Getting things configured

1. System configuration
    http://docs.mesmerizelab.org/en/master/user_guides/general/misc.html#system-configuration
    ○ Check your workdir

    ○ Check pre-run commands
      ▪ For Windows users
        • I think that the default setting should work
        • The BLAS & MKL settings should be automatic

      ▪ For Linux users
        • source /path/to/env/bin/activate
        • export OPENBLAS_NUM_THREADS=1
        • export MKL_NUM_THREADS=1

      ▪ For Mac users
        • make sure you have:
          ○ source activate <conda_env_name>
        • The BLAS & MKL settings should be automatic

Allen PVC-7 Dataset – Explain the data (visual sinusoidal orientation stimuli etc.)

1. 1. Create a new project
      ▪ stimulus columns: `ori`, `sf`, `tf`

      ▪ roi columns: `cell_id`, `anatomical_location`, `cell_type`

      ▪ custom columns:
        • promoter, just for `something_gcamp`
        • animal age
        • breed etc.

2. Go to the dir containing the image file
      • Explain minimal json meta data example
      • Add your own meta data extraction function to
        `mesmerize.viewer.core.organize_metadata.py`
        ○ must install in developer mode

3. Open image
      ○ Explain the stimulus mapping csv
      ○ Use script editor to import stimulus mappings

4. There's movement, get a mean projection
      ○ Add a few mcor batch items using the GUI

5. Perform CNMF
      ○ Just use GUI with the mcor outputs for now

6. Import CNMF output, explain ROI Manager, tagging ROIs, deleting ROIs, etc.

7. Add to project

8. Flowchart, heatmap, normalized, zscored
   - Explain Datapoint Tracer
     - Show analysis graphs
   - Open sample in Viewer, change something, upload `Load_Proj_DF` to show how things can be done live dynamically/interactively etc.
   - **Save to project to illustrate how it can be shared etc.**
     - **→ And to use for the later part of the workshop in notebooks!!**

9. Stim tuning plots, spacemap, neural decompose, explorative cross-correlation
   - stim tuning and spacemap can be saved (maybe also neural decompose? It's new…)
   - **→ SAVE to use for the later part of the workshop in notebooks!!**

1p dataset
1. Create new project
   - Stimulus column: `behavior`
   - Same ROI columns as before
   - Same custom columns

2. Explain dir of images and minimal json meta data

3. Open image, show movement

4. Use script editor to map stimulus information which is stored per-frame rather than per-chunk

5. There is lots of movement
   - Use the script editor to add several parameter variants to the batch manager

6. Open completed batch, show how mean projection can be compared across batch items

7. Use a few batch items to manually add corr-pnr items to the batch

8. Show corr-pnr GUI

9. Add CNMFE items to the batch using the GUI
   - If someone is interested in a script they can ask for help or see the docs

10. Open CNMFE output items, handling them is identical to the previous pvc7 example
    - Calculating raw min and max is useful for situations where there is low neuropil contamination, it can be used to normalize the CNMFE temporal components between the real ranges of the data using the **NormRaw** flowchart node
      - Show Ciona cell types mesmerize project in /share/temp

11. Add 3 CNMFE items to the project

12. Flowchart, heatmap, normalized, zscored, stim tuning plots, spacemap, neural decompose, peak detection, peak-features, k-Shape clustering <u>with gridsearch</u> (with maybe just 1 sample), explorative cross-correlation
    - **→ SAVE a few plots to use for the later part of the workshop in notebooks!!**

13. Configuring Heatmap and KShape plot:
    ◦ using matplotlib navbar
    ◦ Through the console

Show Zebrafish project plots (too big to practically share beforehand, will be available later) - Dataset from Martin Haesemeyer

1. Much of the visualizations and downstream analysis works similarly
   ◦ Datapoint tracers have will highlight the plane the ROI's centroid originates from

Other ROI import methods

1. Create a new project with `s2p_iscell` ROI column

2. Nuset
   ◦ ??? Need to decide which dataset to show this with, maybe the Williams one
   ◦ Can import as ManualROIs or export seeds for CNMF(E)
     ▪ Maybe show an example of this with the pvc7 img or 1p dataset

3. Import suite2p outputs

4. Import ImageJ Polygon ROI
   ◦ Open ImageJ, draw & save some ROIs, open…

Console fun! Learn the API!

1. Viewer
   ◦ Open arbitrary images
     ▪ open_arbitrary_image.py

   ◦ Add ROIs from x-y coordinates
     ▪ draw_circle.py

   ◦ Tag ROIs
     ▪ auto_tag_rois.py

2. Create `Transmission` from project dir
   ◦ load_proj_data.ipynb

3. Open and explore plot files and analysis data files
   ◦ load_trn_ptrn_files.ipynb

   ◦ Refer to my notebooks on the mesmerize_manuscript_notebooks repo for ideas

If there is time

1. Stimulus analysis

   ◦ Maybe the C.elegans dataset

2. Bokeh based datapoint tracer, create an ngrok session