R Markdown Workshop - Day 2

Creation, organisation, storage, and collaboration

Anne-Kathrin Kleine | University of Groningen

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Version control

Version control 🎛️

- Research papers have many versions before publication
- two main challenges:
  - keeping track of changes and versions
  - reverting a previous version if necessary
- different approaches for version control:
  - edit, rename and save files
  - use applications (Dropbox, Google Docs, Overleaf)
  - use version control systems such as Git and GitHub

```
manuscript
   |
   |- journals_FINAL_19May.Rmd
   |- journals_PAPERVERS_17May.Rmd
   |- journals_10May.Rmd
   |- journals_FINAL.Rmd
   |- journals_26APRIL_newliterature.Rmd

   ...

   |- journals.Rproj
   |- references.bib
   |- apa_7th.csl
```

Version control with Git and GitHub

Advantages of using Git and GitHub

🎈 **Contribute to open source projects, see here**

- almost all open source projects use GitHub

🎤 **Showcase your work**

🔍 **Track changes across versions**

👩‍🎨 👷 **Collaborate on projects**

🤹 **Various integration options**

- Amazon and Google Cloud; or use GitHub pages or Netlify to build websites based on your R files

Version Control — Git and GitHub — Definitions

Git 

- a software that keeps track of versions of a set of files
- it is *local* to you; the records are kept on your computer

Version Control — Git and GitHub — Definitions

Git 

- a software that keeps track of versions of a set of files
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GitHub 

- a hosting service that can keep the records
- it is *remote* to you, like Dropbox
- GitHub is specifically structured to keep records with Git

Version Control — Git and GitHub — Definitions

Repository, or repo

- a set of files whose records are kept together, by Git and/or on GitHub

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Version Control — Git and GitHub — Definitions

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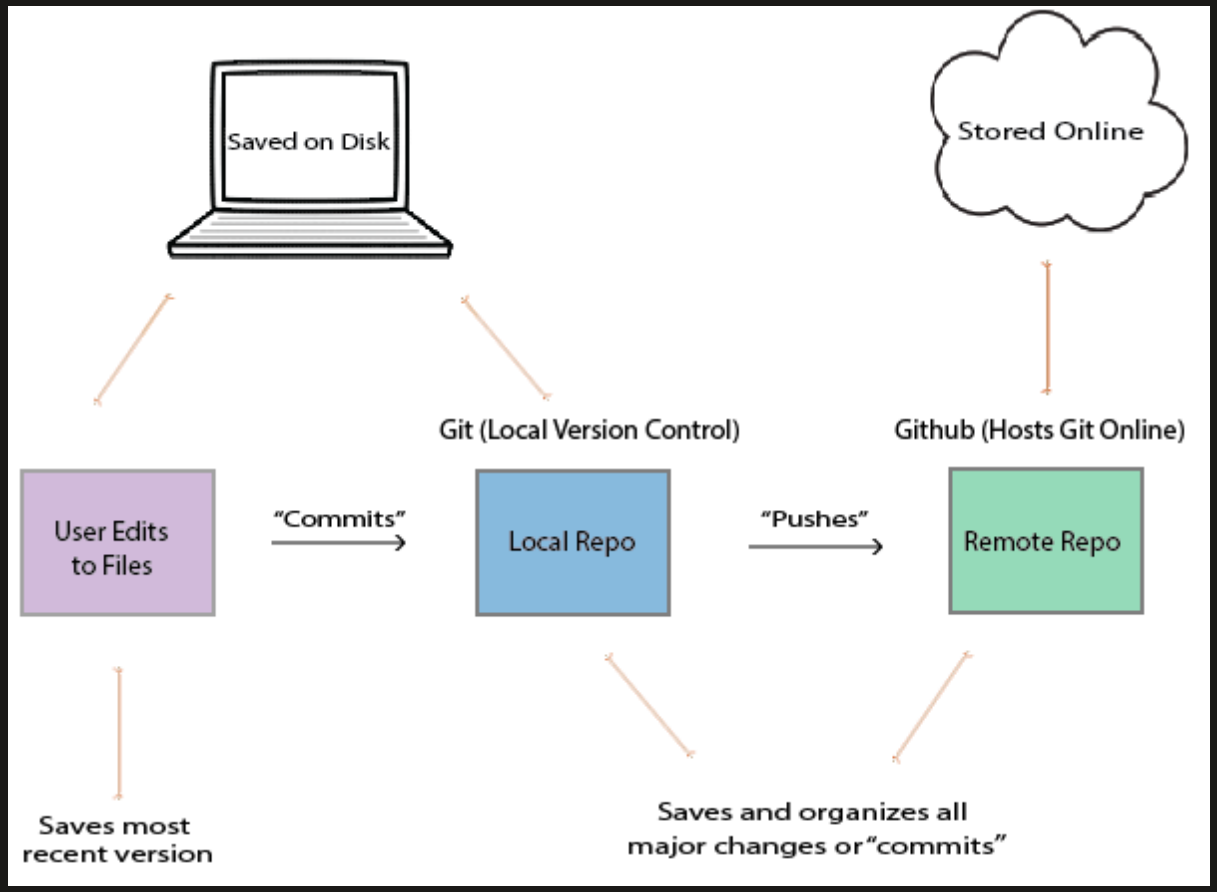
To commit

- to take a snapshot of a repository
- it is local, the records are kept on your computer unless you push

To push

- to move a copy of the records from Git to GitHub, from your computer to online server
- it is like uploading (the new versions of) your files and sub-folders to a website

Version Control — Git and GitHub



Source: https://iqss.github.io/dss-rbuild/version-control.html

How familiar are you with using the command line (terminal, power shell…)?

Go to https://www.menti.com/9eof4daf4h 🤸 (and enter the code **4173 2433**)

See results

Version Control — Git and GitHub — check setup

In the 🚦 terminal 🚦: `git --version`

- you should see the Git version ✅

In the 🚦 terminal 🚦: `git config --global user.name`

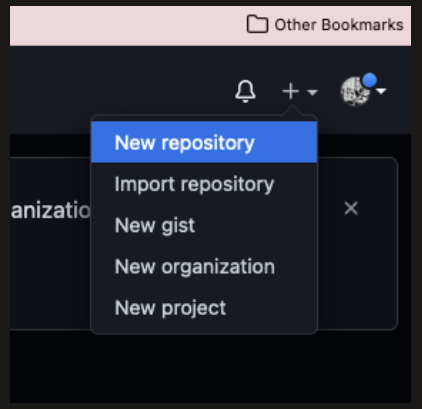
- you should see the Git user name ✅

🚫 If these steps did not work, go back here and continue setting up Git where you left off

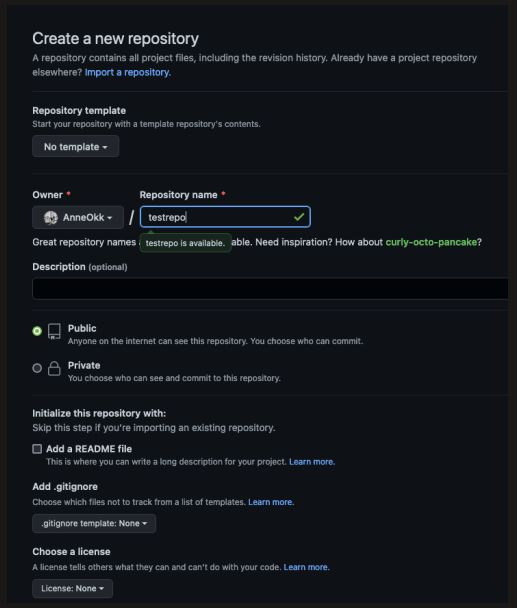
You really don't want to use the terminal ❓ ▶ For version control in RStudio, see here, and particularly this video

Version Control — Git and GitHub — connect local with remote

1. Go to GitHub and create a new repository

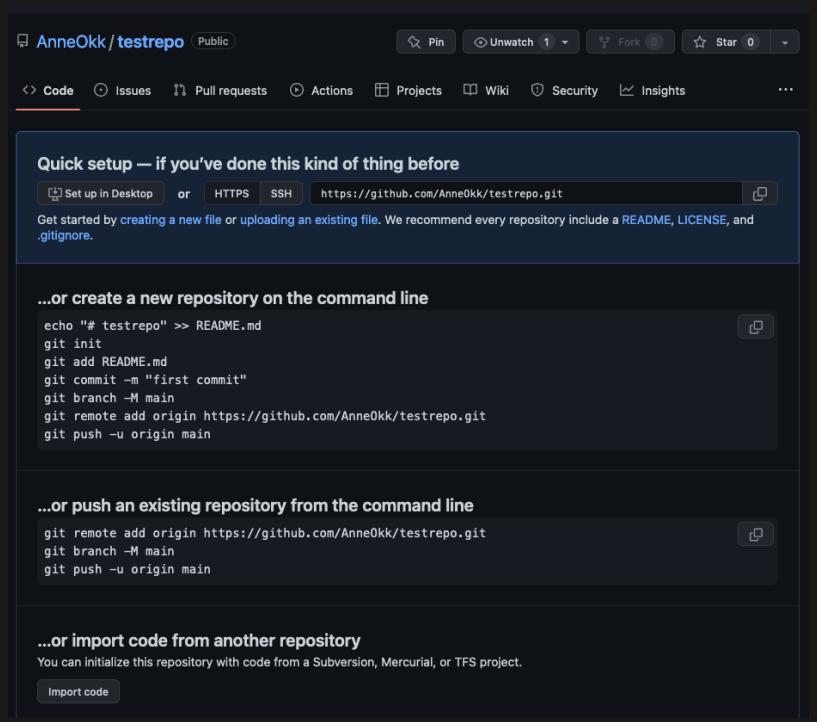


2. Fill in some info, create a public repository (don't bother with Readme etc - those will be added later!)

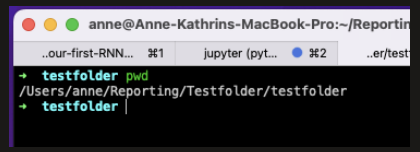


Version Control — Git and GitHub — connect local with remote

3. Follow the steps in Option 1: "...create a new repository on the command line"



4. In the 🚦 terminal 🚦, navigate to your R project folder



Version Control — Git and GitHub — connect local with remote

5. In the 📱 terminal 📱, type:

`git init` this initializes a git repo on your local machine

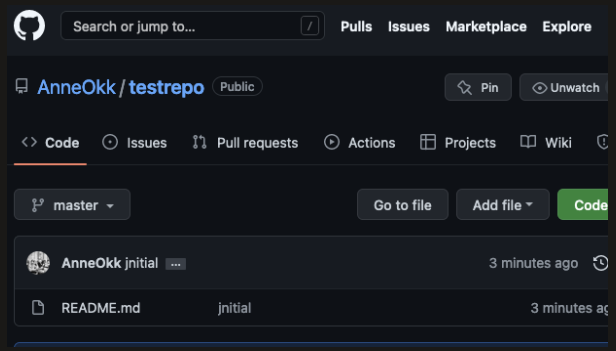
`touch README.md` this creates an empty README file

`git add .` this stages all the content in that folder to be committed

`git commit -m "add empty readme"` stages all content to be pushed

`git remote add origin https://github.com/AnneOkk/testrepo.git` substitute with your repo URL

`git push origin master` push all the content from Git to GitHub



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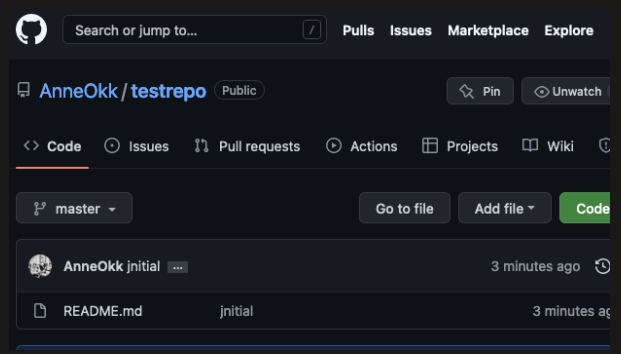
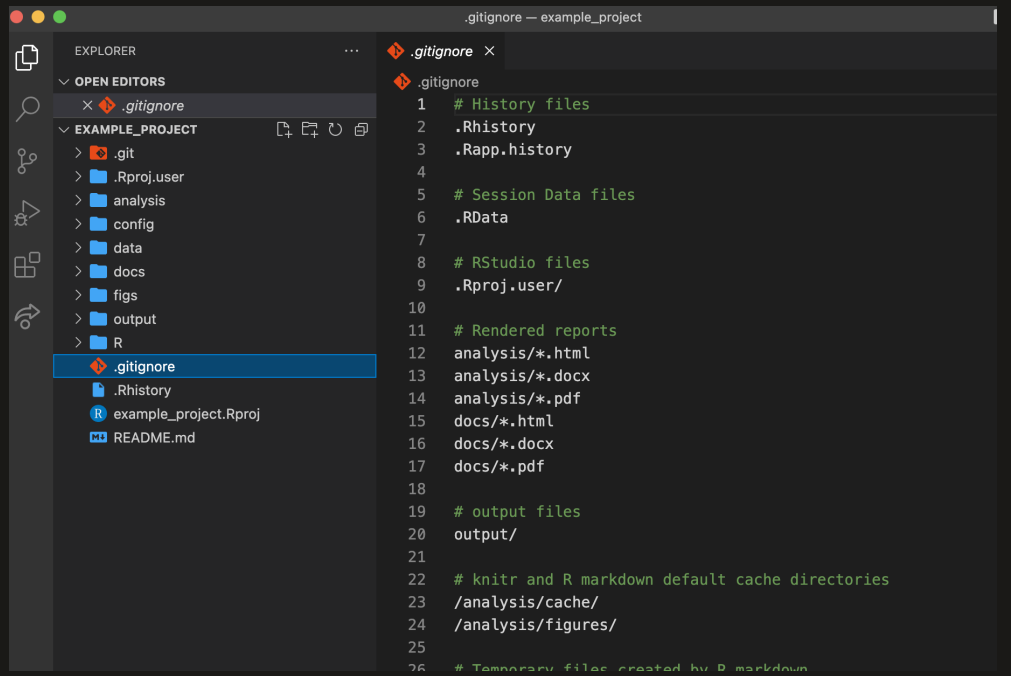


🎈 Pushed files should appear in GitHub repository 🎈

Version Control — Git and GitHub — .gitignore

- `.gitignore` file specifies which file(s) and/or folder(s) should be excluded from version control
- lists one item per line; each line has a pattern, which determines whether files should be ignored
- see gitignore documentation for more info on the different patterns
- reasons to exclude files from being pushed include:
  - personal information others should not see (e.g., credential files)
  - no rights to share (e.g., certain data files)
  - outputs that may be re-created (e.g., `outputs.pdf`)



Version Control — Git and GitHub — collaborating

Imagine... 🤔

Version Control — Git and GitHub — collaborating

Imagine... 🤔

...you work in a team of data scientists/ data enthusiastic researchers 🧙‍♀️🧙🏿‍♀️🧙‍♀️🧙🏽‍♀️

Version Control — Git and GitHub — collaborating

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...you work in a team of data scientists/ data enthusiastic researchers 👩🏾‍🔬👩🏾‍🔬👩‍🔬👩🏽‍🔬

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Version Control — Git and GitHub — collaborating

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...you want to keep track of what the others do and finally merge individual contributions into one overall project ✨💾✨

Version Control — Git and GitHub — collaborating

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...you want to keep track of what the others do and finally merge individual contributions into one overall project ✨💾✨

But how ❓ 🤷‍♀️

Version Control — Git and GitHub — collaborating

Scenario 1 - you are owner/ collaborator

... first things first!

Version Control — Git and GitHub — collaborating

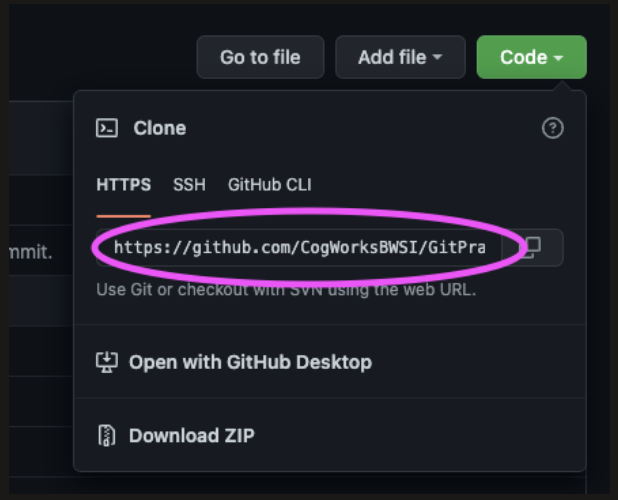
Scenario 1 - you are owner/ collaborator

... first things first!

1) Go to the GitHub repository you are working on as a team

2) In the 🚦 terminal 🚦, navigate to where you want to store the project files and type:

```
git clone https://github.com/AnneOkk/testrepo.git
```



Version Control — Git and GitHub — collaborating

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Version Control — Git and GitHub — collaborating

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4) Create a new branch to add changes that belong to a novel feature you are working on (this prevents messing up the master branch)

```
git checkout -b "cool-feature"
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Version Control — Git and GitHub — collaborating

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6) Add, commit, and push the files ...through the usual workflow (`git add .`, `git commit -m "new feature file added"`) 😴

Version Control — Git and GitHub — collaborating

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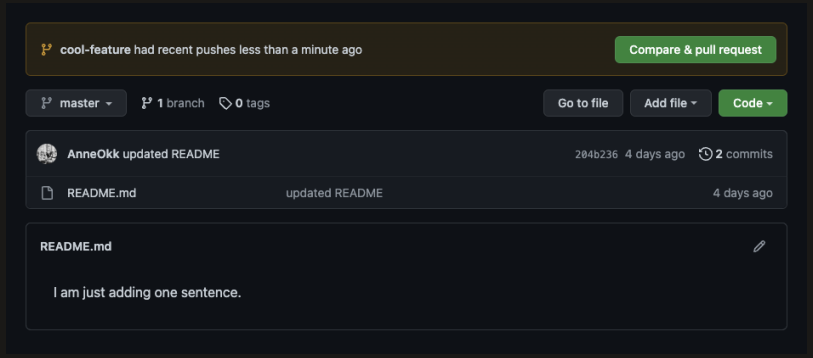
🚧👀 BUT you push the changes to the newly created branch to prevent messing up the master branch! 👀🚧

```
git push origin cool-feature
```

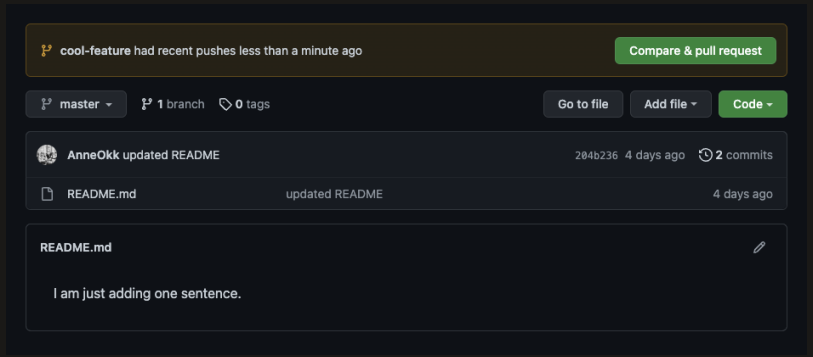
Version Control — Git and GitHub — collaborating



7) On GitHub, you create a pull request

Reviewers (other team members) may be assigned to check the changes and start a conversation (through comments)

Version Control — Git and GitHub — collaborating



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Reviewers (other team members) may be assigned to check the changes and start a conversation (through comments)

8) Once all issues are resolved, your changes will be merged into the master branch 🥳

Version Control — Git and GitHub — collaborating

... But what if some issues remain unresolved? 👆 "You forgot to read in the data!" 🤔

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Pull all changes that happened in the mean time:

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```

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git checkout master
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Pull all changes that happened in the mean time:

```
git pull origin master
```

Checkout a new branch for the missing feature;

```
git checkout -b data-reader
```

Version Control — Git and GitHub — collaborating

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If the branch has not been removed, you may add smaller changes (on the same feature) through `git add .`, `git commit -m "added data reader"`, `git push origin branch-name`

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Make the necessary changes!

Version Control — Git and GitHub — collaborating

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Pull all changes that happened in the mean time:

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Checkout a new branch for the missing feature;

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Make the necessary changes!

... And then, the usual workflow (don't forget to push to new branch!)

Version Control — Git and GitHub — collaborating

Scenario 2 - you want to contribute to an open science project

Version Control — Git and GitHub — collaborating

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1) In GitHub, navigate to the project you want to contribute to

Version Control — Git and GitHub — collaborating

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Version Control — Git and GitHub — collaborating

Scenario 2 - you want to contribute to an open science project

1) In GitHub, navigate to the project you want to contribute to

2) Fork the repo!

3) Clone the new repo!

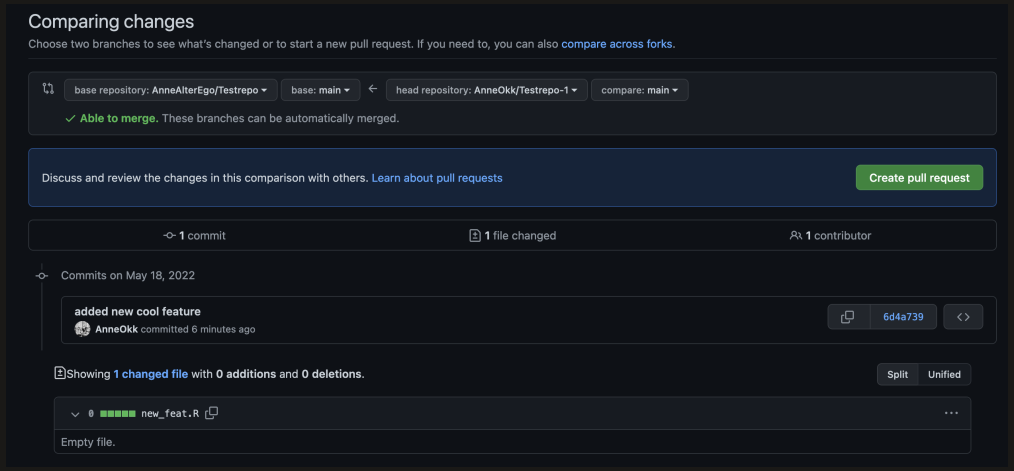
```
git clone https://github.com/AnneOkk/Testrepo-1.git
```

4) Make your changes and then add, commit, and push to your master branch

4) Make your changes and then add, commit, and push to your master branch

5) On GitHub, go back to the original repository and create a pull request.

You may need to click "compare across forks"



... On the other side

Open and review the pull request! 🔍

If you're happy with the changes, merge! 👍

Otherwise, request additional changes in comments. 💬

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If you're happy with the changes, merge! 👍

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🎊 Yey, you're all set to contribute to open science projects on GitHub! 🎊

Your turn! 

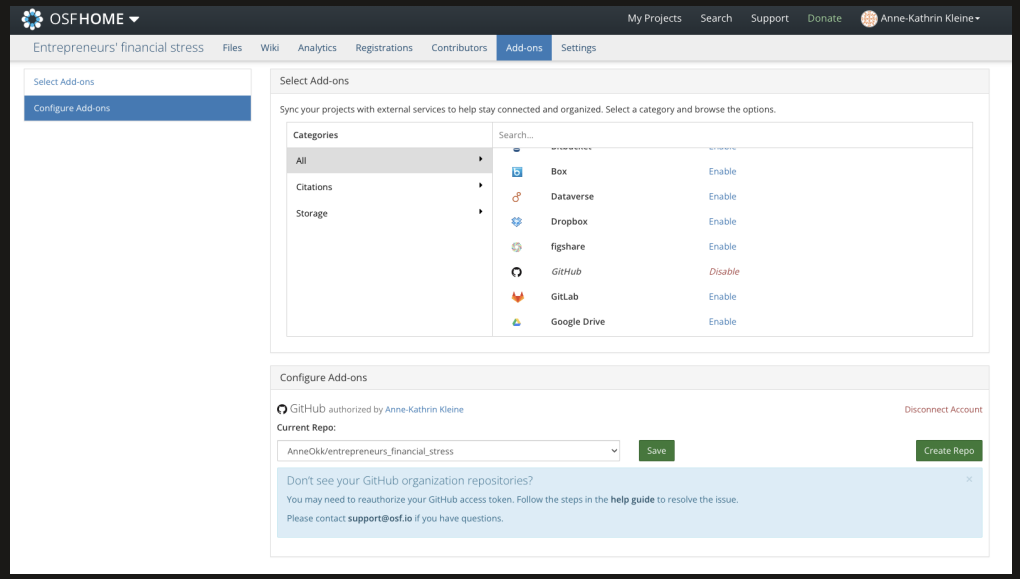
1. Connect your local R project folder with a GitHub repository
2. Change some of the content in R, save, and then push the changes to GitHub
    - `git add .`
    - `git commit -m "senseful commit message that describes the change(s)"`
    - `git push origin master`
3. [OPTIONAL] Create a pull request for your own repository and merge the changes into the master branch
4. [OPTIONAL] One team member creates a pull request for the other team member's repository (first fork and clone); the repo owner merges the changes into her/his master (or main) branch.

Integrating osf with GitHub

Integrating osf with GitHub

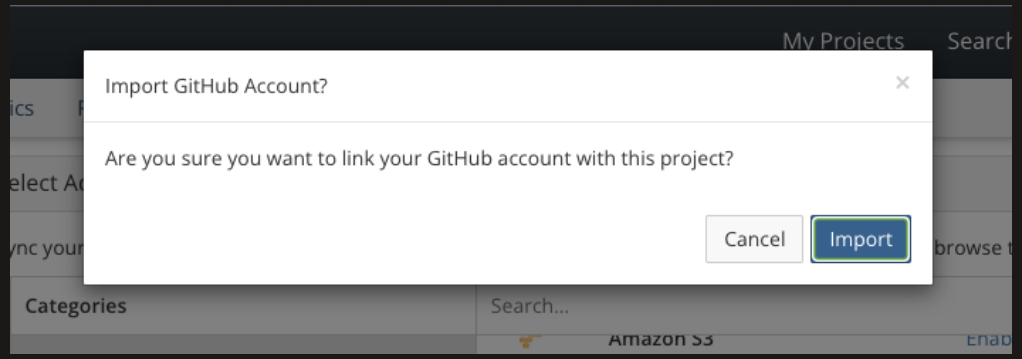
1. Create your osf project

2. Enable GitHub in Add-ons



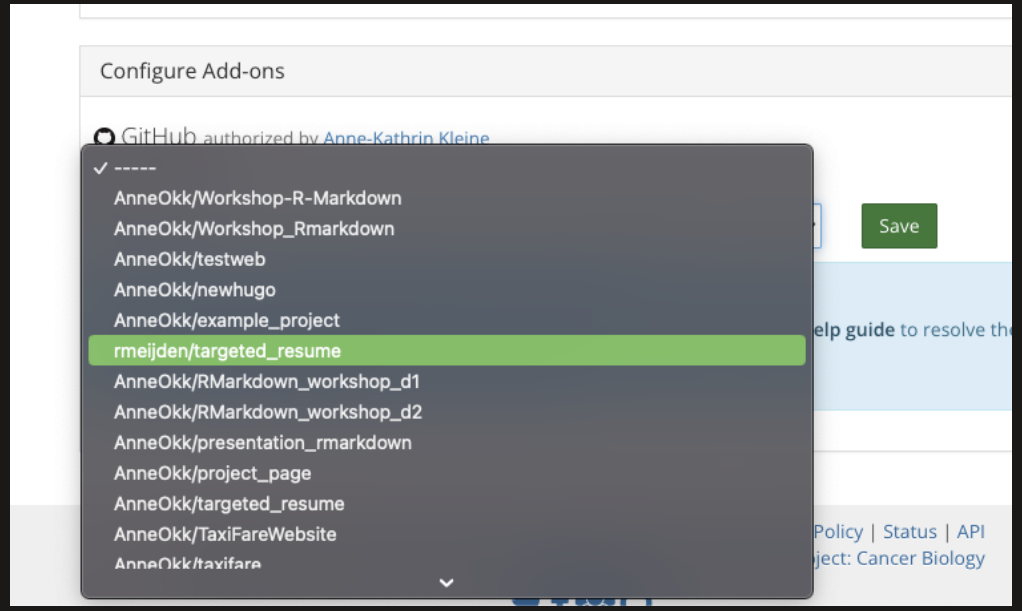
Integrating osf with GitHub

3. Import GitHub Account



Integrating osf with GitHub

4. Select Repo

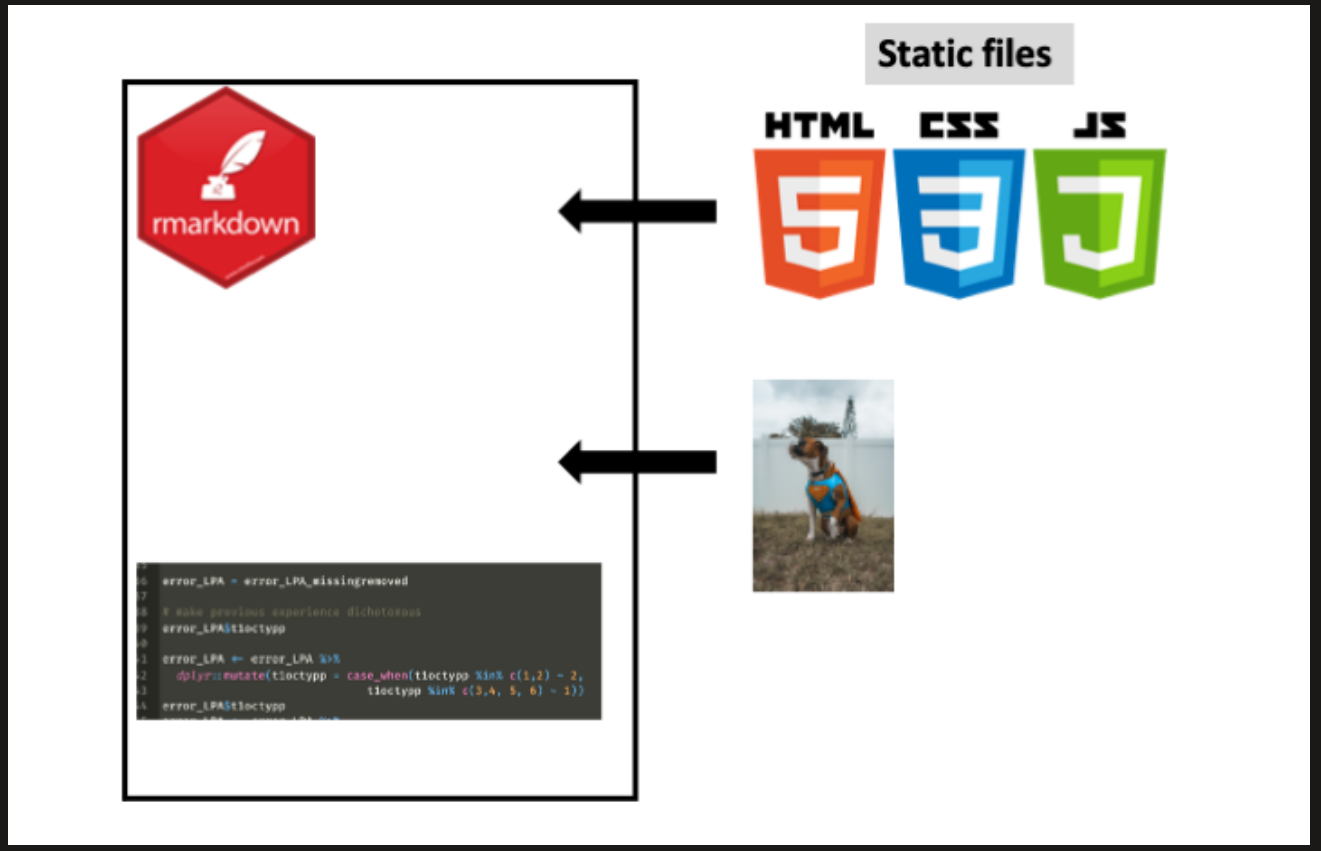


Meet blogdown

Making Websites in R Markdown

Major resources: Alison Hill and Yihui Xie's Advanced R Workshop

What is blogdown?



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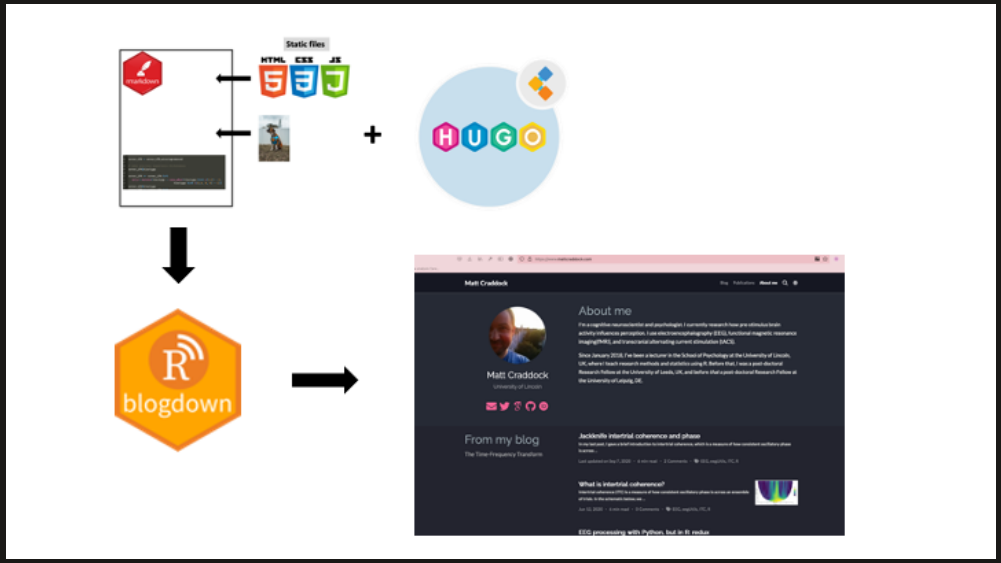
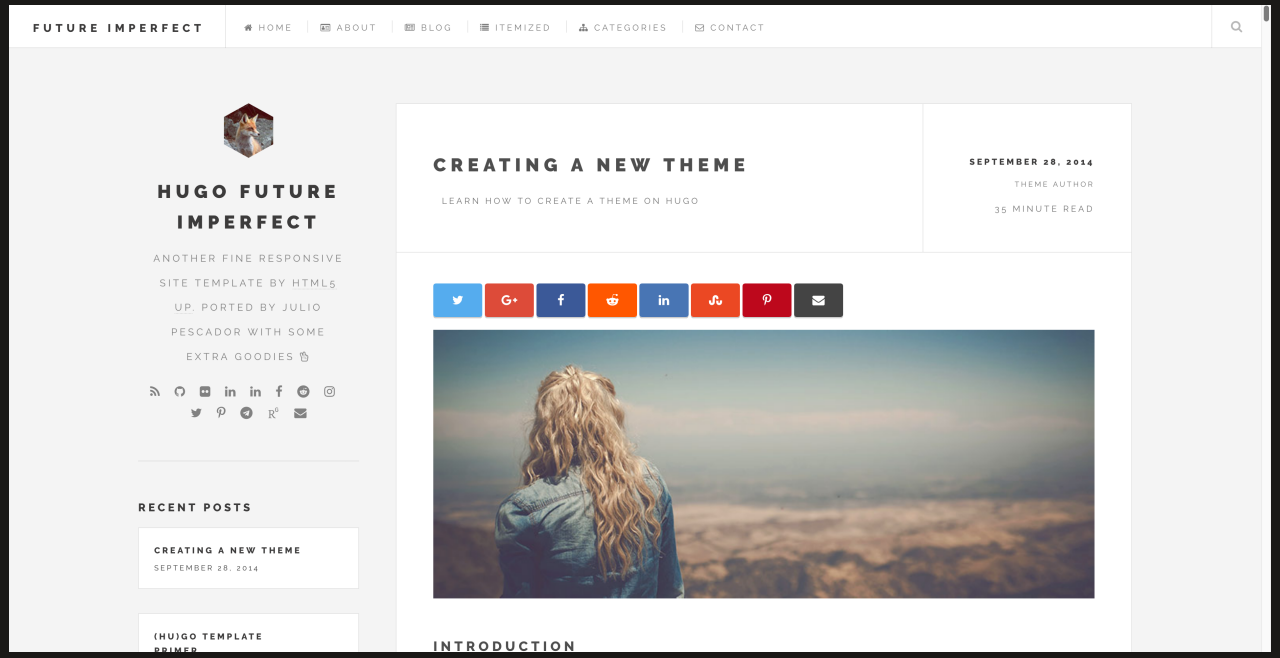


- Hugo is a static site generator
- free, open-source, relatively easy to use
- extremely fast and multiple purpose (websites, blogs,...)

Why not WordPress, Tumblr, Medium.com, Blogger.com, etc?

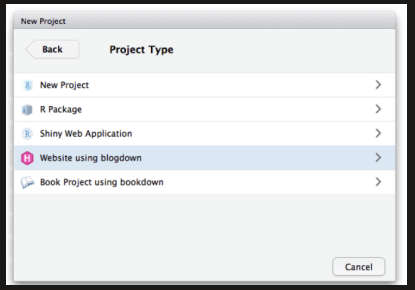
- No R (Markdown) support (even math support is often nonexistent)
- If there is anything related to R, statistical computing, and/or graphics, blogdown will be much more convenient

Build a site for your project



Build a site for your project

1) Create an R blogdown project



2) Make a repo on GitHub

3) Connect remote repo to local

Build a site for your project

4) Serve site

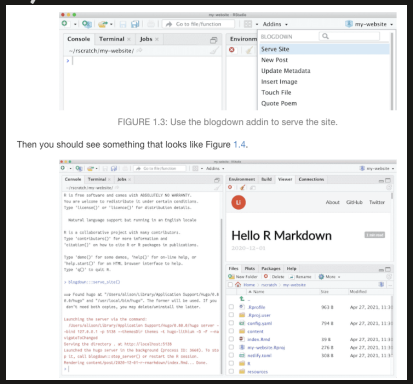


FIGURE 1.3: Use the blogdown addin to serve the site.

Then you should see something that looks like Figure 1.4.

Gaze into your directory structure

🔐 Directory Structure

```
.
├── R
├── config.yaml
├── content
├── website.Rproj
├── index.Rmd
├── layouts
├── netlify.toml
├── public
├── resources
├── static
└── themes
```

🔐 Directory Structure

```
.
├── R
├── config.yaml
├── content
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├── index.Rmd # DO NOT TOUCH!
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├── public
├── resources
├── static
└── themes
```

🔐 Directory Structure

```
.
├── R
├── config.yaml
├── content
├── website.Rproj
├── index.Rmd # DO NOT TOUCH!
├── layouts
├── netlify.toml
├── public
├── resources
├── static
└── themes
```

```
---
site: blogdown:::blogdown_site
---
```

🔐 Directory Structure

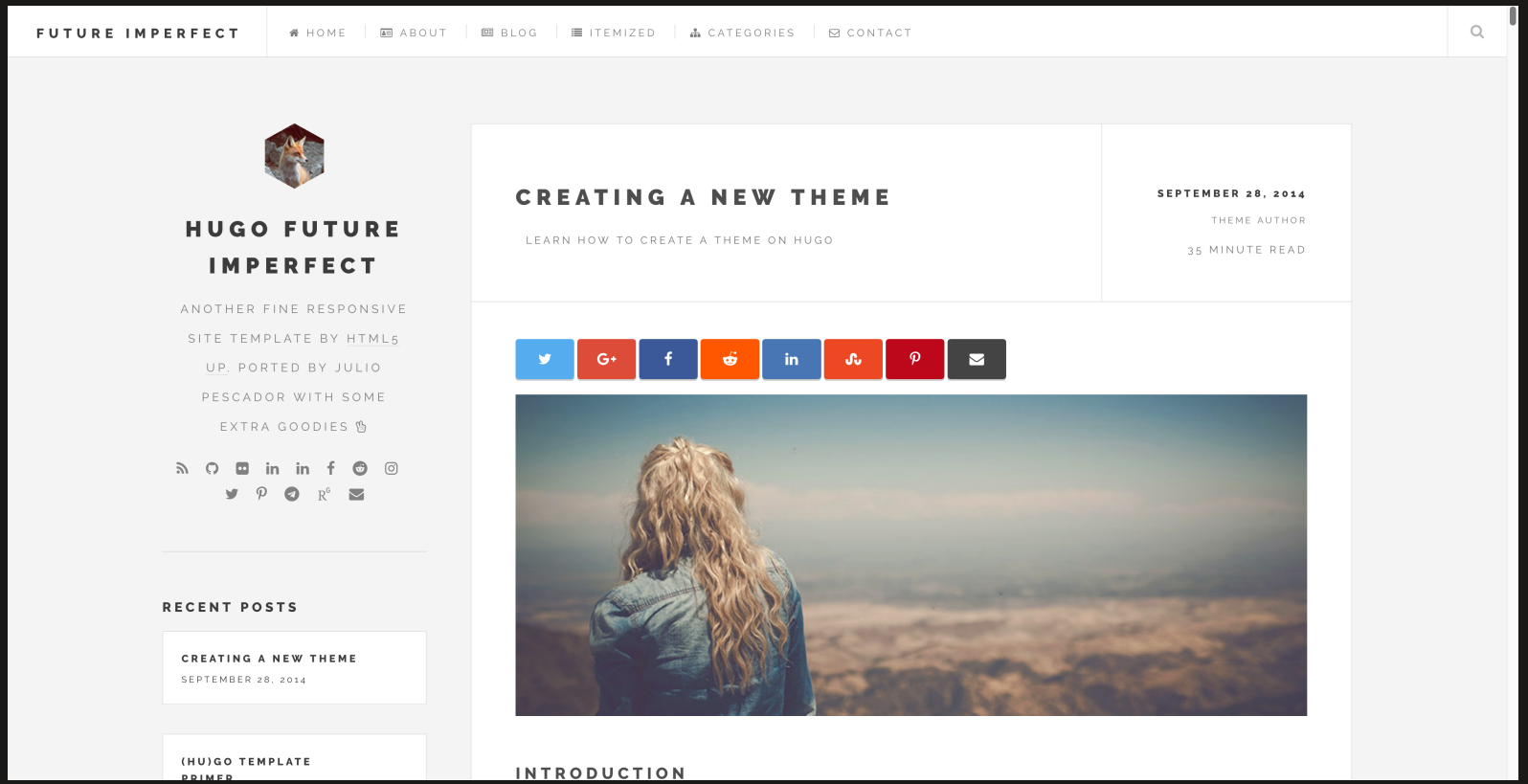
```
.
├── R
├── config.yaml
├── content
├── website.Rproj
├── index.Rmd
├── layouts
├── netlify.toml
├── public # IGNORE!
├── resources
├── static
└── themes
```

DON'T 🧶 KNIT!

Serve site!

Mouse up to "Addins" ➡️ "Serve site"

Success?

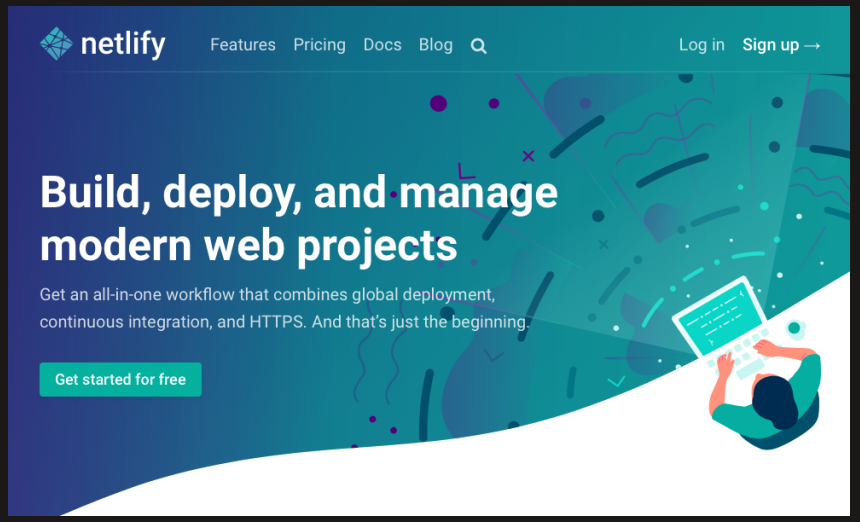


"Show in new window" to see in local browser

Publishing 📣

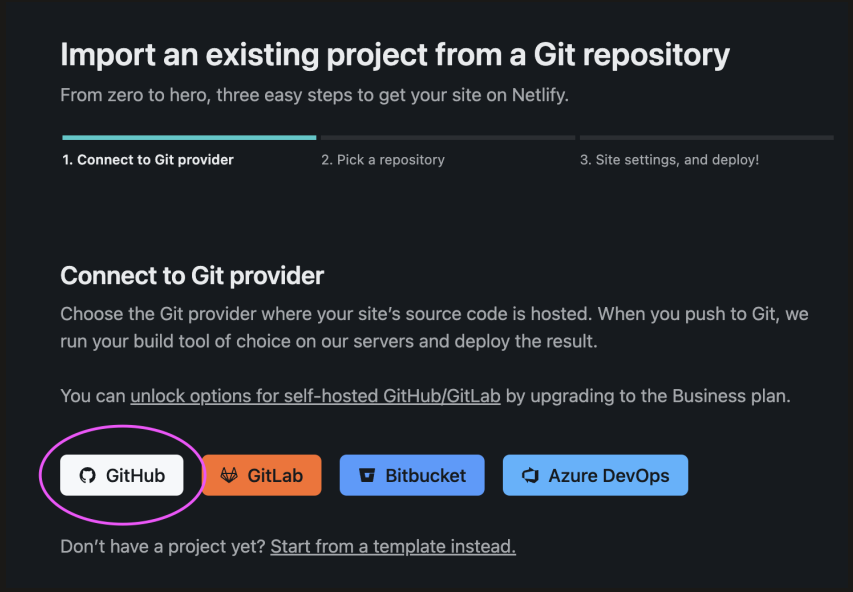
Publishing 📣

Go to Netlify.com & Log in



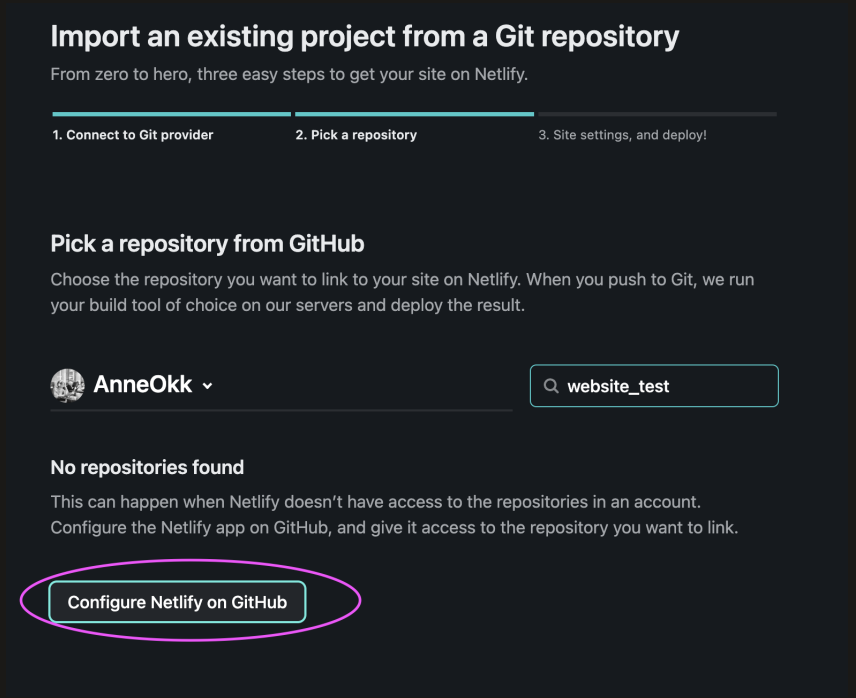
Publishing 📣

Connect netlify with to GitHub repository



Publishing 📣

Configure Netlify on GitHub

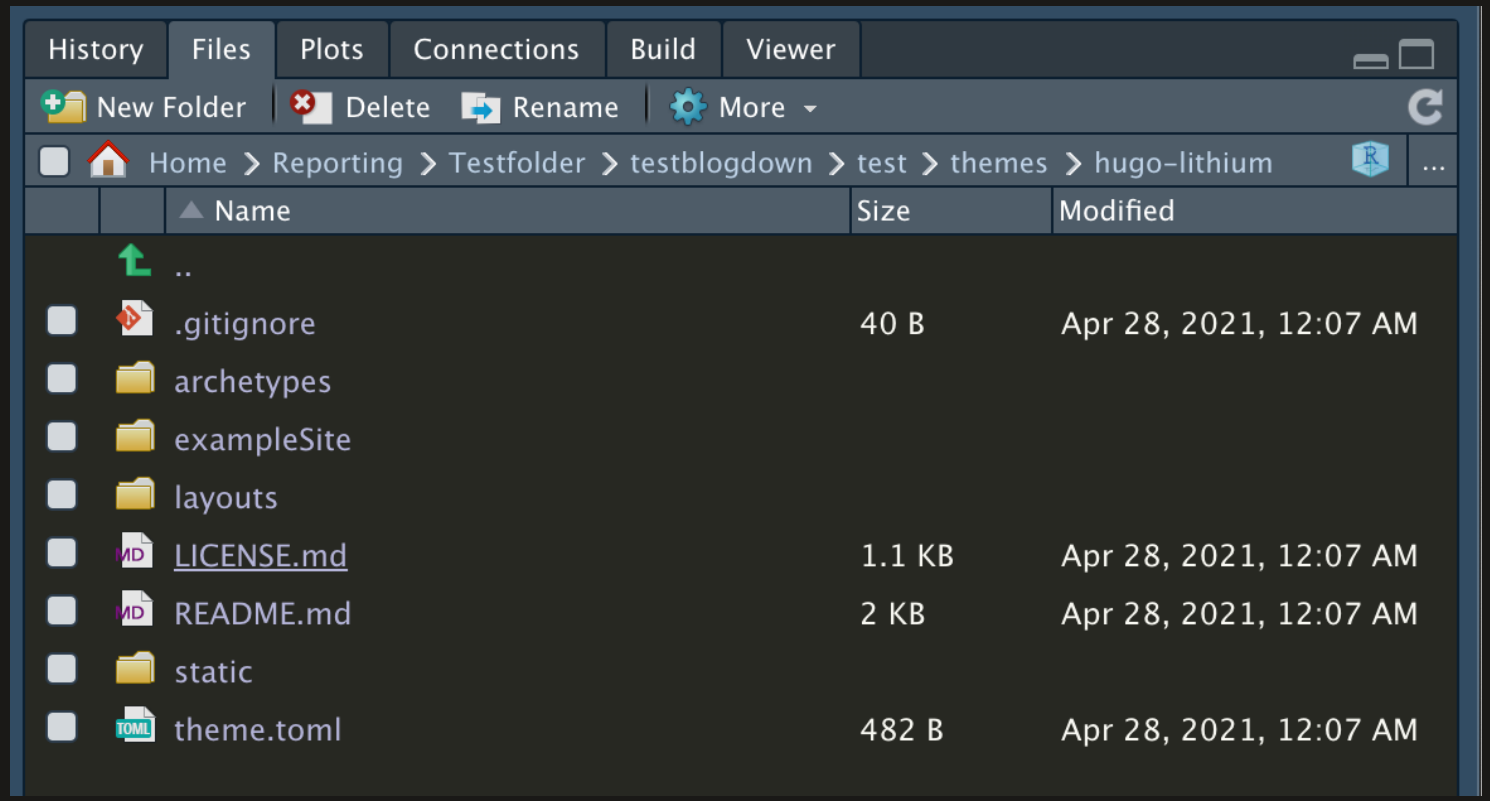


🔐 Directory Structure

```
.
├── R
├── config.yaml
├── content
├── website.Rproj
├── index.Rmd
├── layouts
├── netlify.toml
├── public
├── resources
├── static
└── themes # Do NOT TOUCH!
```

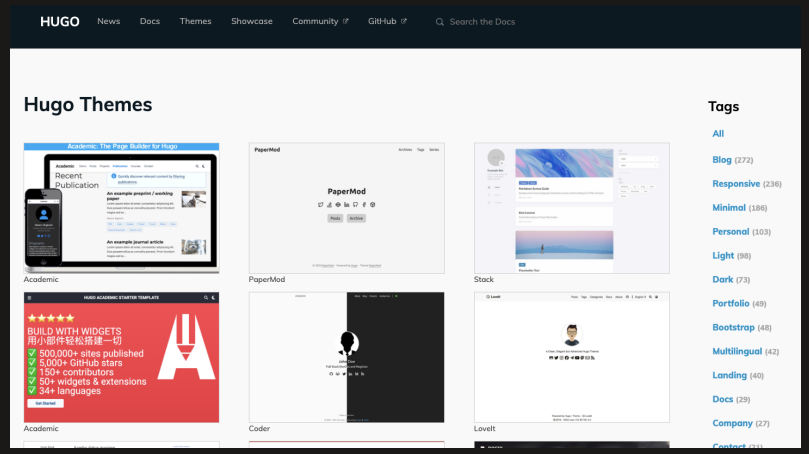
Themes

Look in `/themes/hugo-lithium/`. Notice now the folder structure here *mirrors* your Hugo directory structure.



Choose your theme

See here for a collection of Hugo themes.



Recommended workflow: create a new site with desired theme

```
# create a new site with the anatole
# theme
blogdown::new_site(theme =
                   "lxndrblz/anatole")
```

Existing site, new theme:

```
blogdown::install_theme(theme = "lxndrblz/anatole")
```

1. Move the configuration file (config.yaml or config.toml) from the themes/theme-name/exampleSite/ directory to the root directory of your website to match the newly installed theme.

2. Carefully inspect the differences between your new theme's exampleSite and the files inside your content/ folder. A theme's exampleSite content is tailored to a specific theme.

Archetypes

- They are like a template for the content on your site
- You may create your own archetypes! See the blog posts here and here

```
.
├── categories.md
├── default.md
└── tags.md
```

Layouts

- They control the looks of elements on your site
- Since you should not touch the theme folder's files, this is where you can easily customize certain parts of your website
- See here for an example

```
<footer>
  {{ partial "foot_custom.html" . }}
  {{ with .Site.Params.footer }}
  <hr/>
  {{ . | markdownify }}
  {{ end }}
  </footer>
  </body>
</html>
```

Add new content

Want to change the landing page?

You need to do two things:

1. add an `_index.md` file to `content/` (not in a subfolder)
2. update the `index.html` layout

🌍 Setting global options in .Rprofile

```
library(usethis)
edit_r_profile()
options(blogdown.author = "Author Name",
        blogdown.ext = ".Rmd",
        blogdown.subdir = "blog",
        blogdown.yaml.empty = TRUE, # preserves empty fields in YAML header
        blogdown.new_bundle = TRUE, # created index.md file (using bundles - storing files related to post in post f
        blogdown.title_case = TRUE)
```

Global options

More global options

Workflow

- Open your website project, click the "Serve Site" addin
- Revise old pages/posts, or click the "New Post" addin
- Write and save (take a look at the automatic preview)
- Push everything to Github

Blogdown resources

- Blogdown demo site
- Blogdown book
- Blog post
- Blogdown workshop
- Yihui's slides from RStudio Conf

Your turn! 

1. Create a new blogdown project with the theme of your choice (follow the workflow described here)
2. Connect your blogdown project to a remote GitHub repository
3. Create a netlify account and connect netlify with GitHub
4. Publish your blogdown page through netlify

Other useful R tools 🌟

Xaringan

See here for more info.

Bookdown

BOOKDOWN

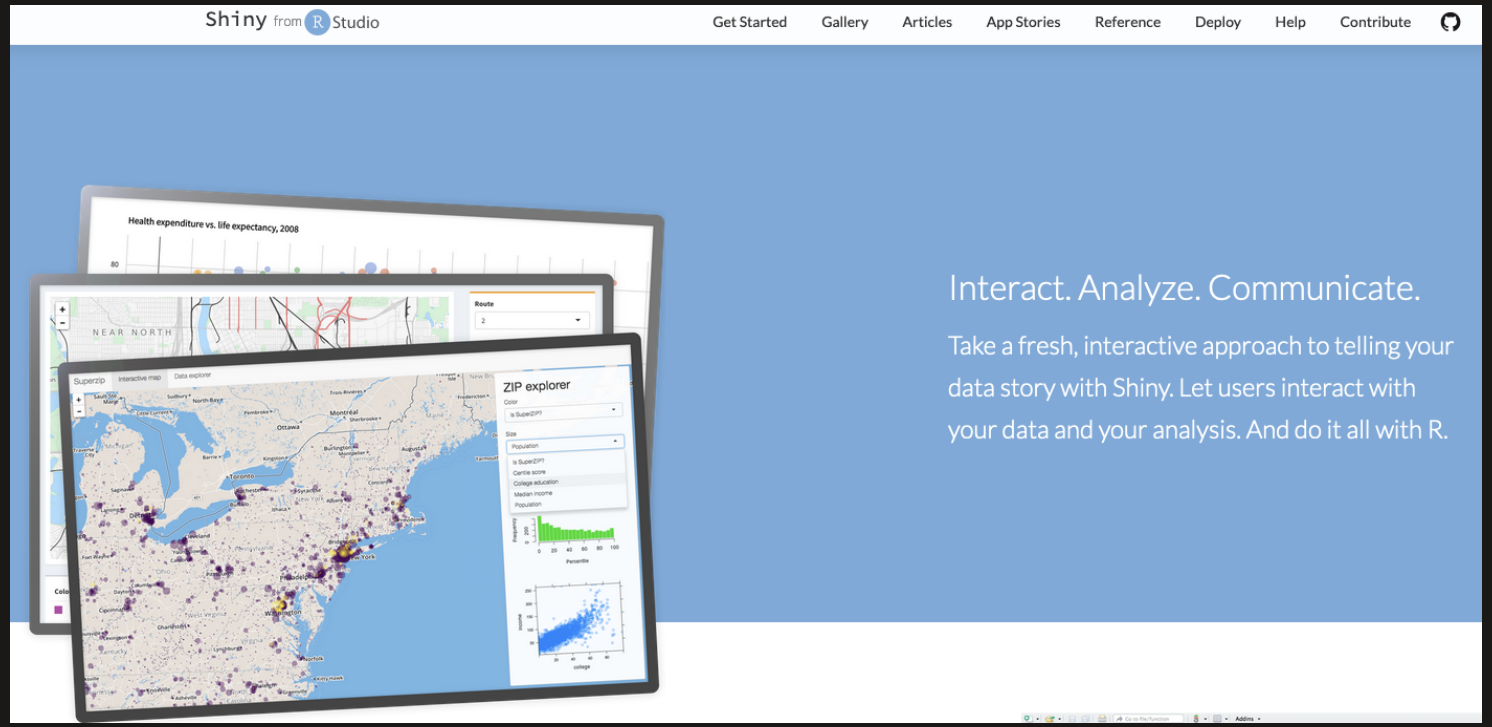
Write HTML, PDF, ePub, and Kindle books with R Markdown

The **bookdown** package is an open-source R package that facilitates writing books and long-form articles/reports with R Markdown. Features include:

- Generate printer-ready books and ebooks from R Markdown documents.
- A markup language easier to learn than LaTeX, and to write elements such as section headers, lists, quotes, figures, tables, and citations.
- Multiple choices of output formats: PDF, LaTeX, HTML, EPUB, and Word.
- Possibility of including dynamic graphics and interactive applications (HTML widgets and Shiny apps).
- Support a wide range of languages: R, C/C++, Python, Fortran, Julia, Shell scripts, and SQL, etc.
- LaTeX equations, theorems, and proofs work for all output formats.
- Can be published to GitHub, bookdown.org, and any web servers.
- Integrated with the RStudio IDE.
- One-click publishing to https://bookdown.org.

See here for more info.

Shiny applications



See here for more info