

# Introduction to Git and GitHub

Jacob Fiksel

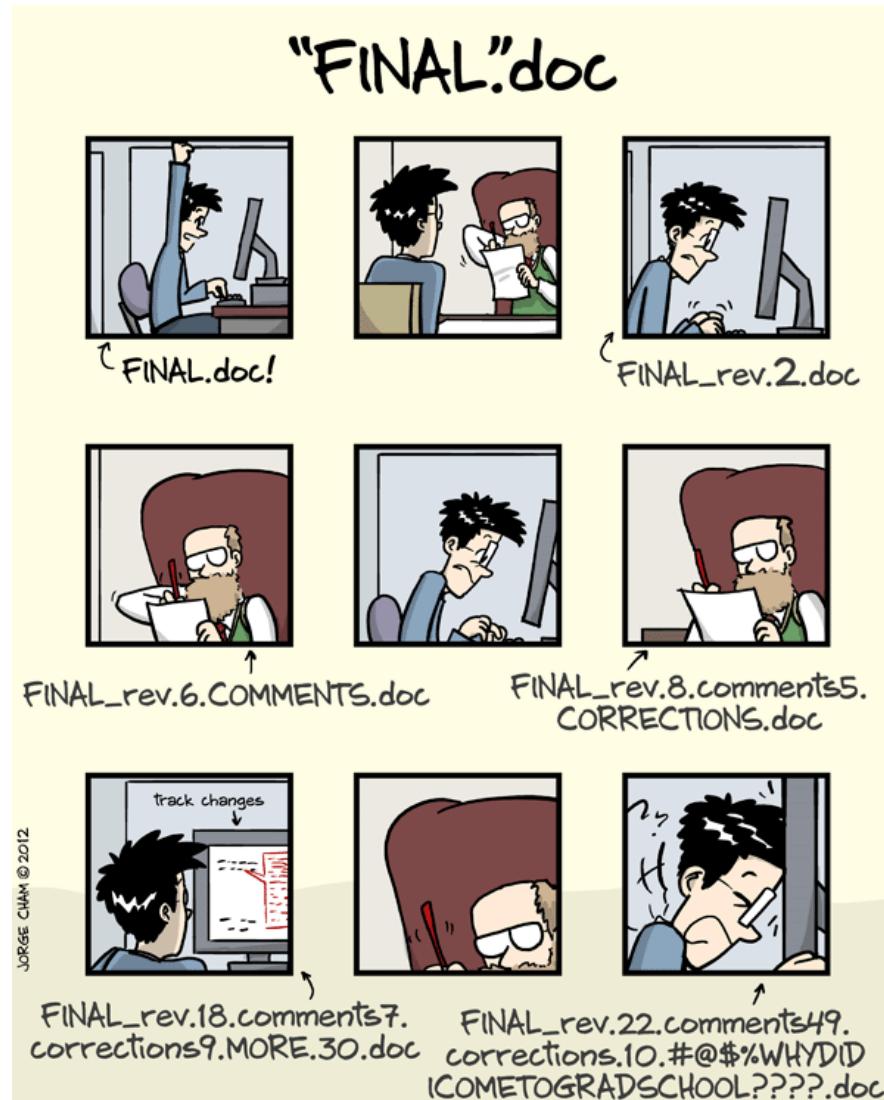
PhD Candidate, JHSPH Biostatistics

[Email: jfiksel@gmail.com](mailto:jfiksel@gmail.com)

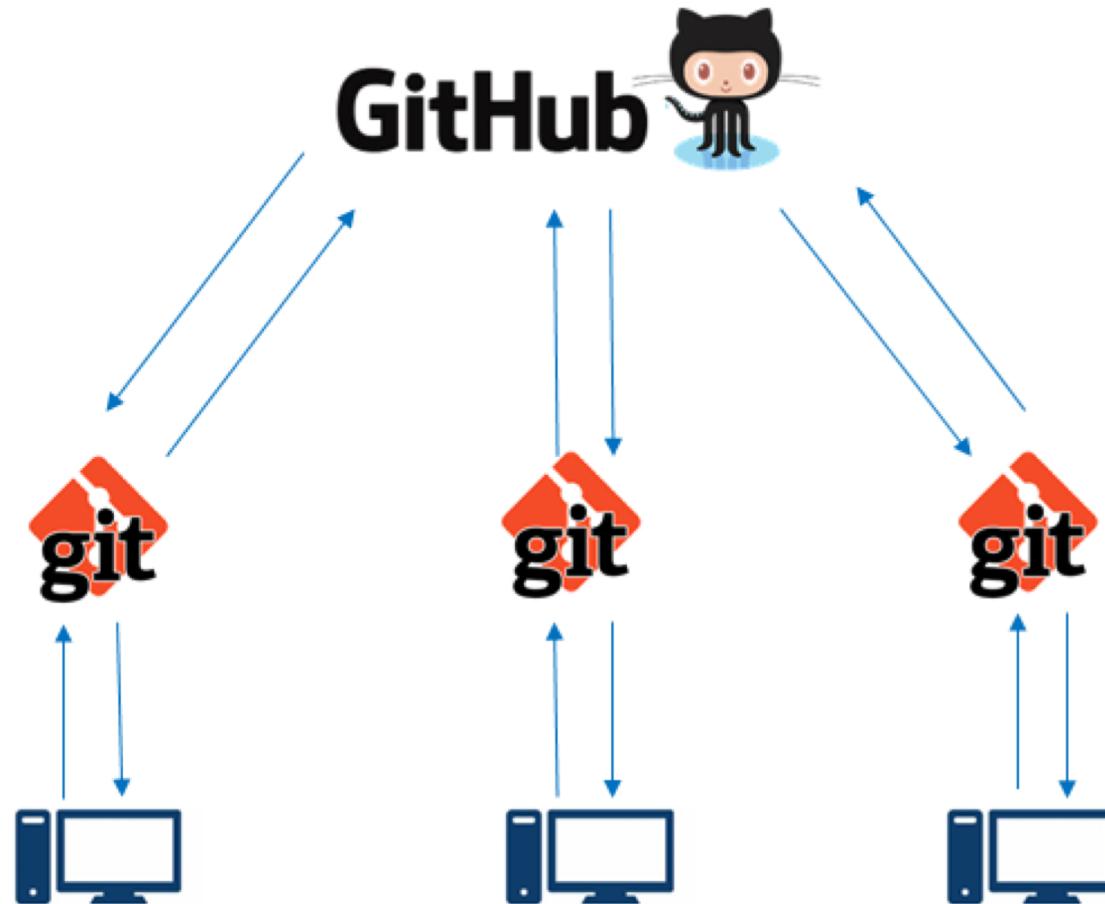
Twitter: @jfiksel1

GitHub: <https://github.com/jfiksel>

# Has this happened to you?



Git and GitHub allow for easy management and sharing of data analytic content



# Difference between Git and GitHub



- Version control system used on your computer
- “Git manages the evolution of a set of files—called a *repository* or *repo*—in a sane, highly structured way. It is like the “Track Changes” feature from Microsoft Word, but more rigorous, powerful, and scaled up to multiple files” (Brian 2017)



- Hosting service for git projects—essentially DropBox for git projects
- Mainly used for collaboration and/or distributing code and software

# Git allows for tracking of a project through commit messages

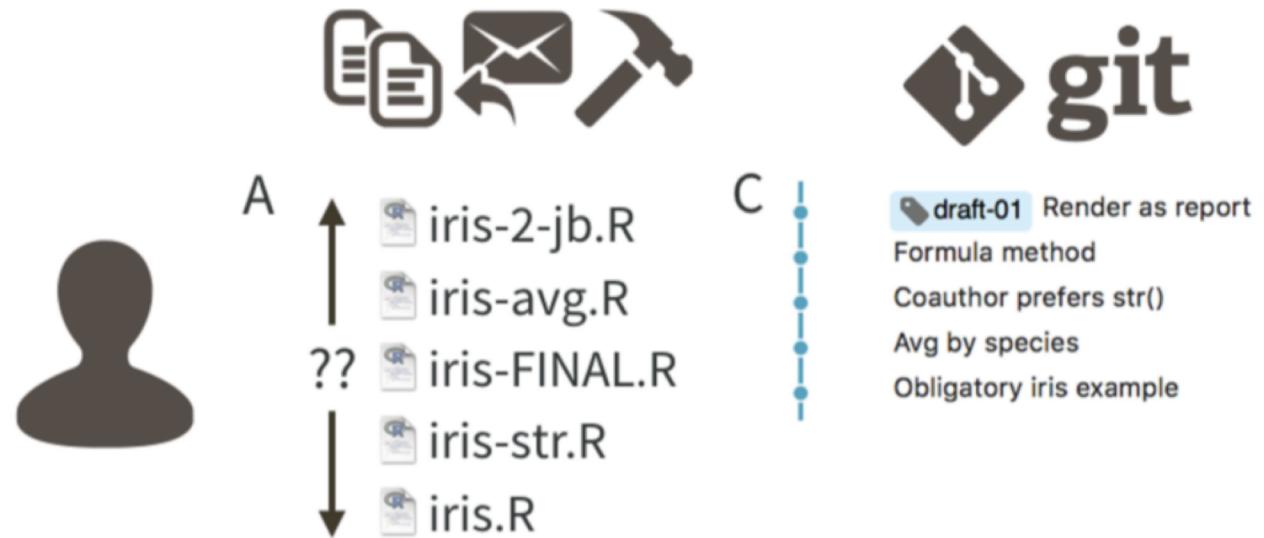
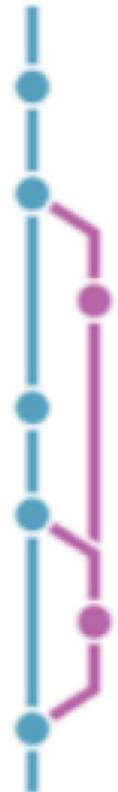


Figure from Bryan (2017)

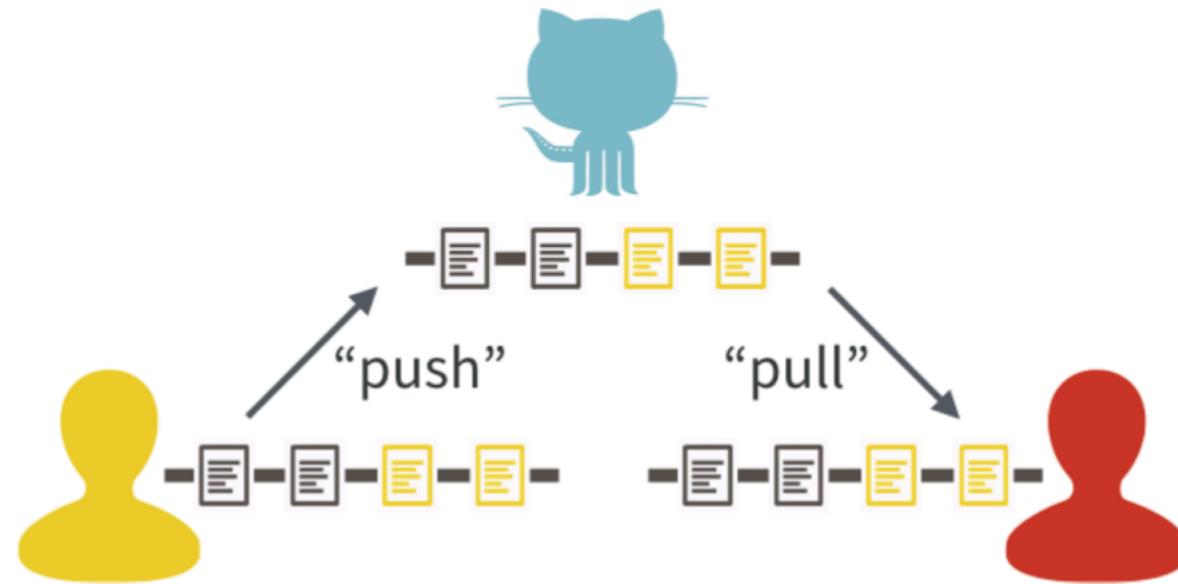
You can use branches when working as a team or on a new feature



- draft-01** Render as report
- Merge branch 'formula'
- formula** Formula method
- Coauthor prefers str()
- Merge branch 'species'
- species** Avg by species
- Obligatory iris example

Figure from Bryan (2017)

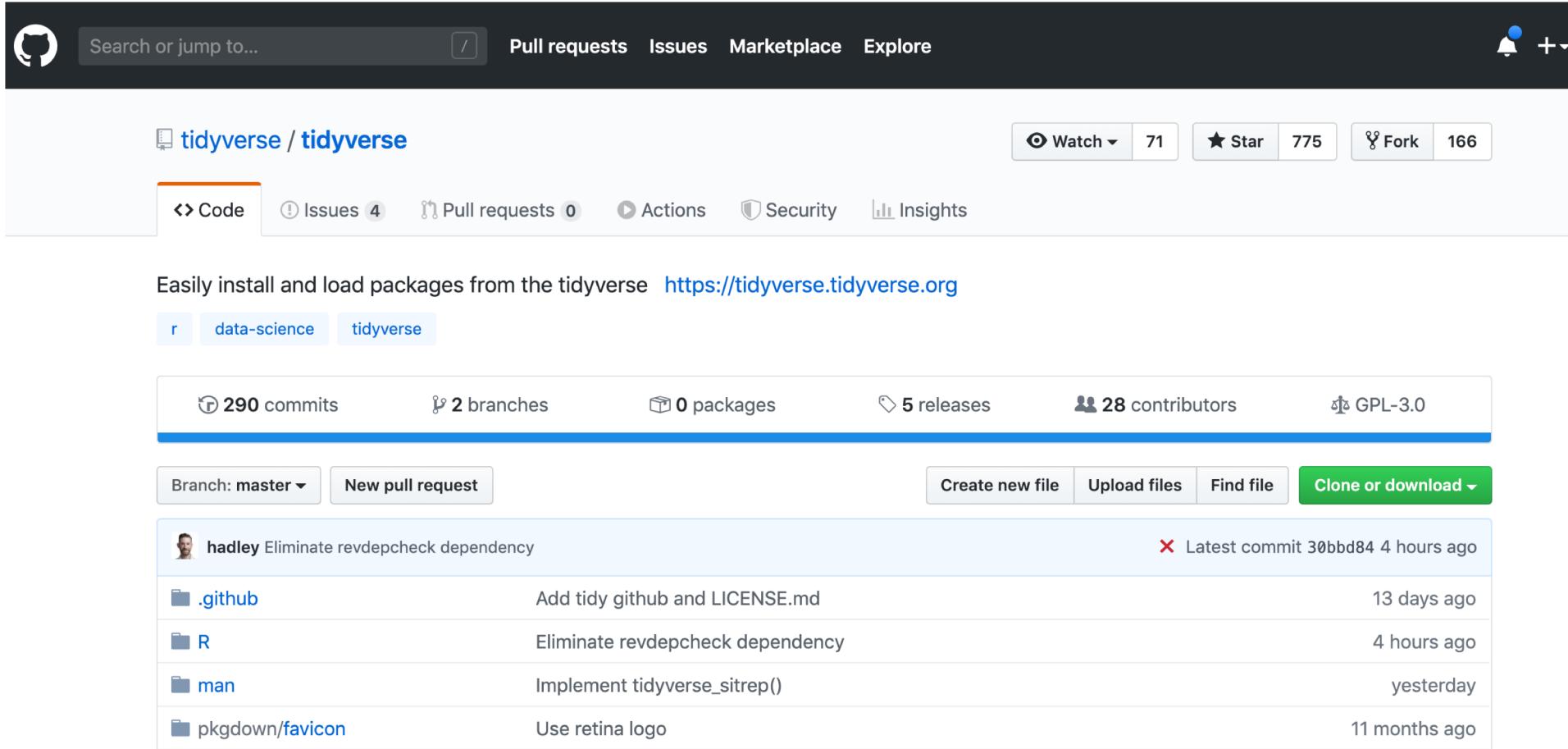
# GitHub allows for easy collaboration on projects



**Figure 5.** One contributor has made two new commits and updates the master copy on GitHub with a push. Another contributor stays up-to-date with a pull from GitHub.

Figure from Bryan (2017)

# GitHub provides a great way to distribute software



The screenshot shows the GitHub repository page for `tidyverse / tidyverse`. The top navigation bar includes links for Pull requests, Issues, Marketplace, and Explore. On the right, there are icons for notifications, a new repository button, and user statistics: 71 issues, 775 stars, 166 forks. Below the header, there are tabs for Code, Issues (4), Pull requests (0), Actions, Security, and Insights. A note says "Easily install and load packages from the tidyverse <https://tidyverse.tidyverse.org>". The repository summary shows 290 commits, 2 branches, 0 packages, 5 releases, 28 contributors, and a license of GPL-3.0. A dropdown menu shows the branch is set to master. There are buttons for New pull request, Create new file, Upload files, Find file, and Clone or download. A list of recent commits by user `hadley` shows changes like eliminating revdepcheck dependency, adding tidy github and LICENSE.md, and implementing tidyverse\_sitrep(). The latest commit was made 4 hours ago.

Easily install and load packages from the tidyverse <https://tidyverse.tidyverse.org>

Branch: master ▾ New pull request

Create new file Upload files Find file Clone or download ▾

Author	Commit Message	Time Ago
hadley	Eliminate revdepcheck dependency	Latest commit 30bbd84 4 hours ago
.github	Add tidy github and LICENSE.md	13 days ago
R	Eliminate revdepcheck dependency	4 hours ago
man	Implement tidyverse_sitrep()	yesterday
pkgdown/favicon	Use retina logo	11 months ago

# You can also submit issues if you're having trouble with software

The screenshot shows a GitHub repository page for 'jfiksel / github-classroom-for-teachers'. The repository has 12 watchers, 120 stars, and 40 forks. The 'Issues' tab is selected, showing 0 issues. A specific issue titled 'Step 4 Clarification - #5' is displayed, which is closed. The issue was opened by kmkinnaird on Aug 15 with 1 comment. The comment from kmkinnaird states: 'I'm at step 4 of the classroom step up: Go to the current year's version of the classroom organization. Under settings, go to member privileges. Change Default repository permission to "none" (if it's not already) and save these changes. This will make it so that students cannot change non-assignment repositories in the organization.' Below the comment, there is a screenshot of the GitHub 'Member repository permissions' settings page under 'Organization settings'. The settings show 'None yet' for Assignees, Labels, Projects, and Milestone. The 'Base Permissions?' section is visible, with 'Repositories' and 'Member repository permissions' listed.

# Pull requests allow you to collaborate on all public projects on GitHub!

The screenshot shows a GitHub repository page for `jfiksel / github-classroom-for-teachers`. The navigation bar includes options like Code, Issues (0), Pull requests (0, highlighted in orange), Actions, Projects (0), Wiki, Security, Insights, and Settings. The main title of the pull request is "Adding Alternate grading method using pull request #4". A purple "Merged" button indicates the status. Below it, a message states "jfiksel merged 1 commit into `jfiksel:master` from `acorbin3:master`" on Aug 14. The pull request has 2 conversations, 1 commit, 0 checks, and 1 file changed. The commit message from `acorbin3` on Aug 14 reads:

Added a section diving into how to use pull requests and a small section on Continuous Integration(automated testing) with TravisCI.

I did add a little bit of my opinion related to the Software Industry. If you feel that its too much I can take it out.

On the right side, there are sections for Reviewers (No reviews), Assignees (No one—assign yourself), and Labels (empty).



# GitHub Classroom

The workflow developers use, whether you have five students or 500.

- Can easily distribute coding assignments to students
- Knowing Git and GitHub is extremely valuable for working in industry, and this allows you to teach it to your students in a “controlled environment” (while also learning it yourself)
- For more info: “Using GitHub Classroom to Teach Statistics” (Fiksel et al. 2019)

# References

- <https://happygitwithr.com/>
  - Extremely useful tool for learning Git and GitHub—based off using R/RStudio for analyses
- <https://learngitbranching.js.org/>
  - Can help you visualize the process of using Git
- “Excuse Me, Do You Have a Moment to Talk About Version Control?”  
(Bryan 2017)
  - Great paper for telling you why you should use Git and GitHub

You can view this presentation on my GitHub

- [https://github.com/jfiksel/intro\\_to\\_git\\_and\\_github](https://github.com/jfiksel/intro_to_git_and_github)