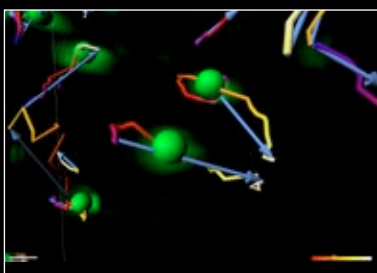
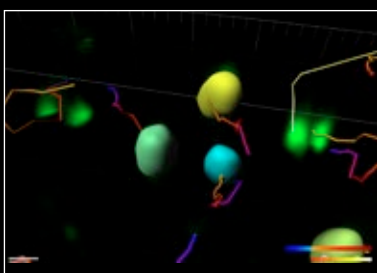


ImarisTrack - the cutting-edge scientific solution for studies of highly dynamic processes involved in intra- and extracellular traffic of cells and organelles

Monitoring these processes can be facilitated by **object detection** and **object tracking**. The first operation, object detection (segmentation), is very heterogeneous since objects can vary in size and shape. The second operation, object tracking, needs to relate objects at consecutive time points and to integrate these into a single object moving across space and time.



ImarisTrack is powered by a choice of multiple sophisticated automatic tracking algorithms and offers researchers a set of tools to support their analyses of extremely large and complex data sets. Advanced tools in **ImarisTrack** include translational and rotational drift correction, which allow users to unravel key individual events that take place within a dynamic environment, e.g. tracking a group of defined cells within a developing embryo.



ImarisTrack is fully integrated with **Imaris** to enable users to leverage its comprehensive 3D and 4D visualization capabilities as well as its image editing, processing and analysis.

Left Top: Two GFP-labeled vesicles moving in 3D+time, i.e. 4D. The track color represents time direction and the blue arrows depict vesicles' displacement (start-to-end 3D position change in 4D space).
Left Bottom : Tracking of iso-surfaces. The movement of surface objects is represented by colored paths showing their travel in 3D space across time dimension. Tracks of iso-surfaces allow analysis of statistical values such as volume, surface area, voxel intensities etc. at each time point.

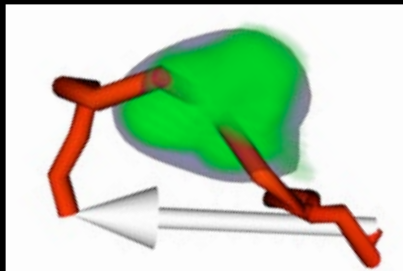
Main Image: A snapshot of a 3D+time tracking scene with GFP-labeled vesicles segmented and visualized according to their tracks' lengths.

ImarisTrack

Discover the Meaning of Motion

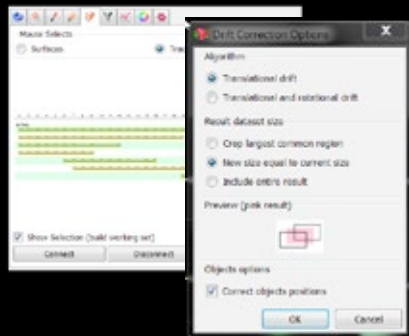
Construction

Tracks can be created from iso surfaces, spots or manually. Wizards with 3D previews help to find appropriate segmentation parameters and to automatically create tracks.



Interaction

A track is a component within the surpass view that describes the behavior of an object over time. As a surpass component, a track can be freely combined with any other component in this view (volume rendering, orthogonal slice, clipping plane etc.).

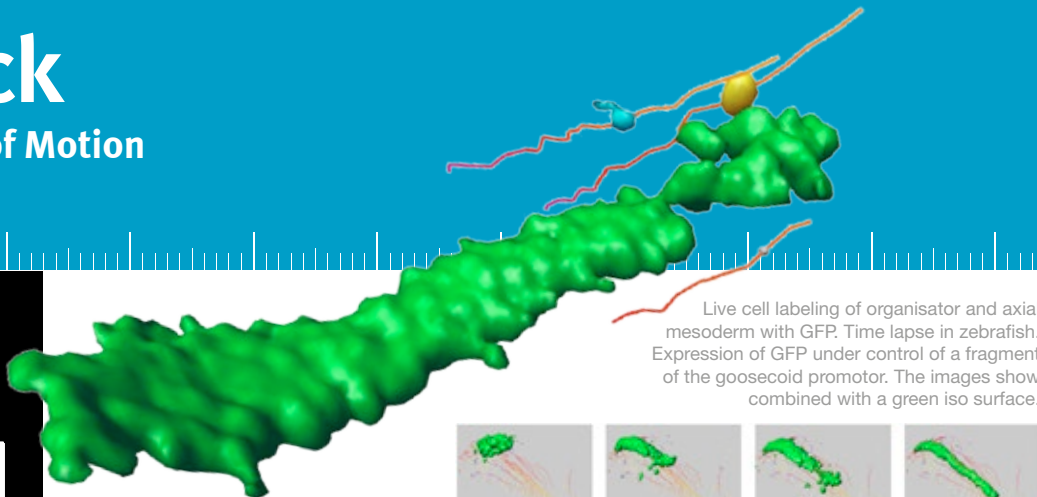
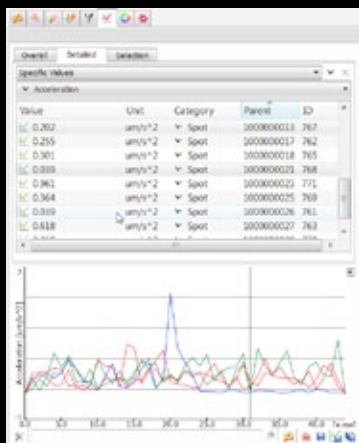


Editing

Tracks can be created, modified or deleted. A track editor allows easy modification of connections between objects. Connections can be one to one, one to many (splits) or many to one (merges). Standard techniques such as drag & drop facilitate this modification. The appearance of the path can be adjusted to visualize different properties over time.

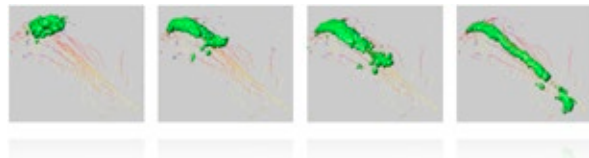
Statistics

Tracking enables users to find correlations of individual changing objects. Statistic values such as volume, surface area, sum and mean of intensities, position etc. are grouped by tracks and can be exported to Microsoft Excel.



Live cell labeling of organism and axial mesoderm with GFP. Time lapse in zebrafish. Expression of GFP under control of a fragment of the gooseoid promotor. The images show combined with a green iso surface.

Image courtesy of Dr. Dirk Meyer, Institute of Biology I, Developmental Biology, University of Freiburg, Germany.



Your Benefits

Save time by automatically identifying and tracking large numbers of Spot and Surface objects over time.

Understand and quantify various types of motion and spatiotemporal changes of key object attributes including shape, volume and intensity.

Document such changes by generating movies where camera motions and time changes occur simultaneously.

Edit tracks and correct drifts in your image stack caused by shears and torsions in the specimen or imaging systems.

Algorithms and Track Construction

- Segmentation based on thresholding or local maxima.
- Automatic track building based on overlapping regions, Brownian or autoregressive motion.
- Manual placement of spots and drawing of contour surfaces.
- Manual track building and editing by defining connections between temporally related objects (Surfaces or Spots).

Measurements

- Track-specific statistical values – including duration, length and displacement.
- Time-dependent statistic values – changes in size, shape and intensity over time.
- Filtering and classification of individual objects or object groups with **Imaris MeasurementPro**.
- Data export - track statistics can be exported as .csv, Excel .xml or .xls files.

Visualization

- Visualize the track using a line for high contrast or a shaded cylinder.
- Highlight the shortest path between the start and the end points with displacement.
- For display clarity, show only selected time points of track as a dragon tail.
- Color-code tracks according to specific statistical values with **Imaris MeasurementPro**.
- Create key-frame animations or figures using **Imaris'** outstanding versatility.

Editing

- Track editing – add, delete, merge, connect and split selected track objects.
- Translational and Rotational Drift Corrections – track objects in an image and make them stationary if unwanted drift(s) are present in your data.
- Single spot object tracking – save on computation time and simplify display with single spot objects tracking.

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Software requirements

ImarisTrack requires **Imaris** and **Imaris MeasurementPro** for statistical output. Obtaining statistical data for original image and Cells or Filaments objects requires **ImarisCell** and **FilamentTracer**, respectively.

Operating system requirement

ImarisTrack runs on PCs with Microsoft® Windows® XP, Vista, 7 (32 and 64-bit) and MacOS (10.6 or later).

Windows systems - we recommend using 64-bit OS with 16GB RAM, 3.3 GHz (or faster) quad-core CPU with 64-bit support.

Mac systems - we recommend using Intel 2.8 GHz (or faster) quad-core CPU and 16GB RAM

Graphics boards - ATI/nVidia graphics card with 512 MB RAM. For full list of supported hardware please visit bitplane.com/go/support/system-requirements