

CNMFE User Guide:

Here are the links for the scripts that you will need to use for this package:

STEP1: Download Packages

Williams lab Guillaume Etter's analysis package:

<https://github.com/etterguillaume/MiniscopeAnalysis>

This package puts together all the other programs into one useable platform. You will be directly interacting with this package.

Motion correction NoRMCorre:

<https://github.com/flatironinstitute/NoRMCorre>

This program will deal with motion correction of the camera. There is an option for Rigid or Non-Rigid motion correction depending on your needs.

CNMFE:

https://github.com/zhoup/CNMF_E

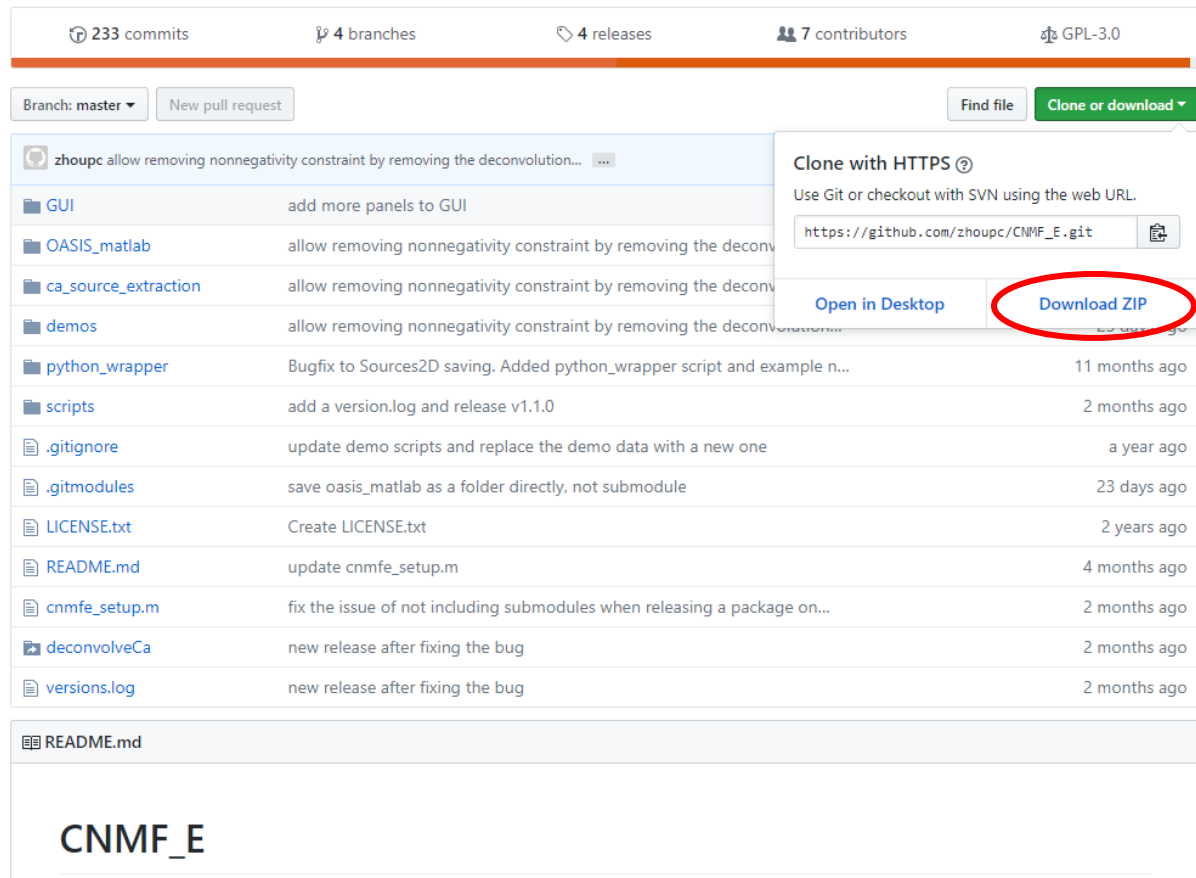
This is your main analysis program which will extract your calcium signal and spatial footprints.

You will require the following packages to run CNMFE:

1. /images/images
2. /shared/optimlib/
3. /signal/signal/
4. /stats/stats/
5. /curvefit/curvefit

From the links above, Download the script packages by clicking the green button on the right-hand side of the screen and selecting “Download ZIP”.

Constrained Nonnegative Matrix Factorization for microEndoscopic data



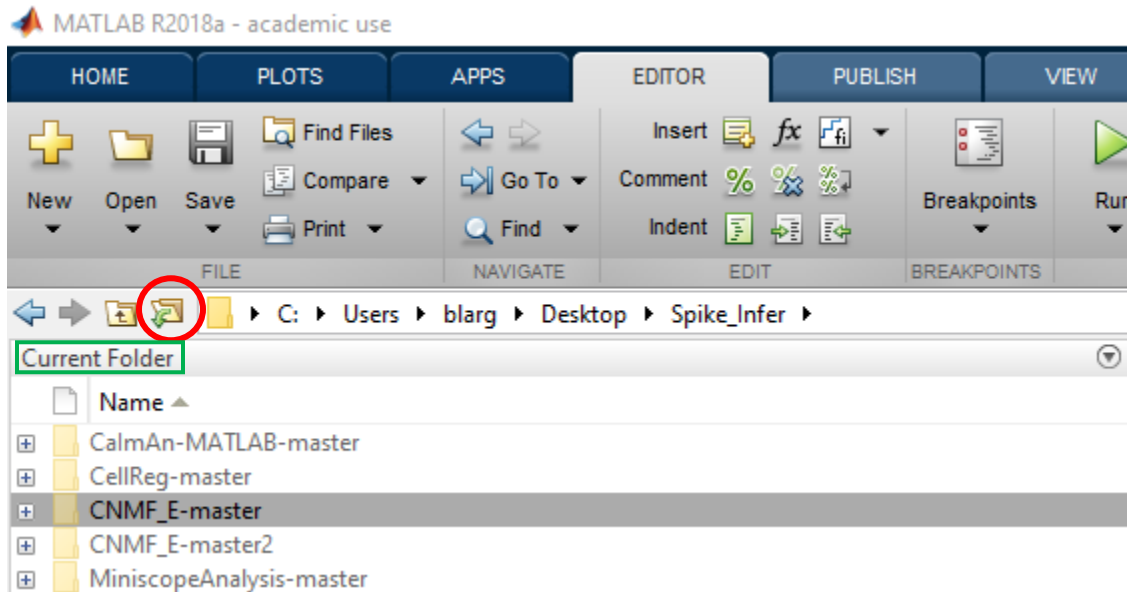
The screenshot shows the GitHub repository page for 'CNMF_E' by user 'zhoupc'. The repository has 233 commits, 4 branches, 4 releases, 7 contributors, and is licensed under GPL-3.0. The 'Clone or download' button is highlighted with a red arrow. The dropdown menu is open, showing the 'Download ZIP' option circled in red. The repository contains several files and folders, including 'GUI', 'OASIS_matlab', 'ca_source_extraction', 'demos', 'python_wrapper', 'scripts', '.gitignore', '.gitmodules', 'LICENSE.txt', 'README.md', 'cnmf_setup.m', 'deconvolveCa', and 'versions.log'. The 'README.md' file is selected, showing the title 'CNMF_E'.

File/Folder	Description	Last Commit
GUI	add more panels to GUI	11 months ago
OASIS_matlab	allow removing nonnegativity constraint by removing the deconvolution...	2 months ago
ca_source_extraction	allow removing nonnegativity constraint by removing the deconvolution...	2 months ago
demos	allow removing nonnegativity constraint by removing the deconvolution...	2 months ago
python_wrapper	Bugfix to Sources2D saving. Added python_wrapper script and example n...	2 months ago
scripts	add a version.log and release v1.1.0	2 months ago
.gitignore	update demo scripts and replace the demo data with a new one	a year ago
.gitmodules	save oasis_matlab as a folder directly, not submodule	23 days ago
LICENSE.txt	Create LICENSE.txt	2 years ago
README.md	update cnmf_setup.m	4 months ago
cnmf_setup.m	fix the issue of not including submodules when releasing a package on...	2 months ago
deconvolveCa	new release after fixing the bug	2 months ago
versions.log	new release after fixing the bug	2 months ago

Once you have the package, you will UnZip the package in a folder of your choice. For ease I suggest putting all the analysis scripts in the same folder.

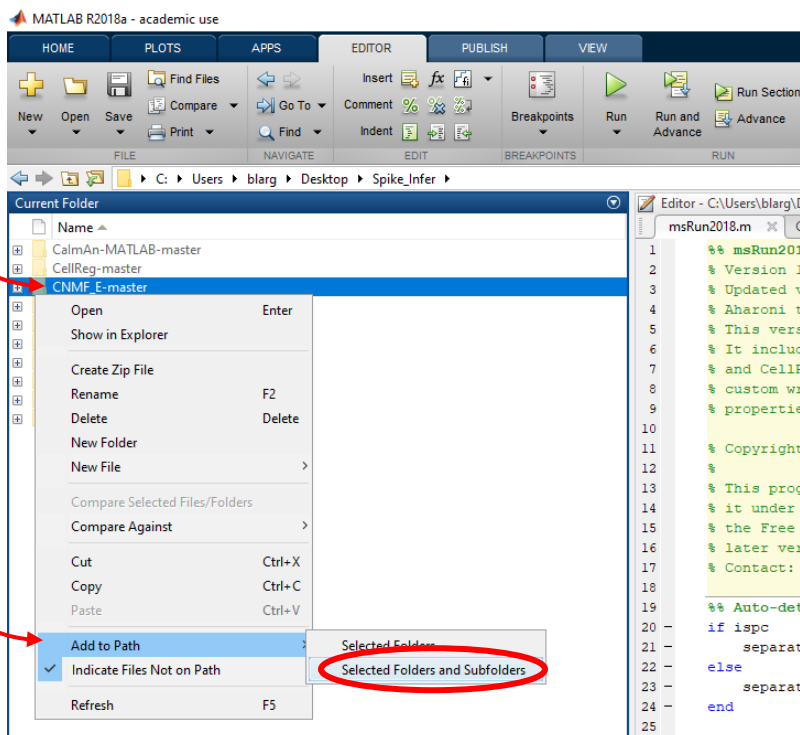
STEP2: Add Folder to Path

Next, you will need to add these folders to your path. To do so, select the small folder icon with the green arrow located at the top left of the Matlab screen (marked in Red below). This will prompt a window popup from which you can select the folder containing your analysis pipeline.



Once you do so the contents of the folder should be available under the “Current Folder” panel (marked in Green above).

Next you add the folders to the path. Right click on your respective folders, select the “Add to Path” option and “Selected Folders and Subfolders”.



After all of your folders have been added to path, you will need to install CNMFE. You will only have to do this once.

STEP4: CNMFE set up

Type the following under your command window:

```
>> cnmfe_setup
```

And press enter. Text will flow user input shouldn't be needed.

STEP5: CVX set up

You will also need the CVX package in order to run the more complex deconvolution type analyses, you can download the folder here:

<http://cvxr.com/cvx/download/>

Once on your computer, you will have to install it in your command window with the following line:

```
>> cvx_setup
```

Once it is finished you are ready for analysis!

Step4 and Step5 only need to be performed once on the computer. After the proper installation you won't need to do it again until you update Matlab.

Warning: The CVX package will mess with the creation of legends in your figures. To solve this issue remove the package from path.

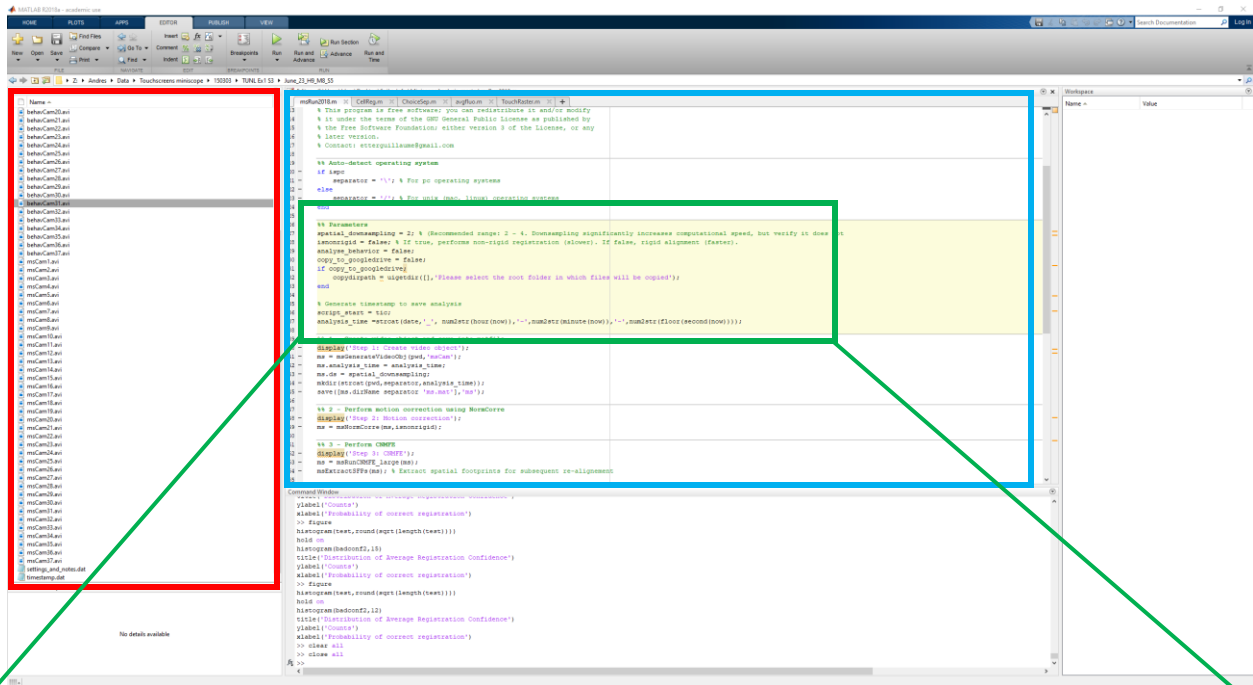
STEP5: Analysis

Open the "Miniscipe-Analysis-master" folder from the Williams lab Guillaume Etter's analysis package and open the "msRun2018.m" script.

Before you run the script, change your *Current Folder* to contain the data you wish to analyze (follow the first half of STEP 2).

Your window should then look like this:

Where your msCam videos should be in your *Current Folder* (marked in red) and the msRun2018 script should be seen in your *Editor Panel* (marked in blue). You can modify certain parameters for your analysis under the "Parameters" section of the script (marked in green).



```

%% Parameters
spatial_downsampling = 2; % (Recommended range: 2 - 4. Downsampling significantly increases computational speed, but verify it does not
isnonrigid = false; % If true, performs non-rigid registration (slower). If false, rigid alignment (faster).
analyse_behavior = false;
copy_to_googledrive = false;
if copy_to_googledrive
    copydirpath = uigetdir([], 'Please select the root folder in which files will be copied');
end

% Generate timestamp to save analysis
script_start = tic;
analysis_time = strcat(date, '-', num2str(hour(now)), '-', num2str(minute(now)), '-', num2str(floor(second(now))));

```

Some of the parameters include, spatial down sampling, rigid vs non-rigid motion correction, behavioural analysis and google drive saving which you can modify to your liking.

Once everything is set, the pipeline is now ready! Press:



to start the analysis.

If for any reason it is not running let me know! Should be a pretty quick fix to get it up and running.