# Modelling Frameworks

**Today's agenda:**
Discuss modelling frameworks,
Software installation and setup

# What are some of the model choices mentioned?

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General vs specific

Descriptive vs predictive

Mechanistic vs phenomenological

Analytical vs computational

Deterministic vs stochastic

Simple vs complex

# Why are there so many different options?

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Trade-offs: models differ in when they're useful

E.g., mechanistic models can be linked to specific mechanisms,

but may require more data!

You'll have to consider these trade-offs when selecting methods

# Questions?

# Our goal for today is setting up software

We'll be installing:

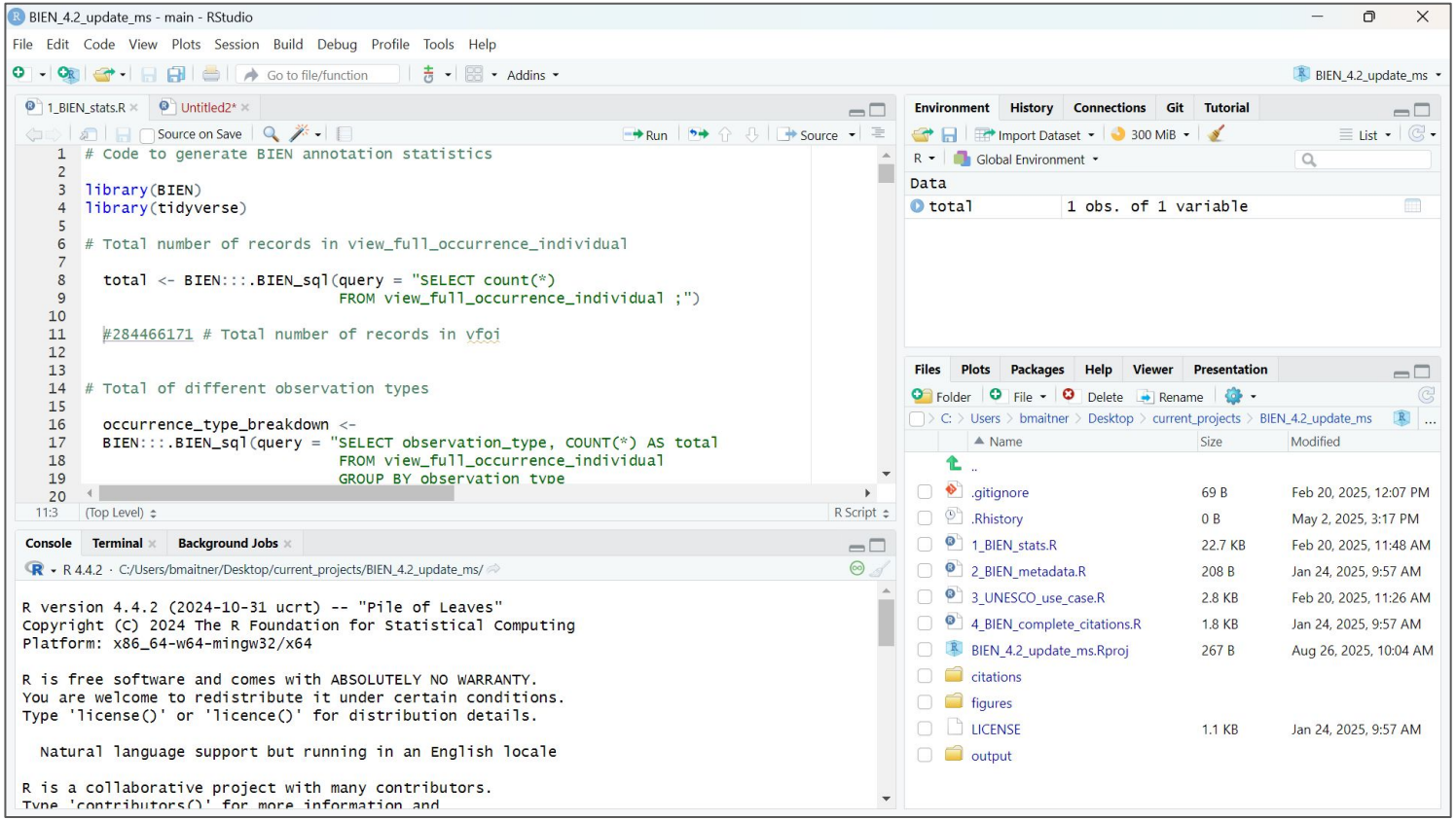
- R
- RStudio

And, optionally, Git and Github

# R

```
FOREST+bmaitner@USFAAD-228TFW3 MINGW64 ~/Desktop/current_projects/BIEN_4.2_update_ms (main)
$ R

R version 4.4.2 (2024-10-31 ucrt) -- "Pile of Leaves"
Copyright (C) 2024 The R Foundation for Statistical Computing
Platform: x86_64-w64-mingw32/x64

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

  Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> library(BIEN)
Loading required package: RPostgreSQL
Loading required package: DBI
Type vignette("BIEN") or vignette("BIEN_tutorial") to get started
>
```

# RStudio


BIEN_4.2_update_ms - main - RStudio
File Edit Code View Plots Session Build Debug Profile Tools Help
Go to file/function
Addins
BIEN_4.2_update_ms
1_BIEN_stats.R
Untitled2*
Source on Save
Run
Source
1 # Code to generate BIEN annotation statistics
2
3 library(BIEN)
4 library(tidyverse)
5
6 # Total number of records in view_full_occurrence_individual
7
8 total <- BIEN:::.BIEN_sql(query = "SELECT count(*)
9 FROM view_full_occurrence_individual ;")
10
11 #284466171 # Total number of records in vfoi
12
13
14 # Total of different observation types
15
16 occurrence_type_breakdown <-
17 BIEN:::.BIEN_sql(query = "SELECT observation_type, COUNT(*) AS total
18 FROM view_full_occurrence_individual
19 GROUP BY observation_type
20
11:3
(Top Level)
R Script
Console
Terminal
Background Jobs
R 4.4.2 · C:/Users/bmaitner/Desktop/current_projects/BIEN_4.2_update_ms/
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Files
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Help
Viewer
Presentation
Folder
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May 2, 2025, 3:17 PM
1_BIEN_stats.R
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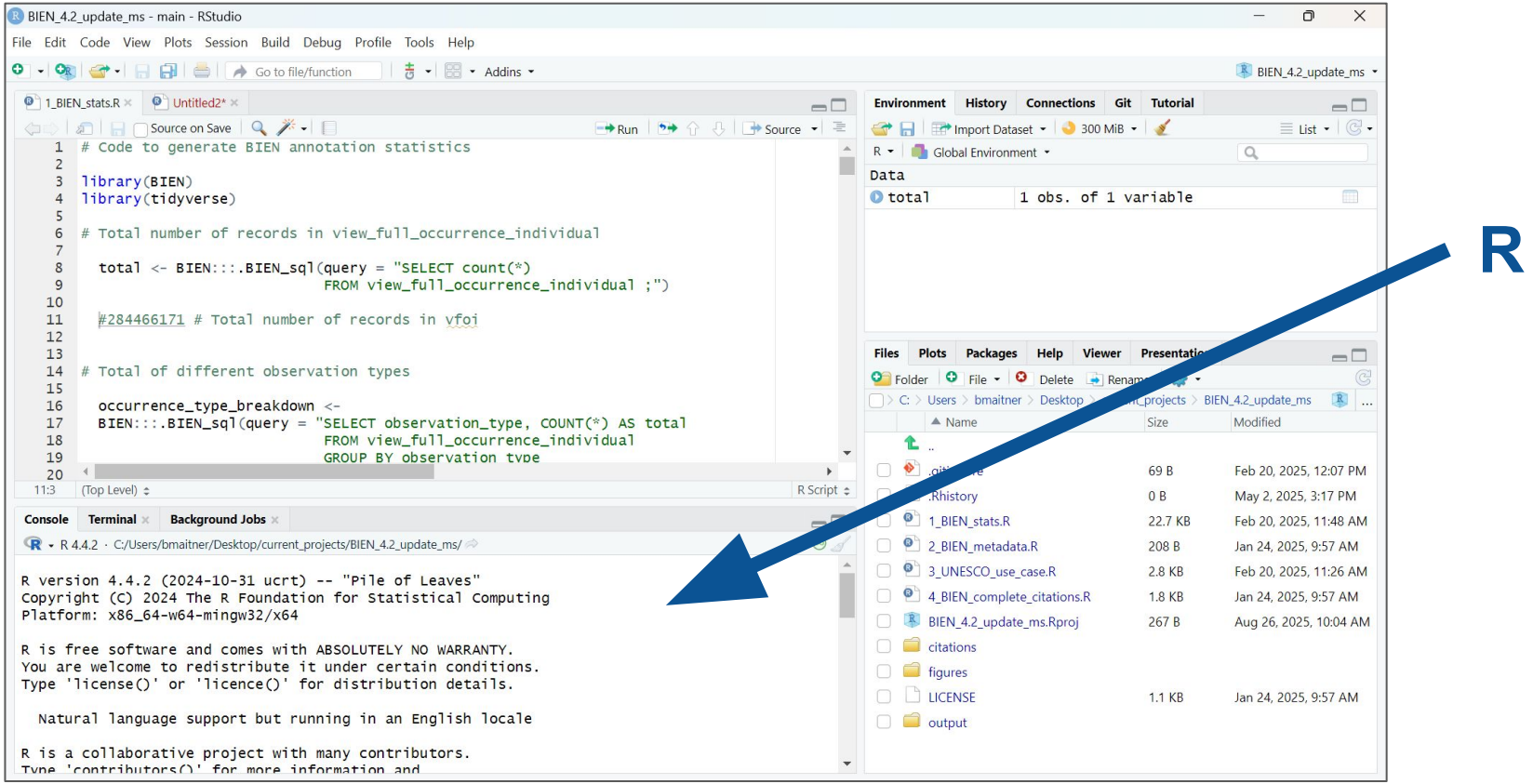
Feb 20, 2025, 11:48 AM
2_BIEN_metadata.R
208 B
Jan 24, 2025, 9:57 AM
3_UNESCO_use_case.R
2.8 KB
Feb 20, 2025, 11:26 AM
4_BIEN_complete_citations.R
1.8 KB
Jan 24, 2025, 9:57 AM
BIEN_4.2_update_ms.Rproj
267 B
Aug 26, 2025, 10:04 AM
citations
figures
LICENSE
1.1 KB
Jan 24, 2025, 9:57 AM
output

# RStudio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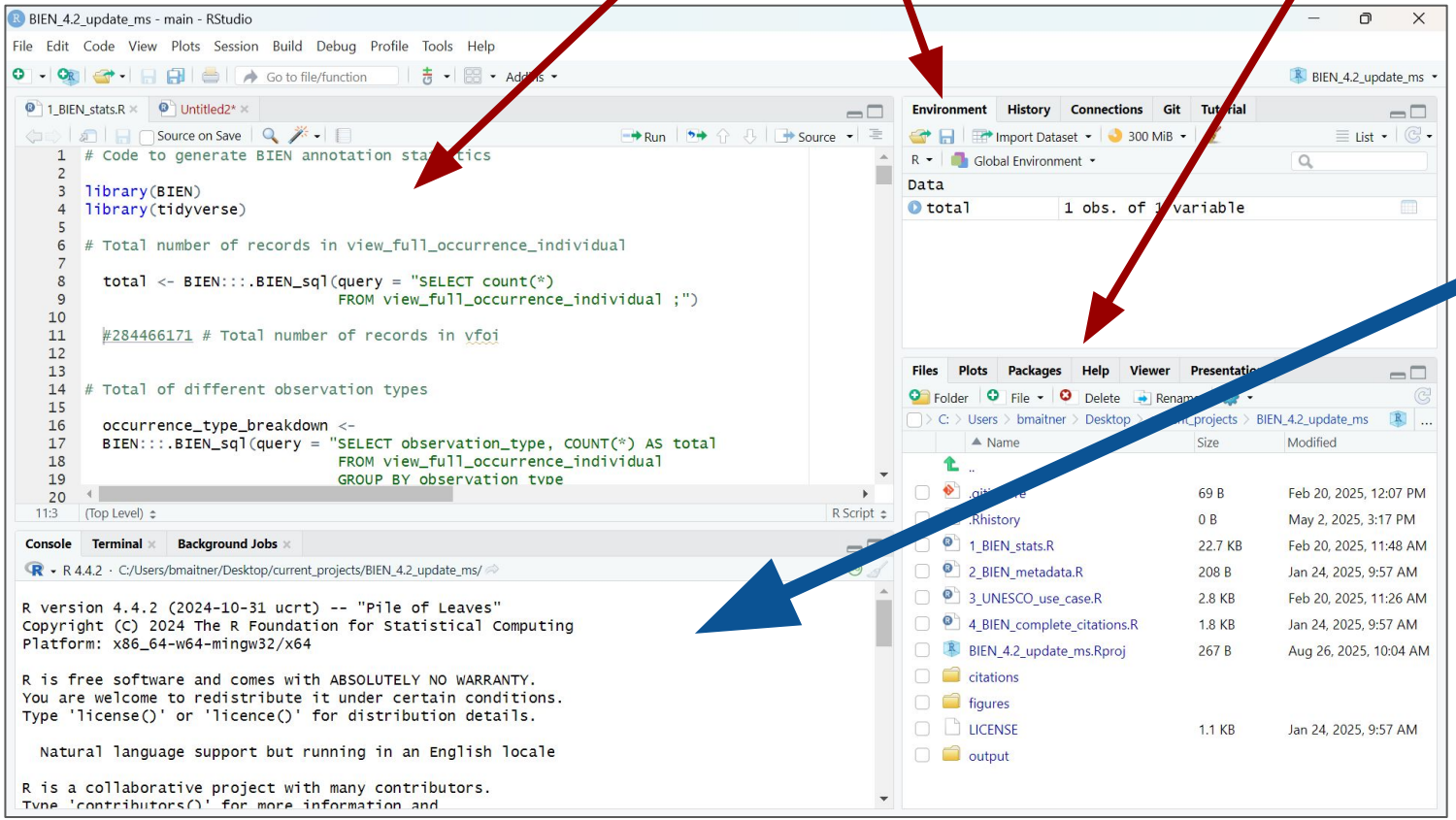
output
R

# RStudio

## Stuff to make R easier to use



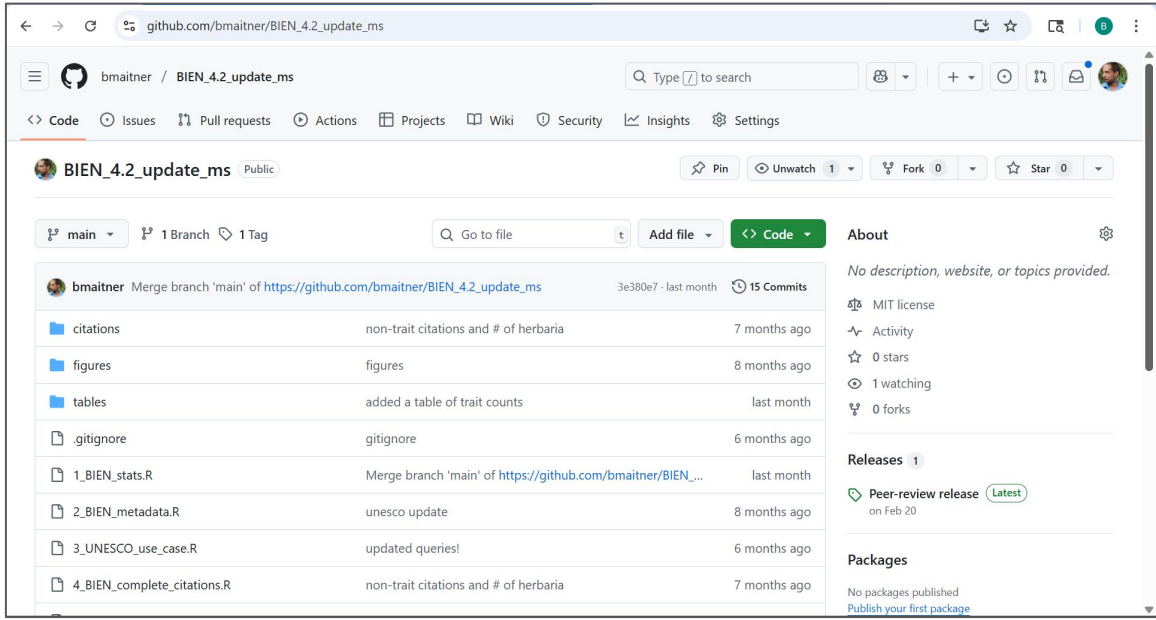

R

# Git

- Program that tracks changes in files
- Removes need for multiple versions of file (you can always go back)
- Tracks what is added or removed in each version
- Allows multiple users to work on files and combine their changes

# Github

- A repository for Git
- Stores your files
- Also can be used for editing files
- You can even set it up to run analyses for you!



# Why use Github?

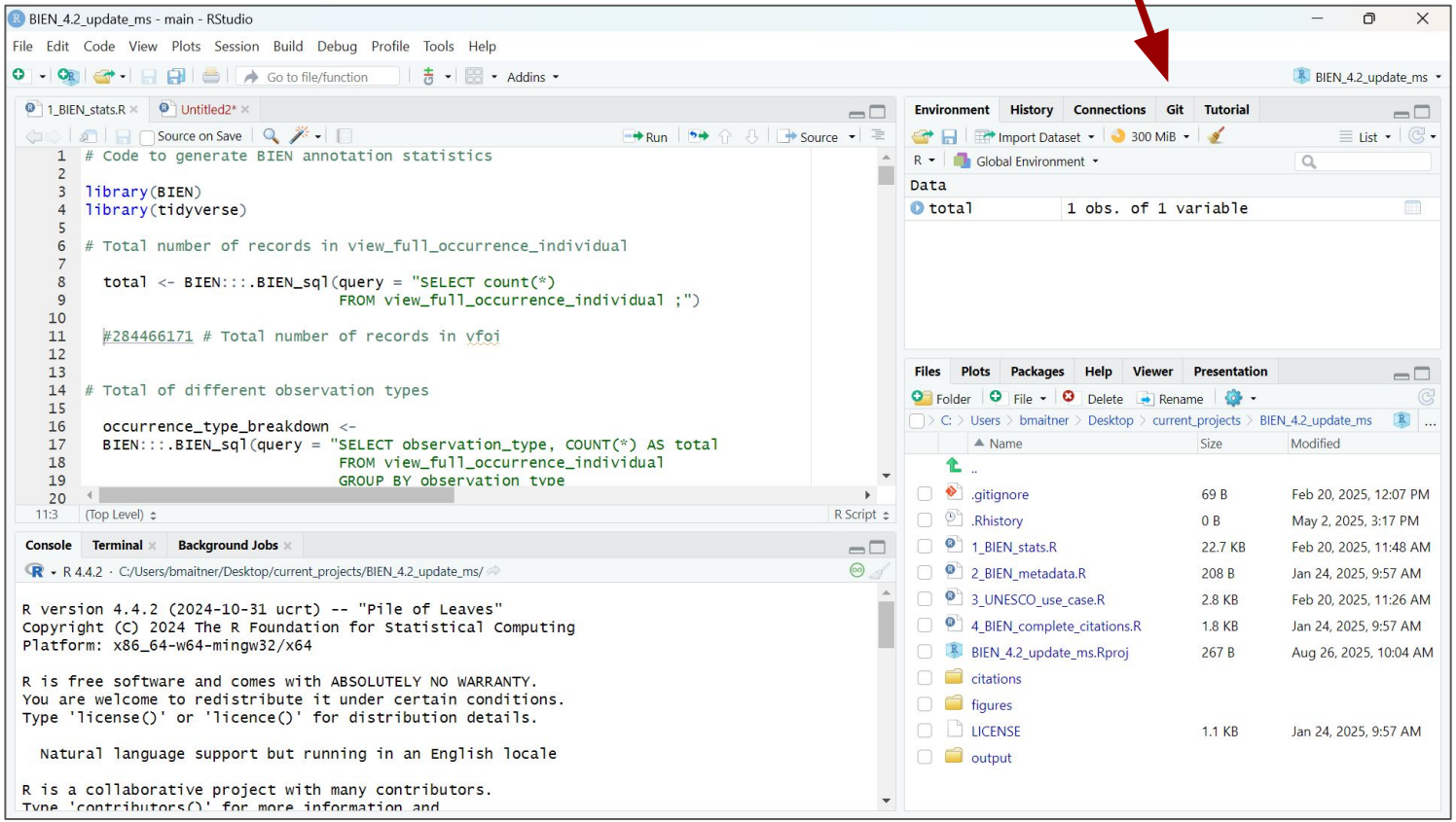
- Secure backup of code (in case your computer dies…)
- Helps when you use multiple computers
- Collaboration
- Transparency and reproducibility (if you make it public)
- Letting other people use your code (forking/copying)
- Increasingly expected of biologists
- Can be archived, cited (e.g., via Zenodo)
- Grad students have to, undergrads get extra credit

# Installing the needed software

- R (available for free at https://www.r-project.org/ )
- RStudio (available for free at https://posit.co/download/rstudio-desktop/ )
- Git (optional for undergrads.  Available for free at https://git-scm.com/downloads )
- Github account (optional for undergrads. Sign up for free at: https://github.com/ )

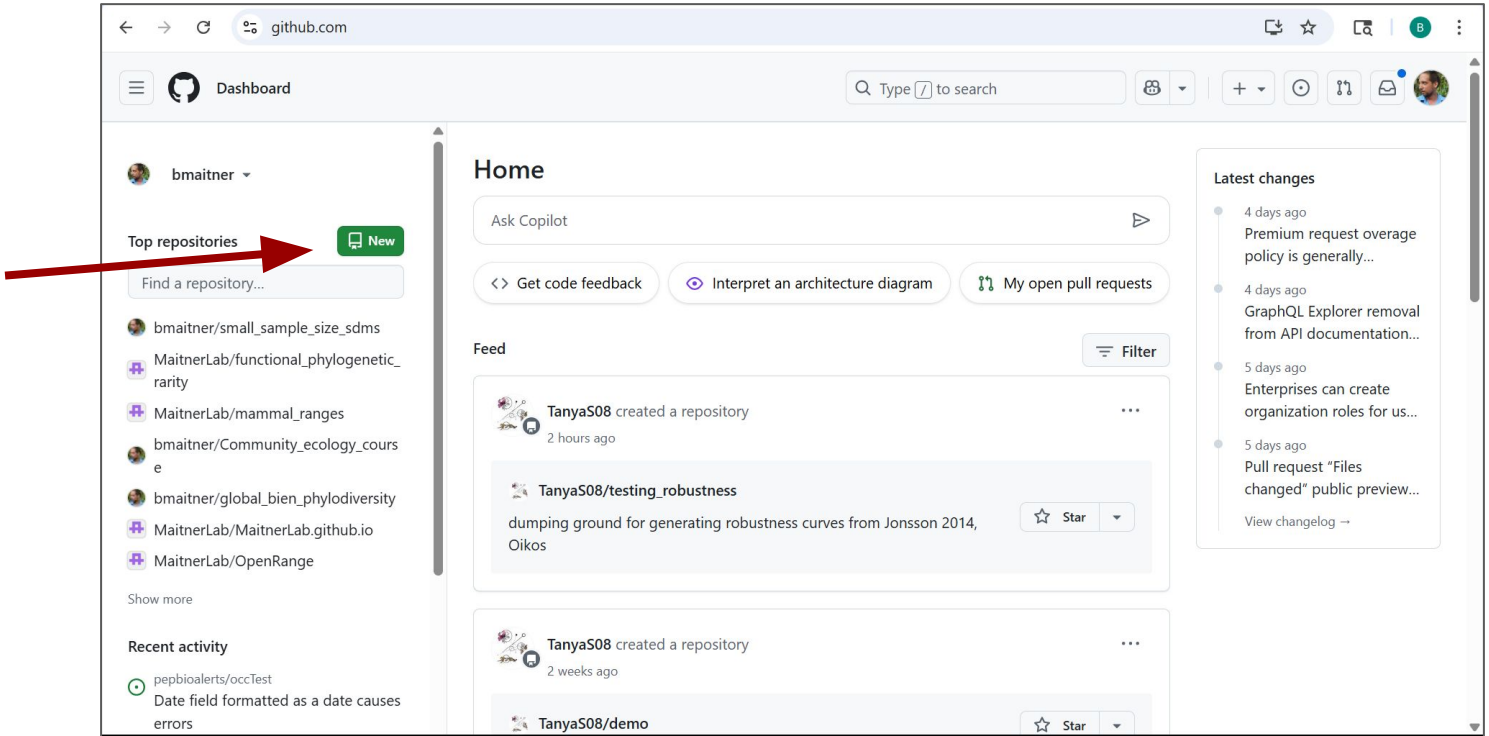
# Did it work?

**Should have a “Git” tab in RStudio**



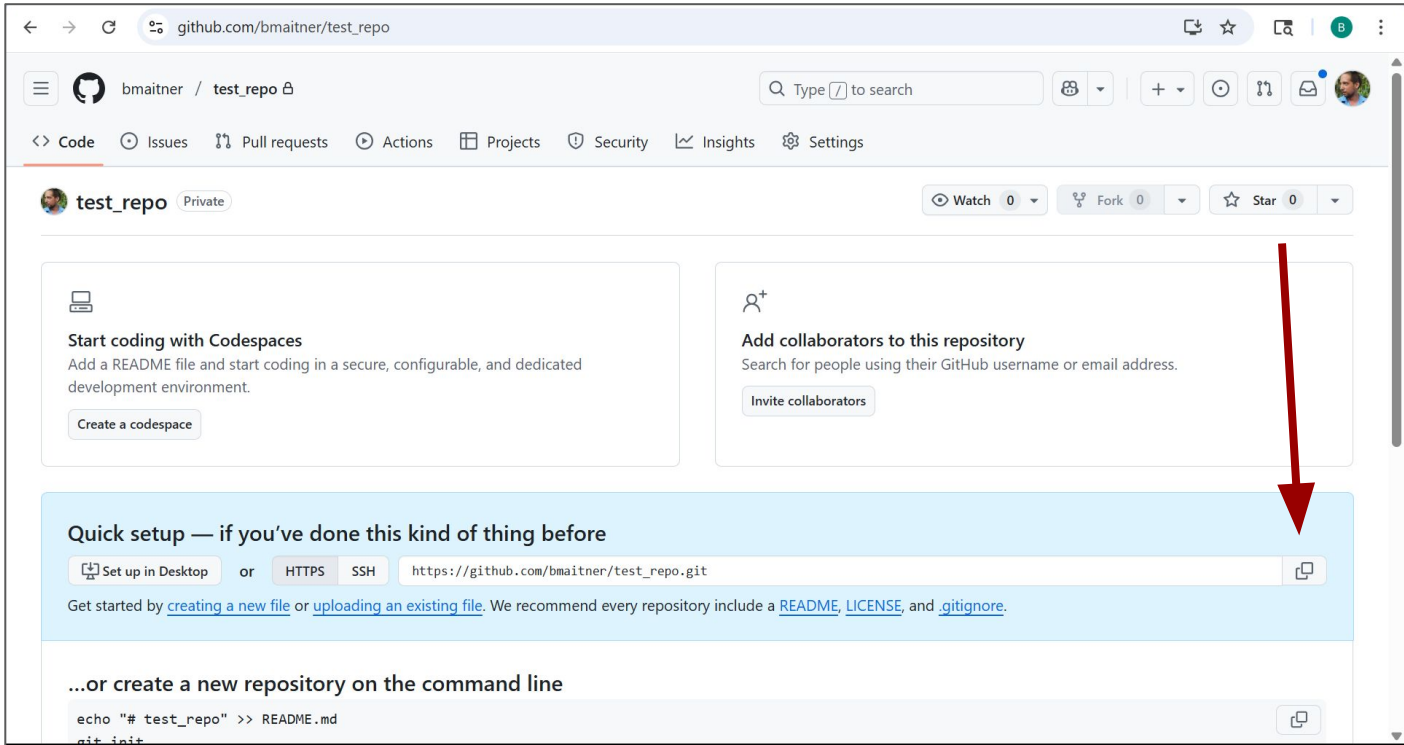
# Make sure it works

## Go to your Github page and make a new repo



# Make sure it works

## Copy the URL



# Make sure it works

In RStudio:

- File > New Project…
- Select “Version Control”
- Select “Git”
- Paste the copied URL into the “Repository URL” box
- Pick a directory for it to be created in
- Click “Create Project”

# Next time:

Before class: read 1.4 - 1.6

During class:

- Discuss 1.4-1.6
- Work through 1.7