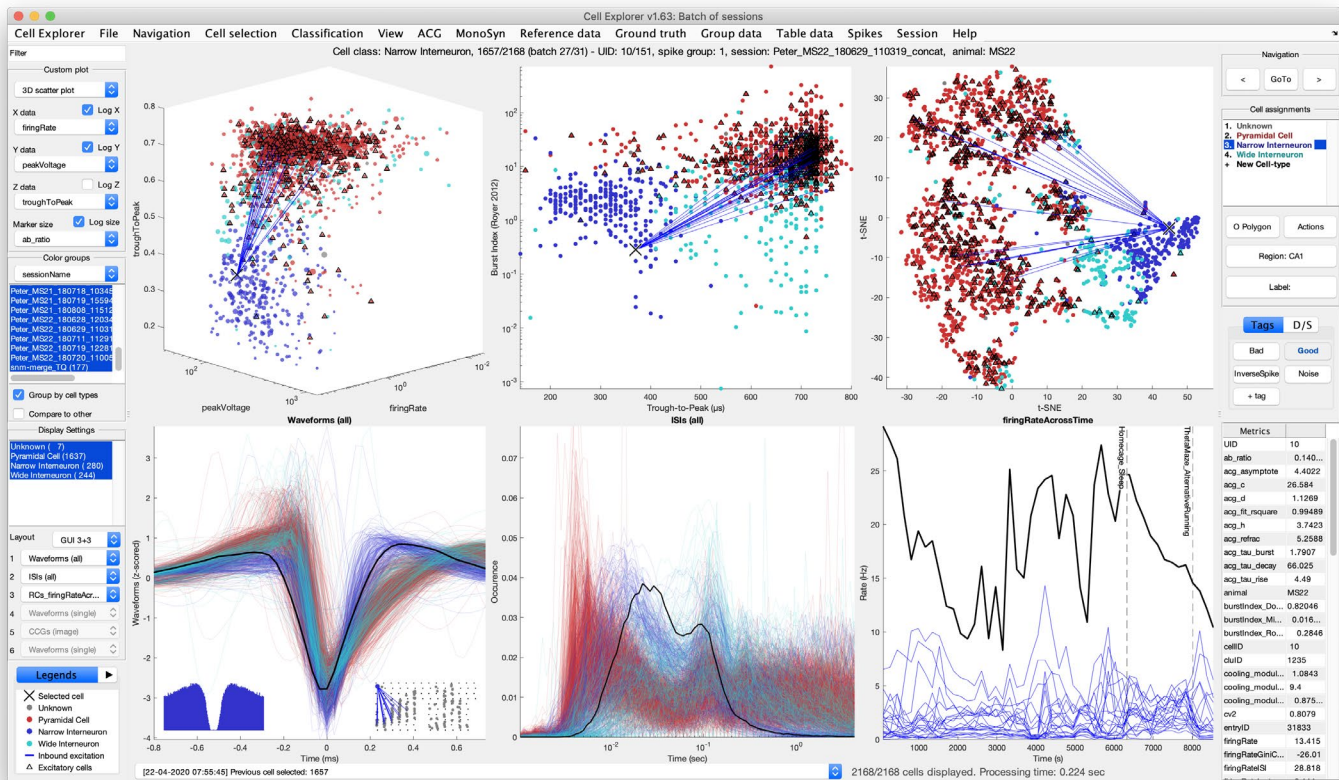


CellExplorer

Framework for analyzing and characterizing single cells



Introduction

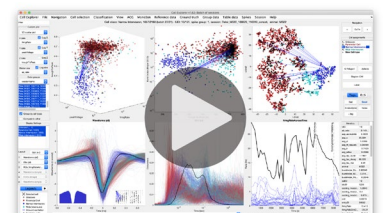
The large diversity of neuron types of the brain, with numerous unique electrophysiological characteristics, provides the means by which cortical circuits perform complex operations. To quantify, compare and visualize the functional features of single neurons, we have developed a MATLAB-based framework, CellExplorer, consisting of three components: a processing module for extracting and calculating physiological metrics, a standardized yet flexible data structure, and a powerful graphical interface for fast manual curation and feature exploration. This data mining and discovery tool allows for inspection of dozens of computed features of neurons from large-scale recordings and relate them to those of other neurons in any combination at the speed of mouse clicks. The open source design of the CellExplorer permits the optimization of its functions tested against an ever-growing community-contributed database. CellExplorer will accelerate linking physiological properties of single neurons in the intact brain to genetically identified types.

Manuscript on bioRxiv

Peter Christian Petersen, György Buzsáki (2020). CellExplorer: a graphical user interface and standardized pipeline for visualizing and characterizing single neuron features. bioRxiv 2020.05.07.083436; <https://doi.org/10.1101/2020.05.07.083436>

Visit website to learn more

<https://cellexplorer.org/>



Check out the video!

Processing module

Temporal metrics
Spike waveform metrics
ACGs, ISIs and CCGs
Monosynaptic connections
Spatial metrics
PSTHs (manipulation and events)
Brain oscillations metrics

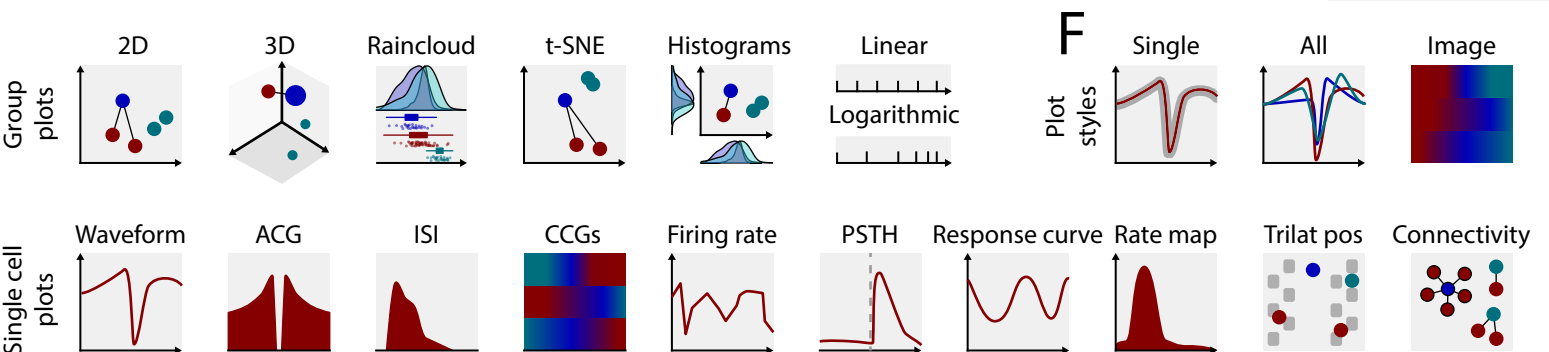
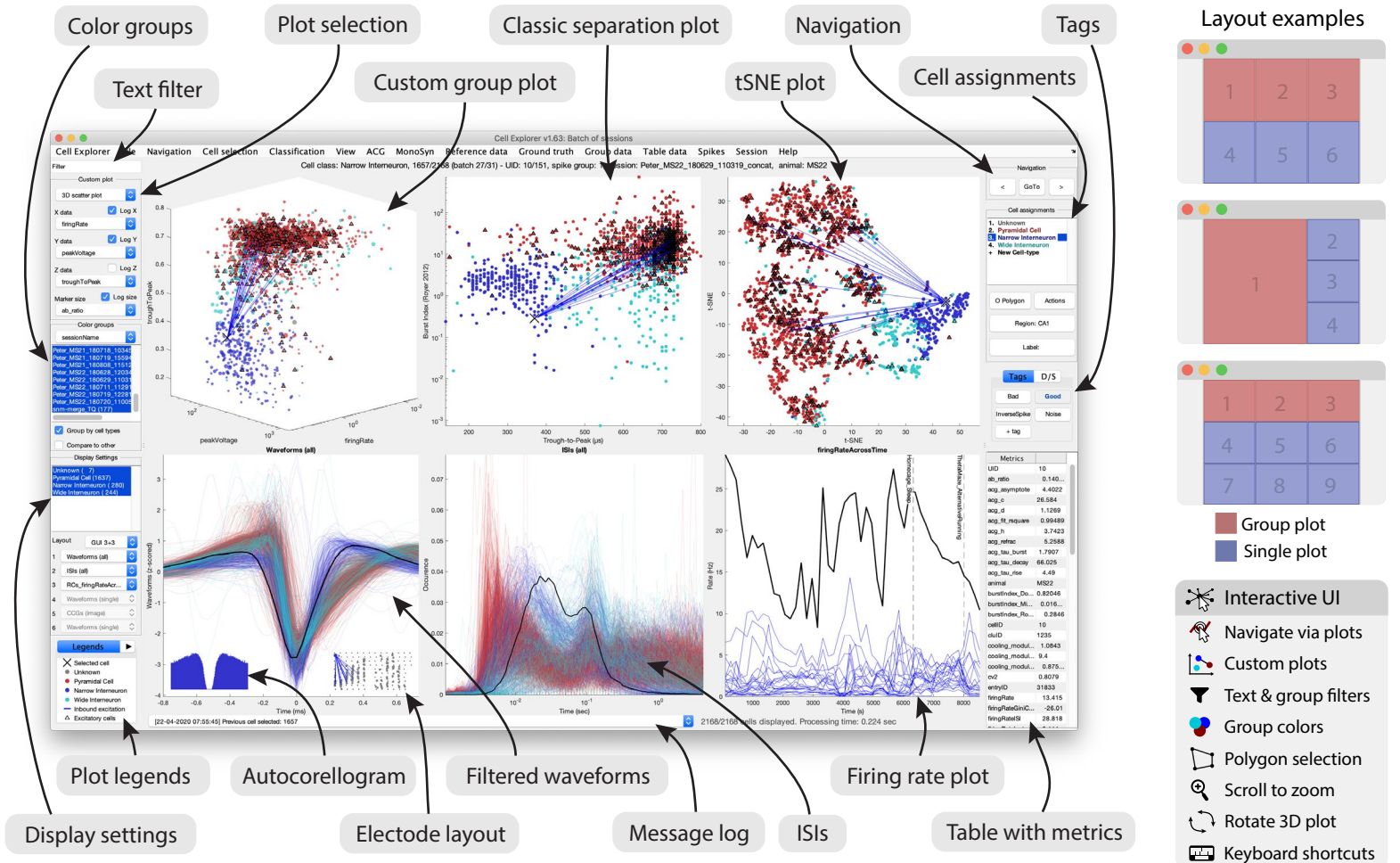
Data structure

session metadata
spikes
cell metrics
events & manipulations
behavior & trials
time series & firing rate maps
channel info & states

Graphical interface

Characterizing & visualising cells
Interactive data representations
Numerous built-in plotting styles
Reference and ground truth data
Dimensionality reduction
Operator inspection

Graphical interface



Resources

- <https://cellexplorer.org/> - CellExplorer website
- <https://github.com/petersenpeter/CellExplorer> - GitHub repository
- <https://doi.org/10.1101/2020.05.07.083436> - bioRxiv manuscript
- <https://www.youtube.com/watch?v=GR1gINhcGIY> - YouTube demo video
- <https://buzsakilab.com/wp/> - Buzsaki Lab website