

blech_clust

The secrets within
a.k.a.

Some of the lesser known but important features (according to Abu)

As of 1/15/26

Docs + Migration guide

The screenshot shows the GitHub repository page for `katzlabbrandeis/blech_clust`. The repository is currently on the `master` branch, which is 130 branches and 3 tags away. The commit history shows a recent commit by `abuzarmahmood` titled "Merge pull request #641 from abuzarmahmood/fix-autocar-ori..." with a commit message "docs: remove blog links from migration guide". A red arrow points to this commit message. The sidebar on the right contains navigation links for "Home", "Getting Started", "Workflow Diagrams", "Tutorials", and "API Reference".

- Getting Started
 - Installation
 - Quick Start
- Migration Guide
 - Overview
- Removed Features
- File Mapping
- QA Improvements

Migration Guide from Original `blech_clust`

This guide documents the changes between the original `blech_clust` and the current [katzlabbrandeis fork](#).

Overview of Changes

The katzlabbrandeis fork represents a significant modernization of the original codebase:

- Table of contents
- Overview of Changes
- Migration Guide Sections
- Quick Reference: New Features
 - Installation and Environment
 - Testing Infrastructure
 - Metadata and Parameter Recording
 - Common Average Reference Improvements

Basic debugging

board-DOUT-12.dat

board-DOUT-13.dat

board-DOUT-14.dat

board-DOUT-15.dat

info.rhd

output.log

ram_usage.log

results.log

time.dat

trial_info_frame.csv

unit_descriptor.csv

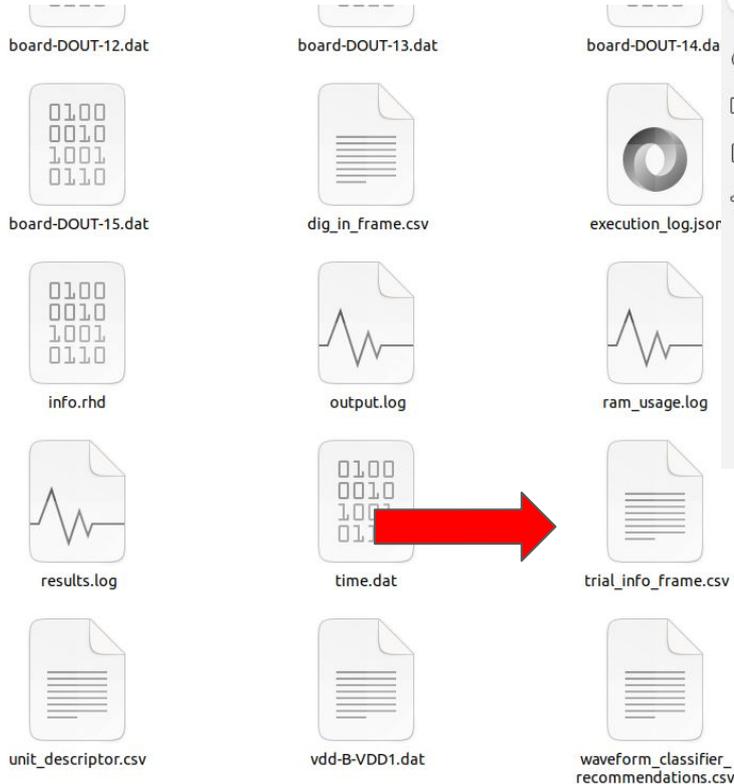
vdd-B-VDD1.dat

waveform_classifier_recommendations.csv

```
1 =====
2 Attempting blech_exp_info.py, started at 2026-01-13 16:23:47
3 Git branch: master
4 Git commit: 454f07821b5ca186cd6fdc87430a58ca3727d544
5 =====
6 =====
7 Completed blech_exp_info.py, ended at 2026-01-13 16:23:47
8 =====
9 =====
10 Attempting blech_common_avg_reference.py, started at 2026-01-13 16:26:05
11 Git branch: master
12 Git commit: 454f07821b5ca186cd6fdc87430a58ca3727d544
13 =====
14 Processing : /media/storage/abu_resorted/bla_gc/AM11_4Tastes_191030_114043_copy/
15 Number of groups : 11
16 bla-04 :: 9 channels ::
17 ['A_00' 'A_01' 'A_24' 'A_26' 'A_27' 'A_28' 'A_29' 'A_30' 'A_31']
18
19 bla-05 :: 5 channels ::
20 ['A_02' 'A_03' 'A_04' 'A_05' 'A_07']
21
22 bla-00 :: 1 channels ::
23 ['A_06']
24
25 gc-05 :: 5 channels ::
26 ['A_08' 'A_10' 'A_14' 'A_16' 'A_20']
27
28 gc-09 :: 1 channels ::
29 ['A_09']
30
31 gc-06 :: 1 channels ::
32 ['A_11']
33
34 gc-08 :: 1 channels ::
35 ['A_12']
36
37 gc-03 :: 6 channels ::
38 ['A_13' 'A_18' 'A_19' 'A_21' 'A_22' 'A_23']
```

Plain Text ▾ Tab Width: 8 ▾ Ln 1, Col 1 ▾ INS

Easy access to trial info



ONLYOFFICE *trial_info_fra... x

File Home Insert Draw Layout Formula Data Collaboration

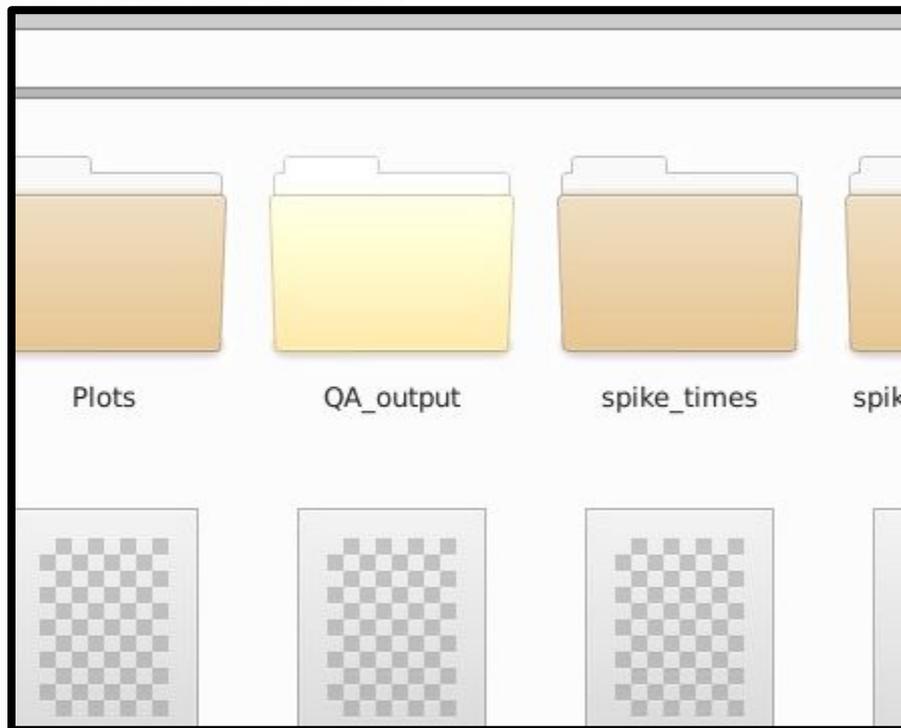
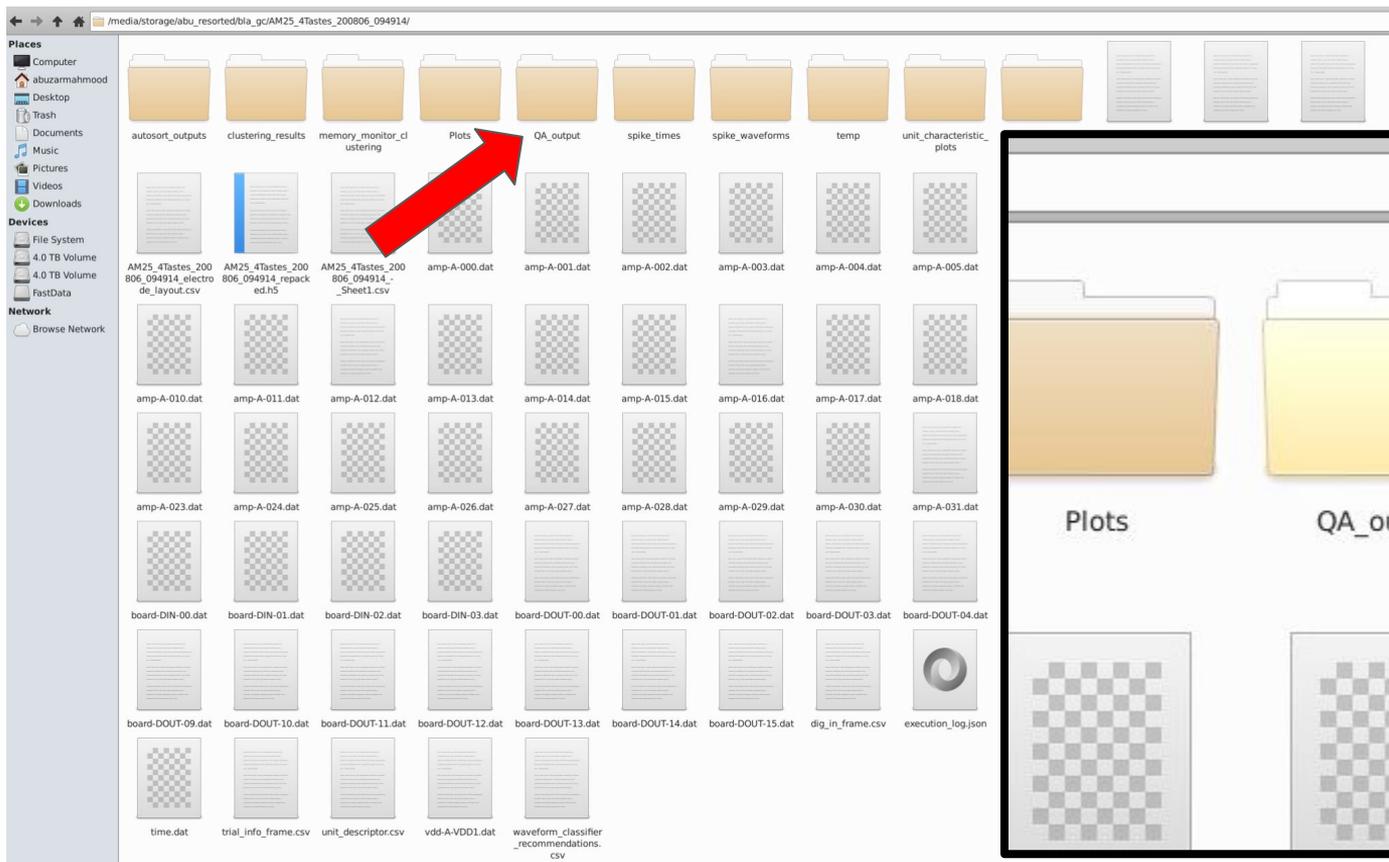
Calibri 11

H27 fx

	A	B	C	D	E	F	G
1	dig_in_num	dig_in_name	taste	start_taste	end_taste	abs_trial_n	taste_r
2	2	board-DIN-02	ca	1529342	1534149	0	
3	1	board-DIN-01	suc	2134755	2140163	1	
4	2	board-DIN-02	ca	2740485	2745292	2	
5	3	board-DIN-03	qhcl	3345897	3350704	3	
6	1	board-DIN-01	suc	3951309	3956717	4	
7	3	board-DIN-03	qhcl	4557322	4562129	5	
8	2	board-DIN-02	ca	5162734	5167540	6	
9	0	board-DIN-00	nacl	5768145	5770699	7	
10	0	board-DIN-00	nacl	6370774	6373328	8	
11	3	board-DIN-03	qhcl	6973933	6978739	9	
12	2	board-DIN-02	ca	7579344	7584150	10	
13	0	board-DIN-00	nacl	8184755	8187309	11	
14	2	board-DIN-02	ca	8787609	8792416	12	
15	2	board-DIN-02	ca	9392661	9397467	13	
16	2	board-DIN-02	ca	9998058	1E+07	14	
17	0	board-DIN-00	nacl	1.1E+07	1.1E+07	15	

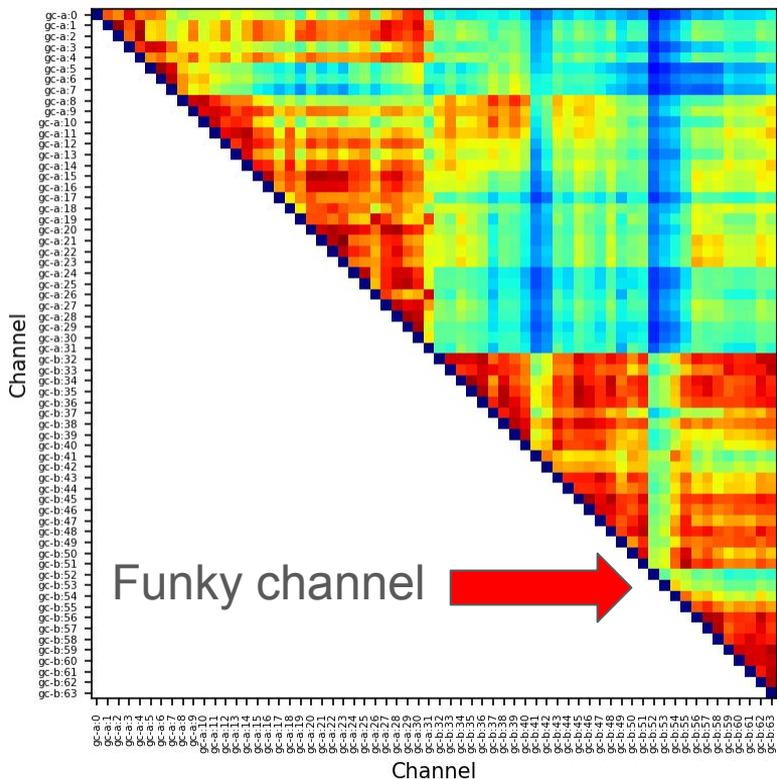
Dig_in_num_taste,
Dig_in_name_taste,
Taste,start_taste,
End_taste,
Abs_trial_num,
Taste_rel_trial_num,
Dig_in_num_laser,
Dig_in_name_laser,
Laser,
Start_laser,
End_laser,
Laser_duration,
Laser_lag,
Start_taste_ms,
End_taste_ms,
Start_laser_ms,
End_laser_ms,
Laser_duration_ms,
laser_lag_ms

Lots of things in QA_outputs dir

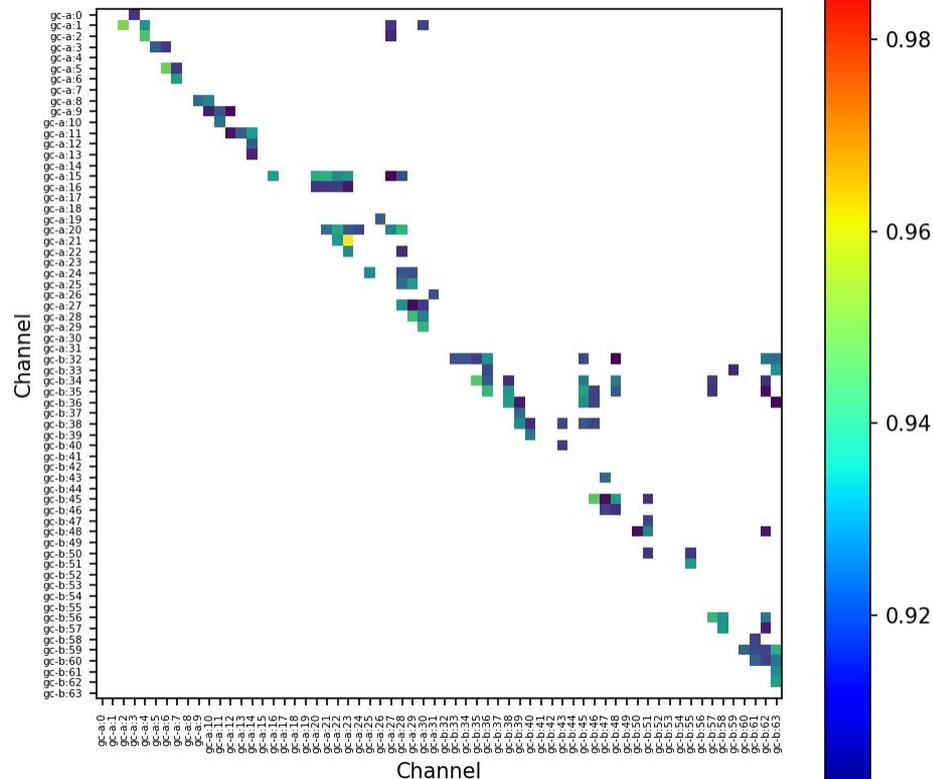


Common Average Reference outputs

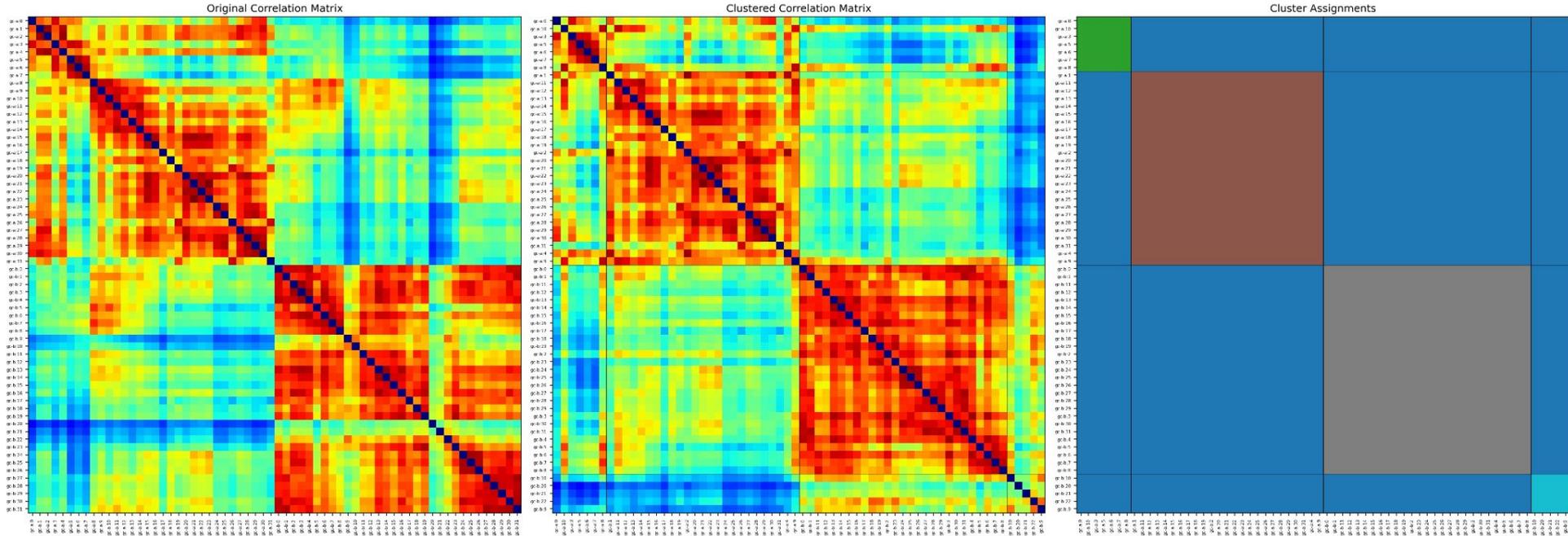
Raw Correlation Matrix



Thresholded Correlation Matrix



Automated sub-clustering of CAR groups



of clusters determined using BIC on K-Means

Classifier recommendations

The image shows a file explorer window with the following files and folders:

- autosort_outputs
- clustering_results
- memory_monitor_clustering
- Plots
- QA_output
- spike_times
- spike_waveforms
- temp
- unit_characteristic_plots
- unit_waveforms.pl
- aggregated charact
- AM25_4Tastes_200
- AM25_4Tastes_200

Files in the main view include:

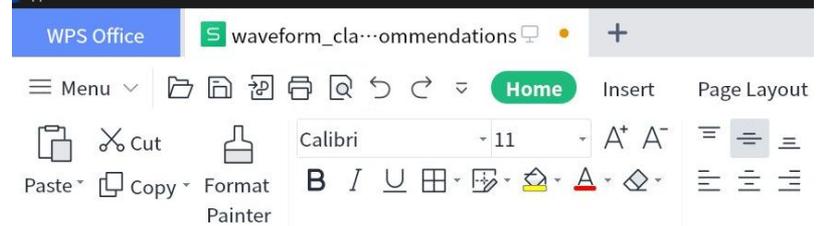
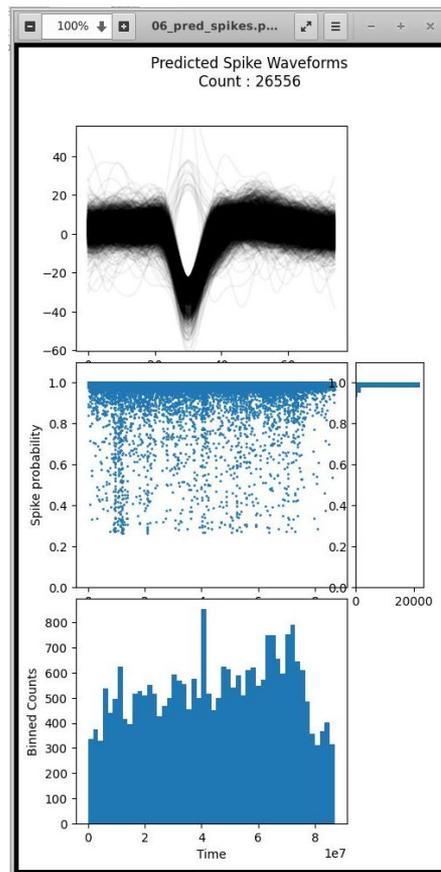
- AM25_4Tastes_200_806_094914_electrode_layout.csv
- AM25_4Tastes_200_806_094914_repacked.h5
- AM25_4Tastes_200_806_094914_Sheet1.csv
- amp-A-000.dat
- amp-A-001.dat
- amp-A-002.dat
- amp-A-003.dat
- amp-A-004.dat
- amp-A-005.dat
- amp-A-010.dat
- amp-A-011.dat
- amp-A-012.dat
- amp-A-013.dat
- amp-A-014.dat
- amp-A-015.dat
- amp-A-016.dat
- amp-A-017.dat
- amp-A-018.dat
- amp-A-023.dat
- amp-A-024.dat
- amp-A-025.dat
- amp-A-026.dat
- amp-A-027.dat
- amp-A-028.dat
- amp-A-029.dat
- amp-A-030.dat
- amp-A-031.dat
- board-DIN-00.dat
- board-DIN-01.dat
- board-DIN-02.dat
- board-DIN-03.dat
- board-DIN-04.dat
- board-DOUT-00.dat
- board-DOUT-01.dat
- board-DOUT-02.dat
- board-DOUT-03.dat
- board-DOUT-04.dat
- board-DOUT-09.dat
- board-DOUT-10.dat
- board-DOUT-11.dat
- board-DOUT-12.dat
- board-DOUT-13.dat
- board-DOUT-14.dat
- board-DOUT-15.dat
- dig_in_frame.csv
- execution_log.json
- time.dat
- trial_info_frame.csv
- unit_descriptor.csv
- vdd-A-VDD1.dat
- waveform_classifier_recommendations.csv

A red arrow points to the file **board-DOUT-13.dat**.

A black box highlights a sub-view of files:

- board-DOUT-12.dat
- board-DOUT-13.dat
- board-DOUT-14.dat
- board-DOUT-15.dat
- dd-A-VDD1.dat
- waveform_classifier_recommendations.csv

Classifier recommendations

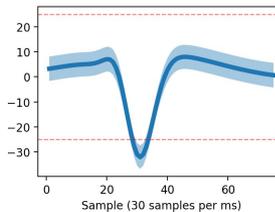
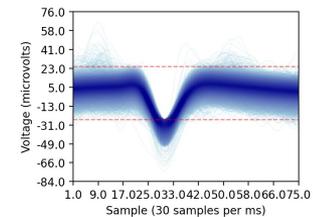
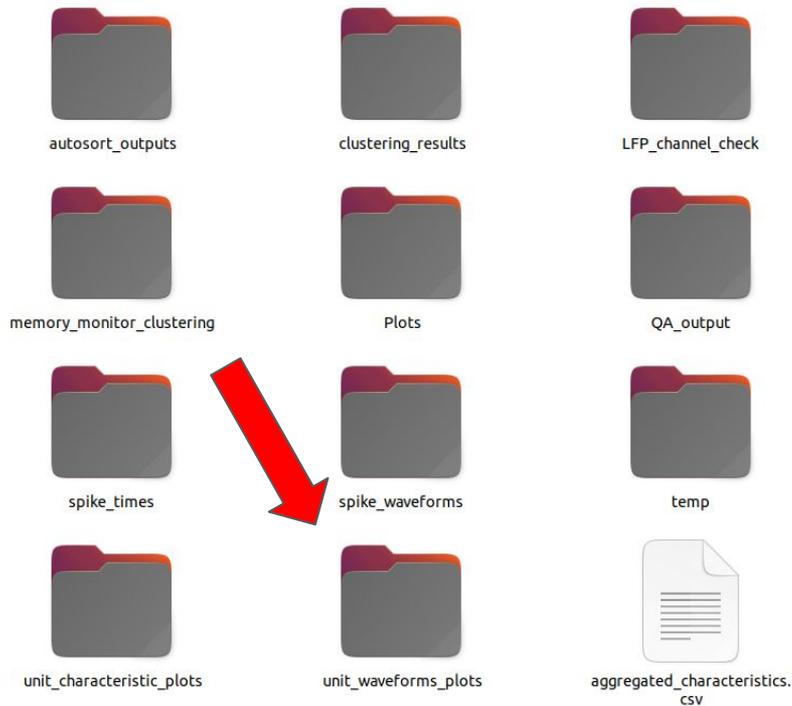


	A	B	C	D	E	F
1		electrod	count	mean_prof	percenti	percenti
2	1	1	2110	0.878	0.377	0.997
3	3	3	30760	0.965	0.821	0.999
4	6	6	26556	0.971		999
5	7	7	7363	0.66	0.288	0.987
6	8	8	2316	0.635	0.286	0.979
7	9	9	4432	0.789	0.313	0.995
8	10	10	14113	0.845	0.359	0.996
9	11	11	12135	0.908	0.375	1
10	12	12	3780	0.739	0.301	0.995
11	13	13	2243	0.647	0.29	0.98
12	14	14	2198	0.654	0.292	0.985
13	16	16	28631	0.96	0.792	0.999
14	19	19	5459	0.648	0.288	0.98
15	21	21	5257	0.654	0.291	0.981
16	22	22	2158	0.83	0.322	0.996
17	23	23	3946	0.687	0.298	0.99
18	25	25	16421	0.967	0.818	1
19	26	26	2245	0.727	0.303	0.996
20	27	27	5631	0.624	0.29	0.968
21	28	28	9271	0.955	0.776	0.998
22	29	29	5088	0.659	0.294	0.985
23	30	30	2583	0.911	0.412	0.999
24	31	31	2219	0.843	0.36	0.996
25						

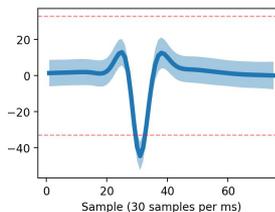
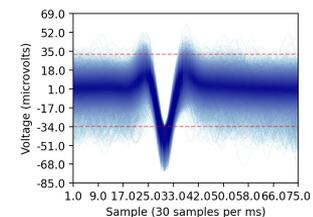
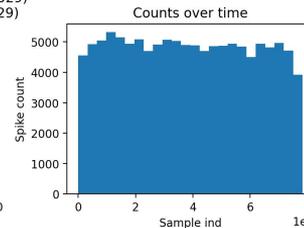
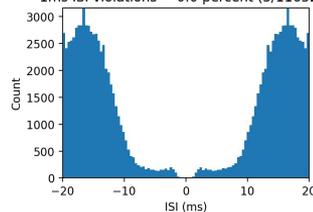
All about unit stability

Sorted units spike-counts

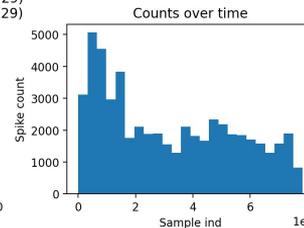
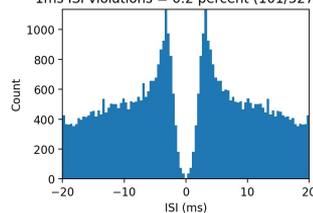
u... rted / bla_gc / AM11_4Tastes_191030_114043_copy



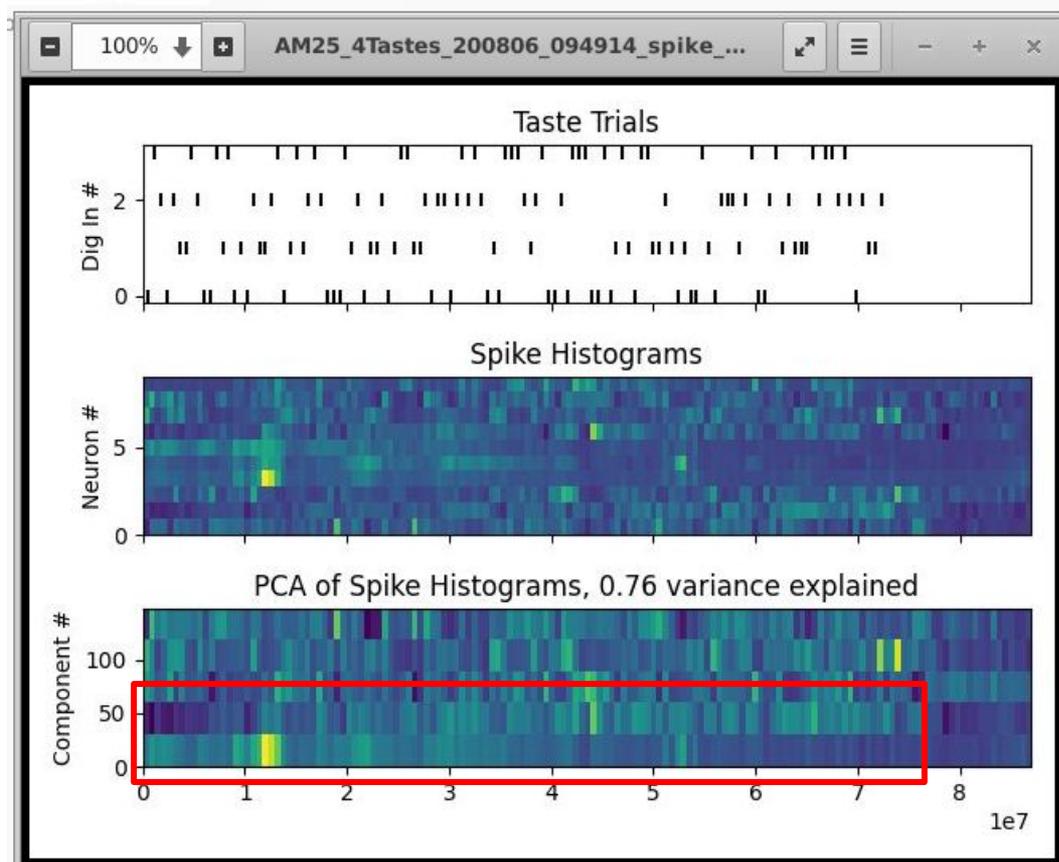
2ms ISI violations = 0.2 percent (202/116529)
1ms ISI violations = 0.0 percent (5/116529)



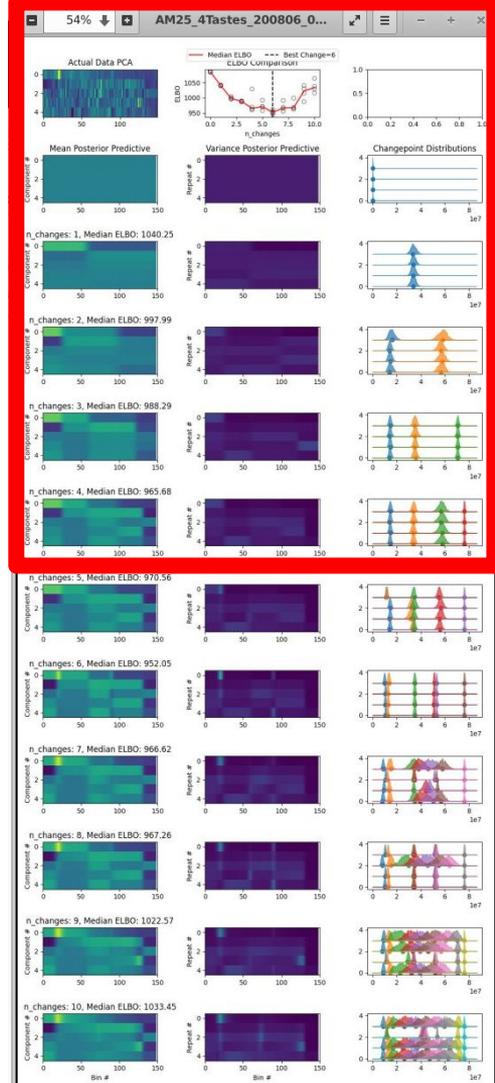
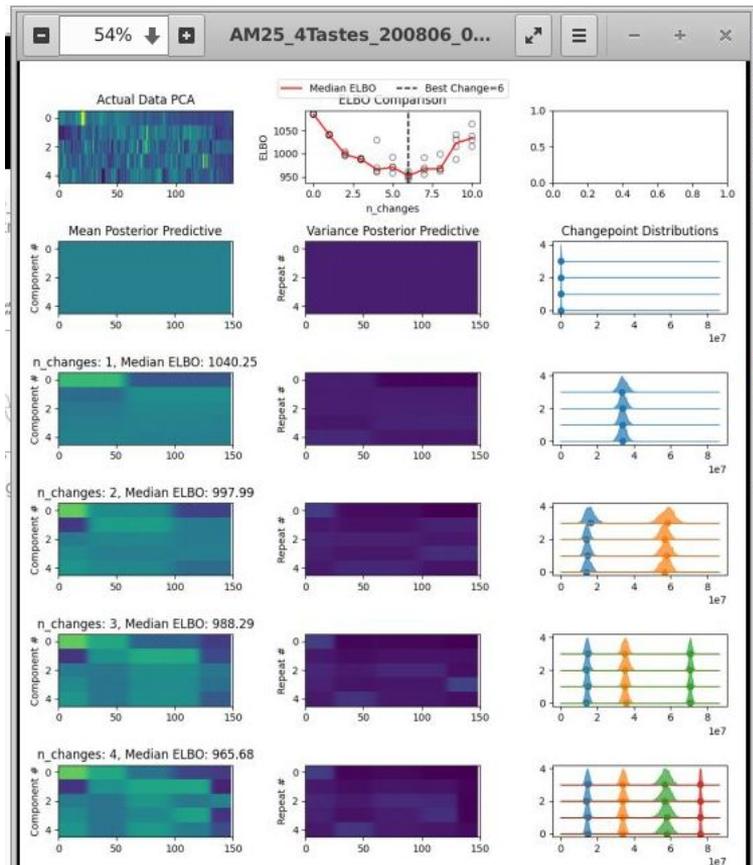
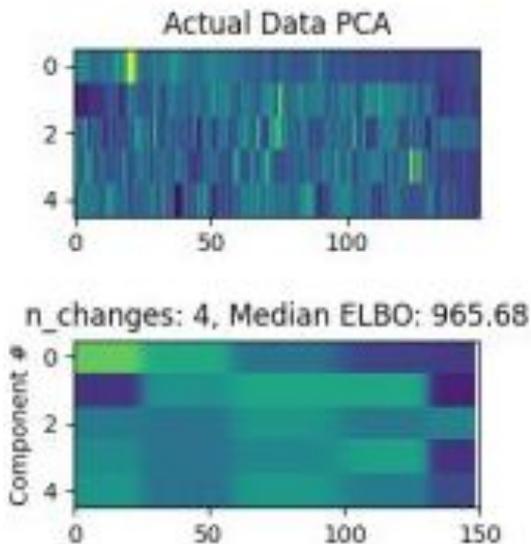
2ms ISI violations = 1.6 percent (845/52729)
1ms ISI violations = 0.2 percent (101/52729)



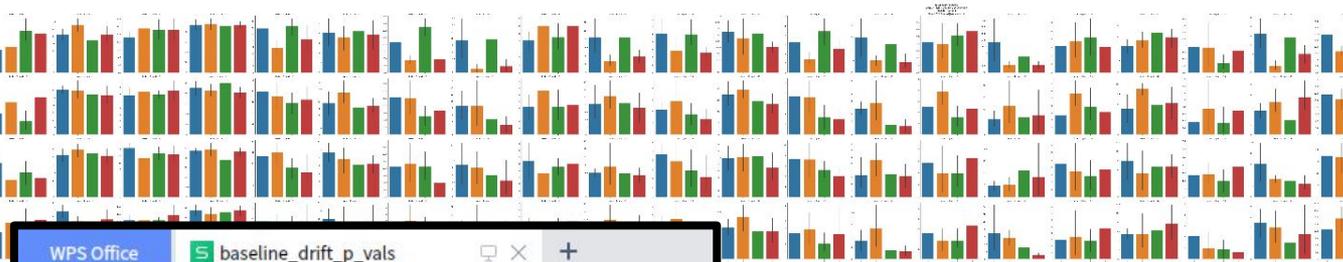
Bulk firing variability over session



Bulk firing variability over session



Changes in baseline rates



WPS Office | baseline_drift_p_vals

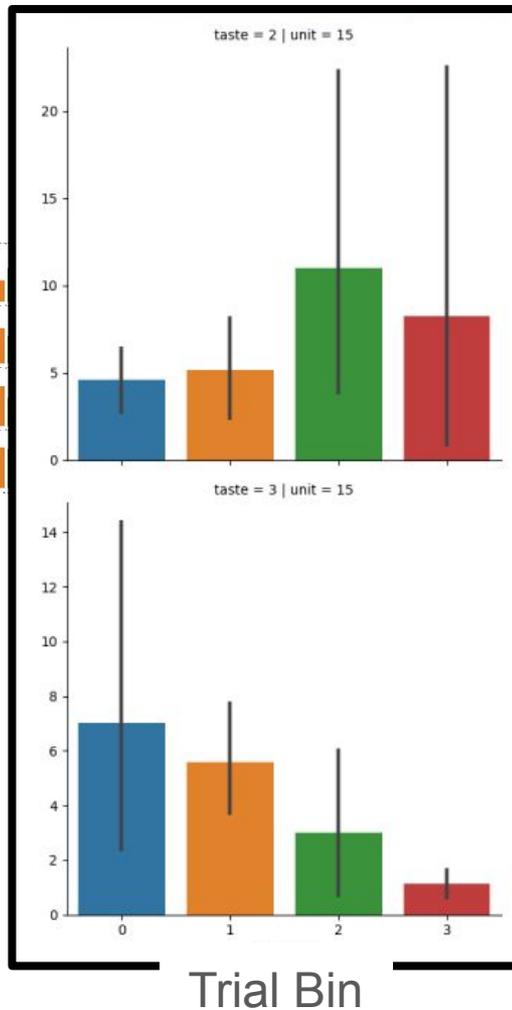
Menu | Home | Insert | Page

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Paste | Copy | Format Painter

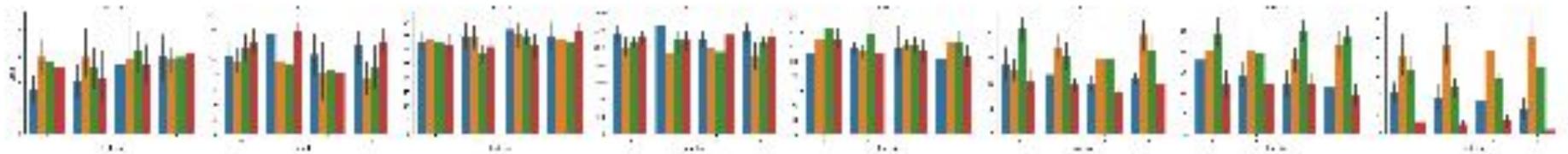
A1 | fx

	A	B	C	D	E	F
1		trial_bin	taste	trial_bin * taste	Residual	unit
2	0	0.67601	0.03115	0.06798		0
3	1	0.10324	0.77822	0.4861		1
4	2	0.68838	0.49648	0.61009		2
5	3	0.84285	0.76545	0.08746		3
6	4	0.22501	0.49345	0.39878		4
7	5	0.23565	0.27651	0.71571		5
8	6	0.0747	0.87517	0.00599		6
9	7	0.03895	0.732	0.26052		7
10	8	0.64293	0.86977	0.36059		8
11	9	0.50257	0.16761	0.3367		9



Trial Bin

Changes in baseline rates



WPS Office | post_drift_p_vals

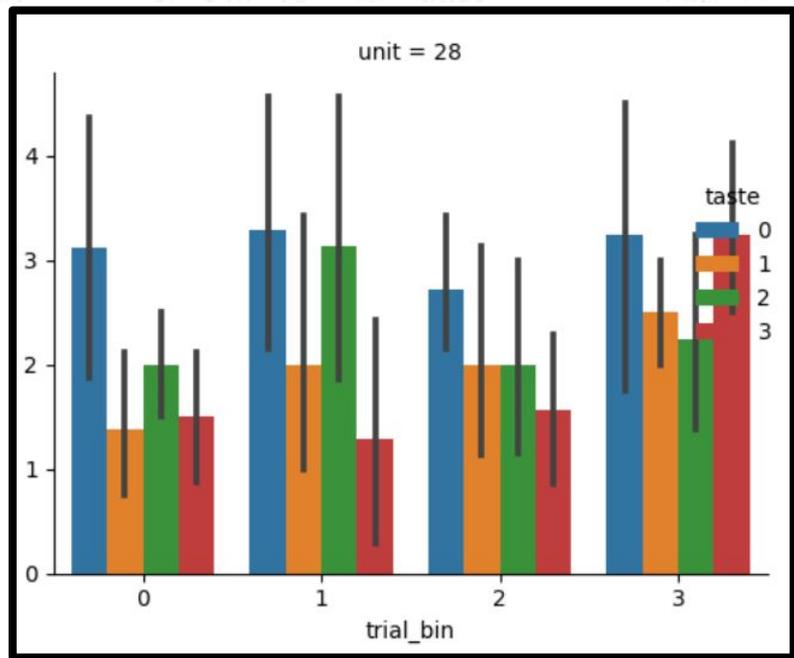
Menu | File | Edit | View | Format | Tools | Help

Paste | Format Painter

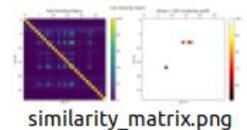
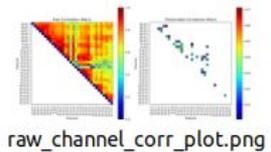
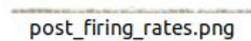
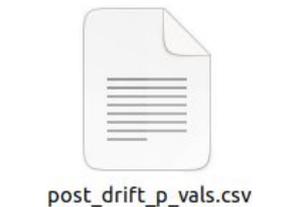
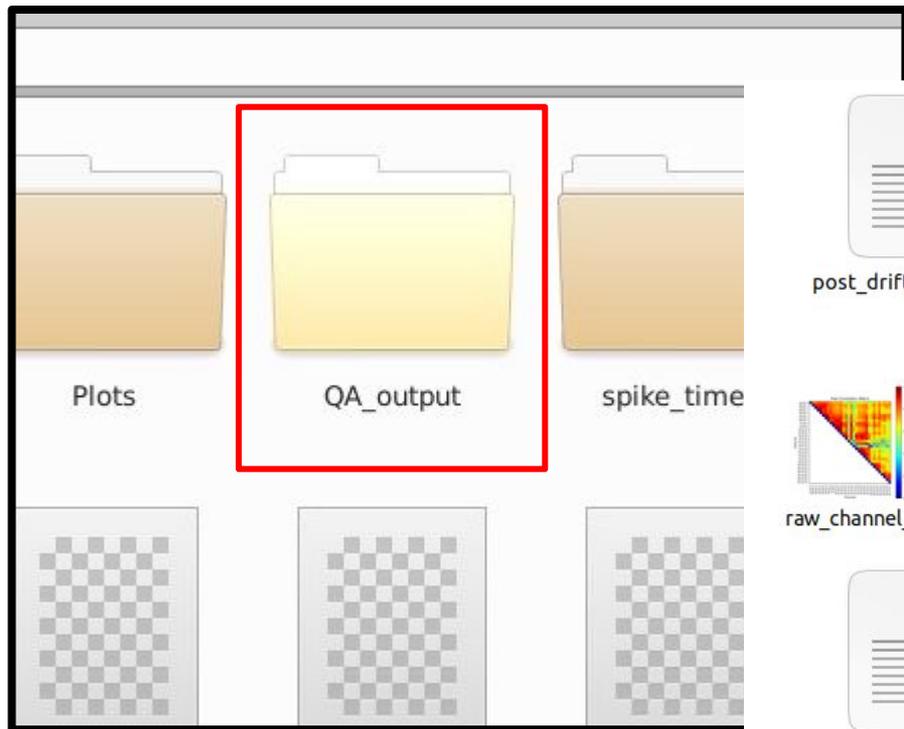
Calibri | 11

A1

	A	B	C	D
1		trial_bin	Error	unit
2		0	0.08872	0
3		1	0.09235	1
4		2	0.26528	2
5		3	0.68118	3
6		4	0.19955	4
7		5	0.39345	5
8		6	0.4933	6
9		7	0.91557	7
10		8	0.49441	8
11		9	0.0095	9
12		10	0.00247	10



Warnings file



Ephys_data submodule

- Data handling and processing
- Visualizing
 - Rasters
 - Firing rate grid plots

```
from utils.ephys_data.ephys_data import ephys_data

# Initialize with data directory

data = ephys_data(data_dir='/path/to/data')
```

Ephys_data submodule

Loading spikes	<code>data.get_spikes()</code>
Extracting LFPs, calculating STFT	<code>data.get_lfps()</code> <code>data.get_stft()</code>
Calculating firing rates + unit properties	<code>data.get_firing_rates()</code> <code>data.calc_palatability()</code>
Separating data by region	<code>data.get_region_units()</code> <code>region_spikes = data.return_region_spikes('region_name')</code> <code>region_firing = data.get_region_firing('region_name')</code> <code>region_lfps, region_names = data.return_region_lfps()</code>
Separating data by laser condition	<code>data.separate_laser_data()</code> <code># Access separated data</code> <code>on_spikes = data.on_spikes</code> <code>off_spikes = data.off_spikes</code> <code>on_firing = data.on_firing</code> <code>off_firing = data.off_firing</code>
Loading experimental + unit metadata	<code>data.get_info_dict()</code> <code>data.get_trial_info_frame()</code> <code>data.get_unit_descriptors()</code>

What to do if you have noise

1. Cry 🥲
2. Try out these folk remedies

Reduce spike detection threshold

- `<data_dir>/<session_name>.params`
- Set "waveform_threshold" to 3 or 4

```
1 {
2   "max_parallel_cpu": 16,
3   "waveform_threshold": 5,
4   "use_rolling_threshold": true,
5   "rolling_threshold_window": 5.0,
6   "rolling_threshold_step": 5.0,
7   "voltage_cutoff": 10000,
8   "max_breach_rate": 1,
9   "max_secs_above_cutoff": 60,
10  "max_mean_breach_rate_persec": 100,
11  "wf_amplitude_sd_cutoff": 3,
12  "bandpass_lower_cutoff": 300,
13  "bandpass_upper_cutoff": 3000,
14  "spike_snapshot_before": 1
```



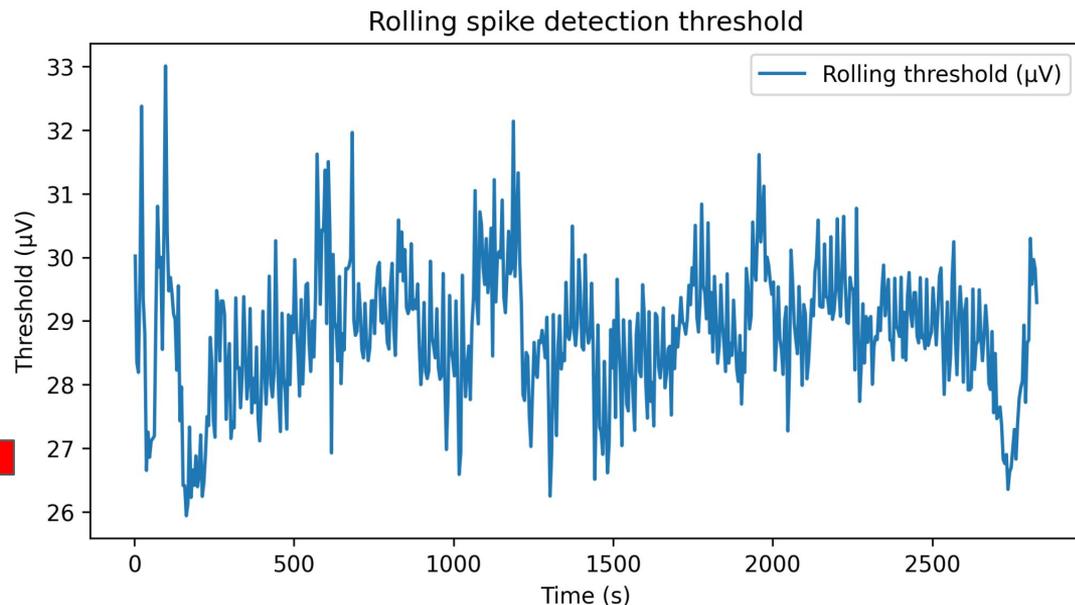
Adjust classifier settings

- blech_clust/params/waveform_classifier_params.json
- Set “throw_out_noise” to true
- Can override classifier threshold by setting “override” to true
 - This may increase false positive waveforms sorted

```
File: waveform_classifier_params.json
1  {
2      "use_neuRecommend": true,
3      "use_classifier": true,
4      "throw_out_noise": false,
5      "min_suggestion_count": 2000,
6      "classifier_threshold_override": {
7          "override": false,
8          "threshold": 0.8
9      }
10 }
```

Use rolling-window threshold (experimental)

```
1 {  
2   "max_parallel_cpu": 16,  
3   "waveform_threshold": 5,  
4   "use_rolling_threshold": true,  
5   "rolling_threshold_window": 5.0,  
6   "rolling_threshold_step": 5.0,  
7   "voltage_cutoff": 10000,  
8   "max_breach_rate": 1,  
9   "max_secs_above_cutoff": 60,  
10  "max_mean_breach_rate_persec": 100,  
11  "wf_amplitude_sd_cutoff": 3,  
12  "bandpass_lower_cutoff": 300,  
13  "bandpass_upper_cutoff": 3000,  
14  "spike_spanshot_before": 1
```



Housekeeping

- Please upload your code to katzlabbrandeis github
 - You can also have your repository forked (copied) to katzlabbrandeis
 - It DOESN'T have to be clean code...the repository can be kept private