Manual for data analysis software

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Custom data analysis software used for the manuscript Fleck/Kenzler et al.: "ATP activation of peritubular cells drives testicular sperm transport."

1 Installation

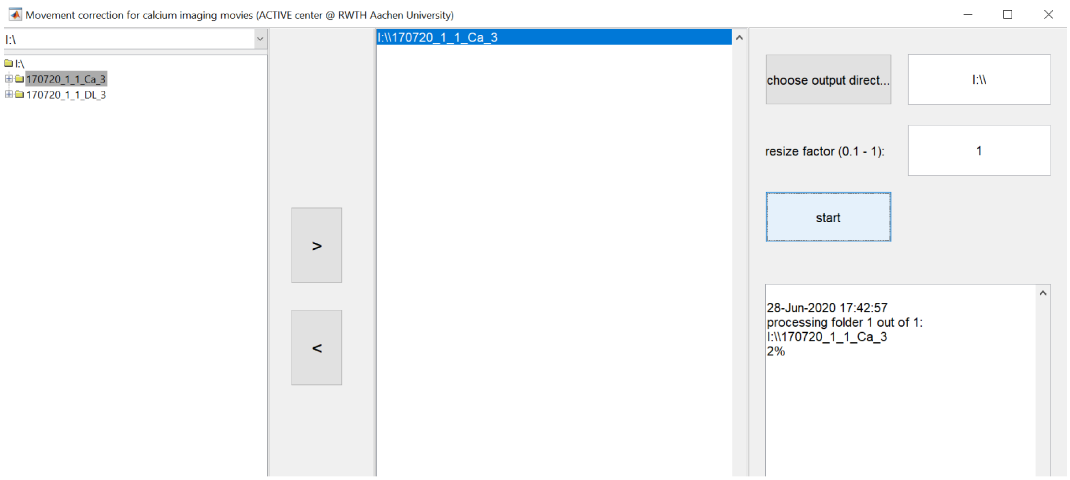
- Requires Matlab (tested with version R2018a on Windows 10), Matlab image_toolbox
- Clone the repository `https://github.com/rwth-lfb/Fleck_Kenzler_et_al`
- Download and unzip the example movies: `https://lfb.rwth-aachen.de/Fleck_Kenzler_et_al_data`
- Type "set_path()" on the Matlab command line to get started.

2 Movement correction GUI

GUI for batch registration of imaging data sets.

- **Input**: Calcium imaging or reflected light microscopy movies. Format: see the example data sets available at `https://lfb.rwth-aachen.de/Fleck_Kenzler_et_al_data`
- **Output**: Original and registered movies where movement, such as caused by contractions, has been removed.

- Type "movement_correction()" on the Matlab command line
- Use the > button to add folders with imaging data sets to the list
- Specify an output directory
- Optional: Specify a resize factor. For resize factors < 1, the images will be downscaled before movement correction. This speeds up computations and can be useful for testing.
- Press the "start" button



3 Data analysis GUI

- **Input**: Registered imaging movies as written by "movement_correction()". Original folder names with the suffix "_reg".
- **Output**: CSV files and graphics files that contain the parameters used in the manuscript.

- Type "analysis()" on the Matlab command line
- Press "open folder" and select the folder "NAME_reg". Movie windows for the individual channels (and a "ratio window" for ratiometric imaging data) will open.
- Press the red "draw ROI" button to draw a ROI on the selected movie window.
- The ROI will appear as entry in the ROI/time series window, e.g. data_ROI_2. Calcium signal (if applicable) or movement of the ROI will be displayed: use the drop box to switch between calcium signal and movement display.
- Parameters to be set: "stimulus on" time point, "period" (length of an individual measurement)
- Press the "save" button to write results to CSV and graphics files.
- Further control elements: Ratio movie and ROIs can also be loaded from external sources ("load ratio/ROIs buttons"). "PCA trajectories" refers to a visualization of movement/contractions in a PCA space (currently not used in the manuscript). The blue "background" button allows you to specify a ROI that captures a background signal.