

PYMEVISUALISE: A TOOL FOR THE EXPLORATION AND ANALYSIS OF LARGE 3D LOCALIZATION DATA SETS

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We present an open source software tool we have developed for the exploration and analysis of large 3D multi-colour localization data sets. This tool operates on point-position lists (post-localization) and offers hardware-accelerated visualization of the point clouds and derived surfaces. A number of different visualization modes are supported, along with multiple layers/channels, and a key-frame mechanism allows the easy generation of fly-through movies.

In addition to the visualization functions, PYMEVisualise supports a wide range of post-processing and analysis options from relatively standard tasks such as linking repeated localizations of a single molecule, drift correction, FRC analysis and the reconstruction of density maps to more complex operations such as point-wise co-clustering of different labels, analysis of fluorophore photo-physics, and the efficient extraction of iso-surfaces directly from the point-cloud data. The processing pipeline is fully scriptable, allowing consistent and automated application of individual processing steps. A plugin architecture facilitates the easy inclusion of user-defined processing steps.

We will discuss both the software itself and the novel methods used for extracting organelle surfaces directly from noisy single molecule datasets. Our software is distributed as part of the larger python-microscopy package, and is available at <http://www.python-microscopy.org>