

# Fundamentals for Collaborating on Research Projects Using GitHub



**Rob Crystal-Ornelas**

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AGU 2021

# Special thanks to GitHub collaborators



Rob Crystal-Ornelas

 @rob\_c\_ornelas




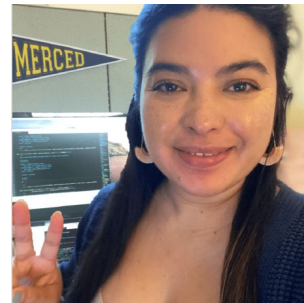
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# A history of GitHub in one slide

- First launched in April 2008
- Git (a version control system) + GitHub (a website) = collaboration on **computer code**
- As of 2021, over 56 million registered users

***Especially within the science research community, GitHub has so many uses beyond collaborating on computer code***

<https://github.com/>

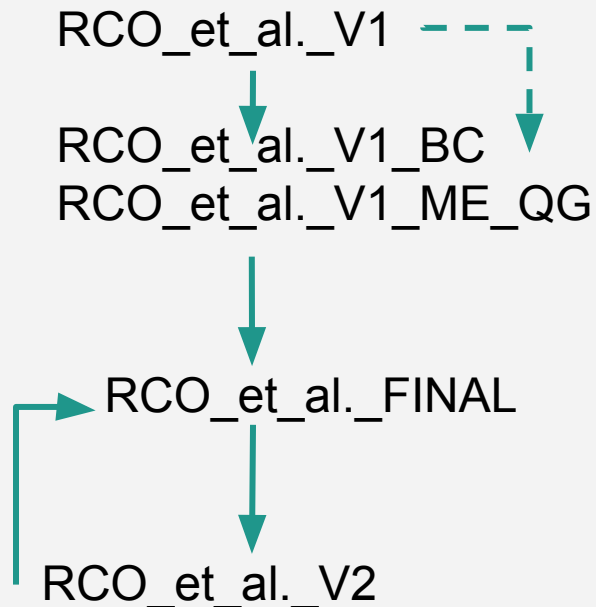


GitHub's  
'octocat'

# GitHub is a place where **scientists** can collaborate on many things (docs, websites, etc.)



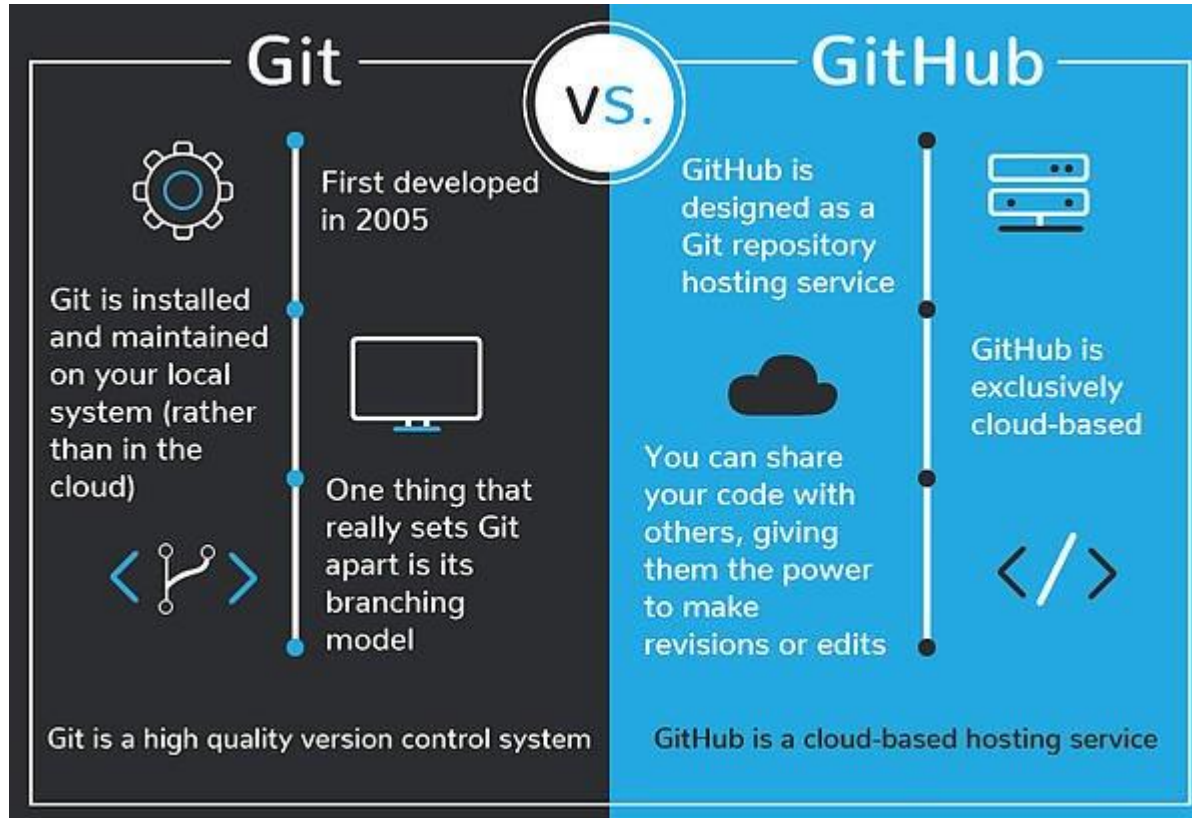
The 'edit, save, attach' method is inefficient



## Version control

“Like track changes [...] but more rigorous, powerful, and **scaled up to multiple files.**”  
(Bryan, 2018)

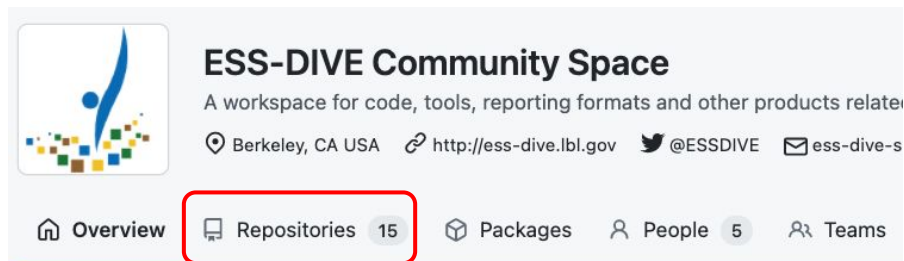
# What are Git and GitHub?



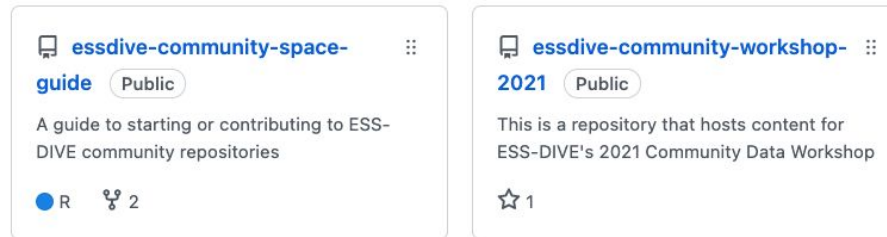
Comparable to “Time Machine” on Mac, or “Version history” within Dropbox and OneDrive, with the added capacity to “**commit**” (provide an explanation of each change) and “**branch**”.

“**Branching**” helps avoid having to manually combine independently-updated versions (e.g., comparing 2 word documents independently updated by 2 people).

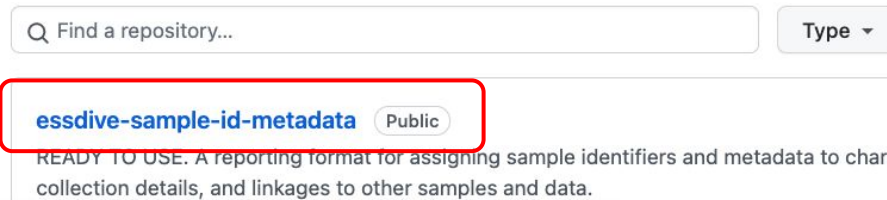
# The GitHub user interface

This is a screenshot of the GitHub profile page for "ESS-DIVE Community Space". The profile header includes the ESS-DIVE logo, the name "ESS-DIVE Community Space", a description "A workspace for code, tools, reporting formats and other products relate", and contact information: "Berkeley, CA USA", "http://ess-dive.lbl.gov", "@ESSDIVE", and "ess-dive-s". Below the header is a navigation bar with tabs: "Overview", "Repositories" (highlighted with a red box and showing 15 items), "Packages", "People" (5), and "Teams".

## Pinned

This section displays two pinned repositories. The first is "essdive-community-space-guide" (Public), described as "A guide to starting or contributing to ESS-DIVE community repositories", with 1 repository and 2 forks. The second is "essdive-community-workshop-2021" (Public), described as "This is a repository that hosts content for ESS-DIVE's 2021 Community Data Workshop", with 1 star.

## Repositories

This section shows the "Repositories" tab with a search bar "Find a repository..." and a "Type" dropdown. Below the search bar, the repository "essdive-sample-id-metadata" (Public) is highlighted with a red box. The description for this repository is "READY TO USE. A reporting format for assigning sample identifiers and metadata to chara collection details, and linkages to other samples and data."

GitHub repositories are the main ways we organize content on GitHub. Think of these as “folders” where you can keep and collaborate on your documents and code.

ESS-DIVE's community space on GitHub: <https://github.com/ess-dive-community>

# Questions?



# Some caveats

GitHub is far from a perfect system in many ways

Acquired by microsoft in 2018

Putting code/data on GitHub? Be aware it's not a **long-term repository**





# What else can GitHub do?



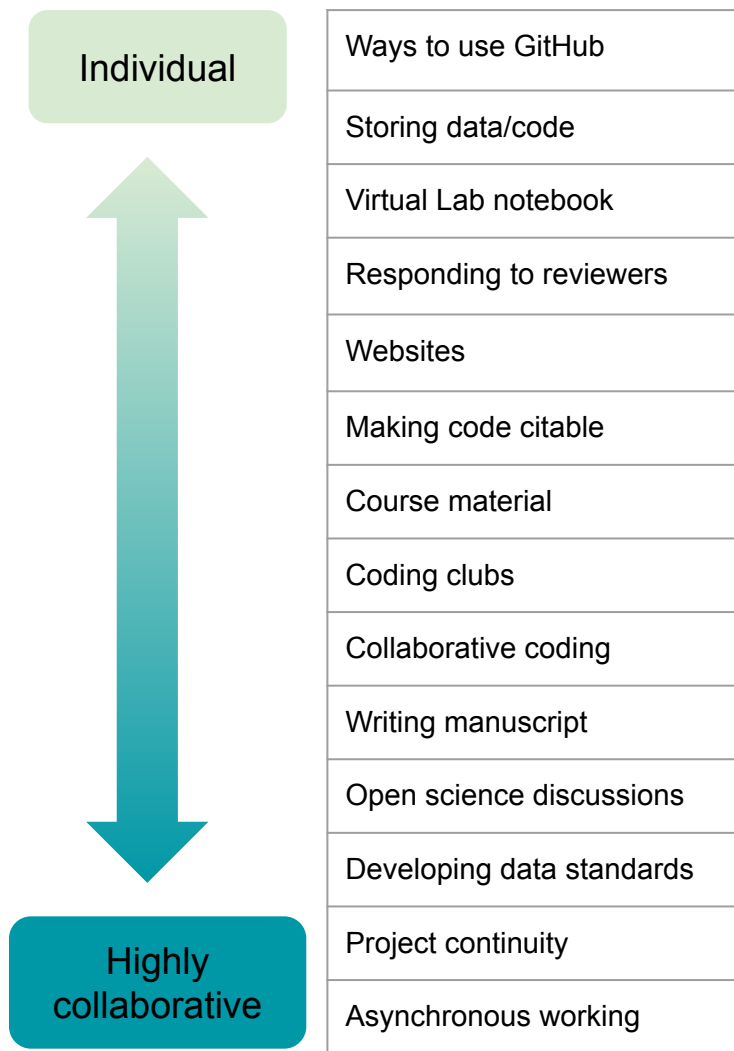
Many other potential uses:

- **Cloud storage** service for some types of files
- **Forking** allows people to use others' repositories as **templates** for their own work
- Provides a **hosting** service for web content
- Allows you to freeze your work at a given moment in time as a **release** which can be linked to a DOI (Required by many journals/funders)
- Provides **integration** with other tools (e.g. OSF, zenodo repository)



Many more ways to use GitHub for science.

We can discuss any of these topics further during discussion!



# Questions?



# Ready to start working with GitHub?

1. Create your \*free\* github account: <https://github.com/>

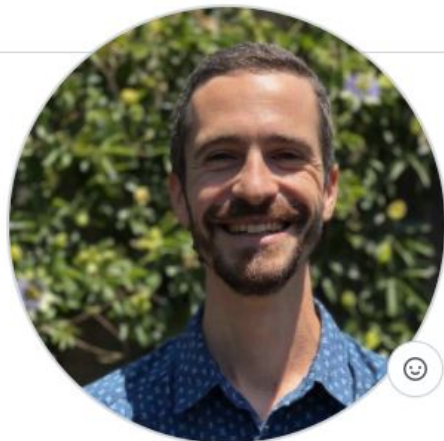
2. Become familiar with a few GitHub basics

A. [Quick intro to github terms and features.](#)

3. Set up your own **GitHub** profile.

A. [instructions from GitHub](#)

1. Create a repository with the same name as your user name
2. Make sure the repository is public
3. In that new repository, add a README.md file and create repo.
4. Introduce yourself (using markdown language)!



## Rob Crystal-Ornelas

robcrystalornelas

PhD in Ecology & Evolution / Postdoc at  
Lawrence Berkeley National Lab

Edit profile

🔗 9 followers · 11 following

Overview

Repositories 18

Projects

Packages

Stars 18

robcrystalornelas / README.md



Hi there 🙋

### About me

My name is Rob Crystal-Ornelas and I'm currently a postdoc at Lawrence Berkeley National Lab. You can find me on [Twitter](#) or [LinkedIn](#).

- 🌱 I'm currently working on community data standards and meta-analysis of environmental data.
- 😊 Pronouns: he/him/his

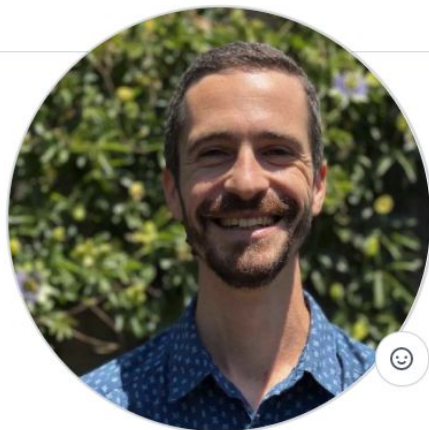
### Collaboration

- 📖 I'm working on a digital book about how to do [meta-analysis in R](#), and always looking for collaborators on that project.
- 📄 I'm collaborating on a manuscript summarizing how to use GitHub in Ecology and Evolution research. Follow along [here](#)

### My skills

Code Python Code R Code LaTeX Code Markdown Code jupyter Code git Code GitHub

# 1. Create a repository with the same name as your user name



Overview

Repositories 17

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Find a repository...

Type ▾

Language ▾

Sort ▾

New

**meta-analysis\_of\_ecological\_data** Public

This is a repository for draft versions of a book called Meta-Analysis of Ecological Data in R (MaEDR)

★ Starred ▾

meta-analysis

ecology

systematic-review

meta-analyses

environmental-science

TeX

★ 4

🔗 2

Creative Commons Attribution 4.0 International

Updated on Oct 28

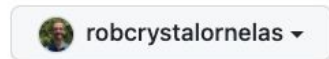
1. Create a repository with the same name as your user name
2. Make the repository public



## Create a new repository

A repository contains all project files, including the revision history. Already have a project repository elsewhere? [Import a repository](#).

Owner \*



Repository name \*

robcrystalornelas



robcrystalornelas is available.



You found a secret! **robcrystalornelas/robcrystalornelas** is a ✨*special* ✨ repository that you can use to add a README.md to your GitHub profile. Make sure it's public and initialize it with a README to get started.

Description (optional)



Public

Anyone on the internet can see this repository. You choose who can commit.

### 3. Add a README.md file and publish your repo



Initialize this repository with:

Skip this step if you're importing an existing repository.

☒ **Add a README file**

This is where you can write a long description for your project. [Learn more.](#)

☐ **Add .gitignore**

Choose which files not to track from a list of templates. [Learn more.](#)

☐ **Choose a license**

A license tells others what they can and can't do with your code. [Learn more.](#)

This will set  `main` as the default branch. Change the default name in your [settings](#).

Create repository



## 4. Open the README.md file, and introduce yourself!



main 1 branch 0 tags Go to file Add file Code

robcrysalornelas Initial commit cd5dafa now 1 commit

README.md	Initial commit	now
<p>Hi there 🙌</p>		

<> Edit file

👁 Preview

```
1  ### Hi there 🙌
2
3  <!--
4  **robcrysalornelas/robcrysalornelas** is a
   GitHub profile.
5
6  Here are some ideas to get you started:
7
8  - 🚧 I'm currently working on ...
9  - 🌱 I'm currently learning ...
10 - 👥 I'm looking to collaborate on ...
11 - 😊 I'm looking for help with ...
12 - 💬 Ask me about ...
13 - 📫 How to reach me: ...
14 - 😄 Pronouns: ...
15 - ⚡ Fun fact: ...
16 -->
17
```

# Ways to learn more



GitHub tutorials	<a href="https://lab.github.com/">https://lab.github.com/</a>
Markdown basics	<a href="https://commonmark.org/help/">https://commonmark.org/help/</a>
Getting to know Git	<a href="https://github.com/dlab-berkeley/Bash-Git">https://github.com/dlab-berkeley/Bash-Git</a>
Longer read: Git, GitHub, and R	<a href="https://happygitwithr.com/">https://happygitwithr.com/</a>



## Next steps

**Check out:** Paper on using GitHub for data standards

<https://doi.org/10.1029/2021EA001797>

**Follow along:** We're writing a paper (on GitHub :) ) sharing ways of using GitHub in Enviro Sci / Ecology research:

<https://github.com/SORTEE-Github-Hackathon/manuscript>

Have fun on [GitHub](#)!

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# Thank you!