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.).

Editings
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.

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.

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

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 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.

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 and 64-bit support.
Mac systems - we recommend using Intel 2.8 GHz (or faster) quad-core CPU and 16GB RAM
Graphics boards - ATI/Avidia graphics card with 512 MB RAM. For full list of supported hardware please visit bitplane.com/go/support/system-requirements.

Email us at: welcome@bitplane.com
bitplane.com

America
Bitplane Inc.
425 Sullivan Avenue
Suite #3, South Windsor
CT 06074, USA
Tel: 1 (860) 290-9211
Email: uussales@bitplane.com

International
Bitplane AG
Badenerstrasse 682
CH-8048 Zürich
Phone: +41 44 430 11 00
Fax: +41 44 430 11 01
Email: sales@bitplane.com