Introduction to Git and Github

Why Git is your friend

Lab meeting
February 1, 2024

Goals of this lab meeting

1. What is Git, and why should we be using it?
2. What is local vs. remote? What is origin? What is main? What is a branch???
3. How do I make a repository, make a change, and push that change via **the command line?**
4. How to use GitHub for collaborative projects, and what to do when you have a merge conflict
5. By the end, it is my hope that no one is scared of Git any more!

What is Git?

- **Git** is a program that runs on your computer. It's main purpose is for version control.
  - You interact with git by using git syntax to perform tasks to keep track of files, edit them, maintain version histories.
  - Git allows you to track files and changes on a **local** machine (your laptop) and on a **remote** (a virtual place, like somewhere on the internet), and to cross talk between those locations. This makes git useful for collaborative work and for backing up code.
- **Github** is a virtual host for code that uses git. It is the most popular **remote** for code.

Why do we want to use Git?

1. Git lets us track the history of our project with repositories and commits
2. Git lets us go back to older versions at any point in time via “checkout”
3. Git lets you safely experiment with new code via branches
4. Git helps you back up your work
5. Git helps you collaborate with other people, and not duplicate work

Git vocab

1. **Repository:** a folder/directory. A repository can exist on a local, remote, or both. Code on Github is usually organized by repositories. In our lab, each project gets its own repository (e.g., “h5nx-clades”, “North-American-HPAI”, etc…).

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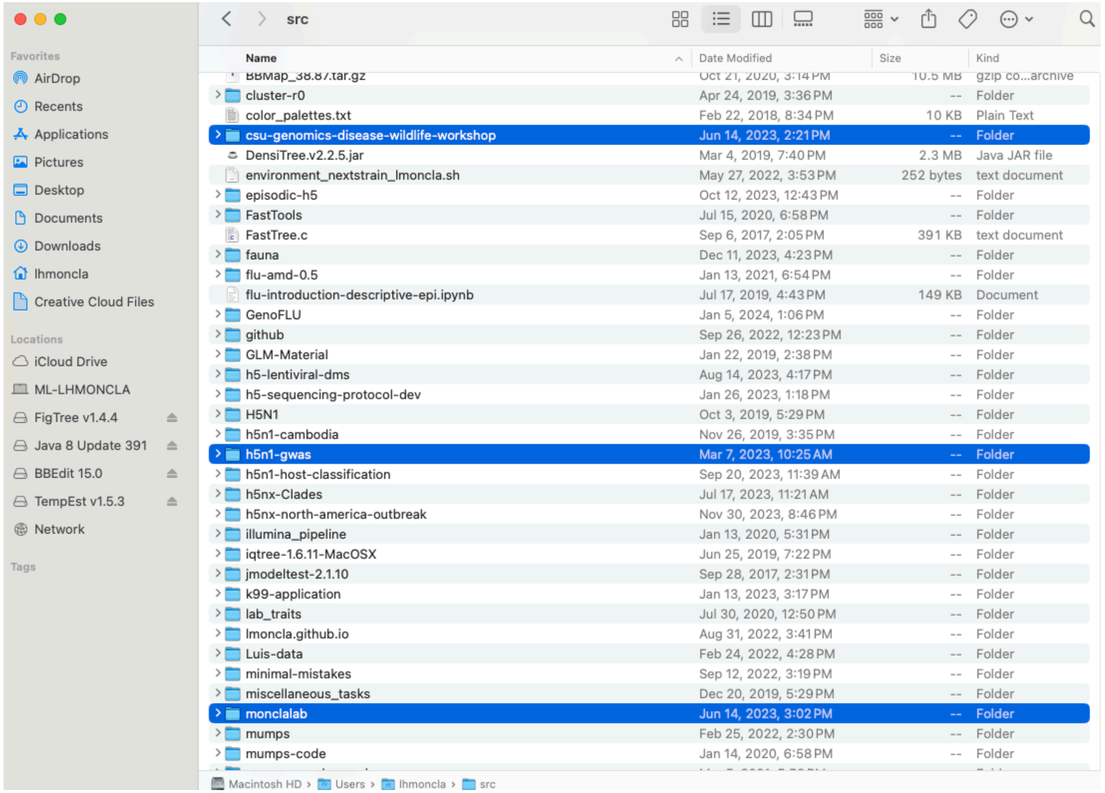

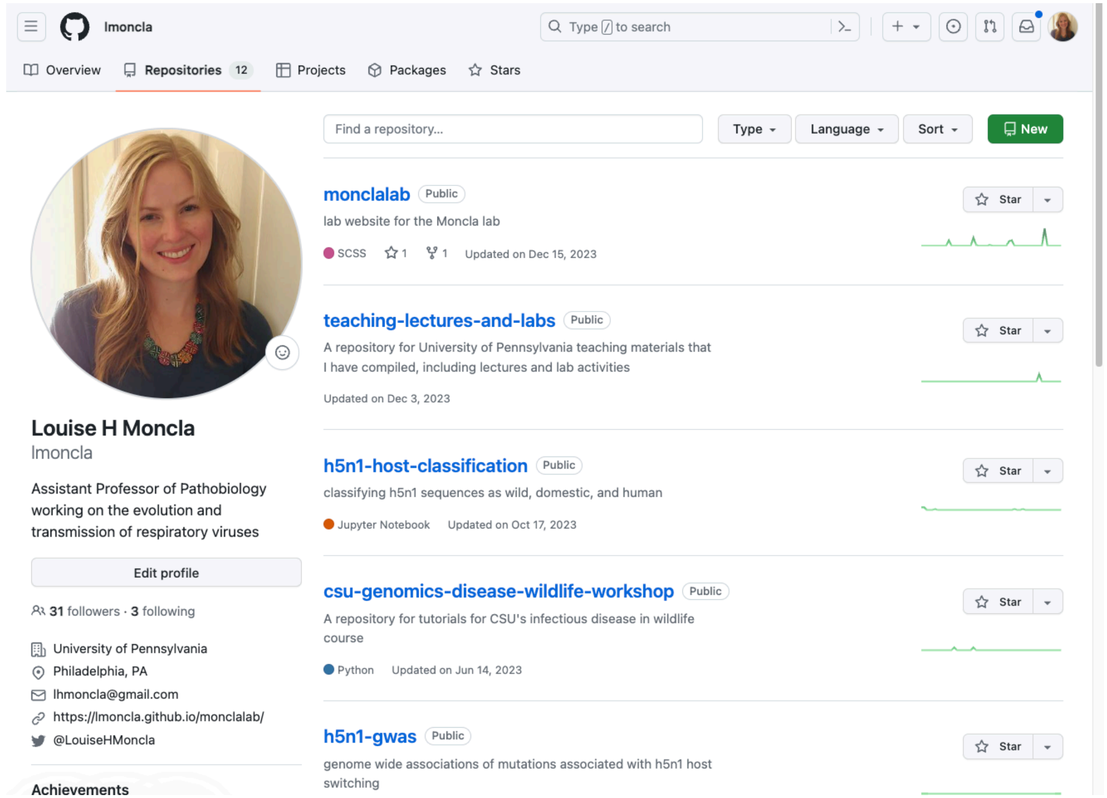

These local repositories live on my laptop in my src folder. They also live remotely as remote repositories on my Github account.

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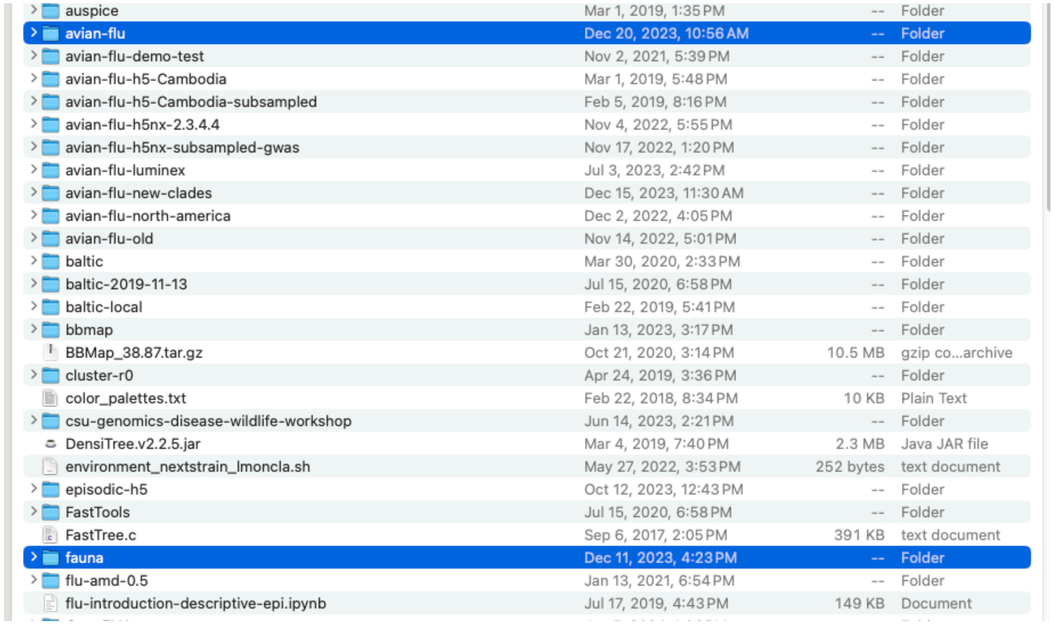

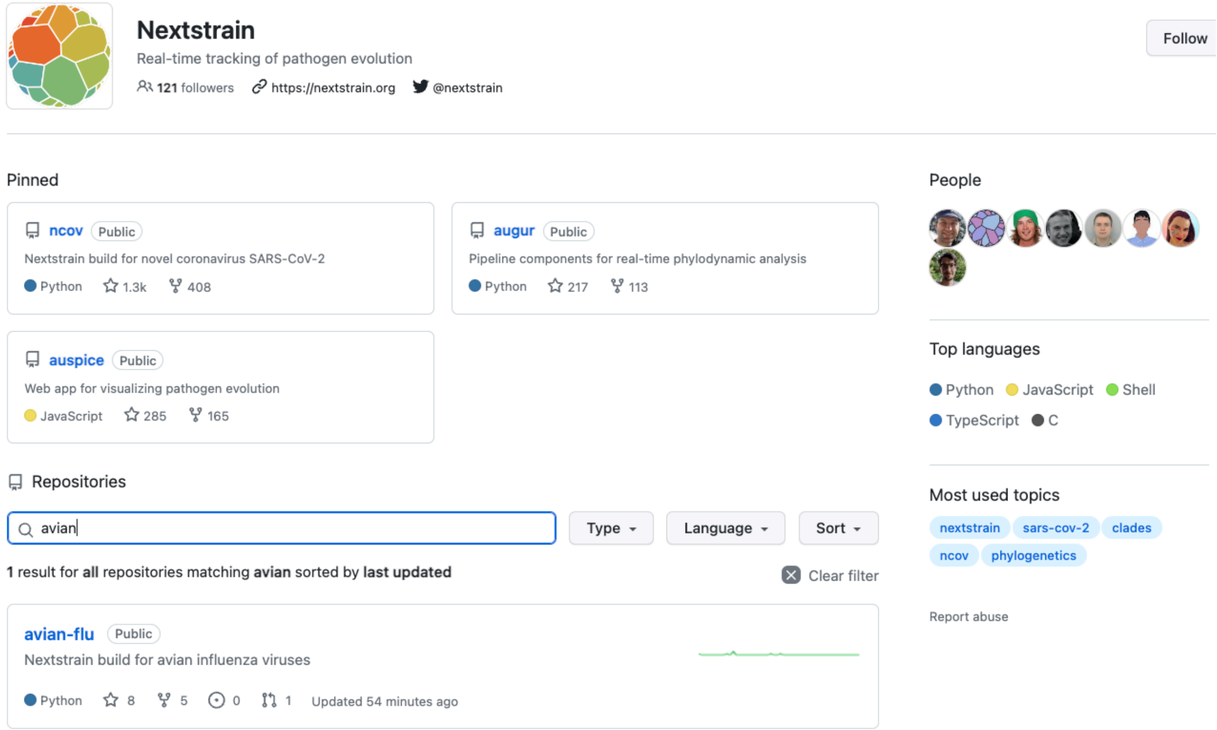

My Nextstrain work lives in the same folder on my laptop, but is housed remotely as part of the Nextstrain **workspace.** A workspace is a collection of repositories that are all related to the same project. Our “Moncla lab” GitHub page is a workspace.

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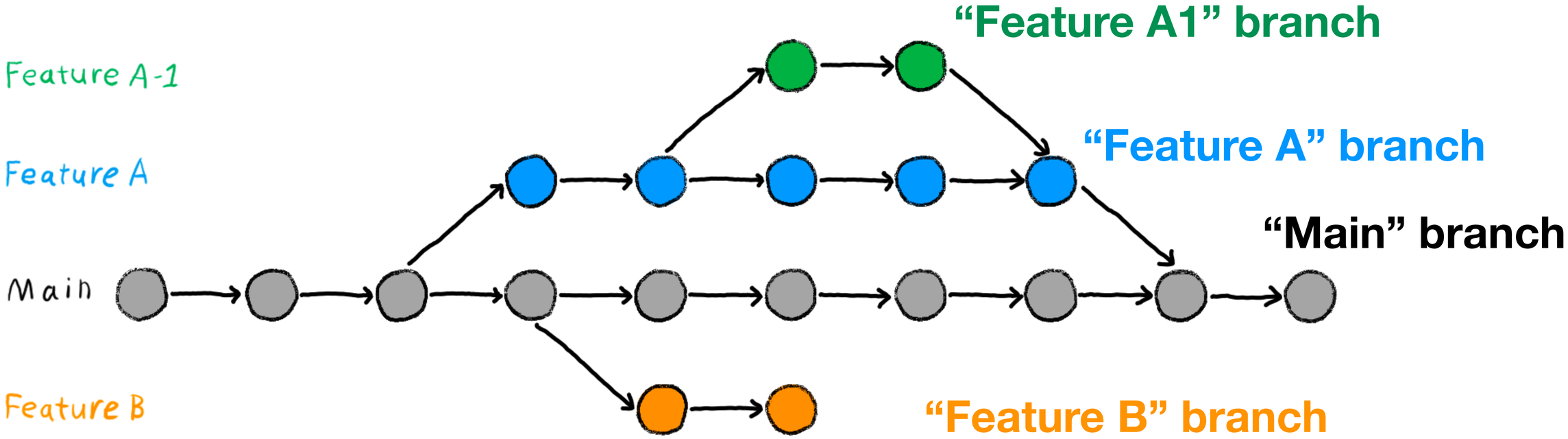
2. **Commit:** A checkpoint or edit in the version history of your project. These are most useful when they are descriptive and come with a message. E.g.: “this commit adds a new classification for mammals and further subsets them into wild marine and wild land. We have added this designation to reflect the unusual epidemiology of the ongoing H5Nx outbreak.” Used well, these commits can be used to retrace your steps in what you’ve done with the project over time. They are a message to future you, so write them well!

3. **Pushing and pulling:** To transfer files and information between a local and remote location. To collect information that exists in the remote version of a repository, we “**pull**” it to our local. To push new changes from our local to remote, we “**push**” it to remote.

Git vocab:

1. **Branch:** A particular copy of your version history. Repositories all have at least 1 branch, and that is called “main”. To make new, experimental features that you want to test out before deploying, you can make new branches.

2. **Merge:** When you have multiple branches and want them to come together, you merge them.



Activity

- https://github.com/lmoncla/teaching-lectures-and-labs/tree/main/Git-tutorial
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