

# A Very Cursory Introduction to Github and Friends

An AGSO 15-minute lecture

Meredith L. Rawls • Aug 29, 2014

*Some slides are from SciCoder,  
courtesy of Demitri Muna*

# What You Want When Writing Code

- Backups
- Ability to see a previous version of your code
- Marking code that works / is stable
- Marking code that ran a particular analysis
- Access to your code from anywhere
- Synchronize changes to code across multiple computers.
- Share your code with people.

Most people try to accomplish some of these things by hand, but often forget to do (or just skip!) one more steps because it isn't easy or is time consuming.

(And really, you want most of these things for *all* your files!)

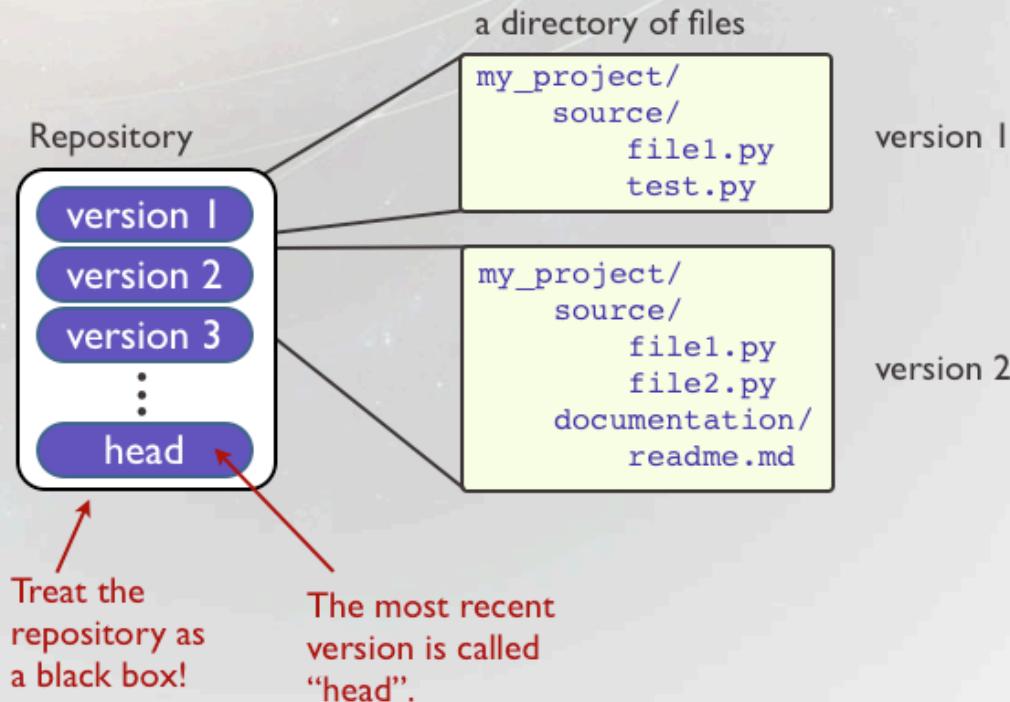
# Git vs. Github

- **Git** is a free *version control* program you can use from the command line
  - <http://git-scm.com/>
  - Learn the basic commands with this tutorial  
<http://try.github.com/>
- **Github** is a website that uses git and lets you save, share, and backup projects online
  - <https://github.com/>
  - It has a friendly GUI for Mac (Windows, too)  
<https://mac.github.com/>



# The Repository

A place where all versions of all files are stored. With this, the current version or any prior version of any file in the repository can be recovered. Can be locally or remotely located. If only a local copy (i.e. on your own hard drive) is created, it doesn't provide a backup in case of computer failure.

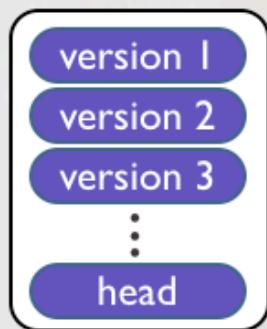


# Kinds of Repositories

## Distributed Repository

Everyone has a full copy of the repository.

Repository



can be located on a remote server

Examples: Mercurial, Git

directory of files

my\_project/  
source/  
file1.py  
file2.py  
file3.py  
documentation/  
readme.md



work computer

directory of files

my\_project/  
source/  
file1.py  
file2.py  
documentation/  
readme.md



laptop

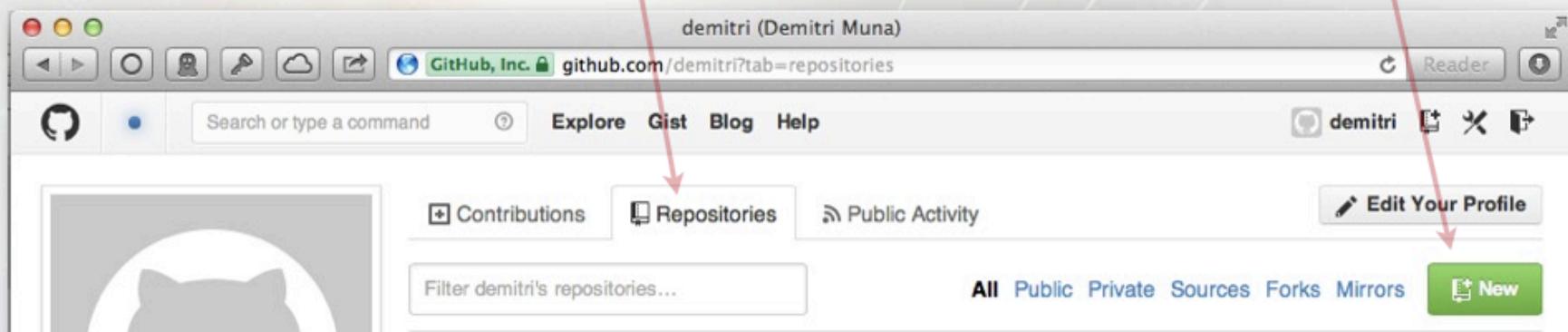
# Learn to speak git

- **Repository (repo)**: like a folder for your project
  - **Remote**: version of a repo that lives on github
  - **Clone**: a local copy of your github repo
  - **Branch**: a separate parallel version of a repo
  - **Fork**: a personal copy of someone else's repo

# Creating a New Repository on GitHub

Go to your account on GitHub, select “Repositories”.

Create new repository.

A screenshot of the GitHub repository creation form. It shows the 'Owner' dropdown set to 'SciCoder', the 'Repository name' field containing 'test\_repository', and a checked checkbox for 'Initialize this repository with a README'. The description field contains 'This is a demo repository.' A red arrow points from the text 'Fill in a name & description.' to the 'Repository name' field.

Fill in a name & description.

Initialize this repository with a README  
This will allow you to git clone the repository immediately.  
Add .gitignore: Python ▾

Initialize repository, select primary language to use (more on “ignores” later).

# Cloning the Repository

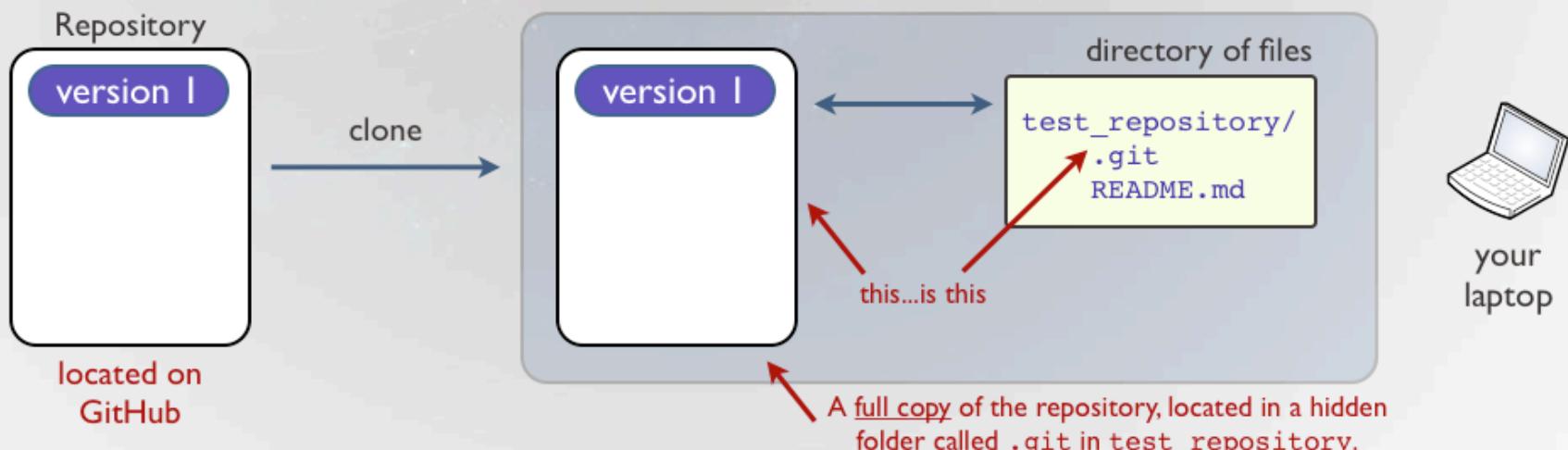
On the lower right on the next page, copy the “clone URL”.

In the terminal, enter: `git clone <URL>`

HTTPS clone URL  
`https://github.co`

```
blue-meanie [~/Documents/Repositories/tmp] % git clone https://github.com/SciCoder/test_repository.git
Cloning into 'test_repository'...
remote: Counting objects: 4, done.
remote: Compressing objects: 100% (4/4), done.
remote: Total 4 (delta 0), reused 0 (delta 0)
Unpacking objects: 100% (4/4), done.
blue-meanie [~/Documents/Repositories/tmp] %
```

What does this do? You've made a local copy of the repository. Now there are two copies of the repository and one copy of the files (your “working directory”).



# Committing Files

You need to be roughly aware staging happens. I do not recommend you use this feature. When you are ready to add files, place them into the repository IMMEDIATELY with the `commit` command.

```
blue-meanie [test_repository] % git status
# On branch master
# Changes to be committed: ← i.e. in staging area limbo
#   (use "git reset HEAD <file>..." to unstage)
#
#       new file:   newfile.txt ← list of files that will be committed
#
blue-meanie [test_repository] % git commit -m "First commit."
[master 9b8c29c] First commit.
 0 files changed
 create mode 100644 newfile.txt
blue-meanie [test_repository] % git status
# On branch master
# Your branch is ahead of 'origin/master' by 1 commit. ← Yeah, that's helpful. We'll get to this.
#
nothing to commit (working directory clean) ← This means that the latest version in
blue-meanie [test_repository] % the repository matches the files in
                                         the working directory.
```

NOTE: Committing files only saves them to your local repository.

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- **Commit**: a change to a file with a note attached

# Saving To Another Repository

What did this line mean...?

name we call the remote repo

now we know this is the name of the main branch

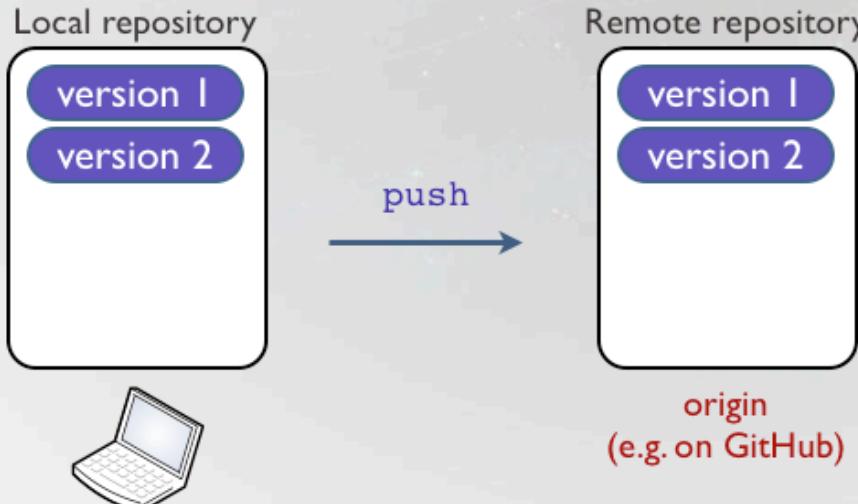
# Your branch is ahead of 'origin/master' by 1 commit.

The local repository (your computer) has a newer update than what is on the remote server (which we call "origin"). The line above means that one commit occurred after the last commit on the master branch on the remote repository origin.

We want to send those changes to the remote repository... this is called a *push*:

git push <remote repo name> <branch name>

note default remote name is "origin"  
and default branch is "master",  
defined in .git/config

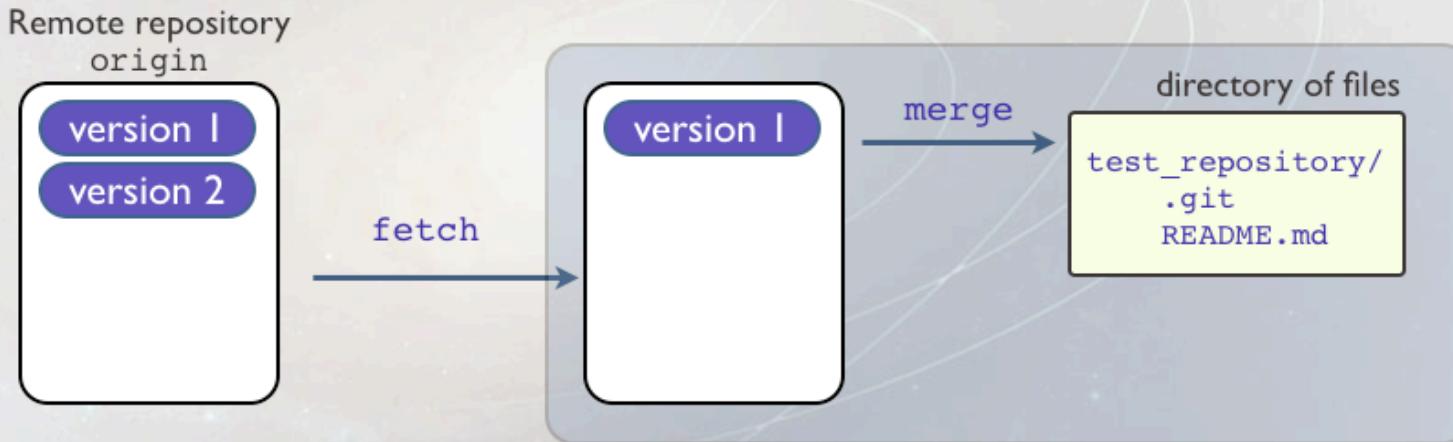


In our example from before, this would be:

git push origin master

```
blue-meanie [test_repository] % git push
Username for 'https://github.com': demitri
Password for 'https://demitri@github.com':
Counting objects: 9, done.
Delta compression using up to 2 threads.
Compressing objects: 100% (6/6), done.
Writing objects: 100% (8/8), 720 bytes, done.
Total 8 (delta 2), reused 0 (delta 0)
To https://github.com/SciCoder/test_repository.git
e5aa6ac..2377659  master -> master
```

# Getting Changes from the Remote Repository



This command will retrieve changes from the remote repository to your local repository:

`git fetch`

This does not update the files in your working directory. To do that, follow the fetch with:

`git merge`

Or, if you actually have better things to do with your time, use this command:

`git pull`

`git pull`

=

`git fetch  
git merge`

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- **Commit**: a change to a file with a note attached
- **Fetch**: retrieve latest changes from a github repo
- **Merge**: take changes from one branch and apply them to another
- **Pull**: Fetch + Merge
- **Push**: send your committed changes to a github repo



# mrawls / kepler-makelc

[Unwatch](#) 1[Star](#) 0[Fork](#) 0

Basic light curve processing for all your Kepler EB needs. — Edit

16 commits

1 branch

0 releases

1 contributor

[Issues](#) · [Pull Requests](#) · [Wiki](#) · [Pulse](#) · [Graphs](#) · [Settings](#)

updated plotter and pretty LC plot!

mrawls authored on Jul 17

latest commit 384ab3a377

<a href="#">.gitignore</a>	exclude big text outfiles from repo	a month ago
<a href="#">ELCprep.py</a>	Added long-term lc detrending	a month ago
<a href="#">README.md</a>	Minor README update	2 months ago
<a href="#">example2_9246715.png</a>	Added long-term lc detrending	a month ago
<a href="#">example2_lcchunks.png</a>	Added long-term lc detrending	a month ago
<a href="#">example_9246715.png</a>	New program: ELCprep.py	2 months ago
<a href="#">example_lcchunks.png</a>	New program: ELCprep.py	2 months ago
<a href="#">lc_finalplot1.png</a>	updated plotter and pretty LC plot!	a month ago
<a href="#">lc_functions.py</a>	Added long-term lc detrending	a month ago
<a href="#">lc_functions.pyc</a>	I put .pyc in .gitignore but here this is anyway.	a month ago
<a href="#">lcplotter.py</a>	updated plotter and pretty LC	
<a href="#">makelc.py</a>	Added long-term lc detrending	
<a href="#">makelc_out.txt</a>	Added long-term lc detrending	
<a href="#">mask_kepcotrend.txt</a>	Kepler light curve detrend fo	
<a href="#">README.md</a>		

```
[~/Astronomy/github/kepler-makelc]$ ls
ELC_lc0.txt          ELC_lcall.txt      lc_functions.pyc
ELC_lc1.txt          ELCprep.py        lcplotter.py
ELC_lc2.txt          README.md        login.cl
ELC_lc3.txt          example2_9246715.png makelc.py
ELC_lc4.txt          example2_lcchunks.png makelc_out.txt
ELC_lc5.txt          example_9246715.png mask_kepcotrend.txt
ELC_lc6.txt          example_lcchunks.png pyraf
ELC_lc7.txt          lc_finalplot1.png uparm
ELC_lc8.txt          lc_functions.py
```

```
[~/Astronomy/github/kepler-makelc]$
```

# Pro Tips

- You don't have to put **data** in your repository
- Use your .edu email for free **private** repositories
  - [https://education.github.com/discount requests/new](https://education.github.com/discount_requests/new)
- *Nobody's code is perfect.*
  - Share anyway.
- Learn to **fork** others' code for your own use
  - Projects like **astropy** and **sunpy** live on github!
- A recommended, more powerful GUI: SourceTree
  - <http://www.sourcetreeapp.com>

# Write papers collaboratively:



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- <https://authorea.com>



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- Developed by astronomers who “get it”
- And when you’re done... export in the format for your journal of choice (!)

Great example: [https://authorea.com/users/23/articles/249/\\_show\\_article](https://authorea.com/users/23/articles/249/_show_article)