

## Jupyter Notebook + Google Colaboratory Instructions

This document provides instructions for generating designs using Jupyter Notebook (.ipynb) files hosted on Google Colaboratory (please note a google account is required). This allows you to run the code without the need to download or install any software. Please follow the instructions below.

### Test Data

To follow the tutorial you should have downloaded the test files provided on the GitHub repo <https://github.com/ElleBowler/optimising-sample-designs>. (Please see the section “Running Jupyter demo files” in the documentation). Once downloaded, please save and unzip the folder in your chosen directory.

We will see how these files are used as we go through the notebooks, briefly we have:

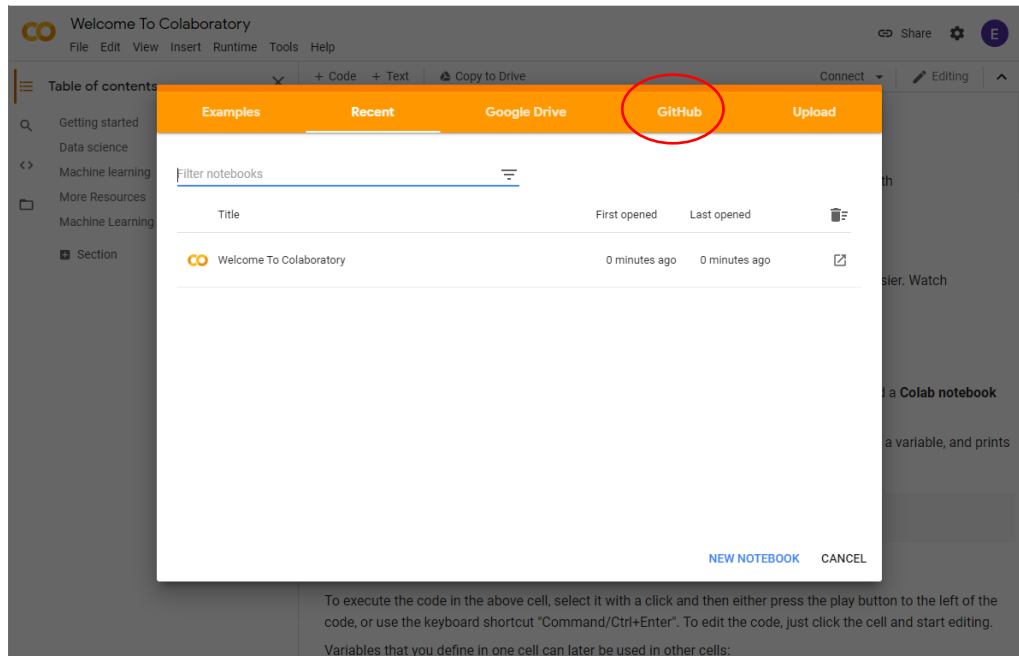
- InvalidAreasMask.tif: *A binary map showing valid (coded with 1) and invalid (coded with 0) areas in the landscape*
- InvalidAreasMask\_updated.tif: *An updated version of InvalidAreasMask.tif, with extra invalid areas added. This is used to demonstrate adapting designs*
- HabitatMap.tif: *A two class habitat map (with non-habitat = 0, habitat = 1). This was used to generate the two fragmentation metric maps:*
  - DistanceToEdgeLog2.tif: *A log2 scaled distance to nearest habitat edge map*
  - FragmentAreaLog10.tif: *A log10 scaled fragment area map*

**Please Note:** All files are in georeferenced tiff format, and information on projection and resolution are used to output results in longitude/ latitude coordinates. This is important to know when inputting your own study site.

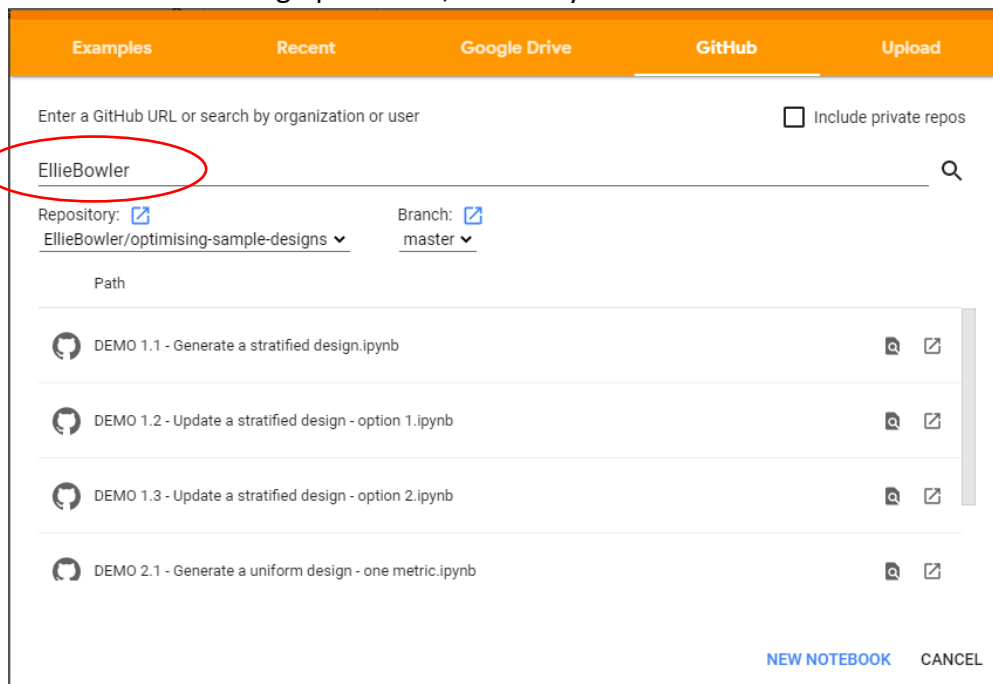
## Google Colaboratory

Now we will open up our notebook files in Google Colaboratory. **Please Note:** It is best to use Google Chrome browser, and log in to your google account.

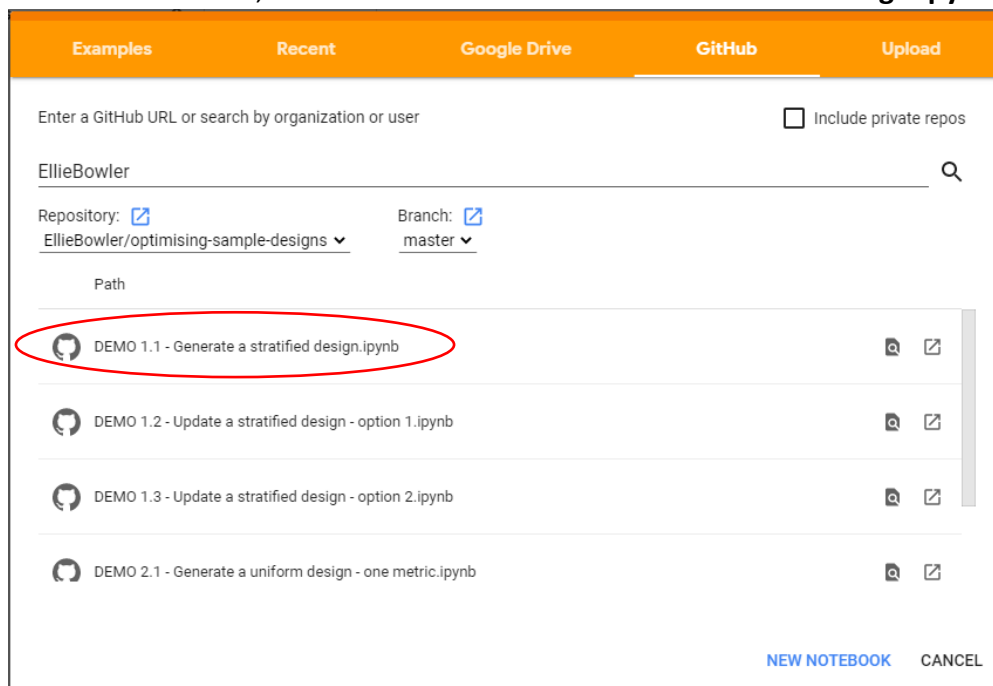
1. First open up Colab via this link: <https://colab.research.google.com/>  
You should see the following pop up. Please click on the **GitHub** tab, circled in red.



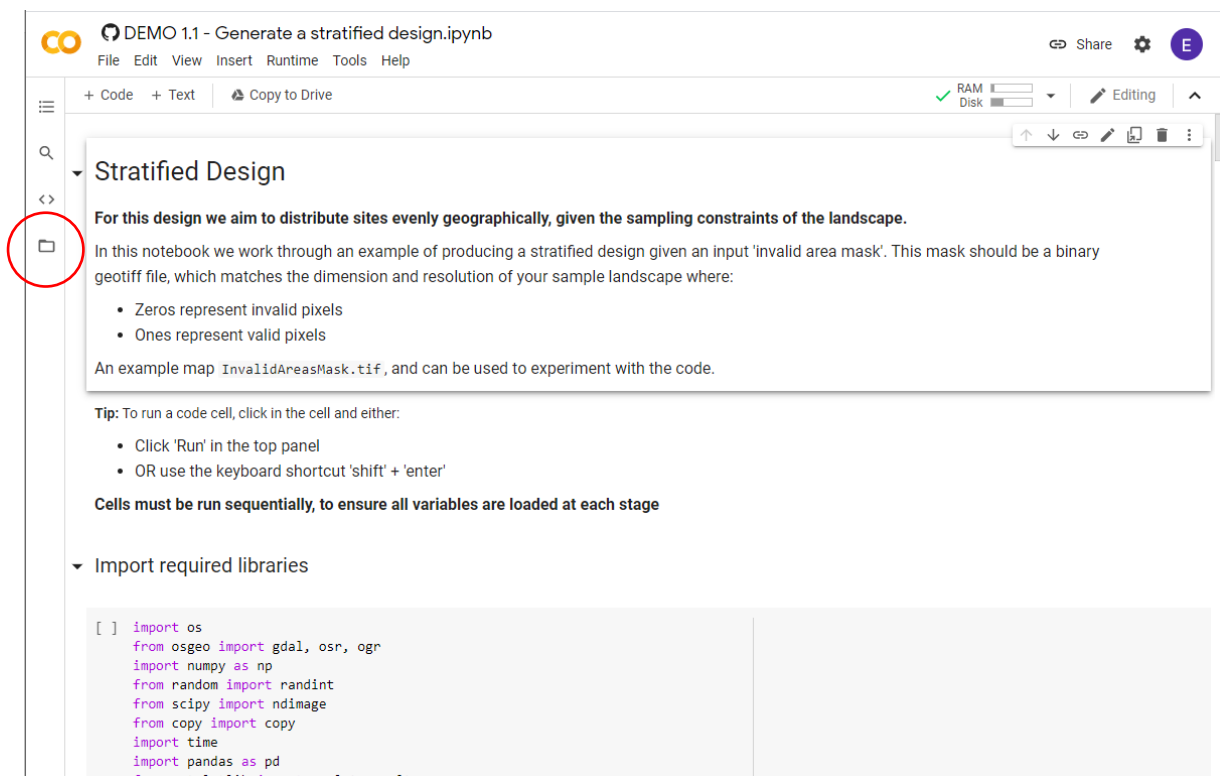
2. Under the top line 'Enter a GitHub URL or search by organization or user', enter the following github repo link <https://github.com/EllieBowler/optimising-sample-designs>. If this does not bring up the files, search by user instead with the name EllieBowler.



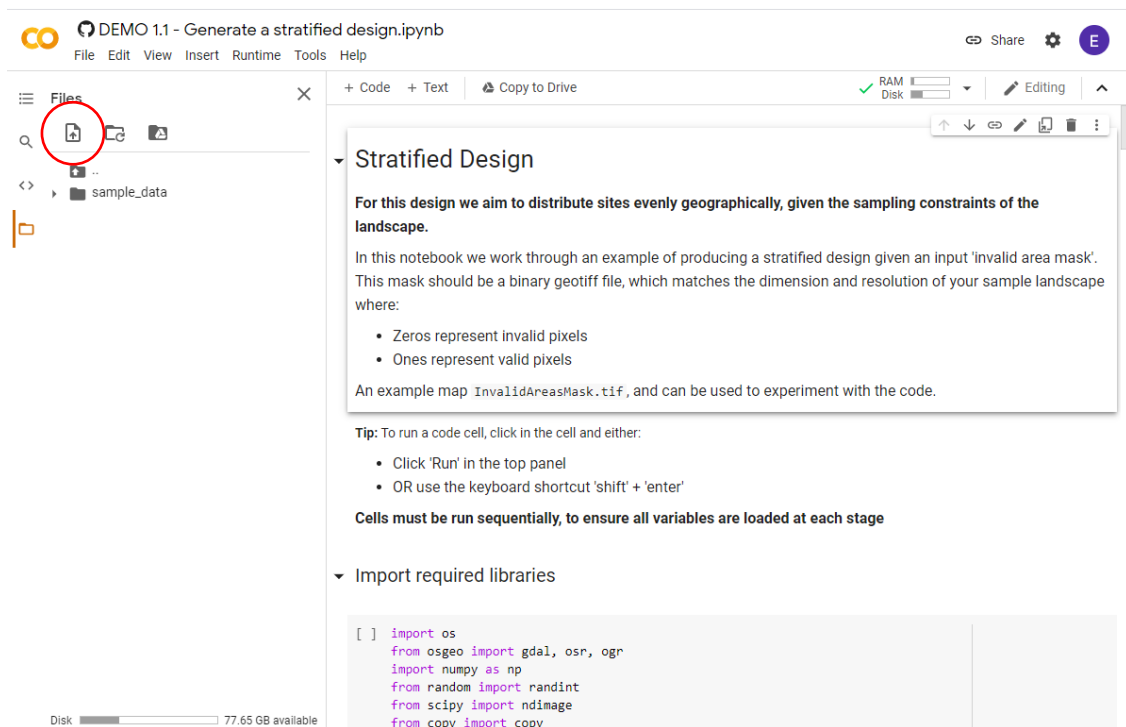
3. All jupyter notebooks (with file extension .ipynb) should appear listed as below. For this demonstration, **click on DEMO 1.1 – Generate a stratified design.ipynb**.



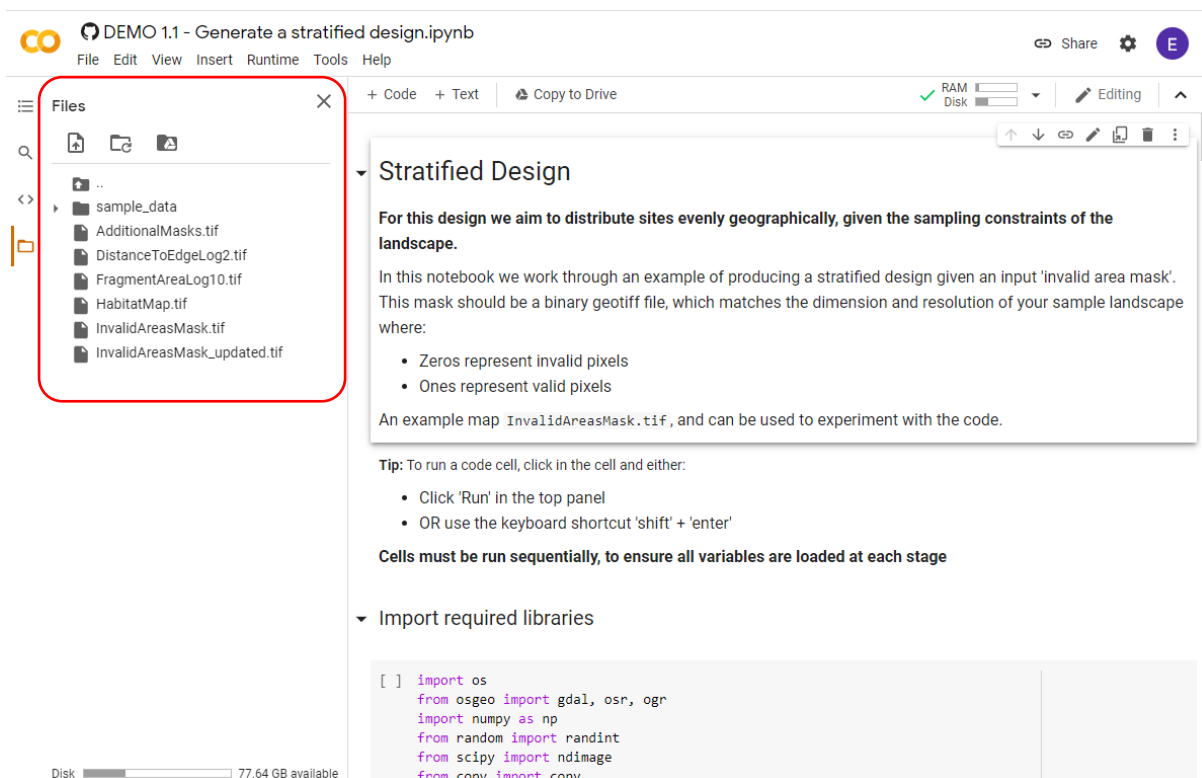
4. You should see the following page. This is the notebook for the Stratified Design. To run the code, we will need to **upload our test files**. To do this click on the folder symbol on the left of the notebook, circled in red.



5. A panel will open with a 'sample\_data' folder. From here **click on the upload files button** circled in red below.



6. You can now **upload your files to Google Colaboratory**. Please copy all test files across, and **ensure they are in the same directory as the sample\_data folder** as shown below.



## 7. You should now be able to run through the notebook!

Instructions are provided within the notebook, please run through each block sequentially. Your results will be generated and saved in a **results** folder, shown in the file panel. You can download these directly from colab and view them in your chosen software.

DEMO 1.1 - Generate a stratified design.ipynb

File Edit View Insert Runtime Tools Help Cannot save changes

Files

- results
  - Stratified\_Design\_Demo
    - 2020\_11\_01\_133140
      - 25site\_strat.csv
      - 25site\_strat.dbf
      - 25site\_strat.shp
      - 25site\_strat.shx
- sample\_data
  - AdditionalMasks.tif
  - DistanceToEdgeLog2.tif
  - FragmentAreaLog10.tif
  - HabitatMap.tif
  - InvalidAreasMask.tif
  - InvalidAreasMask\_updated.tif

Example output:

You should now be able to navigate to your results folder and open the csv file using your preferred software. We can load and print the first few lines of the output here as a quick check...

```
[13] view_csv = pd.read_csv('{} .csv'.format(csv_filename))
```

view\_csv[:10]

	site	longitude	latitude	row	col	sampled
0	1	172.579770	-42.459660	851.0	162.0	0
1	2	172.272434	-42.615860	0.0	726.0	0
2	3	172.308562	-42.419310	110.0	0.0	0
3	4	172.496593	-42.613151	613.0	726.0	0
4	5	172.426787	-42.503273	429.0	316.0	0
5	6	172.645694	-42.566529	1024.0	561.0	0
6	7	172.271129	-42.515642	2.0	355.0	0
7	8	172.468982	-42.418447	550.0	4.0	0
8	9	172.383072	-42.590533	304.0	637.0	0
9	10	172.540071	-42.536928	737.0	446.0	0

In our output csv, the columns consist of:

Disk 77.64 GB available

Once you're happy - test out uploading your own data to generate designs for your study site!