

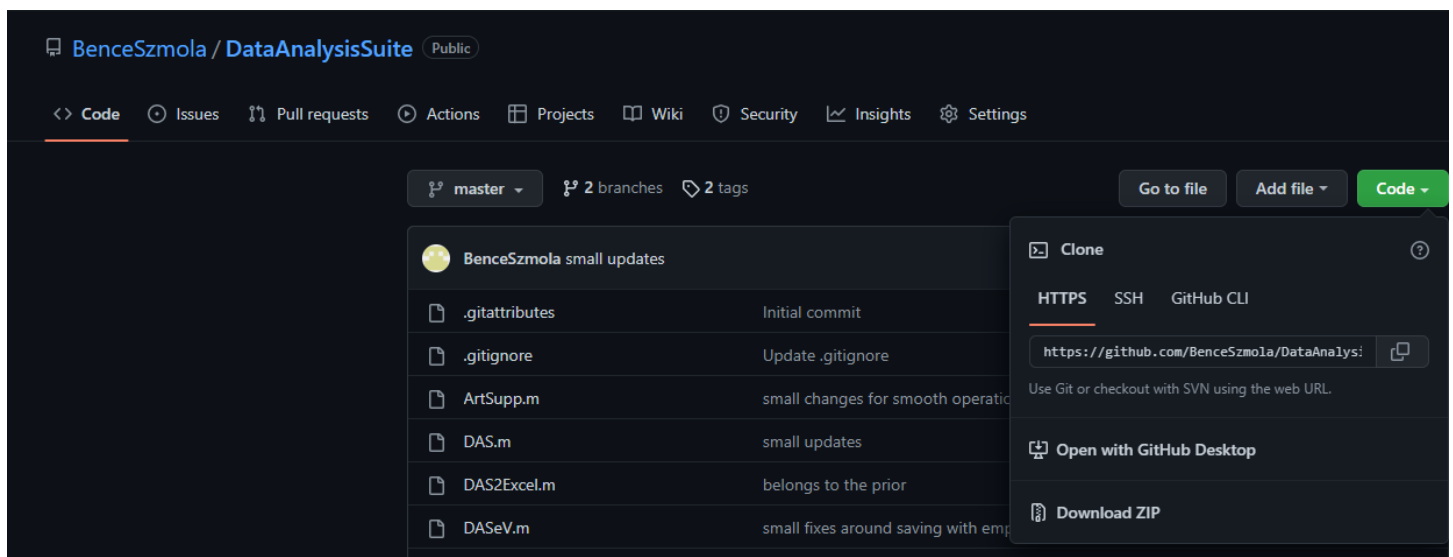
# Data Analysis Suite Package – Documentation

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## Installation

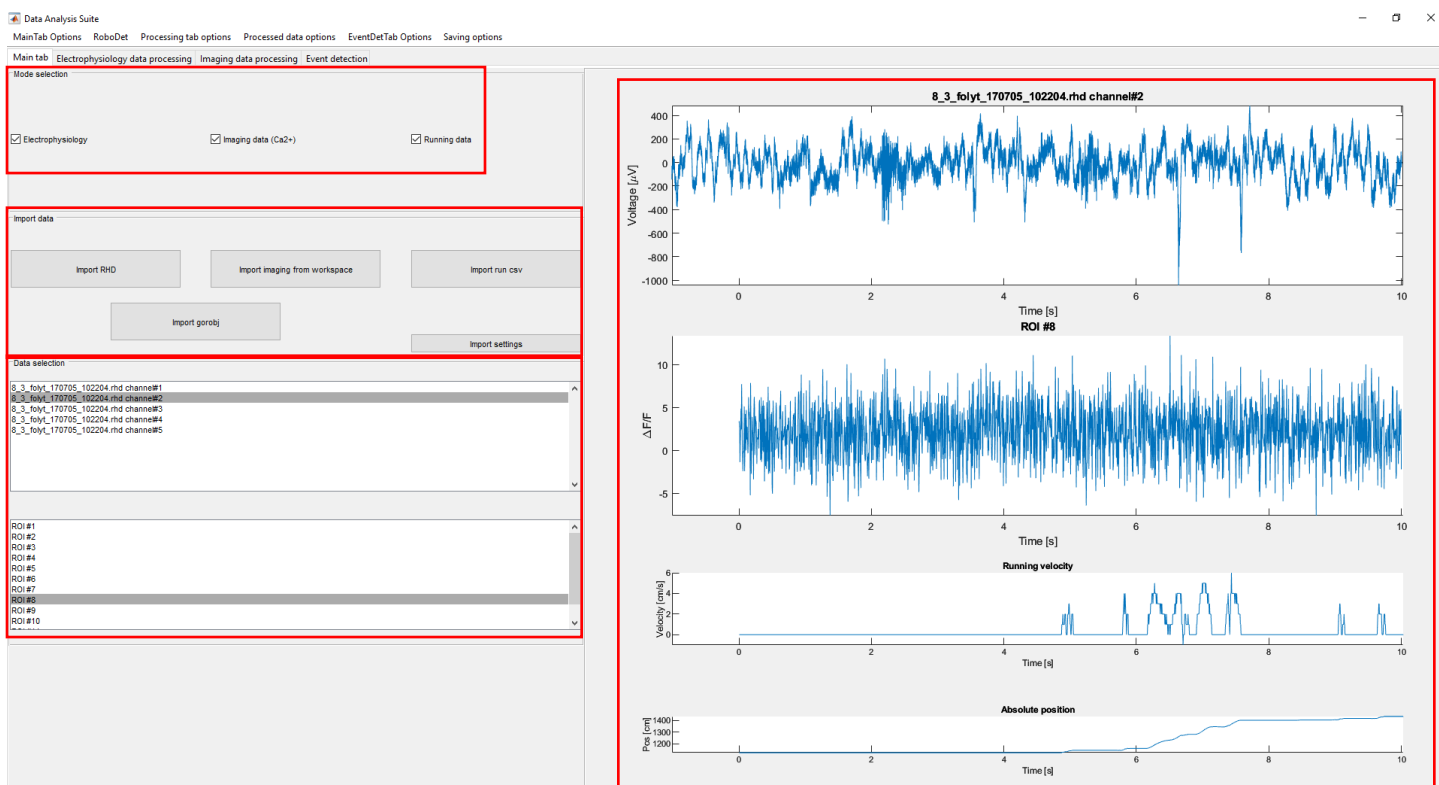
- Go to: <https://github.com/BenceSzmola/DataAnalysisSuite>
- Download the package from the master branch (usually it's the most stable but might not yet have all the latest features)
  - Click "Code", then "Download ZIP", save it wherever you wish



- Open MATLAB, under Home tab select “Set Path” and using Add Folder, add the folder where you extracted the downloaded ZIP. Don’t forget to save!
- Now you can start the GUIs by writing DAS, DASEV and DASEVDB respectively in the command line

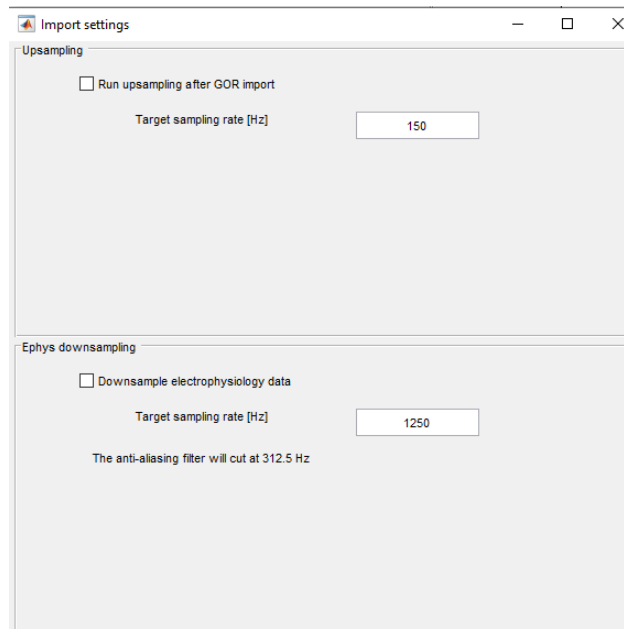
## GUI #1: DAS

- Functions
  - Import raw data
    - Currently supported formats:
      - Intan’s RHD (electrophysiology a.k.a. ephys)
      - MATLAB variables (gorobj class) exported from MES Curve Analysis window (electrophysiology & imaging)
      - Standard MATLAB variables (imaging)
      - CSV (treadmill data)
  - Visualizing data
  - Processing tools for raw data
  - Event detection (ephys, imaging, simultaneous)
  - Saving detections
- Importing data

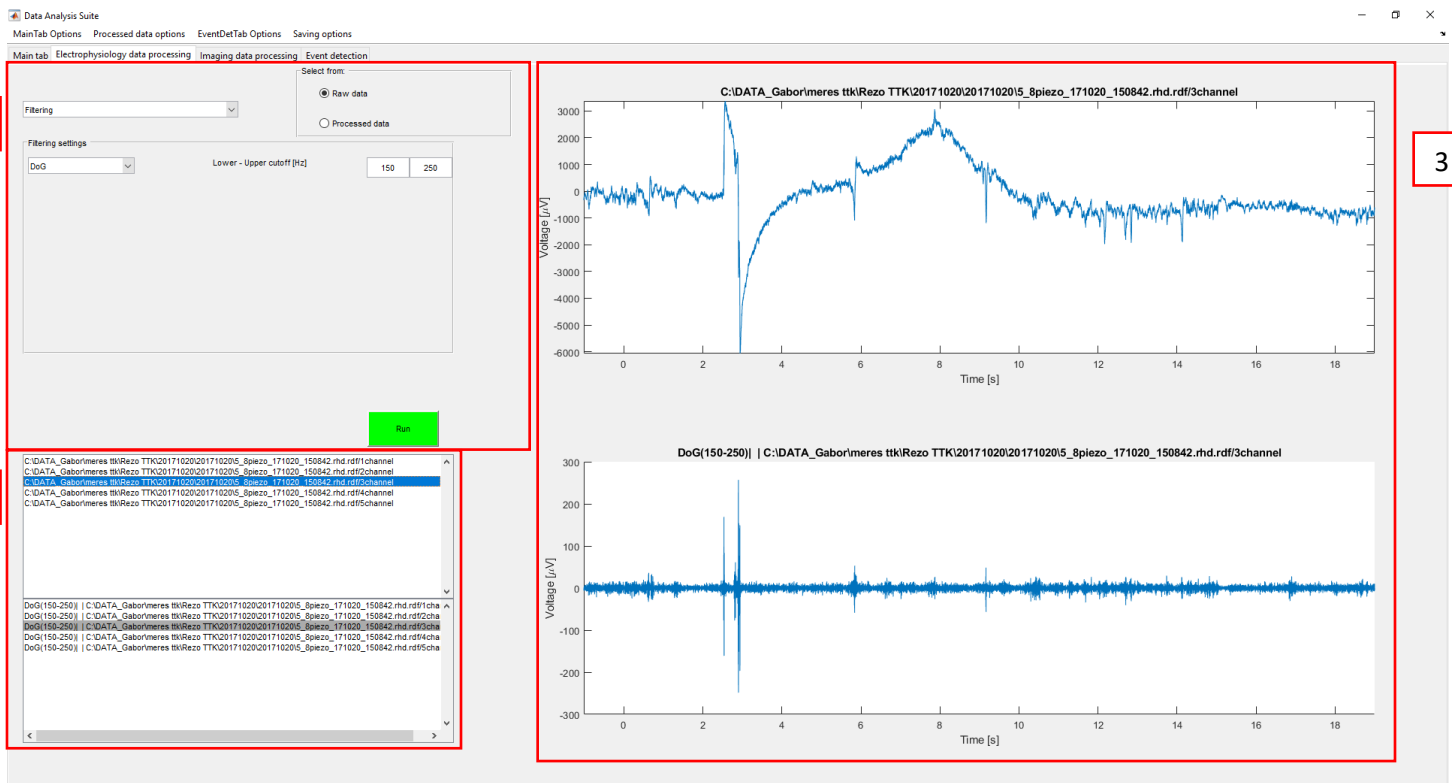


- 1: Checkboxes to select which datatype(s) you want to work with
  - By selecting one, the corresponding import options become available
- 2: Data import options
  - Import RHD: import .rhd files using the Intan import script
  - Import gorobj: import variables which were exported from MES curve analysis window
    - Might extend this to also import from .gor files
  - Import imaging from workspace: import workspace variables which contain imaging data (a #roi-by-#datapoints matrix) and corresponding time axis (a 1-by-#datapoints vector)

- Import run csv: imports data from the treadmill .csv files
- Import settings

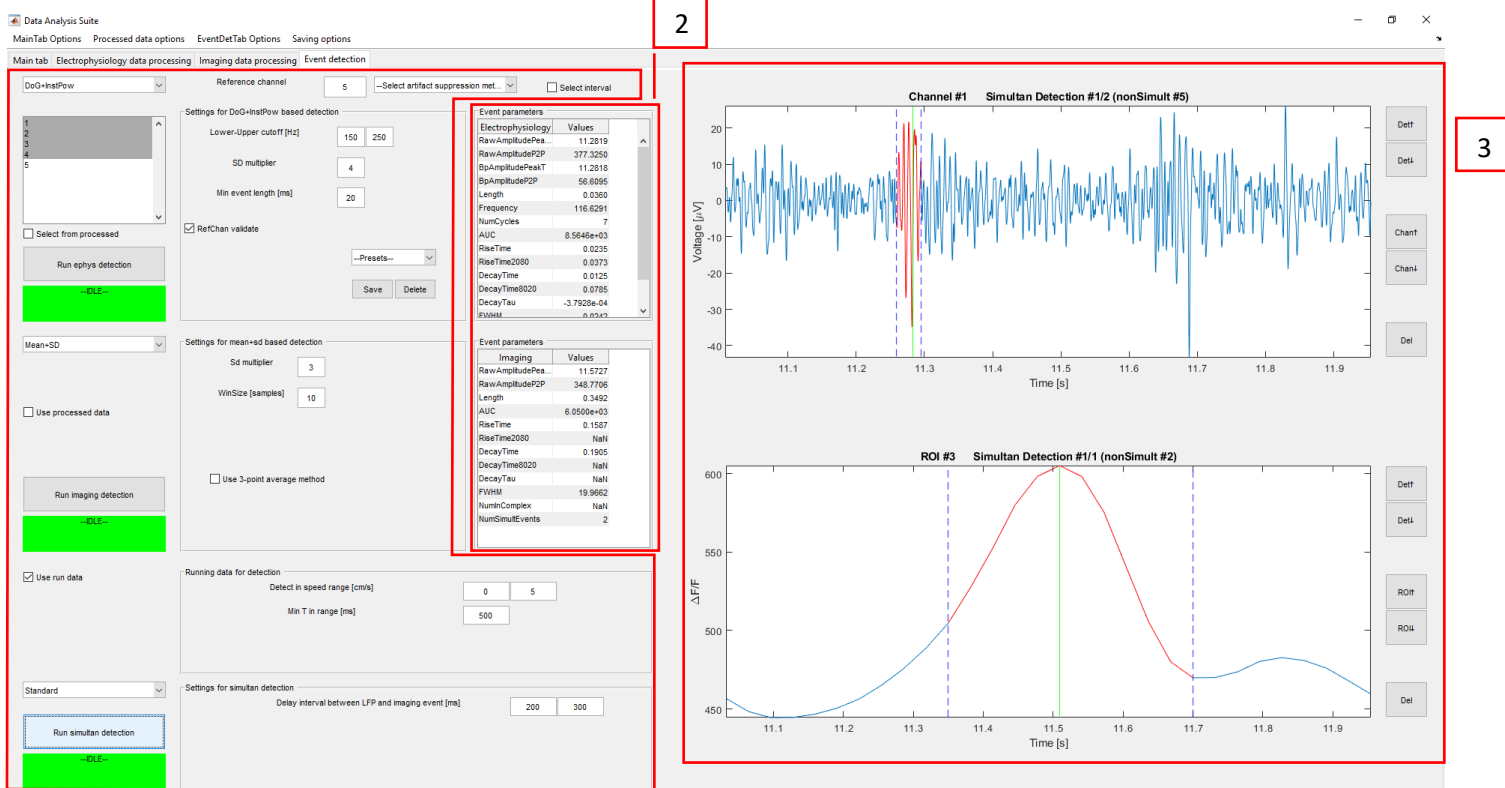


- Enable upsampling (meant for imaging data) and/or downsampling (meant for ephys data) of imported data
  - 3: Listboxes containing the imported data
  - 4: Data display section
- Data processing



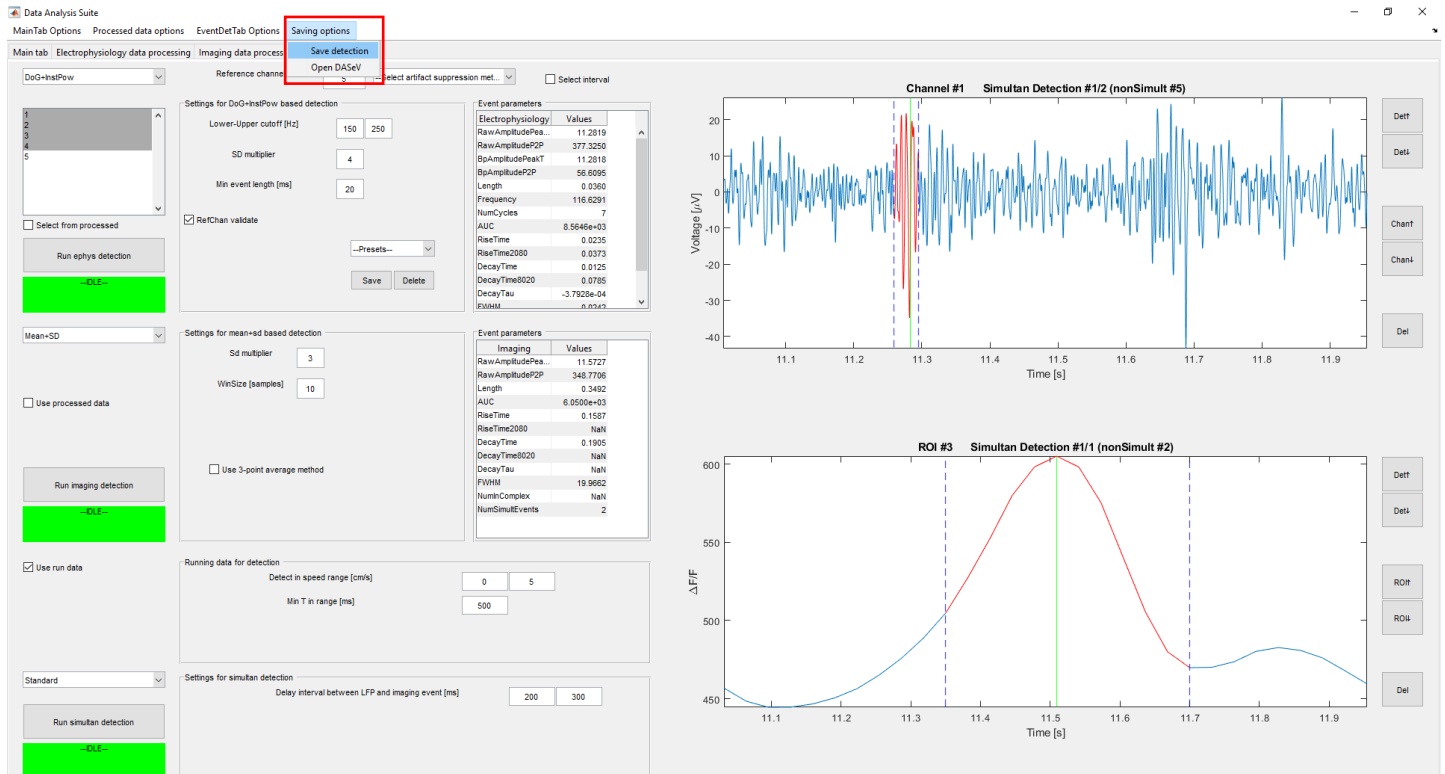
- 1: Processing setup: here you can choose what type of processing you want to do and set the required parameters
  - Using the toggle buttons you can set whether the processing will work on the raw data or data that was already processed in some way
- 2: Listboxes containing the raw and processed data

- The upper box contains the raw data
- The lower contains the processed data
  - Right click in the lower listbox to delete processed data from memory
- 3: Data visualization
  - Upper graph shows the selected raw data
  - Lower graph shows the selected processed data
- Event detection



- 1: Setup of event detection:
  - Select channel(s) for detection (only ephys)
    - There is the option to select channel(s) from the processed data in memory or to run processing before detection
    - If there are intervals in the recording which shouldn't be taken into consideration when running the detection check the "Select interval" box
  - Select detection method, and specify settings for that method
- 2: Parameters of detected events
  - Here you can see the automatically extracted parameters for the displayed event
- 3: Display of events and buttons for browsing through them and deleting them if needed

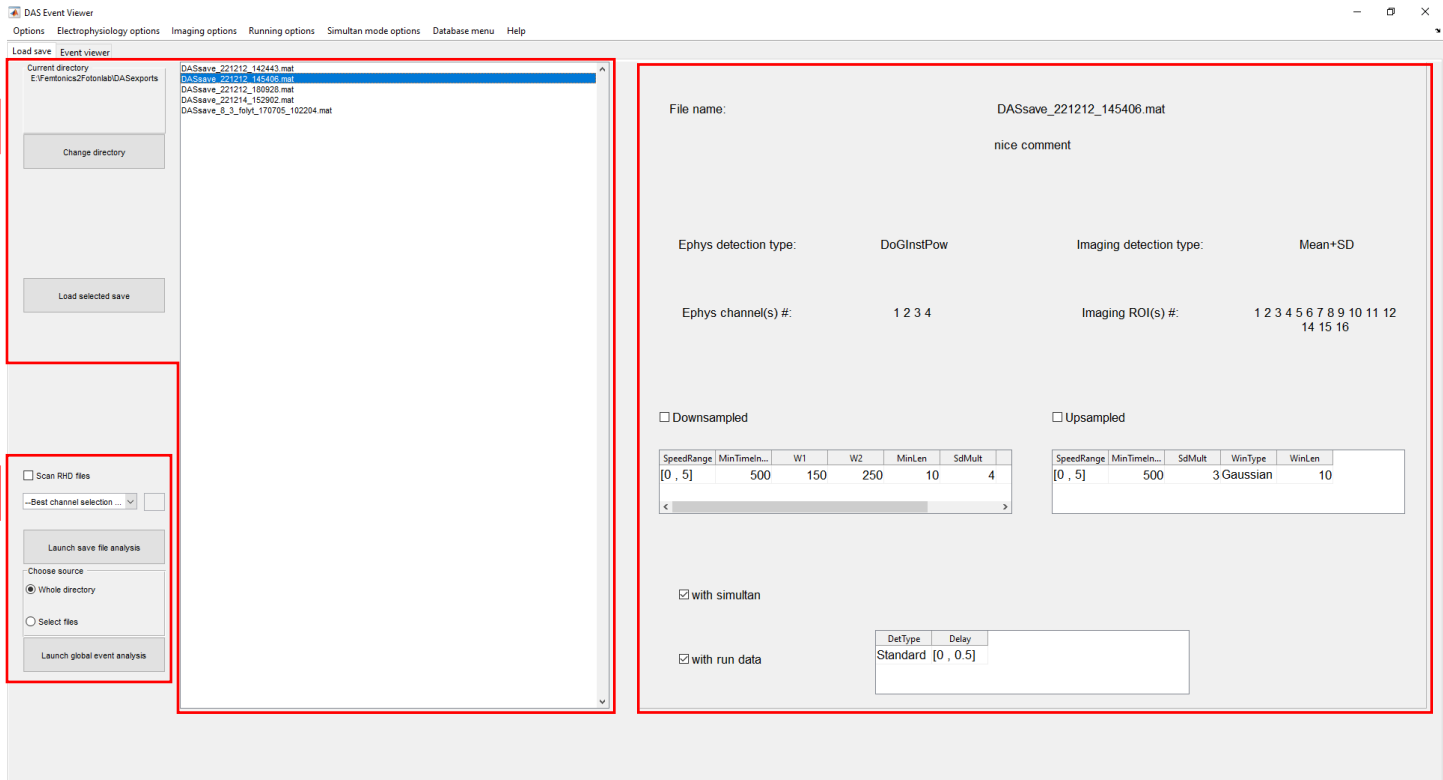
- Saving detection



- There are some options depending on what was loaded and what was used for detection
  - Which detection to save (ephys, imaging, simultaneous)
    - If simultaneous is selected both the ephys and imaging individual detections are also saved
  - Should the running data be saved
  - Should all loaded channels be saved or only those which were used in the detection
  - Choosing the name of the save file
    - There is always a tag attached to the name for easy identification later
    - If RHD was loaded, the RHD filename is used as default, otherwise the current date is the default

## GUI #2: DASEV

- Functions
  - Examining detections saved by DAS in more detail
  - Saving individual events to database
- Loading from the DAS save files



- 1: File selection part
  - Select the directory with “Change directory” → select the save file you want to load from the list → load it using the “Load selected save” button
- 2: Functions to export data to an Excel file
- 3: Information panel
  - Here you get a preview of what is in the highlighted save file

## Examining & saving events

DAS Event Viewer - DASsave\_221212\_145406.mat

Options Electrophysiology options Imaging options Running options Simultan mode options Database menu Help

Load save Event viewer

**1**

Event parameters

Electrophysiology	Values
RawAmplitudePeakT	14.1357
RawAmplitudeP2P	885.1050
BpAmplitudePeakT	14.1302
BpAmplitudeP2P	136.6633
Length	0.0467
Frequency	176.7767
NumCycles	10
AUC	2.2323e+04
RiseTime	0.0310
RiseTime2080	0.0138
DecayTime	0.0157
DecayTime8020	0.0068
DecayTau	-0.0099
FWHM	0.0264
NumComplex	NaN

Imaging	Values
RawAmplitudePeakT	14.4023
RawAmplitudeP2P	201.6970
Length	0.4127
AUC	2.5114e+03
RiseTime	0.1537
RiseTime2080	NaN
DecayTime	0.2539
DecayTime8020	NaN
DecayTau	NaN
FWHM	4.5075
NumComplex	NaN
NumSimultEvents	2
AvgSpeed	0.1548
RstPos	270.6548

**2**

Saving to database

☐ Select current ephys event ☐ w/Parallel imaging

☐ Select current imaging event ☐ w/Parallel ephys

☐ Select current simul. event pair ☐ Save running data

**3**

Channel #4 Simult Detection #1/2 (nonSimult #4) (Global event #3)

Channel #4 Simult Detection #1/2 (nonSimult #4) (Global event #3)

Channel #4 Simult Detection #1/2 (nonSimult #4) (Global event #3)

ROI #16 Simult Detection #1/1 (nonSimult #1) (Global event #2)

Running velocity

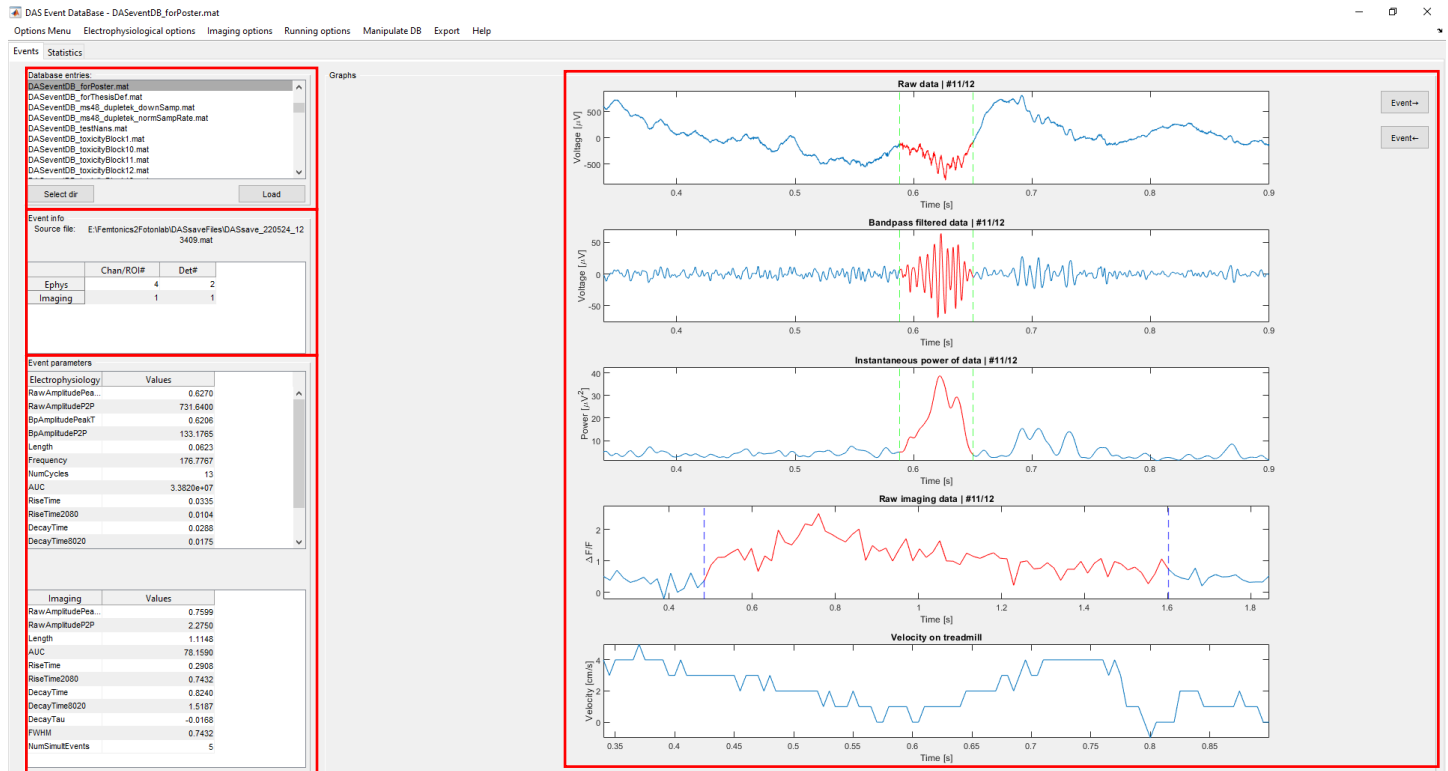
Velocity [cm/s]

Time [s]

- 1: Event parameters
- 2: Panel for selecting events to be saved to database/excel, or deleted
- 3: Graphs showing the events + buttons to step through them
  - Ephys data can be displayed in up to three different forms at once (wideband/raw, bandpassed, power)

## GUI #3: DASEvDB

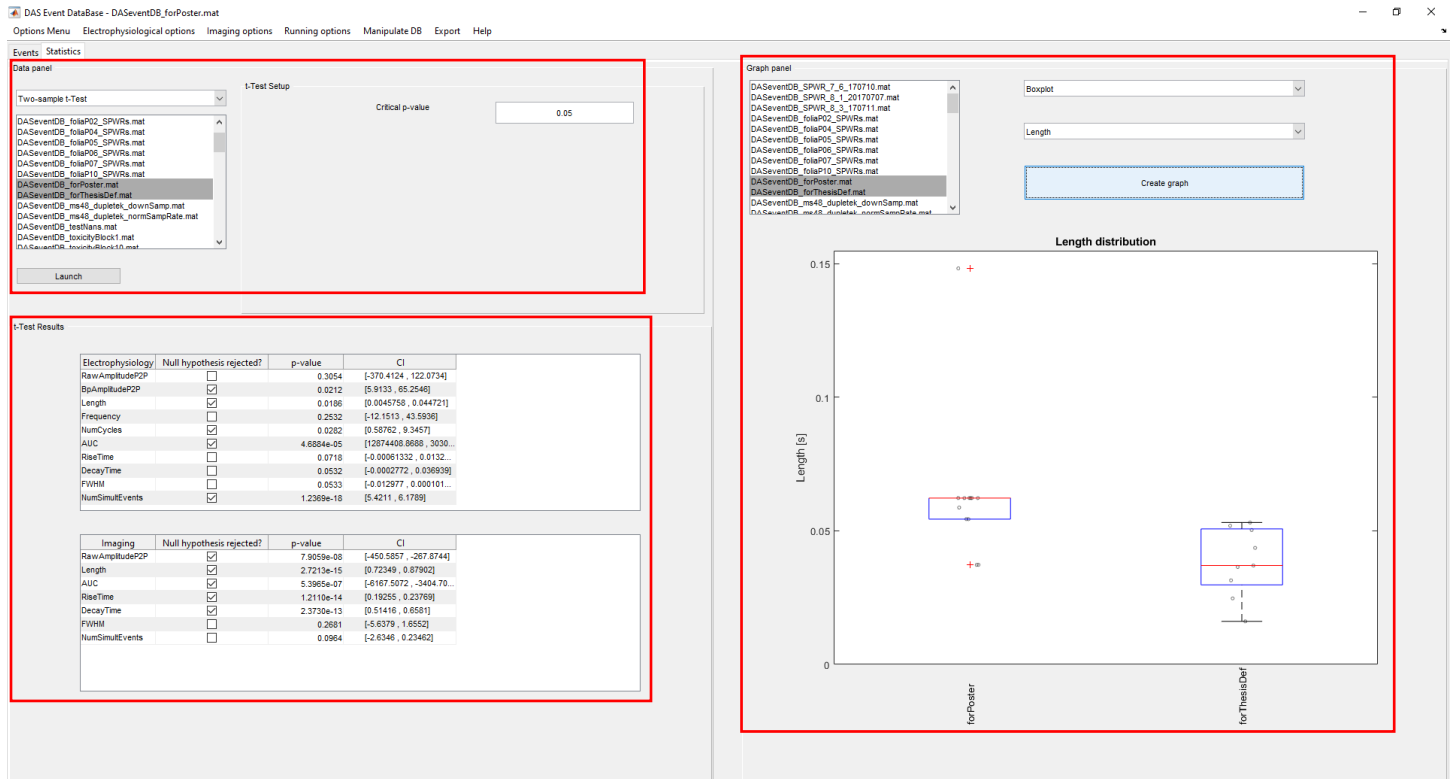
- Functions
  - Examining the event database
  - Computing statistics from the database
- Examining database



- 1: Select which group of events to load
- 2: Information on the source of the event
  - Which DAS save file it is from
  - Channel and event number in the original detection from where it was taken
- 3: Event parameters
- 4: Display of events



- Statistics



- 1: Setup for statistics computations (basic stats, t-tests)
- 2: Results of the statistics computation
  - If the selected event group contains both ephys and imaging data then the upper table shows the stats for ephys and lower the results for imaging
- 3: Statistically relevant plot generation
  - Select which group(s) you want to use
  - Select the type of plot
  - Select parameter to plot
  - Click "Create graph"