THE CARPENTRIES

Version Control with Git

Imperial College London
14.11.19

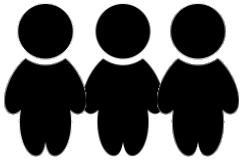
Instructor: Lucy
Helpers: Santiago and Amit
Slides: lucydot.github.io/slides/

What is a version control system?

Version control systems keep track of every change to a file over time so that earlier versions can be restored ⟲

What are the features of Git?

- **You can compare between different versions of your project**
- **There is a written log of the changes made**

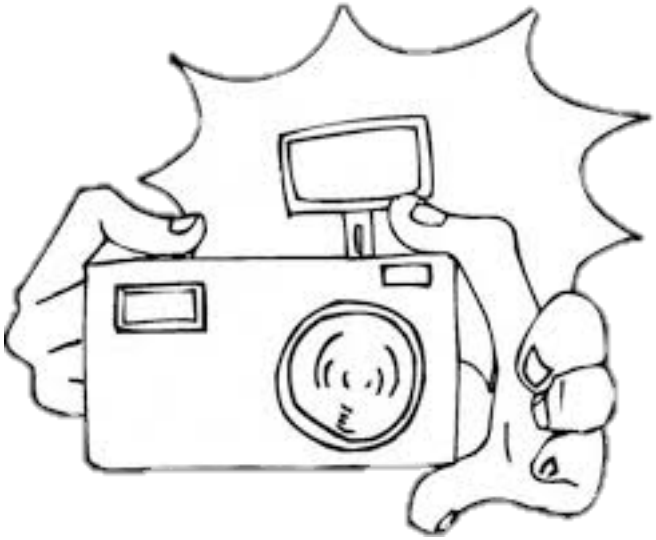


- **There are merge tools if projects diverge**
- **You can see who made which changes and when**

- **You can share your work on GitHub or GitLab**
- **Your repository is backed up**

Commit

Snapshot of your project at a particular point in time



Repository

The history of all your project's commits

Outline

Configuring Git
- ***git config***

Creating a repository
- ***git init, git status***

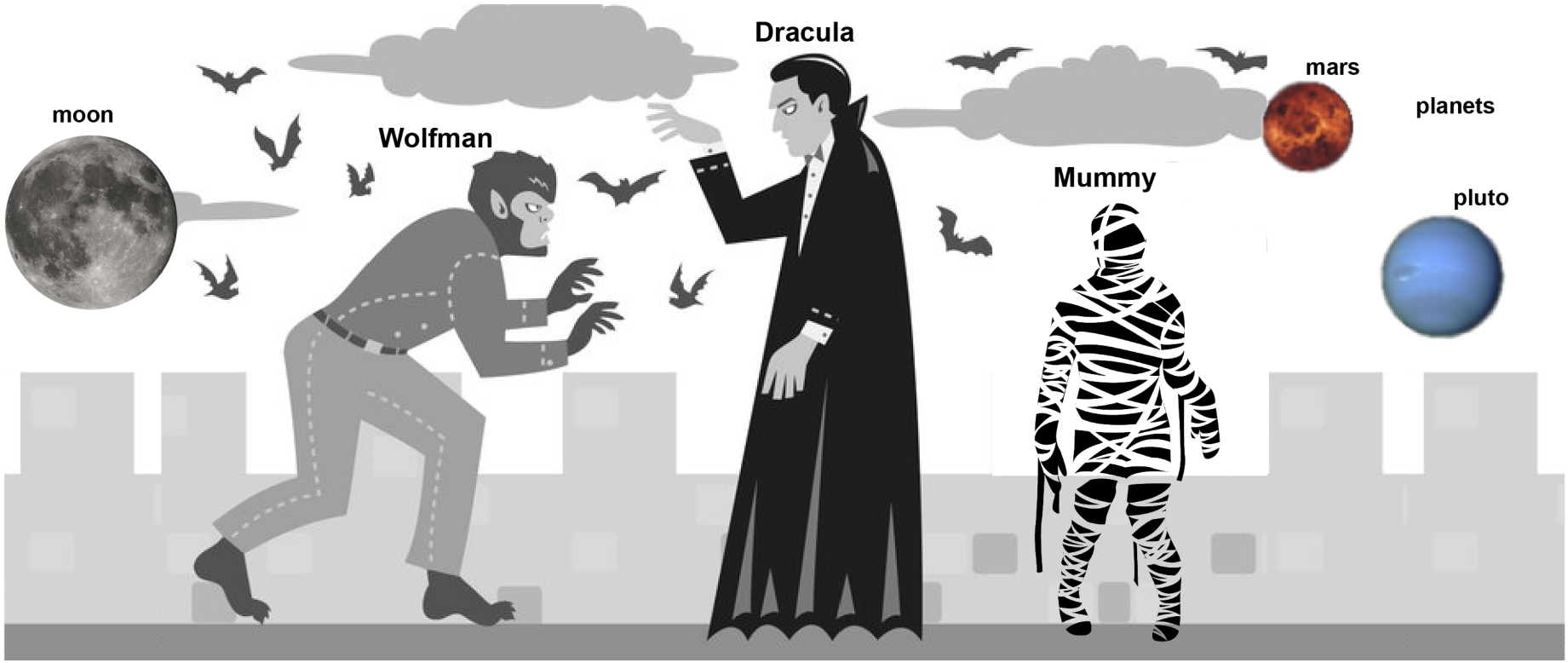
Tracking the changes to your files
- ***git add, git commit, git log***

Exploring your project's history
- ***git diff, git show, git checkout***

Sharing your work with others
- ***git remote, git push, git pull***

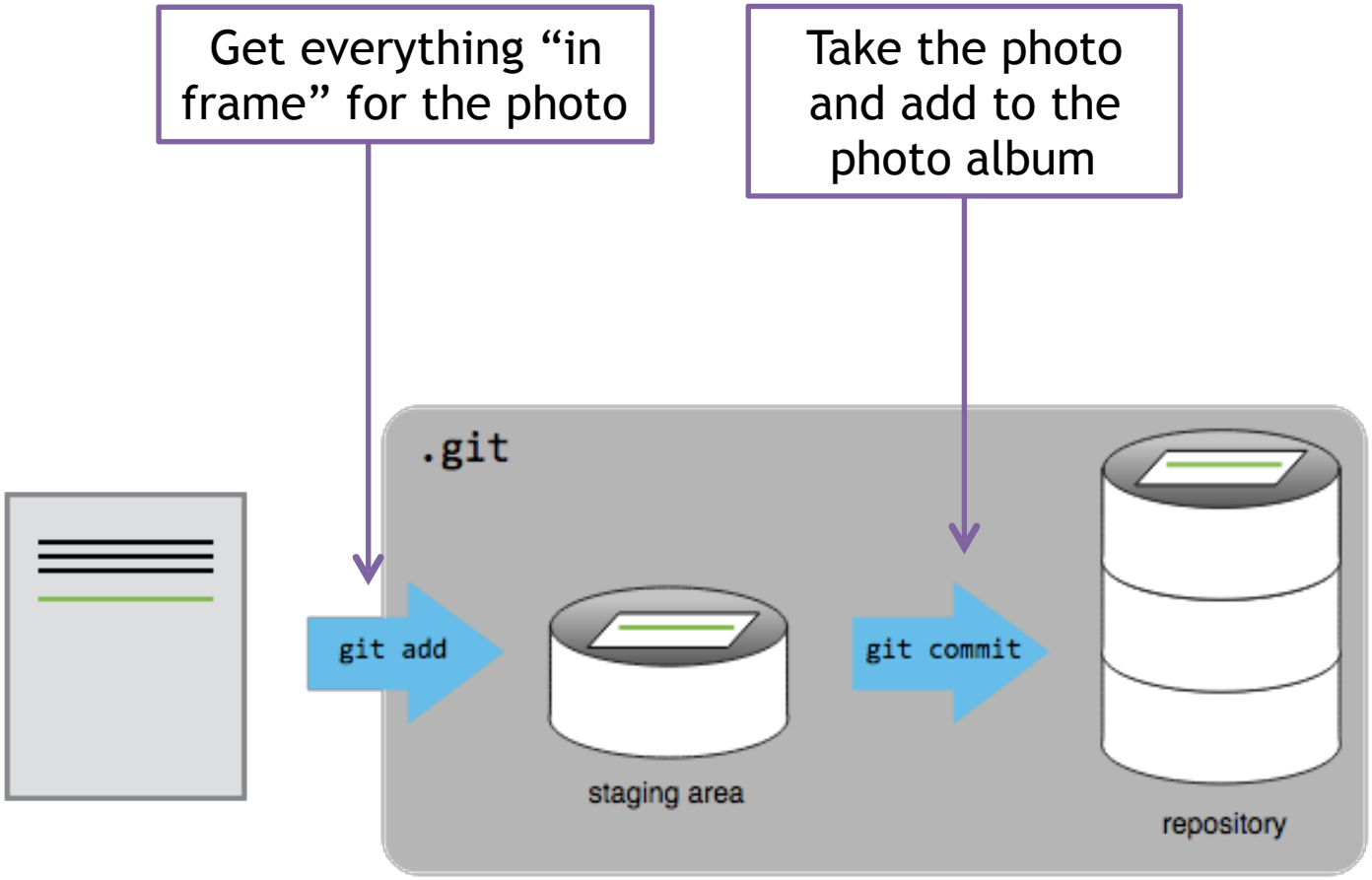
Collaborating with others
- ***git clone***

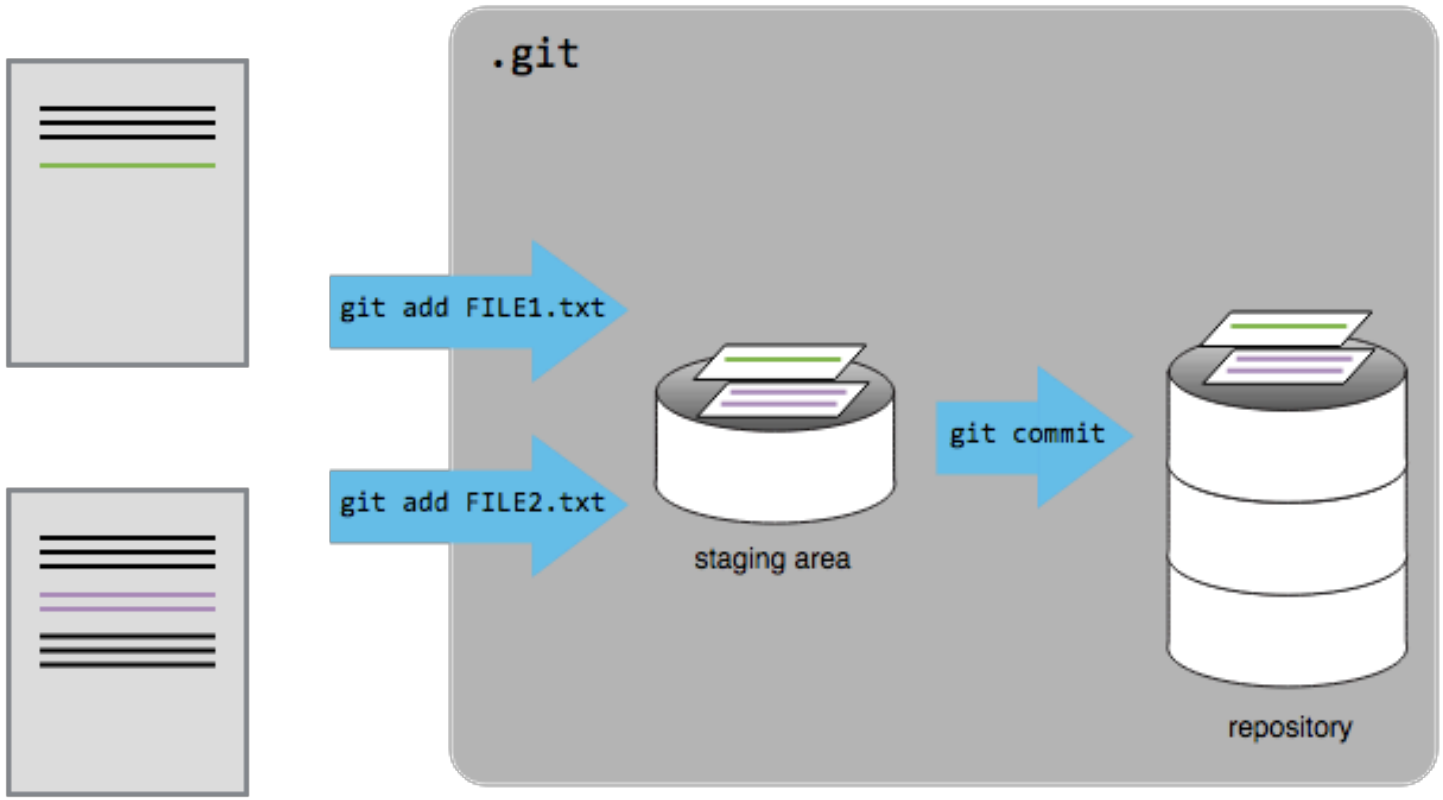
Universal Missions

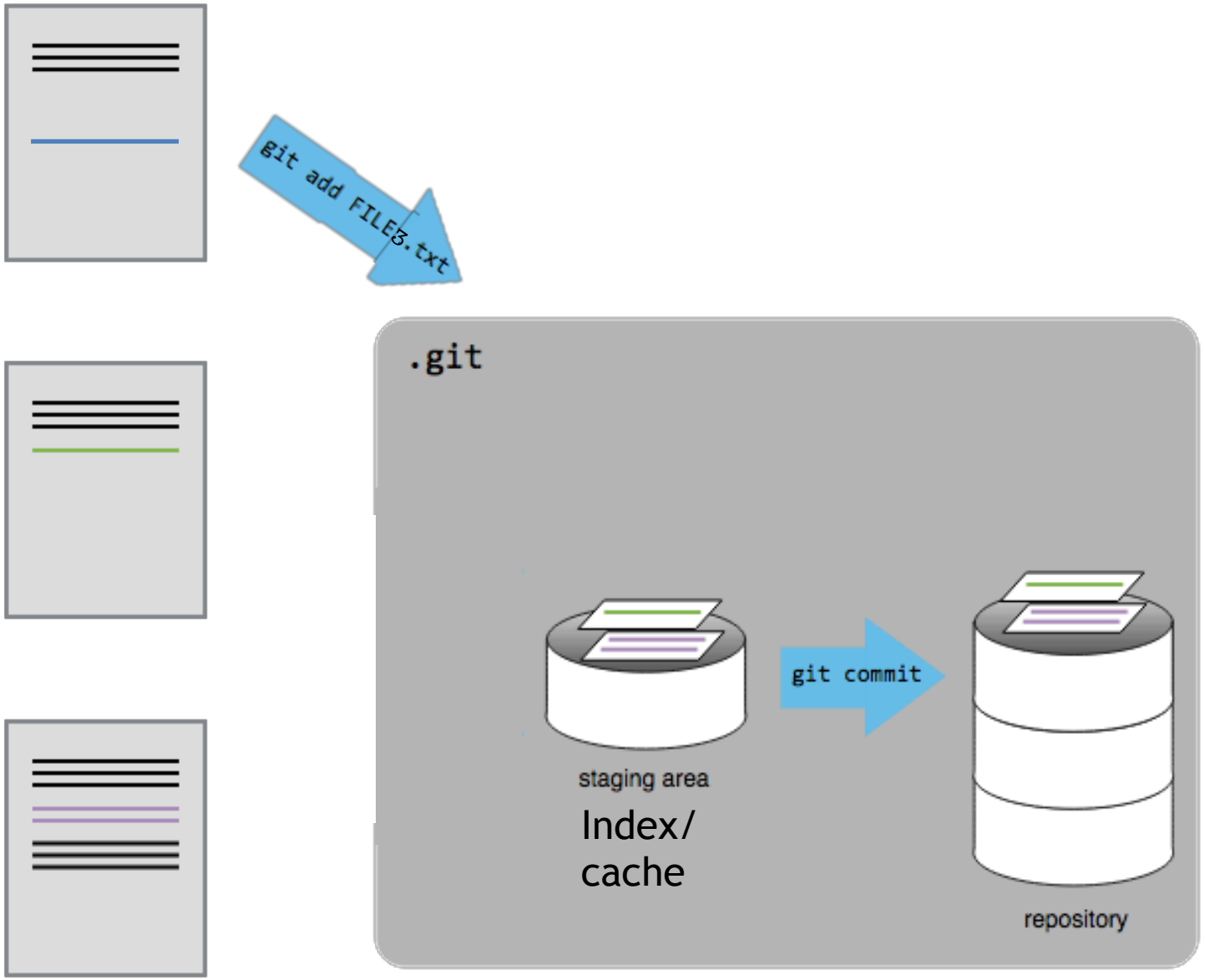


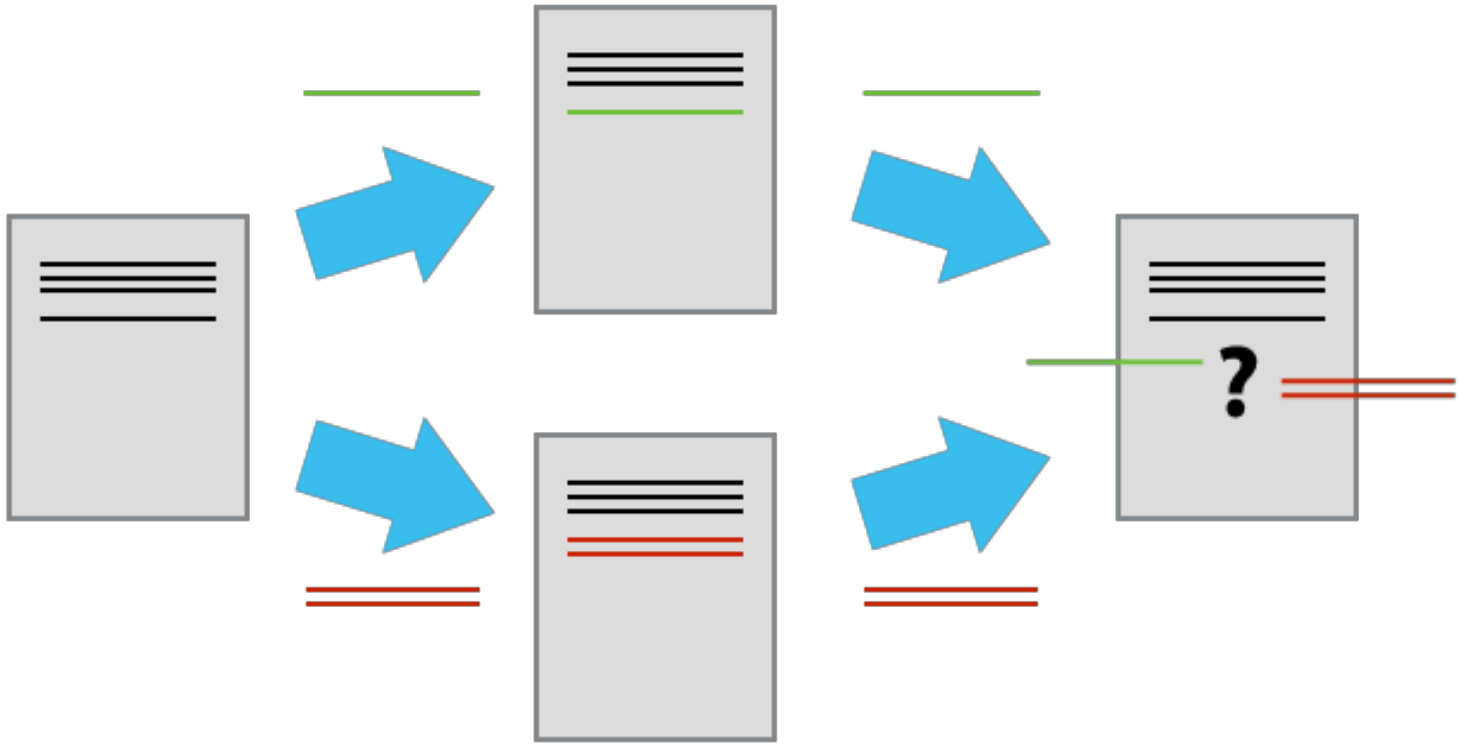
https://commons.wikimedia.org/wiki/File:Planets_are_us.png
https://img00.deviantart.net/95f6/i/2009/156/f/8/werewolf_vs_dracula_by_b_maze.jpg
https://commons.wikimedia.org/wiki/File:Mummy_icon_-_Noun_Project_4070.svg
https://commons.wikimedia.org/wiki/File:Lune_ico.png

Wolfman and Dracula have been hired by Universal Missions to investigate if it is possible to set up a new base on Mars.


Get everything “in frame” for the photo
Take the photo and add to the photo album
.git
git add
staging area
git commit
repository


.git
git add FILE1.txt
git add FILE2.txt
staging area
git commit
repository


git add FILE3.txt
.git
staging area
Index/
cache
git commit
repository



Basic collaboration workflow

Update your local repo	git pull origin master
Make your changes and stage them	git add
Commit your changes	git commit -m
Upload the changes to GitHub	git push origin master

The owner (who created the repository)

The collaborator

Adds collaborator via GitHub

Accepts invitation (https://github.com/owner/repository/invitations)

Clones onto local machine

Makes changes and pushes to GitHub remote (*git add*, *git commit*, *git push origin master*)

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The collaborator

Adds collaborator via GitHub

Accepts invitation (https://github.com/owner/repository/invitations)

Clones onto local machine

Makes changes and pushes to GitHub remote (*git add*, *git commit*, *git push origin master*)

Makes changes (to same line as collaborator) and tries to push to GitHub remote (*git add*, *git commit*, *git push origin master*) **ERROR**

Pulls from GitHub remote (*git pull origin master*)

AUTO-MERGE FAILED

Fixes conflict in file and pushes merged file to GitHub remote (*git add*, *git commit*, *git push origin master*)

Github is used for all sorts

CV

eg: https://github.com/bbrattoli/bbrattoli.github.io

Websites

eg: https://github.com/kbroman/kbroman.github.io

Teaching

eg: https://github.com/aronwalsh

Publishing

eg: https://joss.theoj.org/papers/10.21105/joss.01824

Summary

Configuring Git

- ***git config***

Creating a repository

- ***git init, git status***

Tracking the changes to your files

- ***git add, git commit, git log***

Exploring your project's history

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Sharing your work with others

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Collaborating with others

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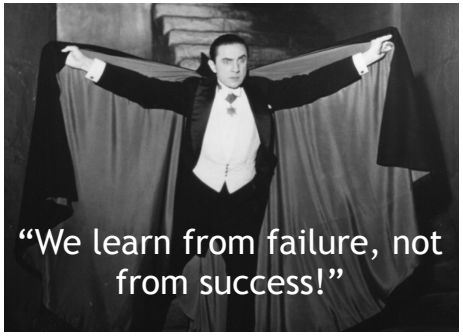
slides: lucydot.github.io/slides/

Next, you could…

- Create a repository for your code and publish it using GitHub
- Use Git to version control your next paper (please encourage your colleagues to come to the next software carpentry sessions)
- Signup for free private GitHub repositories or use Imperial GitHub Enterprise (github.ic.ac.uk)
- Learn about *branching*
- Try out a Git GUI: http://git-scm.com/downloads/gui
- Attend a research computing drop-in session (Tuesdays 2-4pm)

9am start tomorrow: PYTHON