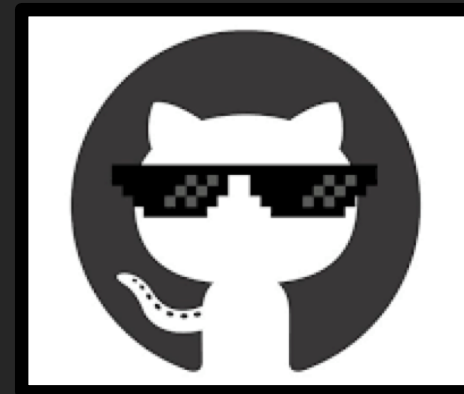
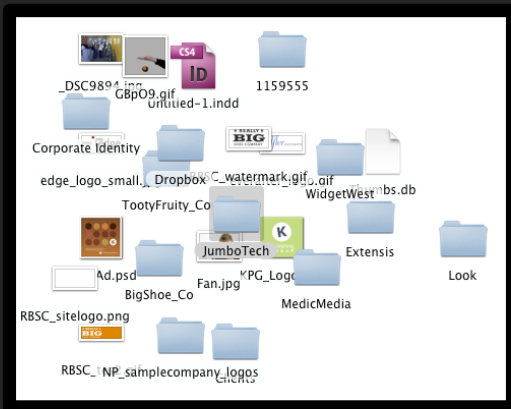
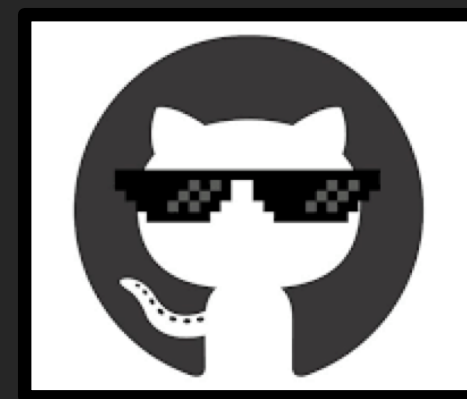
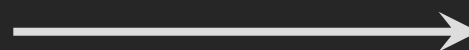
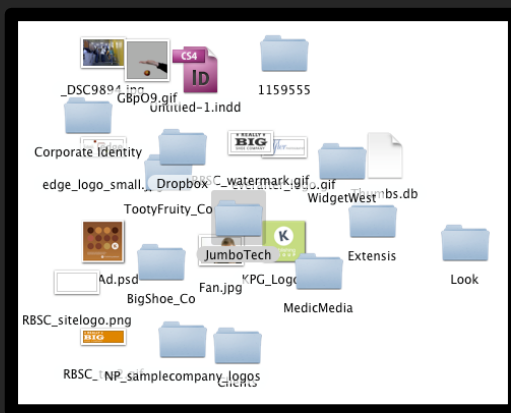


Code Management with **Git** and **GitHub**

Corban Swain | September 17, 2018 | Synthetic Neurobiology Retreat





The Programming Workflow

SET GOALS & MILESTONES

TEST MULTIPLE SOLUTIONS

UTILIZE PRIOR WORK

COLLABORATE ON DEVELOPMENT

BACKUP PROJECT

MANAGE CHANGES & VERSIONS

IDENTIFY & FIX BUGS

EXPLAIN CODE

RELEASE SOFTWARE TO OTHERS

The Programming Workflow

WITHOUT VERSION CONTROL

Map out on paper or doc

Test in series

Copy old functions

Cloud drive with 2 – 3 people

Manually create copies, Cloud

‘code-1.1’, ‘code-1.2’, ...

Ad hoc, #FIXME Lines

Comments & word document

Email .zip file

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Manage a “Utilities” Repo

Infinite mergeable contributions

Built-into the process

Built-in, easily jump between

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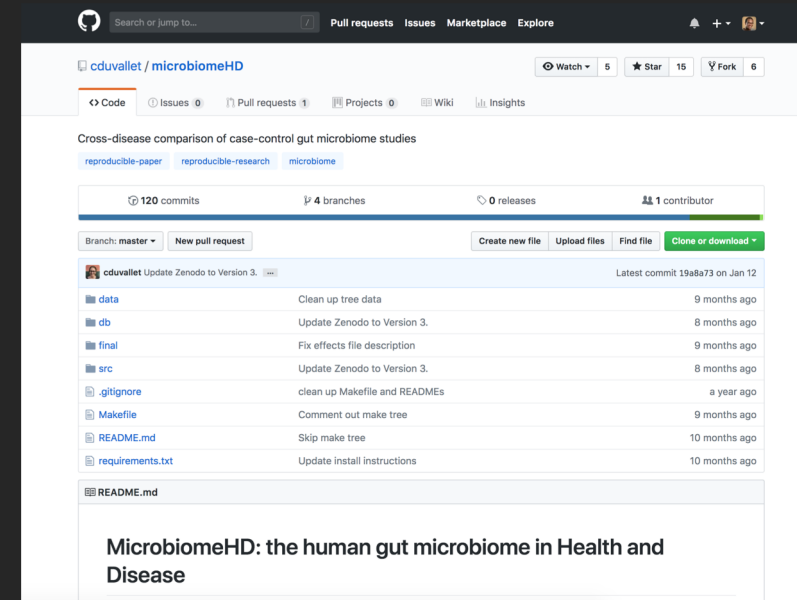
GitHub Issue Tracker

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Git is a Version Control System, GitHub is the Online Platform

```
Terminal — -bash — 69x19
no changes added to commit (use "git add" and/or "git commit -a")
corban_swain Corbans-MacBook-Pro cool_calculator (master)
git add -A
corban_swain Corbans-MacBook-Pro cool_calculator (master)
git commit -m "small formatting of operations.py"
[master d6963ac] small formatting of operations.py
1 file changed, 53 insertions(+), 31 deletions(-)
rewrite operations.py (62%)
corban_swain Corbans-MacBook-Pro cool_calculator (master)
gph
Counting objects: 3, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 532 bytes | 532.00 KiB/s, done.
Total 3 (delta 0), reused 0 (delta 0)
To https://github.com/CorbanSwain/Cool-Calculator
9ee7c74..d6963ac master -> master
corban_swain Corbans-MacBook-Pro cool_calculator (master)
```



- **Distributed** Version Control System
- Visual Interface for Exploring Projects
- The Central Hub for Open Source Development

Git is a framework where **copy-pasting is obsolete.**

“Repositories”

A MATLAB Utilities repository simplifies the management of common functions across many projects.

The screenshot shows the GitHub interface for the repository 'CorbanSwain / MATLAB-Utilities'. At the top, there are buttons for 'Watch', 'Star', and 'Fork', each with a count of 0. Below these are tabs for 'Code', 'Issues', 'Pull requests', 'Projects', 'Wiki', 'Insights', and 'Settings'. The main content area displays the repository description: 'Useful functions and classes for working in MATLAB.' followed by an 'Edit' button. Below this, there are statistics: '12 commits', '2 branches', '0 releases', and '1 contributor'. A bar shows the progress of the repository. Below the statistics, there are buttons for 'Branch: master', 'New pull request', 'Create new file', 'Upload files', 'Find file', and 'Clone or download'. The commit history is listed below, showing the latest commit by CorbanSwain updating to a fed functions, and a list of files and their commit messages.

File	Commit Message	Time Ago
@Logger	updates to logger	28 days ago
panel-2.12	updating imaging utils	a month ago
FigureBuilder.m	initial commit	a month ago
IndentMode.m	updating imaging utils	a month ago
LogLevel.m	updating imaging utils	a month ago
PlotBuilder.m	initial commit	a month ago
affinewarp.m	color support for different functions	28 days ago
affinewarpForward.m	updating imaging utils	a month ago
alphaProject.m	color support for different functions	28 days ago
angsimplify.m	updating imaging utils	a month ago
arrayInterp.m	updating imaging utils	a month ago
bound.m	adding color support to projection view	28 days ago
calcZFactor.m	adding color support to projection view	28 days ago
cell2csl.m	updates to logger	28 days ago

GitHub is the forum where **code is improved**.

“Pull Requests”

An update to the Seaborn plotting library for Matplotlib implements a new functionality that I and others can reuse.

Control dendrogram line properties. #1426



CorbanSwain wants to merge 4 commits into `mwaskom:master` from `CorbanSwain:dendrogram-lineargs2`

Conversation 1

Commits 4

Checks 0

Files changed 1



CorbanSwain commented on May 10 • edited

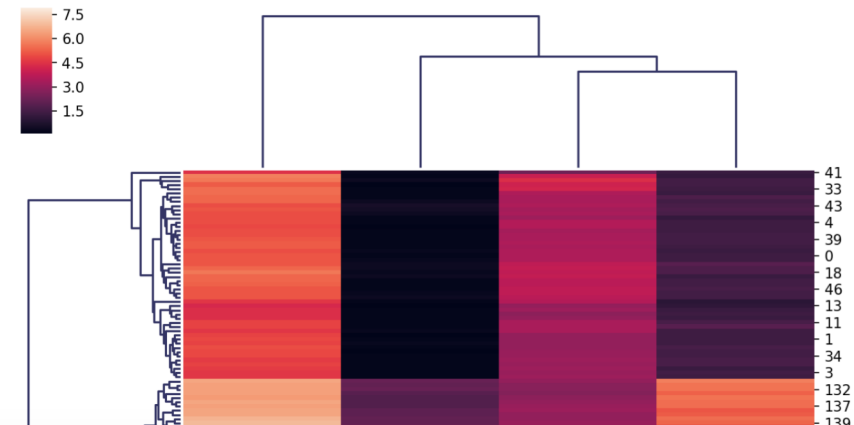
Adds the parameter `dgline_kws` to the `clustermap` call and adds the property `line_kws` to the `DendrogramPlotter` class to allow for editing of the dendrogram line attributes.

Addresses the issue raised on Stack Overflow [here](#).

Default properties of a black, 0.5 pt line width are maintained unless explicitly changed.

Example of use:

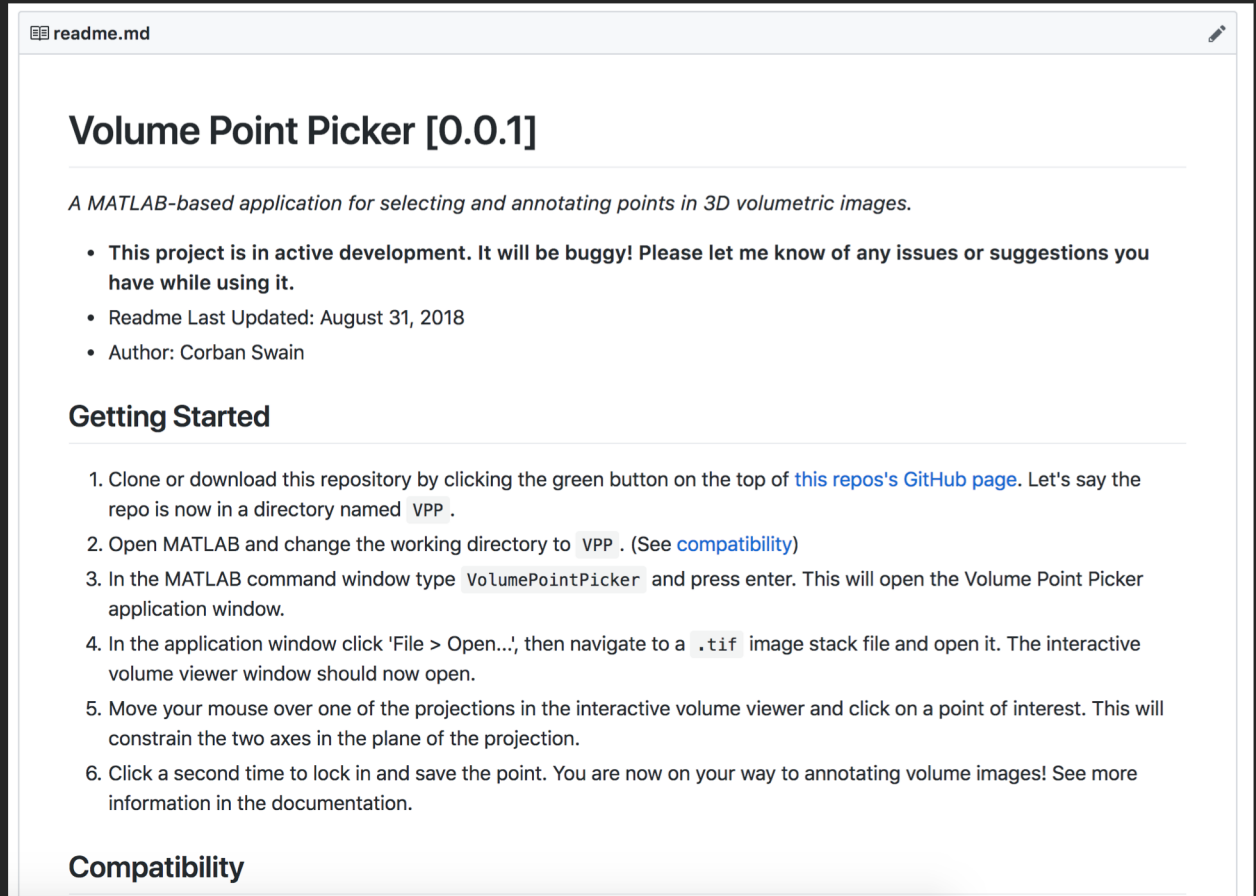
```
>>> import seaborn as sns
>>> iris = sns.load_dataset("iris")
>>> species = iris.pop("species")
>>> g = sns.clustermap(iris, dgline_kws=dict(linewidths=1.5, colors=(0.2, 0.2, 0.4)))
```



GitHub is the **platform for software** to be released.

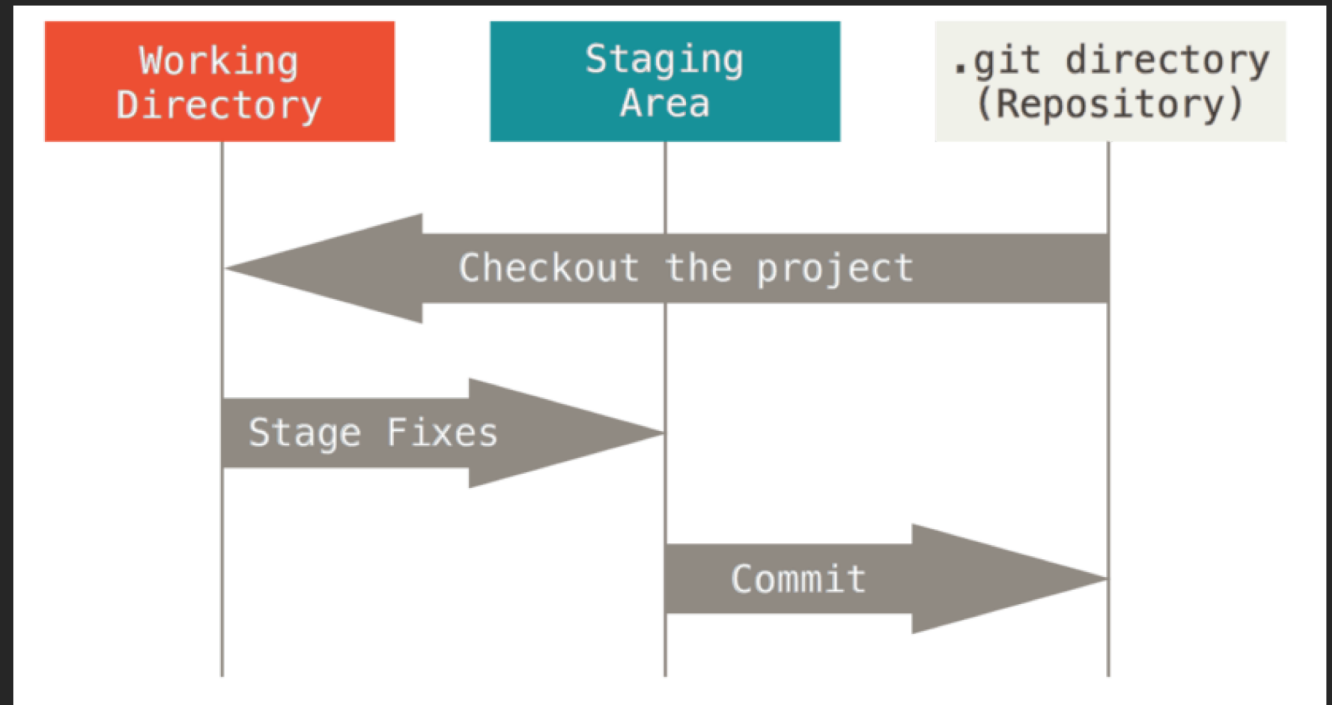
“Branches”

An image annotation application can be both released to others in the lab and updated simultaneously.



Exercise 1: Creating A Repository

- See Your Handouts
 1. Set Configuration
 2. Initialize Repository
 3. Add and edit files
 4. Commit changes
 5. Publish Online



Exercise 2: **Collaborating on a Project** - Calculator

```
(+ 1 2) = 2
(* 5 5) = 25
(+ 10 (- 5 6)) = 9
```

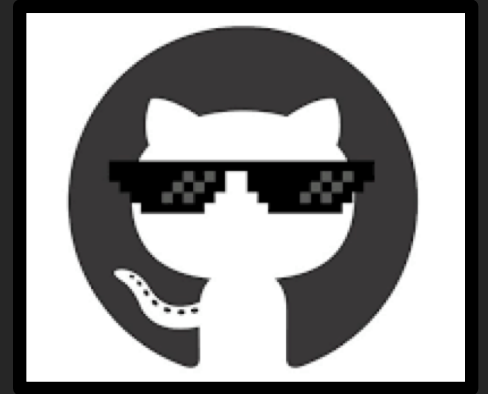
- See Your Handouts
 1. Fork Repository Online
 2. Clone to your Computer
 3. Create a feature branch
 4. Make changes and commit them
 5. Publish Online
 6. Create Pull Request

More Advanced (*But Useful*) Topics

- Ignoring Specific Files
- Co-managing Code with Big Files (e.g. images)
- Nesting Repositories
- Handling Merge Conflicts

Resources

- Cheat Sheet Passed Out
- Pro Git Book (<https://git-scm.com/book/en/v2>)
- Stack Exchange: copy error messages
- Command Line: `$ man git <verb>`
- Start Version Controlling your code today!
 - *Exercise 3 to come*



References

- https://www.planetquark.com/2011/06/24/best-practices-for-file-names/#.W59yK_5Kjxs
- <https://thenextweb.com/security/2018/03/02/how-github-braved-the-worlds-largest-ddos-attack/>