

Introduction to Git & GitHub

Terminal, RStudio

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AG Landscape Ecology

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Why Git?

- Version control software
- Modern software development
 - most R-packages
- Git is the **software**
- GitHub is the **platform**

Other Platforms

- GitLab: <https://about.gitlab.com>
- BitBucket: <https://bitbucket.org>



Install Git

<https://github.com/git-guides/install-git>

On Linux Ubuntu

```
sudo apt update  
sudo apt install git-all
```

On windows

Download manually

Setup Local Git Repository

```
cd my_root_directory  
git init
```

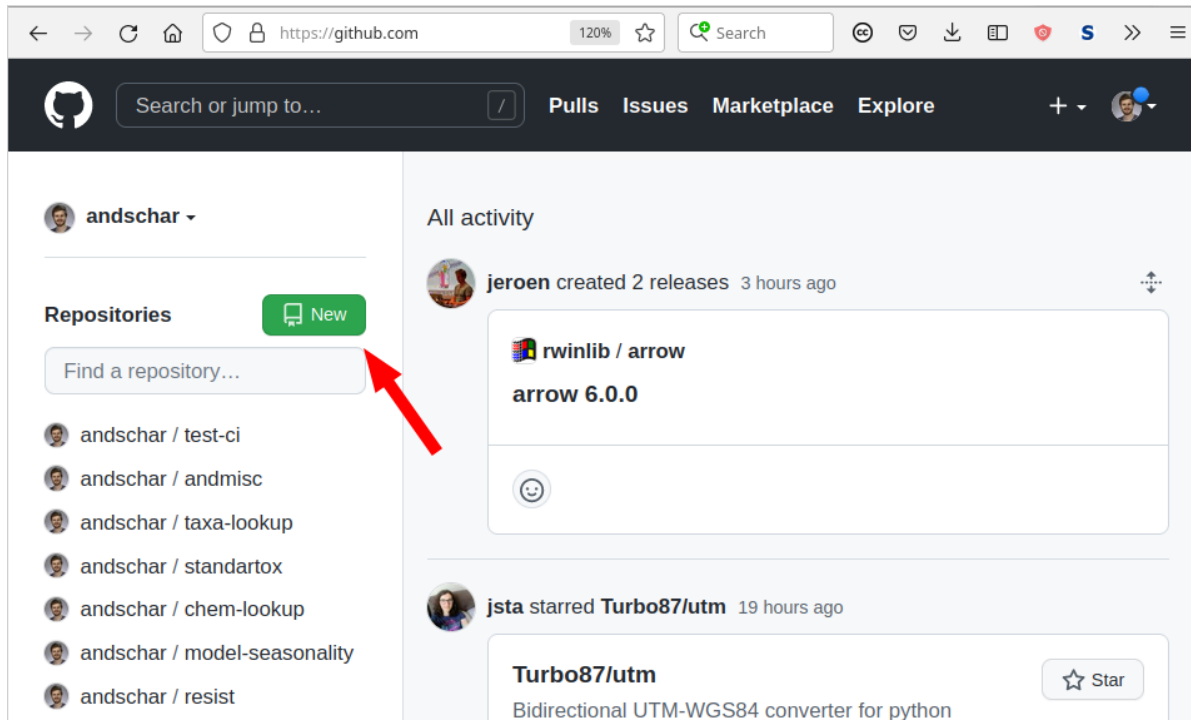
Create a GitHub account

Create (initialize) repository

Locally

```
git init
```

Remote

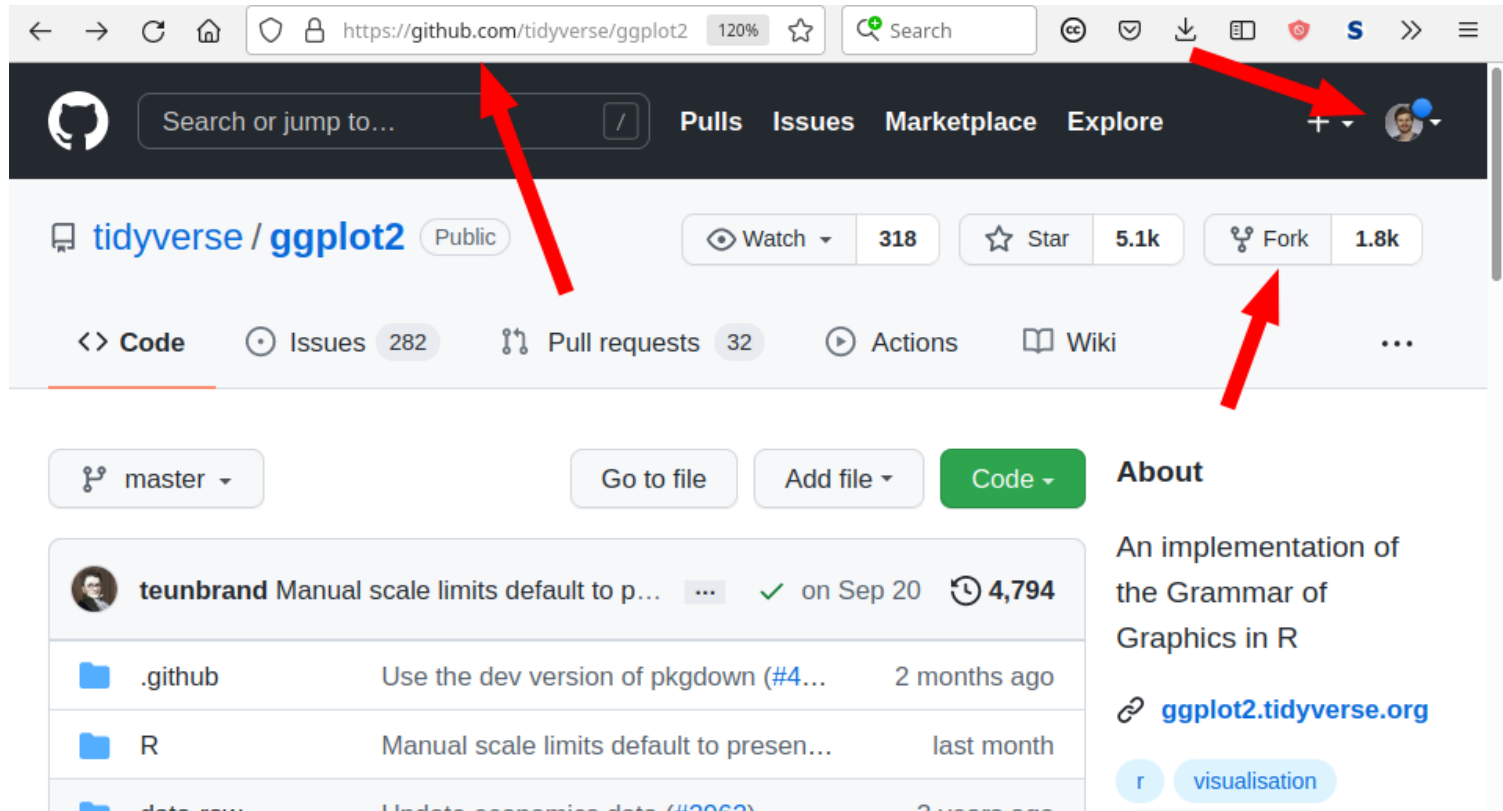


The screenshot shows the GitHub homepage in a web browser. The address bar displays 'https://github.com'. The navigation bar includes the GitHub logo, a search bar, and links for 'Pulls', 'Issues', 'Marketplace', and 'Explore'. On the left sidebar, under the 'Repositories' section, a green 'New' button with a computer icon is highlighted by a red arrow. Below this button is a search bar labeled 'Find a repository...'. A list of repositories for the user 'andschar' is shown, including 'test-ci', 'andmisc', 'taxa-lookup', 'standartox', 'chem-lookup', 'model-seasonality', and 'resist'. The main content area, titled 'All activity', shows recent activity: 'jeroen created 2 releases 3 hours ago' (specifically 'rwinlib / arrow' version 'arrow 6.0.0') and 'jsta starred Turbo87/utm' (described as 'Bidirectional UTM-WGS84 converter for python').

Create (initialize) repository

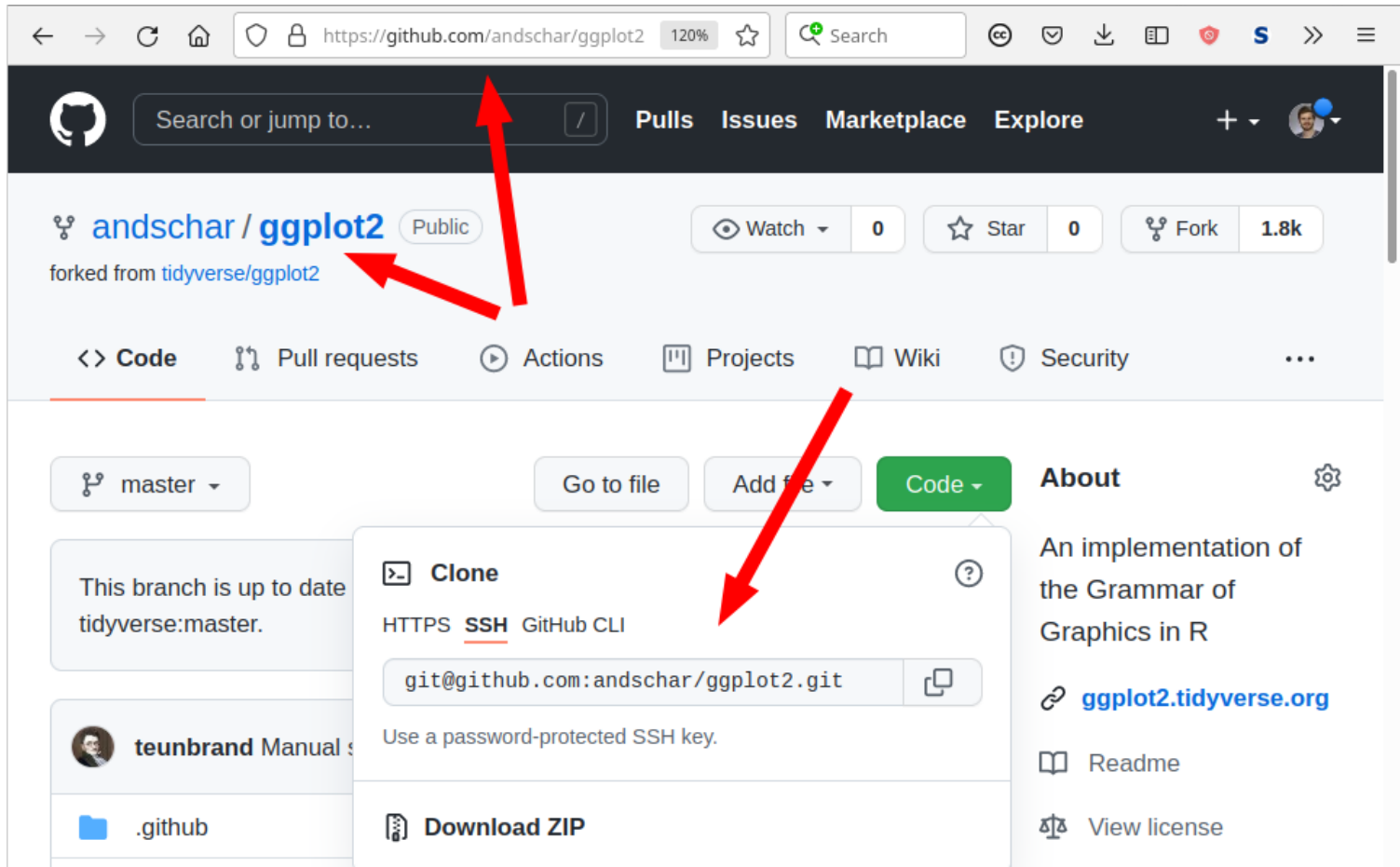
Fork a repository

- Fork someone's repo to your GitHub account



Clone a repository

- Clone **your** fork (i.e. version) to your local machine



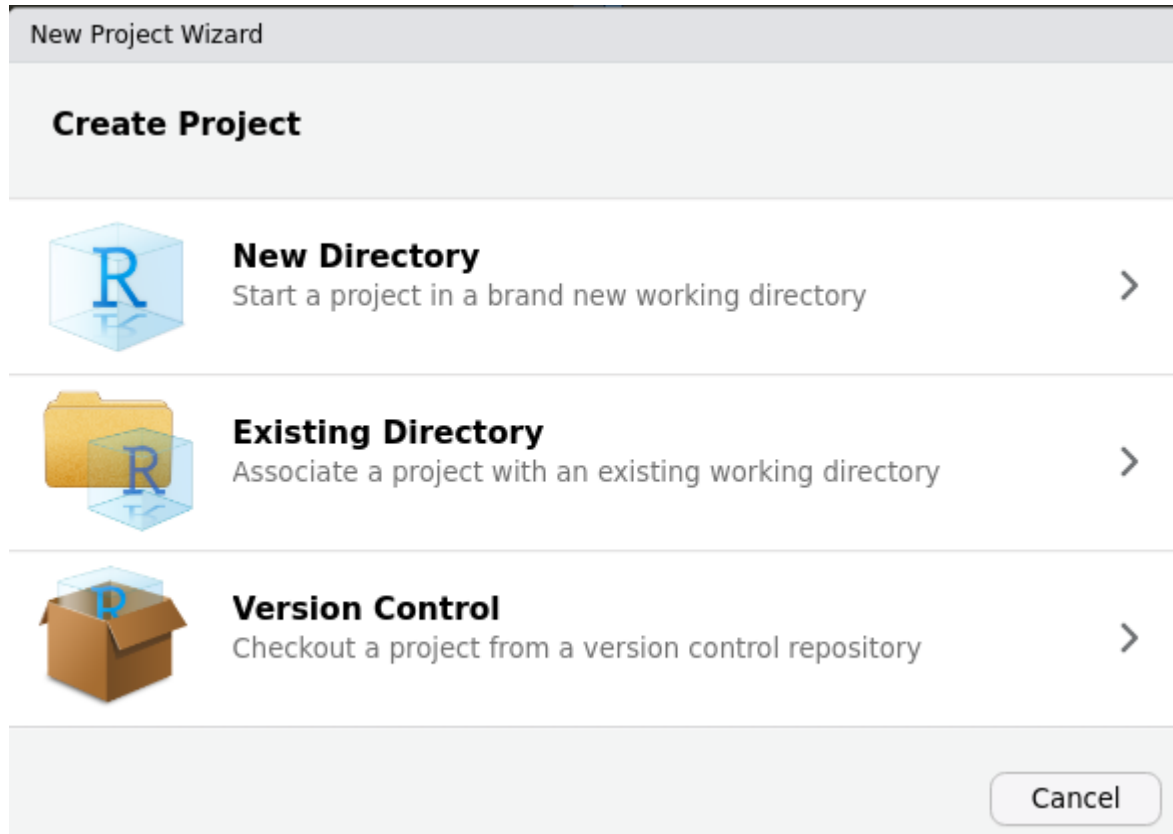
Clone a repository

Command line

```
cd Projects  
git clone git@github.com:andschar/MOD3.git # SSH  
git clone https://github.com/andschar/MOD3.git # HTTPS
```

RStudio


RStudio



RStudio

New Project Wizard

Back **Clone Git Repository**



Repository URL:

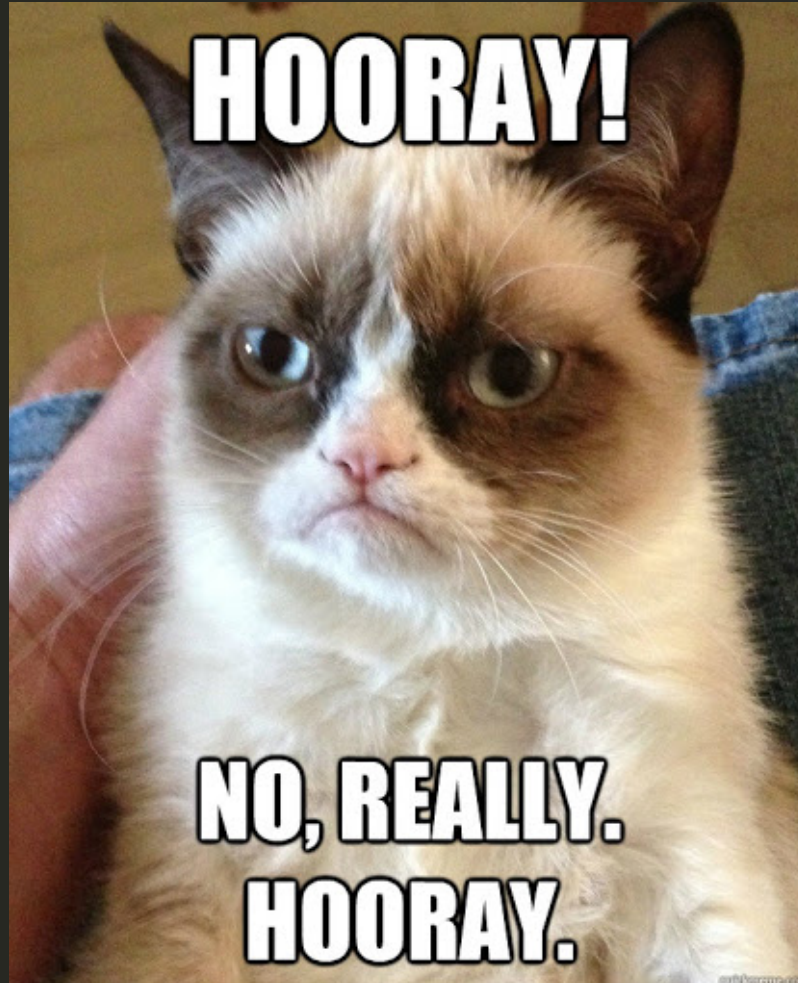
Project directory name:

Create project as subdirectory of:
 Browse...

☐ Open in new session

Create Project **Cancel**

First repository (i.e. fork) !!



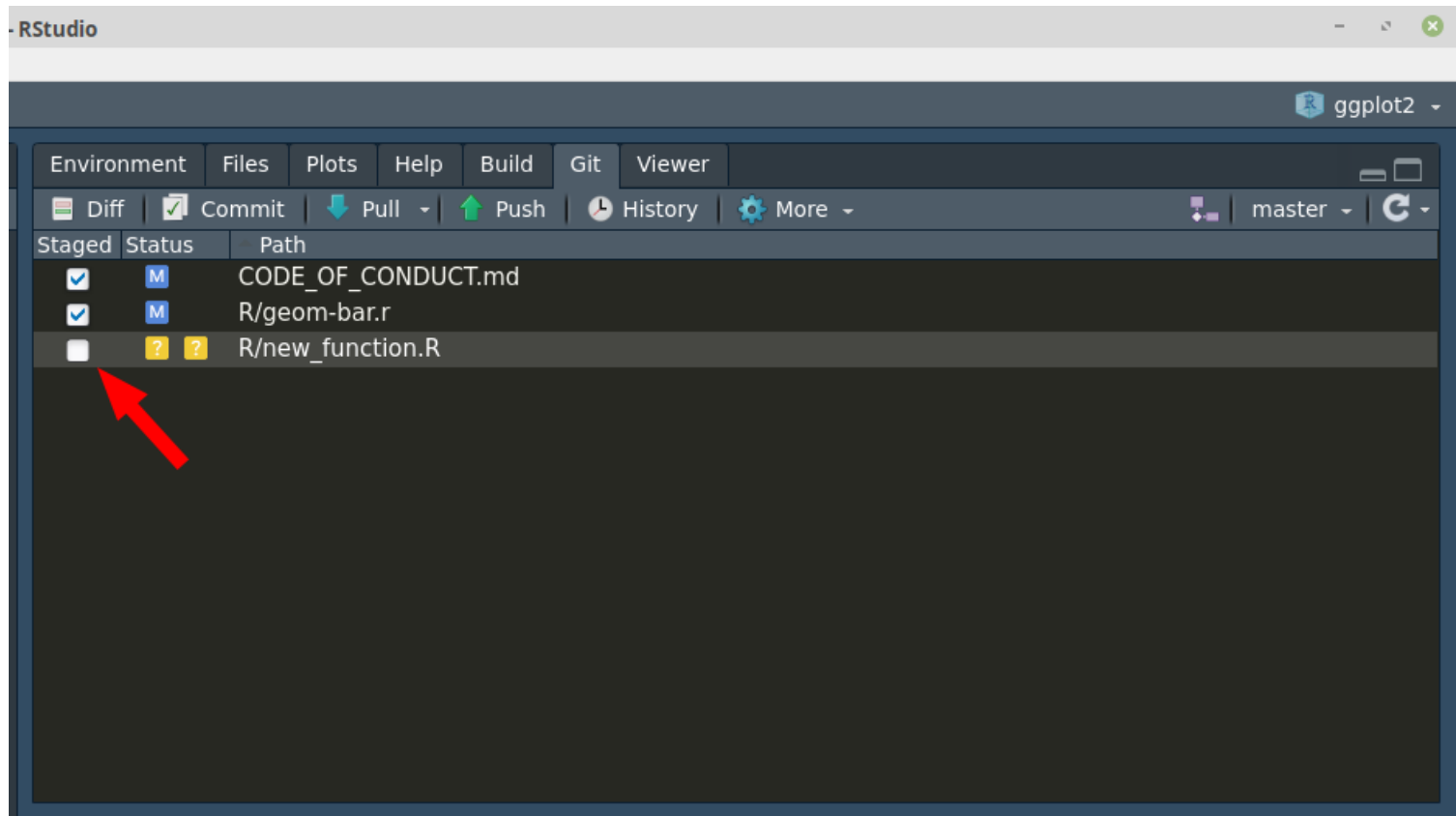
Local changes

Make changes to the .txt, .R, .python or to whatever file...



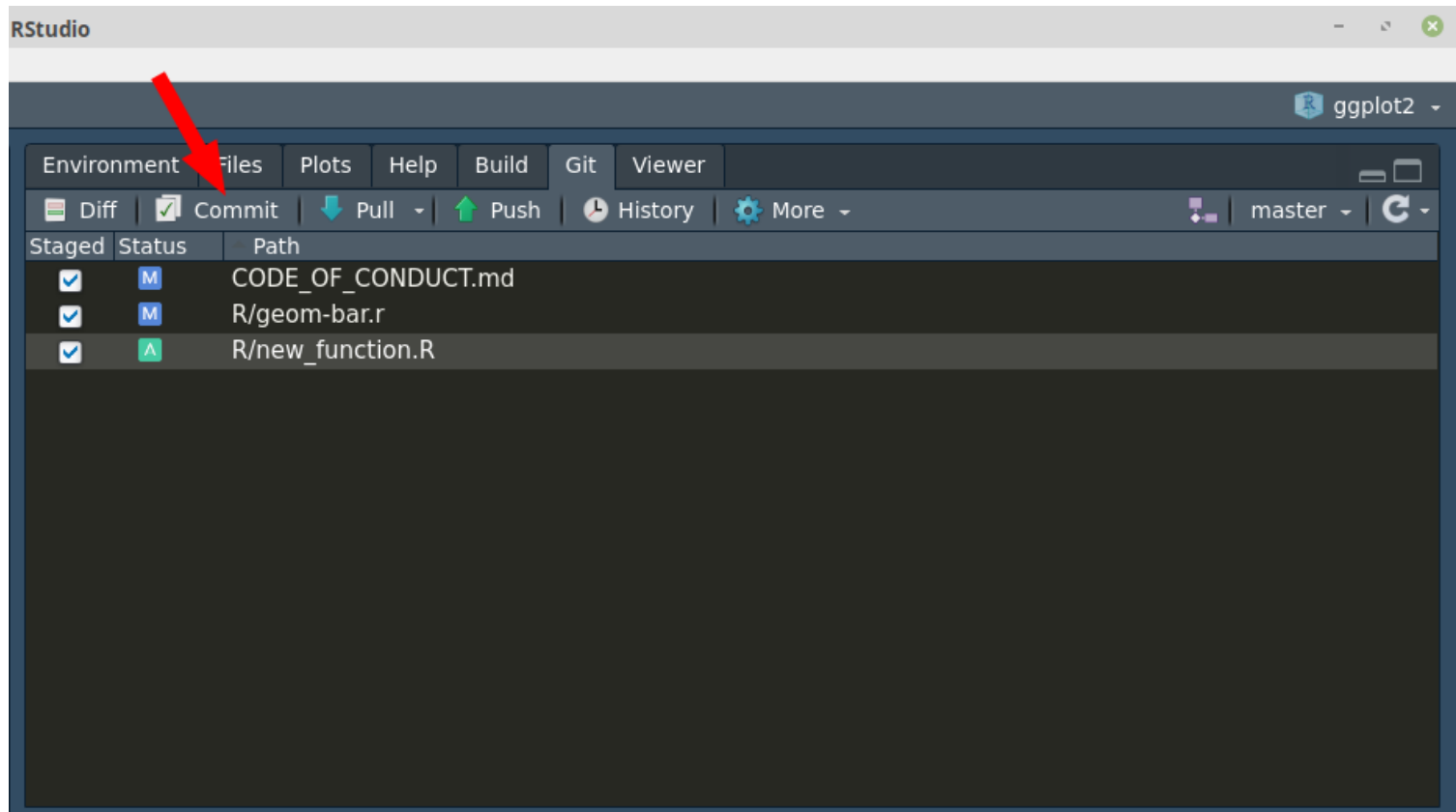
Stage your changes

```
git add file.txt  
git add *.txt  
git add -A
```



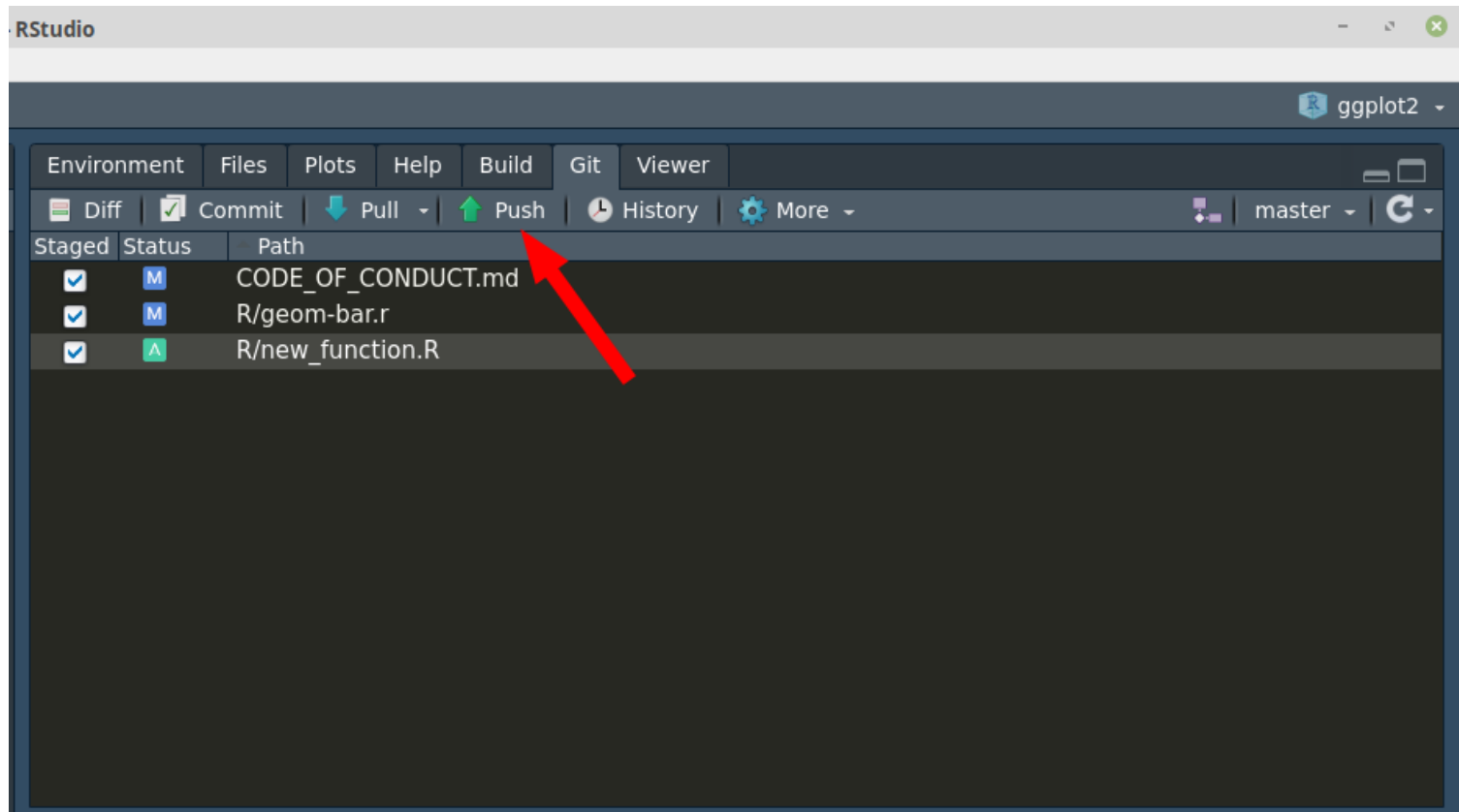
Commit changes

```
git commit -m 'Patch-1'
```



Push to your repo (origin)

```
git push origin master  
git push origin main
```



Pull Request

From your main branch to the remote main branch

The screenshot shows the GitHub interface for the repository `andschar / ggplot2`, which is a public fork of `tidyverse/ggplot2`. The repository is currently on the `master` branch, which is 1 commit ahead of the upstream `tidyverse:master`. A red arrow points to the text "This branch is 1 commit ahead of tidyverse:master." Another red arrow points to the "Open pull request" button in a tooltip that appears when hovering over the status message. The tooltip also contains the text "This branch is 1 commit ahead of tidyverse:master. Open a pull request to contribute your changes upstream." The repository's file list shows `.github`, `R`, and `data-raw` folders. The commit history on the right shows 4,795 commits, with the most recent commit made 2 minutes ago.

andschar / ggplot2 (Public)
forked from tidyverse/ggplot2

<> Code Pull requests Actions Projects Wiki Security Insights Settings

master 51 branches 34 tags Go to file Add file Code

This branch is 1 commit ahead of tidyverse:master. Contribute Fetch upstream

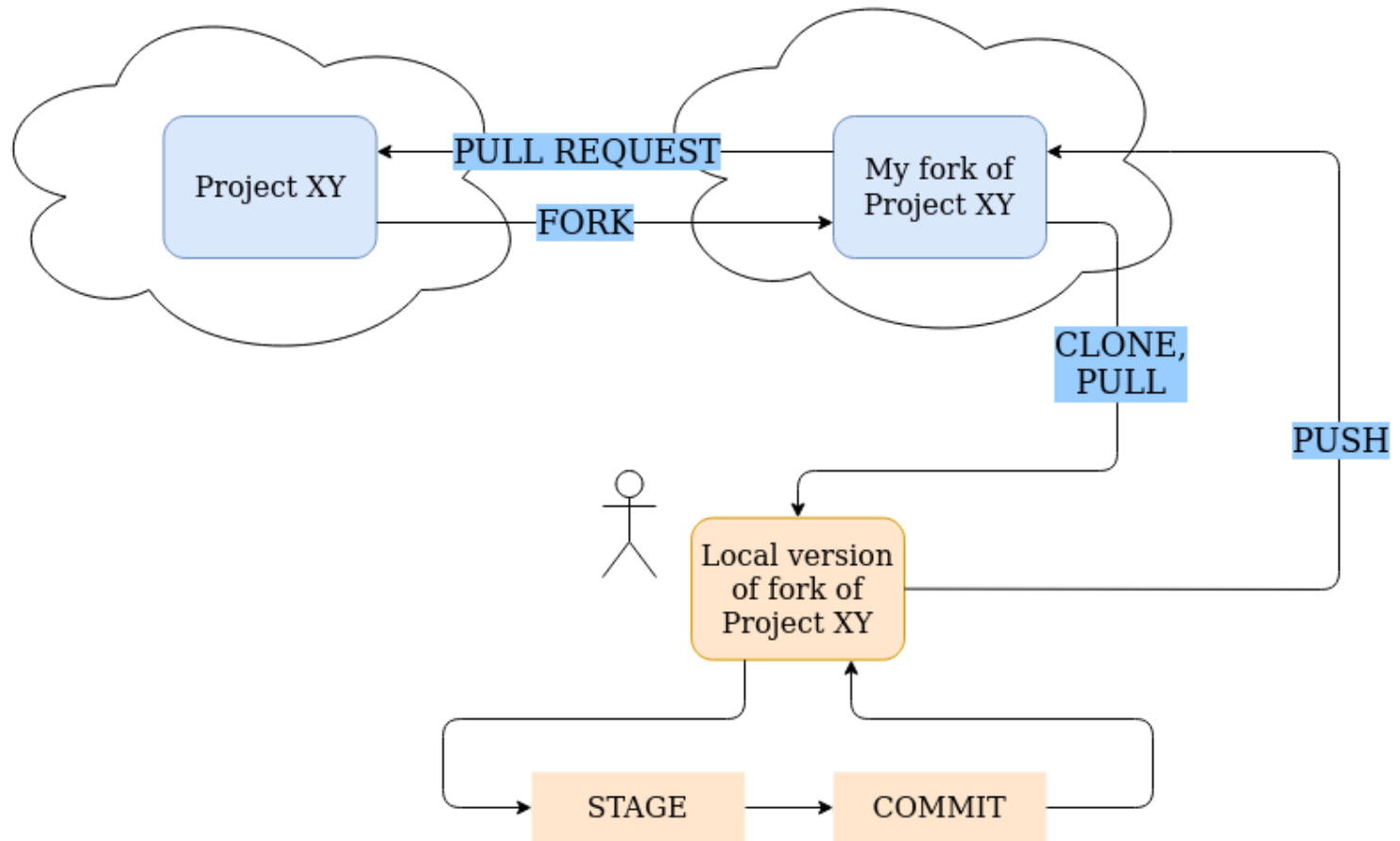
andschar Patch-1

.github Use the
R Patch-1
data-raw Update

This branch is 1 commit ahead of tidyverse:master.
Open a pull request to contribute your changes upstream.
Open pull request

ago 4,795 commits
2 months ago
2 minutes ago
3 years ago

Git/Github Workflow



Git/Github Workflow

1. Create or Fork a repo
2. Clone the repo to local machine
3. Local changes
4. Stage (i.e. add) & Commit changes to Git tree
5. Push to origin
6. Create a Pull-Request against the remote repository

Branches

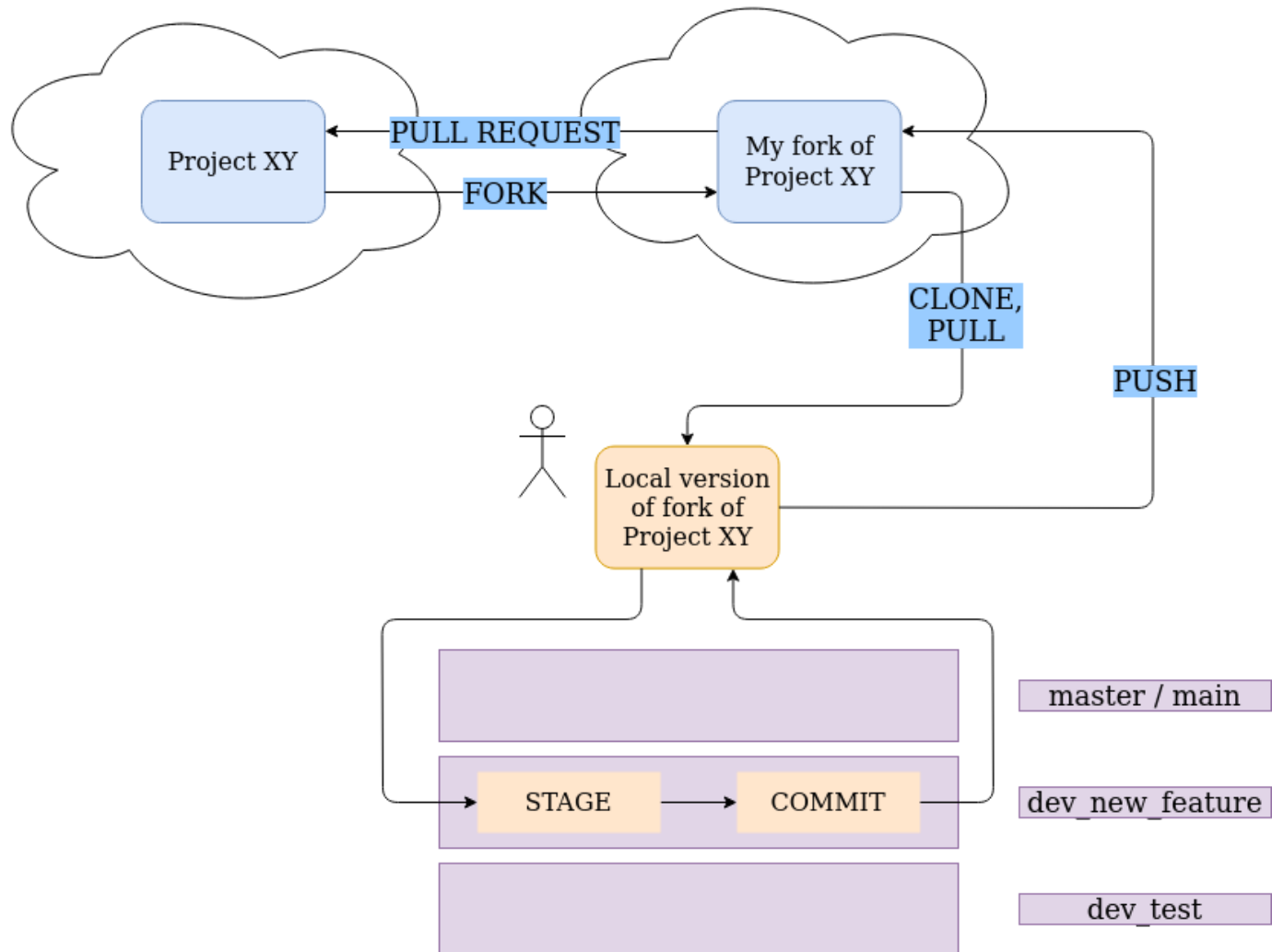


Branch

Create/Switch Branch

```
git checkout -b dev_new_feature  
git checkout master  
git status  
git branch
```

Branch



Branch

Merge Branch

```
git checkout master  
git merge dev_new_feature
```

Branch

Merge example

First 8 commits of my R-package repo: **andschar/dbreport**

```
git log --all --decorate --oneline --graph
```

```
* 190eed7 changed ggplot2 dependancy
* 1d4d97f Merge branch 'master' of github.com:andschar/dbreport
| \
| * 86dfc87 test
| * | 39fd318 exists check
| /
* 1ccf212 handling integer64 + minor changes
* 571795b documentation
* 86052cf DESCRIPTION
* 7dd5646 1st commit
```


Branch

Pull / Merge Request

From your dev_XXX branch to a new remote dev_XXX branch

The screenshot shows the GitHub interface for the repository 'andschar/ggplot2'. The browser address bar shows the URL 'https://github.com/andschar/ggplot2'. The repository is public and forked from 'tidyverse/ggplot2'. The main navigation bar includes links for 'Code', 'Pull requests', 'Issues', 'Marketplace', and 'Explore'. Below the navigation bar, a yellow banner indicates that the 'dev_new_feature' branch has recent pushes less than a minute ago. A red arrow points to this banner. To the right of the banner is a green button labeled 'Compare & pull request', also pointed to by a red arrow. Below the banner, the current branch is 'master', which is 1 commit ahead of 'tidyverse:master'. The '51 branches' link is also pointed to by a red arrow. Below the branch information, there is a section for recent commits by 'andschar'. The first commit is 'Patch-1' (32a6a15, 8 minutes ago) with 4,795 commits. The commit list includes files: '.github' (Use the dev version of pkgdown), 'R' (Patch-1), and 'data-raw' (Update economics data).

dev_new_feature had recent pushes less than a minute ago

Compare & pull request

master 51 branches 34 tags

This branch is 1 commit ahead of tidyverse:master.

Contribute Fetch upstream

andschar Patch-1 32a6a15 8 minutes ago 4,795 commits

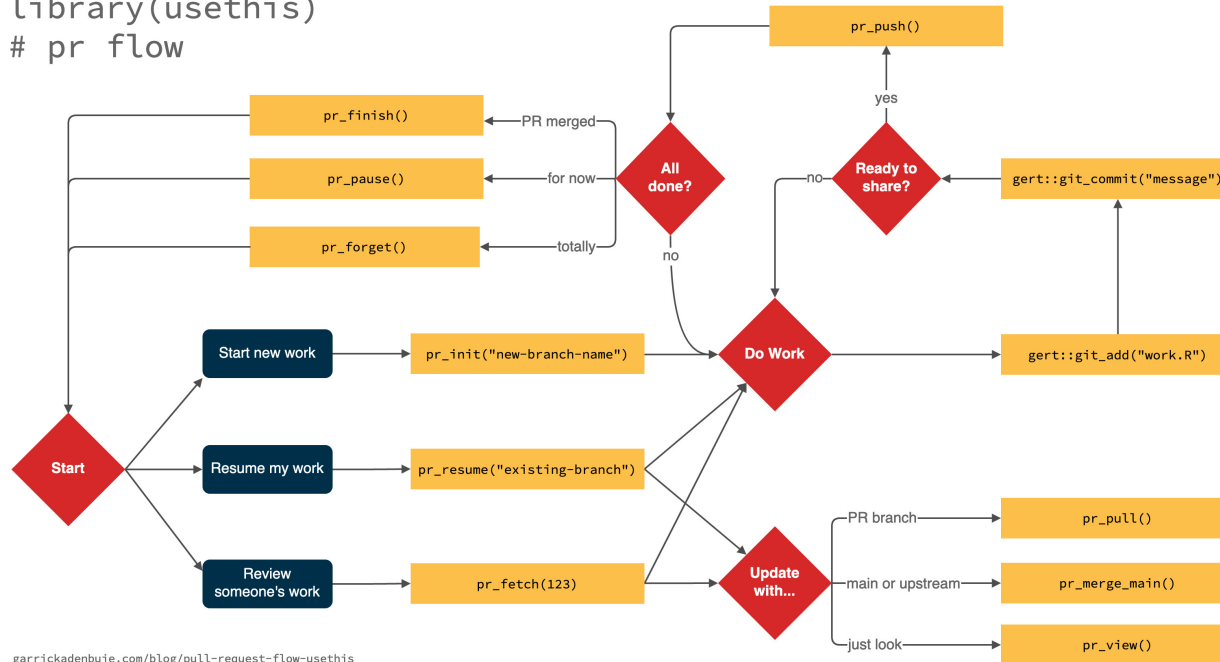
.github	Use the dev version of pkgdown (tidyverse#4543)	2 months ago
R	Patch-1	8 minutes ago
data-raw	Update economics data (tidyverse#2962)	3 years ago

R solutions

{usethis} & {gert} package

```
gert::git_commit()  
usethis::pr_pull()  
usethis::pr_push()
```

```
library(usethis)  
# pr flow
```

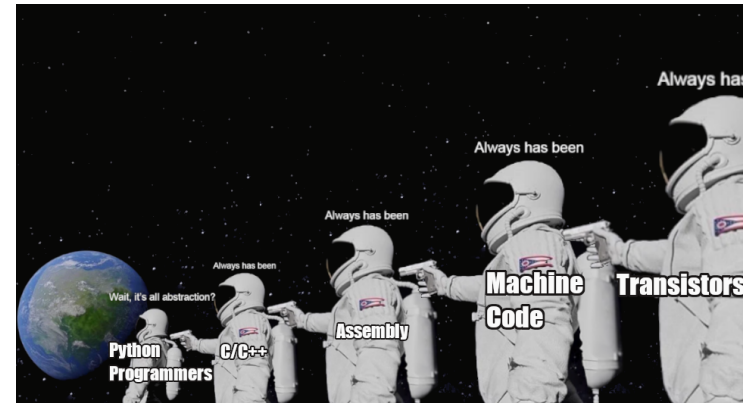


[garrickadenbuie.com/blog/pull-request-flow-usethis](https://www.garrickadenbuie.com/blog/pull-request-flow-usethis)

{usethis} & {gert} package

```
gert::git_commit()  
usethis::pr_pull()  
usethis::pr_push()
```

- Convenience **wrapper** around git
- Advantage:
 - Easier to use
- Disadvantage:
 - More software to maintain
 - Might break something in the future
 - You might not always use R in your career





Material

- OpenOlat
- StackOverflow
- YouTube
- <https://guides.github.com/activities/hello-world>
- <https://support.rstudio.com/hc/en-us/articles/200532077-Version-Control-with-Git-and-SVN>
- <https://ohshitgit.com>
- <https://www.garrickadenbuie.com/blog/pull-request-flow-use-this>

Made with

- <https://github.com/rstudio/rmarkdown>
- <https://github.com/yihui/knitr>
- <https://github.com/yihui/xaringan>

Task: RMarkdown & Git

- **Fork** the MOD3 test repo: <https://github.com/andschar/MOD3>
- **Clone** the repo to your local machine
- Create a new branch named dev_YOURSURNAME
- Change the file *task.Rmd* according to the steps described in the file
- Create (i.e. knit) a .html out of the .Rmd file
- **Stage & Commit** both files in the new branch
- **Push** your local changes to your repo (HINT: this might cause some trouble ;))
- Create a **Pull Request** against my original repo

Introduction to Git & GitHub

Thank you for your attention!

Slides: <https://andschar.github.io/teaching/GIT>

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