

Introduction to programming

Lecture 4:

- GitHub

MCNB - Winter semester 2025/2026

Next lecture (November 11) **online!**

<https://fu-berlin.webex.com/meet/prs8468ox43645>

Coin throw practice (10 minutes)

Find the mistake in the code below.

We're trying to simulate 20 coin throws.

If a random number ranging between 0 and 1 is lower or equal 0.5, the coin shows “heads”.

If it's higher than 0.5, the coin shows “tails”.

```
coin_flip_results = cell(0);  
for i=1:20  
    if rand(1) <= .5  
        coin_flip_results{end+1} = 'heads';  
    elseif rand(1) > .5  
        coin_flip_results{end+1} = 'tails';  
    end  
end
```

Do you get 20 “heads” or “tails”? If not, why not?

GitHub

GitHub

What is GitHub?: GitHub is a collaboration platform that uses [Git](#) for versioning. It is the most popular platform to store, share, and contribute to software.

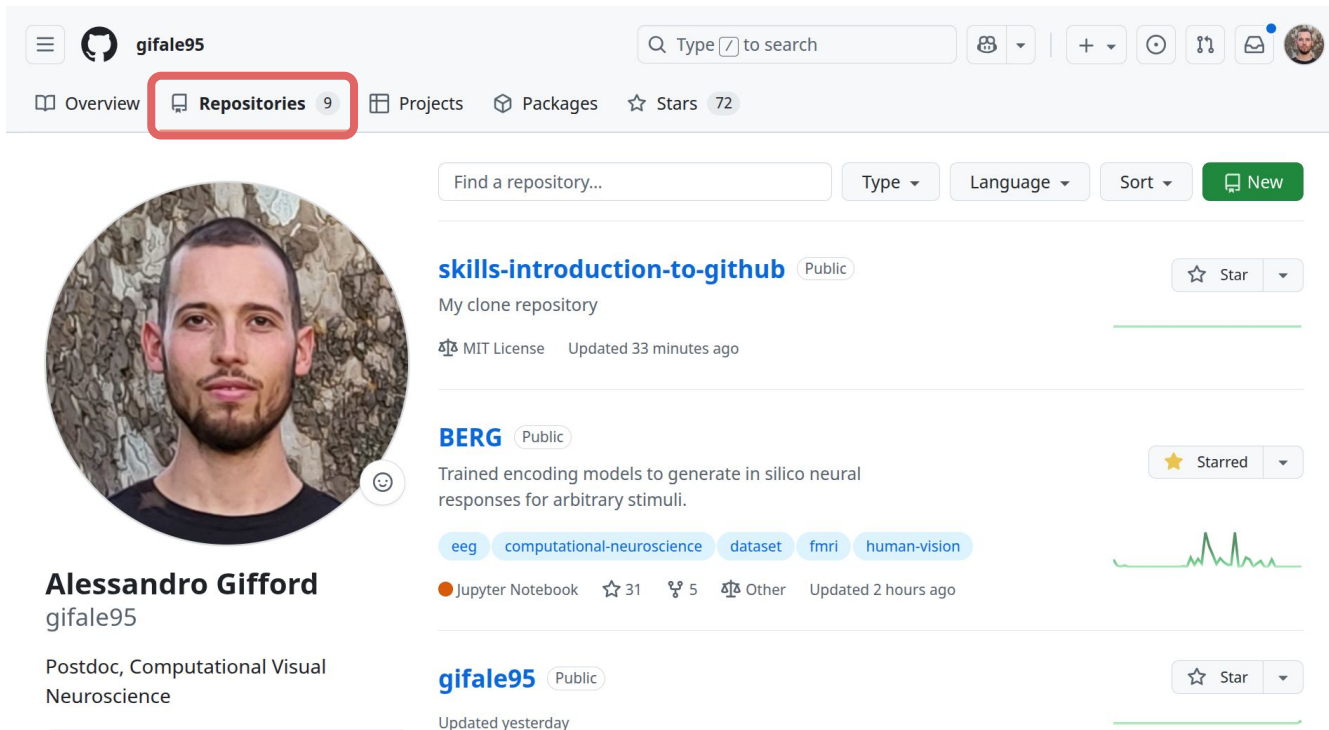
Version control: is the practice of tracking and managing changes to a file or set of files over time, allowing users to collaborate, recall specific versions later, and revert to previous states.

Git versioning: <https://www.youtube.com/watch?v=OqmSzXDrJBk&list=LL&index=1>



Repositories

What is a repository?: A [repository](#) is a project containing files and folders. A repository tracks versions of files and folders. For more information, see "[About repositories](#)" from GitHub Docs.

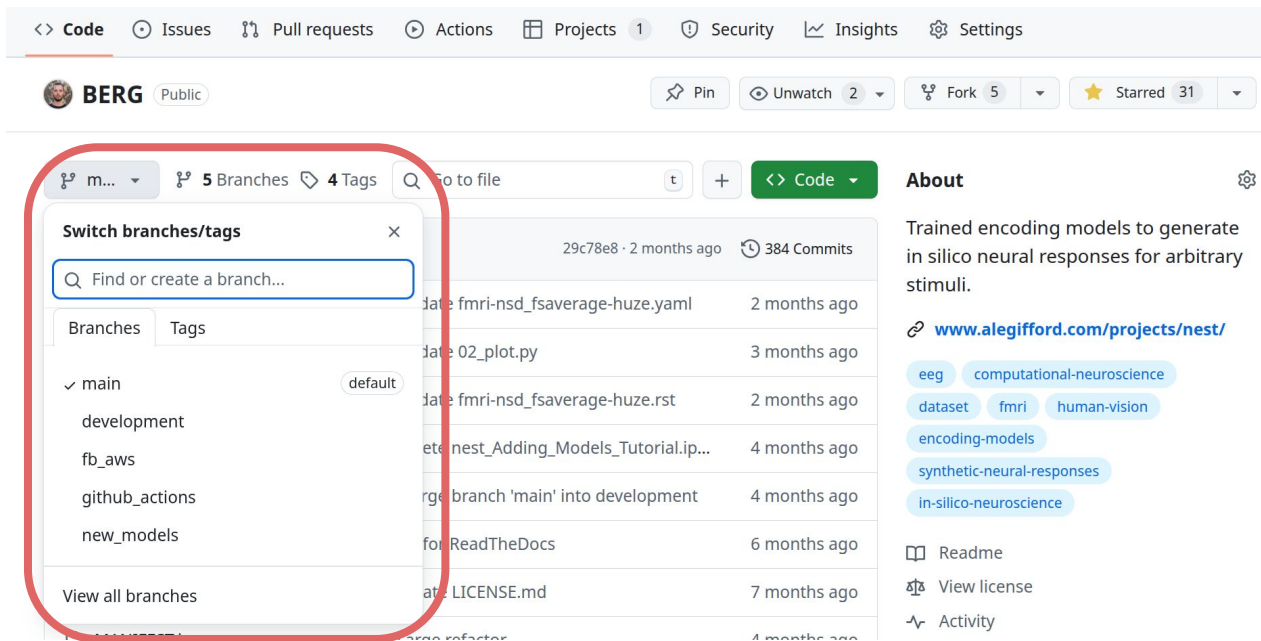


The screenshot shows the GitHub profile of user **gifale95**. The **Repositories** tab is highlighted with a red box. The profile includes a circular profile picture of a man with a beard, the name **Alessandro Gifford**, and the username **gifale95**. Below the name is the bio: "Postdoc, Computational Visual Neuroscience". The repository list shows three items:

- skills-introduction-to-github** (Public): "My clone repository", MIT License, Updated 33 minutes ago. It has a "Star" button.
- BERG** (Public): "Trained encoding models to generate in silico neural responses for arbitrary stimuli." It has tags: **eeg**, **computational-neuroscience**, **dataset**, **fmri**, **human-vision**. It also has tags: **Jupyter Notebook**, **31** stars, **5** forks, and **Other**. It was updated 2 hours ago. It has a "Starred" button and a green waveform icon.
- gifale95** (Public): Updated yesterday. It has a "Star" button.

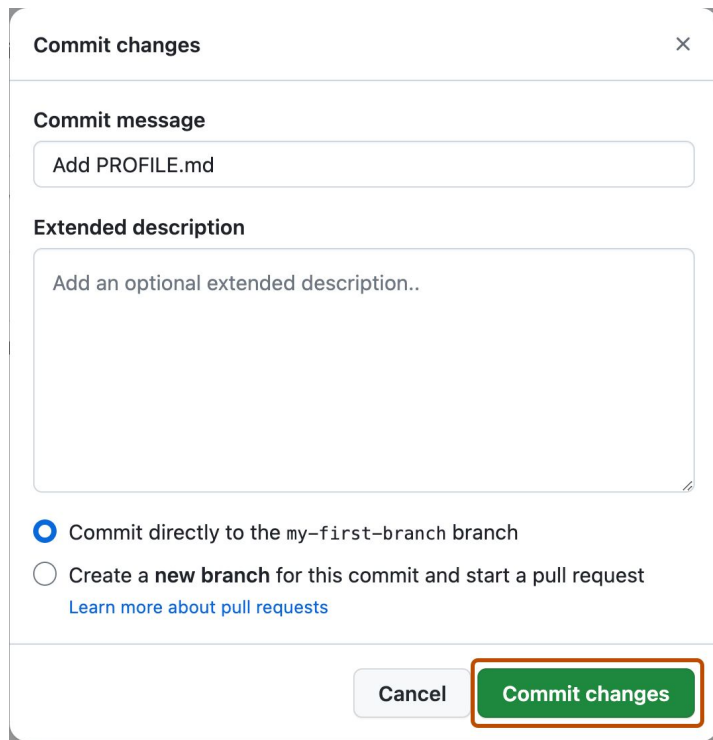
Branches

What is a branch?: A [branch](#) is a parallel version of your repository. By default, your repository has one branch named *main* and it is considered to be the definitive branch. Creating additional branches allows you to copy the *main* branch of your repository and safely make any changes without disrupting the main project. For more information, see "[About branches](#)".



Commit changes

What is a commit?: A [commit](#) is a set of changes to the files and folders in your project. A commit exists in a branch. For more information, see "[About commits](#)".



The screenshot shows a 'Commit changes' dialog box with a close button (X) in the top right corner. It contains two text input fields: 'Commit message' with the text 'Add PROFILE.md' and 'Extended description' with the placeholder text 'Add an optional extended description..'. Below these fields are two radio button options: 'Commit directly to the my-first-branch branch' (which is selected) and 'Create a new branch for this commit and start a pull request'. A link 'Learn more about pull requests' is located below the second option. At the bottom right, there are two buttons: 'Cancel' and 'Commit changes', with the latter highlighted by an orange border.

Commit changes

Commit message

Add PROFILE.md

Extended description

Add an optional extended description..

☒ Commit directly to the my-first-branch branch

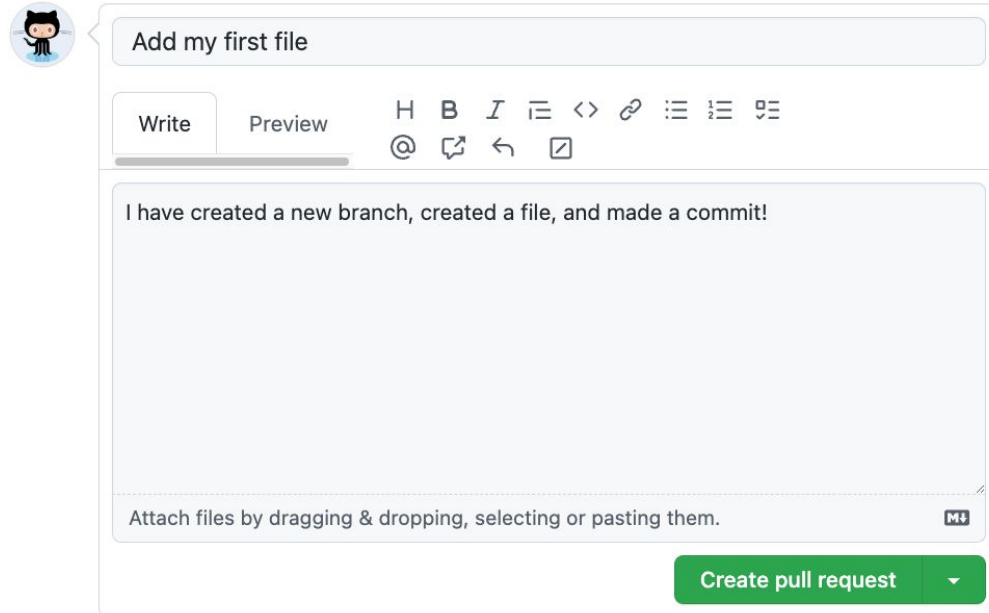
☐ Create a new branch for this commit and start a pull request

[Learn more about pull requests](#)

Cancel Commit changes

Pull requests

What is a pull request?: Collaboration happens on a [pull request](#). The pull request shows the changes in your branch to other people and allows people to accept, reject, or suggest additional changes to your branch. In a side by side comparison, this pull request is going to keep the changes you just made on your branch and propose applying them to the *main* project branch. For more information about pull requests, see "[About pull requests](#)".



The image shows a GitHub pull request creation interface. At the top left is a GitHub Octocat icon. Below it is a text input field with the placeholder text "Add my first file". Below the input field are two tabs: "Write" (active) and "Preview". To the right of the tabs is a rich text editor toolbar with icons for bold (B), italic (I), underline (U), link (link icon), unlink (unlink icon), list (list icon), ordered list (ordered list icon), and quote (quote icon). Below the toolbar is a large text area containing the text "I have created a new branch, created a file, and made a commit!". At the bottom of the text area is a dashed line and the text "Attach files by dragging & dropping, selecting or pasting them." with a small icon of a document with a plus sign. At the bottom right of the form is a green button with the text "Create pull request" and a small downward arrow.

Merges

What is a merge?: A [merge](#) adds the changes in your pull request and branch into the *main* branch. For more information about merges, see "[Merging a pull request](#)".



This branch has no conflicts with the base branch

Merging can be performed automatically.

Merge pull request



You can also [open this in GitHub Desktop](#) or view [command line instructions](#).

Repository README (Markdown)

```
1 # In silico discovery of representational relationships  
  across visual cortex  
2  
3 Here we provide the code to reproduce all results from the  
  paper:</br>  
4 "[In silico discovery of representational relationships  
  across visual cortex][paper doi]"</br>  
5 Alessandro T. Gifford, Maya A. Jastrzębowska, Johannes J.D.  
  Singer, Radosław M. Cichy</br>  
6 _Nature Human Behavior_, 2025  
7  
8  
9  
10 ## 📄 Paper abstract  
11  
12 Human vision is mediated by a complex interconnected  
  network of cortical brain areas that jointly represent  
  visual information. Although these areas are increasingly  
  understood in isolation, their representational  
  relationships remain unclear. Here we developed relational  
  neural control and used it to investigate the  
  representational relationships for univariate and  
  multivariate functional magnetic resonance imaging (fMRI)  
  responses of areas across the visual cortex. Through  
  relational neural control, we generated and explored in  
  silico fMRI responses for large numbers of images,  
  discovering controlling images that align or disentangle  
  responses across areas, thus indicating their shared or  
  unique representational content. This revealed a typical  
  network-level configuration of representational  
  relationships in which shared or unique representational  
  content varied on the basis of cortical distance,  
  categorical selectivity and position within the visual  
  hierarchy. Closing the empirical cycle, we validated the in  
  silico discoveries on in vivo fMRI responses from  
  independent participants. Together, this reveals how visual  
  areas jointly represent the world as an interconnected
```



In silico discovery of representational relationships across visual cortex

Here we provide the code to reproduce all results from the paper:

"[In silico discovery of representational relationships across visual cortex](#)"

Alessandro T. Gifford, Maya A. Jastrzębowska, Johannes J.D. Singer, Radosław M. Cichy



Nature Human Behavior, 2025









Paper abstract


Human vision is mediated by a complex interconnected network of cortical brain areas that jointly represent visual information. Although these areas are increasingly understood in isolation, their representational relationships remain unclear. Here we developed relational neural control and used it to investigate the representational relationships for univariate and multivariate functional magnetic resonance imaging (fMRI) responses of areas across the visual cortex. Through relational neural control, we generated and explored in silico

Repository real example (I)

 gifale95 / RNC











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 **RNC** Public

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[m...](#) [1 Branch](#) [2 Tags](#) [Code](#)

 **gifale95** Added paper info 2ec0920 · 4 months ago 55 Commits

 00_generate_insilico_fmri_respo...	NEST to BERG	4 months ago
 01_in_silico_fmri_encoding_accu...	NEST to BERG	4 months ago
 02_univariate_rnc	Revised paper	6 months ago
 03_generative_univariate_rnc	NEST to BERG	4 months ago
 04_multivariate_rnc	Revised paper	6 months ago
 05_multivariate_rnc_retinotopy	NEST to BERG	4 months ago
 06_rnc_categorical_slectivity	Revised paper	6 months ago

About

Algorithms to investigate (through neural control) the representational relationships between univariate or multivariate in silico fMRI responses of multiple visual areas of the brain.

www.alegifford.com/projects/rnc/

deep-neural-networks

eeg

computational-neuroscience

fmri

human-vision

neural-control



retinotopic-cortex







mid-level-vision

encoding-models


[Readme](#)

Repository real example (II)

 courtois-neuromod / **algonauts_2025.competitors**


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 **algonauts_2025.competitors** Public

[Edit Pins](#) [Watch 5](#) [Fork 18](#) [Starred 56](#)

[m...](#) [8 Branches](#) [0 Tags](#) [+](#) [Code](#)

 **bpinsard** [fix DATS dates](#) ✖

96750e7 · last month  85 Commits

 .datalad	add rewrite rule for https submodule d...	10 months ago
 .github/workflows	set wanted public remotes	3 months ago
 code	Added phase 2	3 months ago
 fmri	add transcripts and fmri samples	4 months ago
 media	Updated banner	10 months ago
 stimuli	add transcripts and fmri samples	4 months ago
 tutorial	Added benchmark info	3 months ago

About



Data and code for the Algonauts Project 2025 challenge.







[algonautsproject.com/](#)

[challenge](#) [artificial-intelligence](#) [computational-neuroscience](#) [fmri](#) [encoding-models](#) [naturalistic-movies](#) [multimodal-stimulation](#)


[Readme](#) [CC0-1.0 license](#) [Activity](#) [Custom properties](#) [56 stars](#)





Repository real example (III)






 gifale95 / **BERG**



 |  |  |  |  








[Code](#) [Issues](#) [Pull requests](#) [Actions](#) [Projects](#) [1](#) [Security](#) [Insights](#) [Settings](#)

 **BERG** Public

 Pin  Unwatch **2**  Fork **5**  Starred **31**

 m...  **5** Branches  **4** Tags   Code

 **gifale95** Update README.md 29c78e8 · 2 months ago  **384** Commits




 berg	Update fmri-nsd_fsaverage-huze.yaml	2 months ago
 berg_creation_code	Update 02_plot.py	3 months ago
 source	Update fmri-nsd_fsaverage-huze.rst	2 months ago
 tutorials	Delete nest_Adding_Models_Tutorial.ip...	4 months ago
 .gitignore	Merge branch 'main' into development	4 months ago
 .readthedocs.yaml	Fix for ReadTheDocs	6 months ago
 LICENSE.md	Create LICENSE.md	7 months ago

About

Trained encoding models to generate in silico neural responses for arbitrary stimuli.

www.alegifford.com/projects/nest/

eeg computational-neuroscience dataset fmri human-vision encoding-models synthetic-neural-responses in-silico-neuroscience

 Readme  View license  Activity

Assignment 4

Assignment 4a: GitHub Tutorials

Create a [GitHub account](#).

Complete the following [tutorials](#):

- <https://github.com/skills/introduction-to-github>
- <https://github.com/skills/communicate-using-markdown>

Send me the [screenshot](#) of the final README of each tutorial:

- Before the next lecture on November 11.
- Include your name and the course number (127050) in the email subject.
- alessandro.gifford@gmail.com

Assignment 4b: Create your own GitHub course repo

Create a **repository** of this course, and make it public.

Add to the repository the ***.m files** of the previous Assignments 2-3.

Note: you can also do this **locally** from your computer by using the terminal (for this, see the “*Git Tutorial*” and “*Git and GitHub*” sections of [this page](#)), or by using the GitHub extensions of VS Code.

Send me the **link** of your public repository:

- Before the next lecture on November 11.
- Include your name and the course number (127050) in the email subject.
- alessandro.gifford@gmail.com