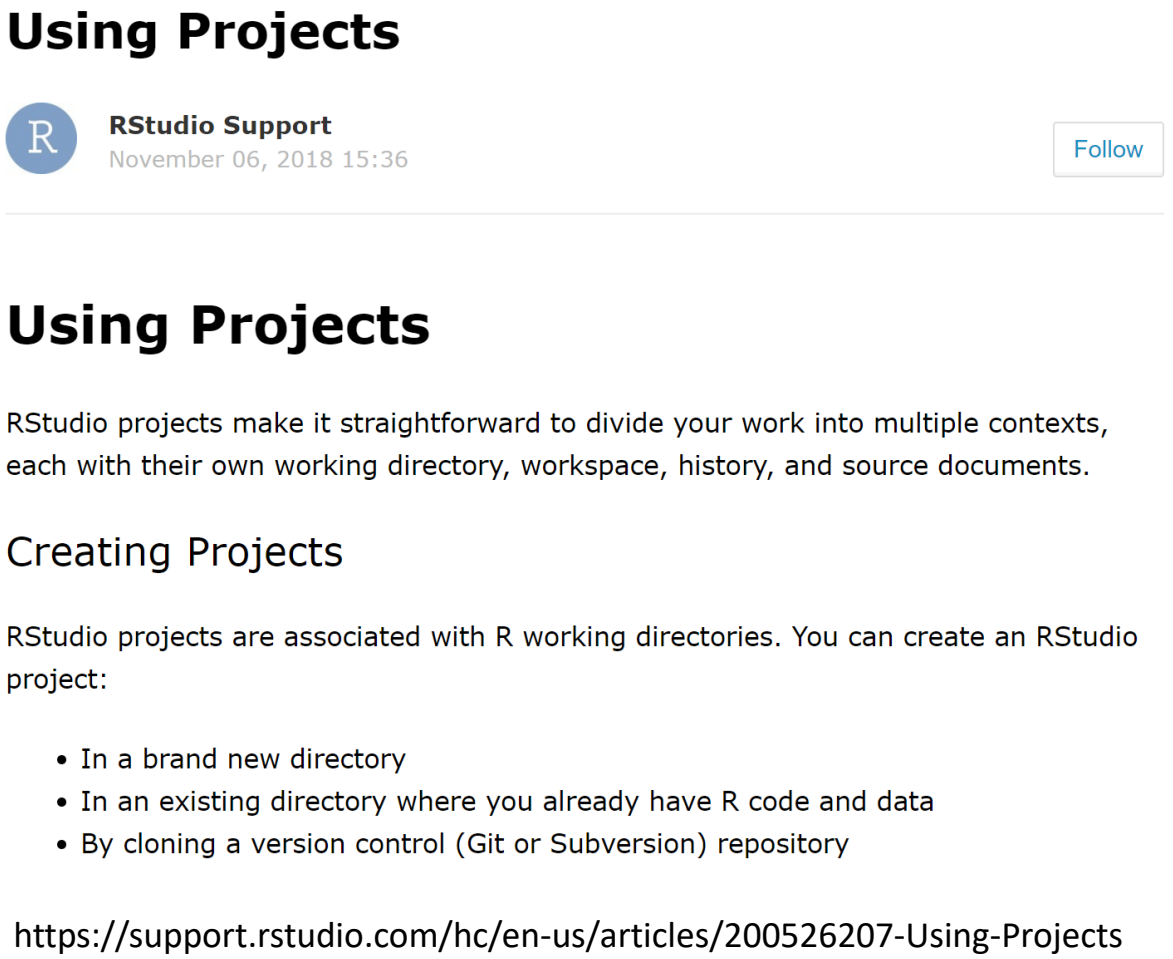

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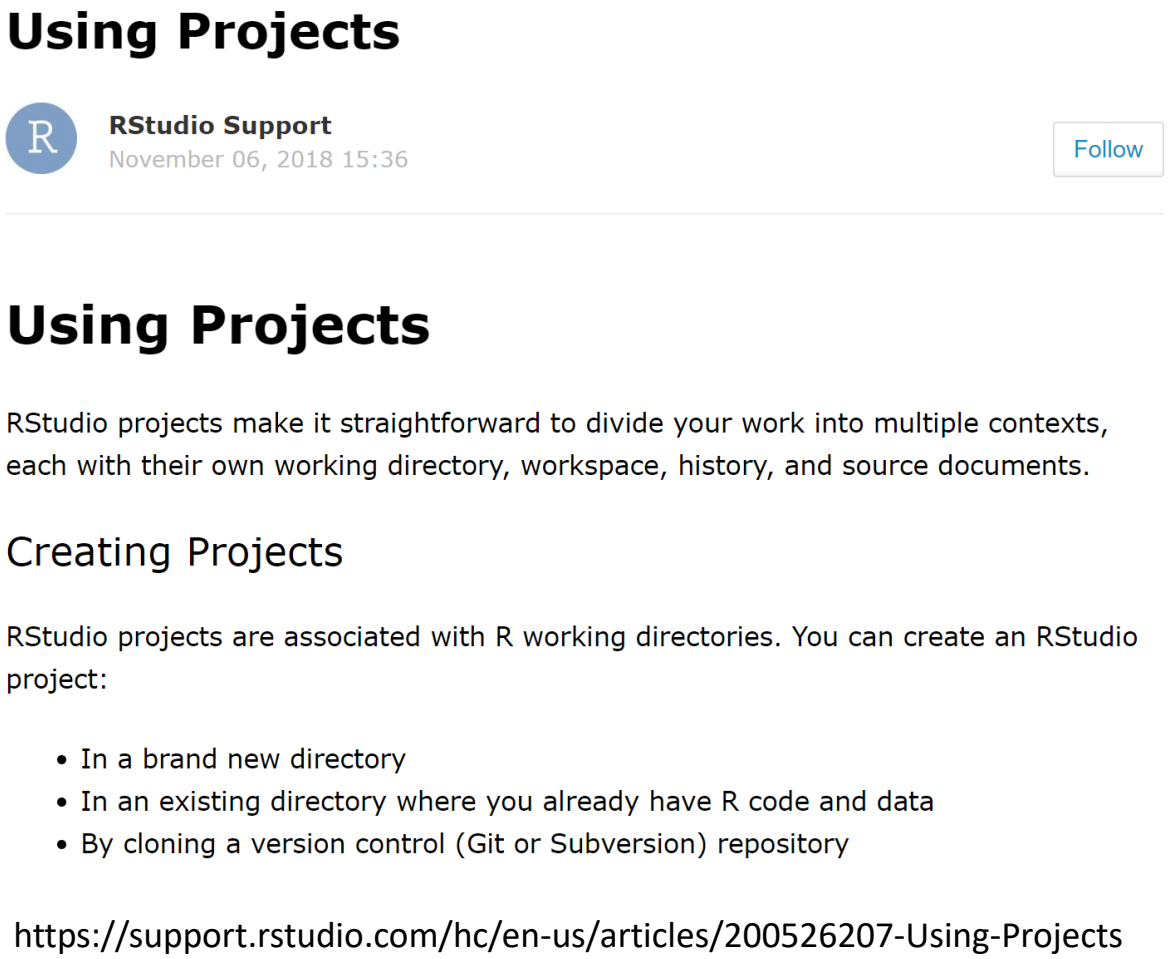
   - Avoid `setwd()` in every script
   - Easier for collaboration
   - Start at beginning of project, but if you haven't, it's not too late!



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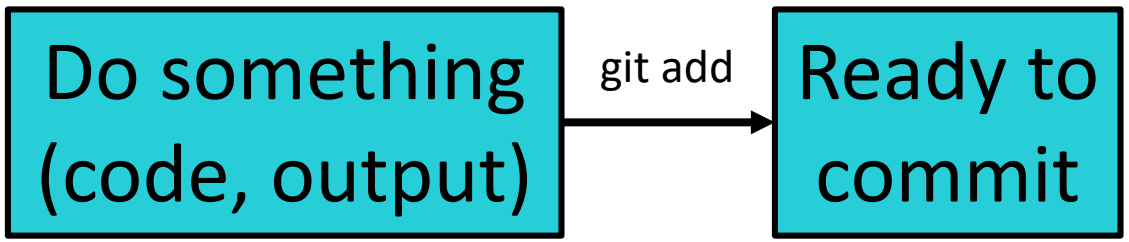
   - Yes, it’s worth it
   - No, people won’t judge your messy code
   - Good, because it forces you to track progress and steps

GitHub - Overview



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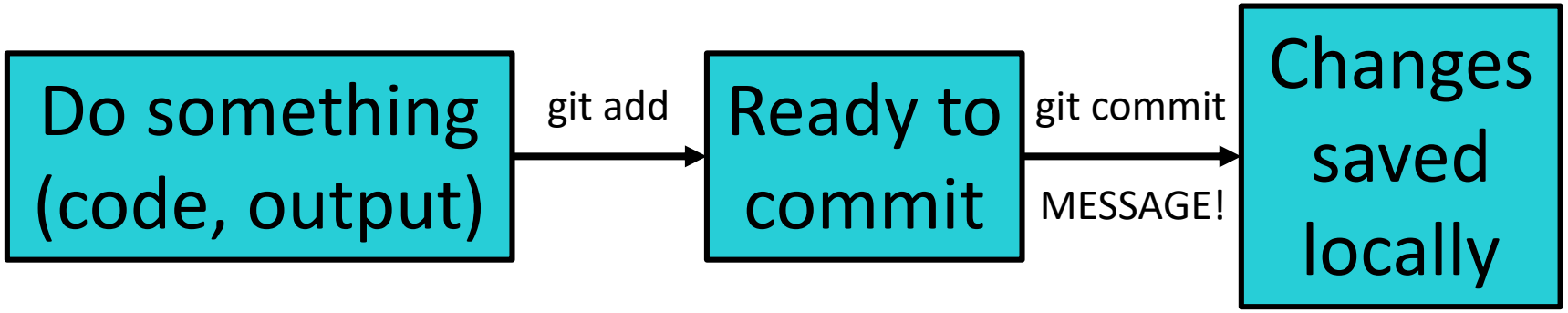

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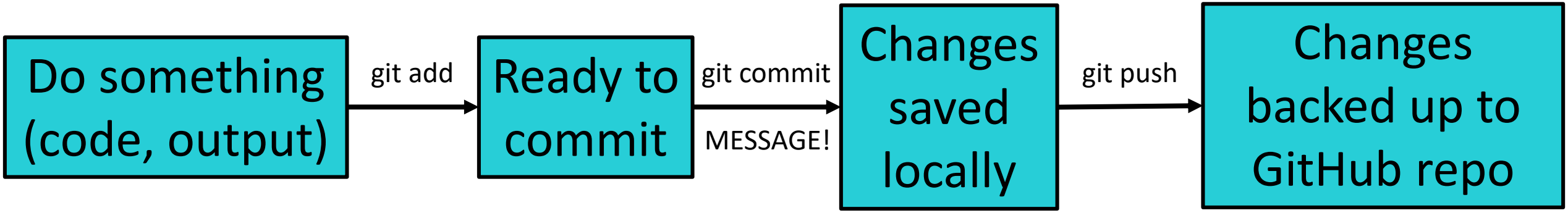

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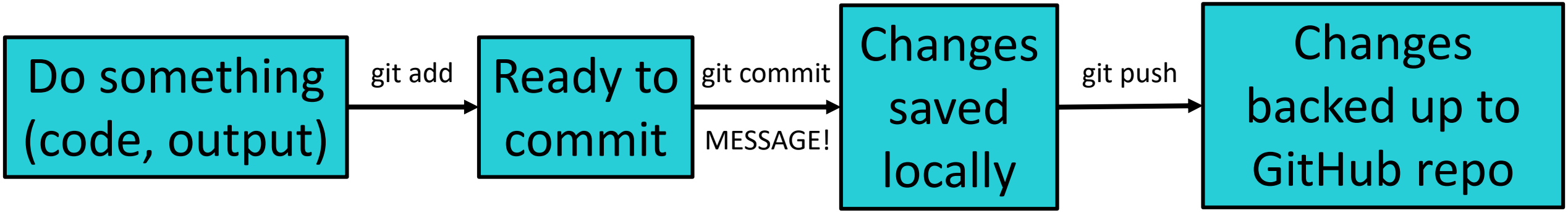

Benefits:

- Track what you've done
- Online backup in case of computer failure
- Preps code to share with colleagues

GitHub

- My strategy – separate script for each task
  - If complicated, build a map!

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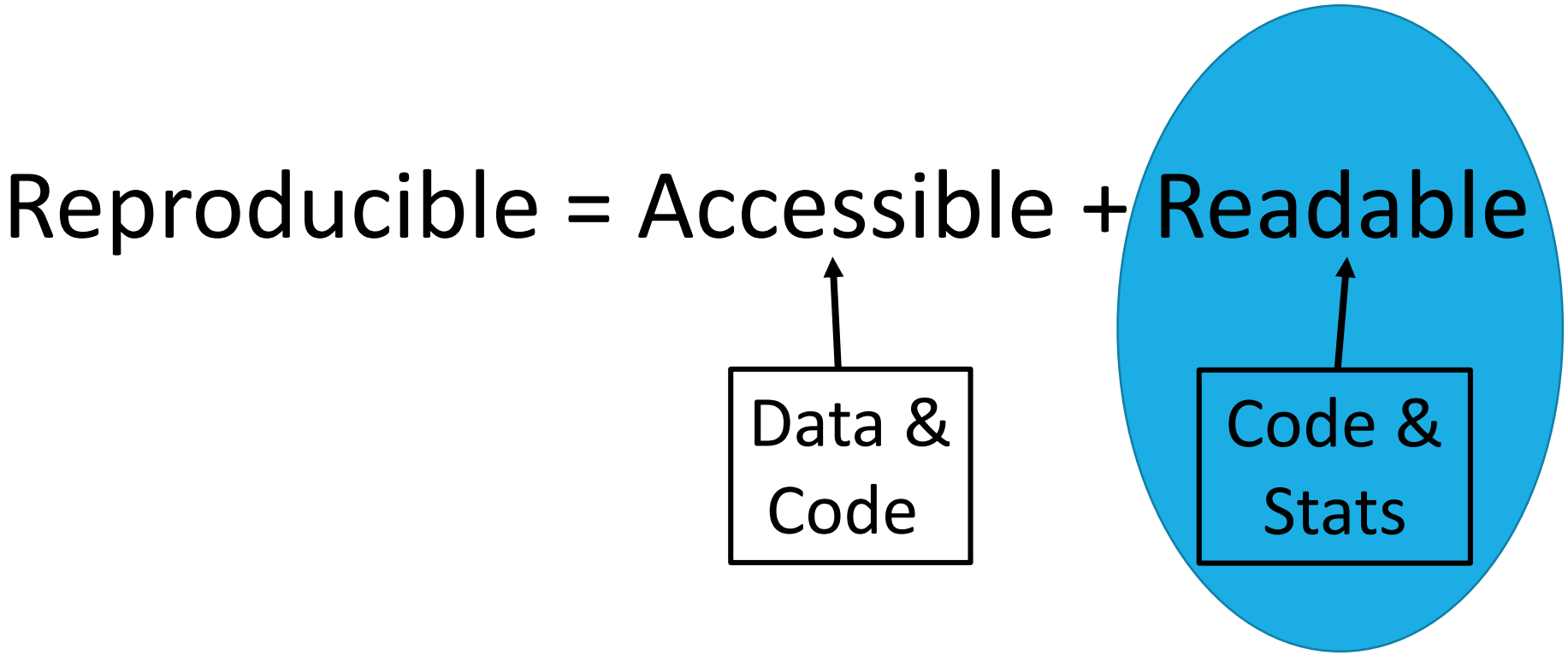
- Commit all the time
- Make commit messages specific
- What about when code gets messy?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Data & Code
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Readability: Tools and Strategies

- Commenting throughout code

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- Divide code into chunks or sections ⟶ R Markdown!

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- Great for preliminary analyses & figures, as well as statistical analyses

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Now for a few examples…

A few resources…

- R Markdown Basics https://rmarkdown.rstudio.com/authoring_basics.html
- Baum Lab – Gitting Started – R Markdown Tips https://github.com/baumlab/Gitting-started/blob/master/ms-rmarkdown-tips.md
- Reproducible Research using R Markdown https://www.r-bloggers.com/reproducible-research-write-your-clinical-chemistry-paper-using-r-markdown/
- Using R Projects https://support.rstudio.com/hc/en-us/articles/200526207-Using-Projects
- Pimp my RMD: a few tips for R Markdown https://holtzy.github.io/Pimp-my-rmd/
- Example Repo with RMarkdown data analysis file https://github.com/hputnam/Moorea_Sym
- New Data Visualization Book http://serialmentor.com/dataviz/
- Organizing Multiple Plots on a Page https://cran.r-project.org/web/packages/egg/vignettes/Ecosystem.html?utm_content=buffercef33&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer