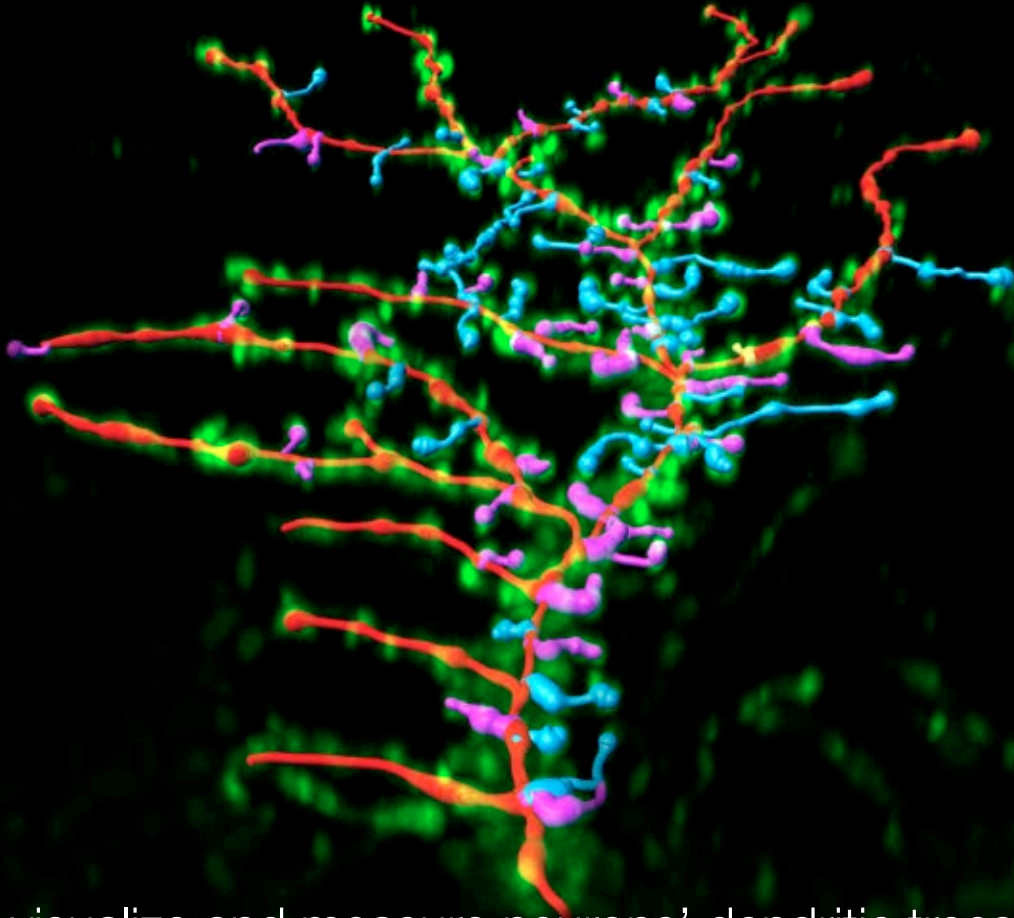


FilamentTracer

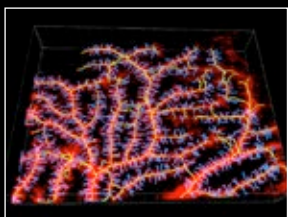
The Intelligent Way to Visualize and Measure
Filamentous Structures



Detect, visualize and measure neurons' dendritic trees, axons, spines and microtubules. FilamentTracer is the most advanced software product for the automatic detection of filamentous structures in 2D, 3D and 4D



FilamentTracer is fully integrated with **Imaris**, enabling users to leverage its impressive range of 3D and 4D visualization capabilities as well as its image editing and processing and analysis functions all in one window. The ideal combination for **FilamentTracer** is **Imaris MeasurementPro** for measurement of distance, volume and intensity changes. When combined with **ImarisTrack**, the **FilamentTracer** becomes a tool for detection and analysis of temporal changes in length and volume of developing spines and dendrites caused by developmental and environmental factors. Together with **Imaris XT** it can be taken even further and spines can be classified by diameter, size, shape or any other parameter that is calculated by **FilamentTracer**.

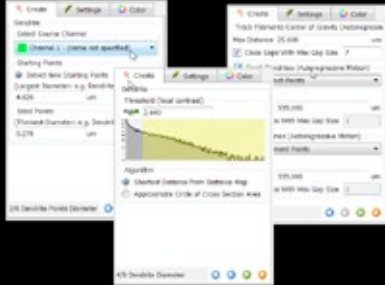


Left Top: A 3D image of Purkinje cell visualized with Easy3D projection in Imapris prior to tracing and segmentation analysis.
Left Bottom: The same cell traced in FilamentTracer and rendered to display dendritic filaments and numerous smaller dendritic spines protruding from main filaments. Images courtesy of Yvonne Clarkson and Mandy Jackson at the University of Edinburgh.

Main Image: A GFP-labeled neuron traced and visualized in FilamentTracer highlighting several classes of dendritic spines (purple, blue and yellow) color-coded by Spine Classifier XTension in ImaprisXT. Image courtesy of Miso Mitkovski at MPI-ern Goettingen.

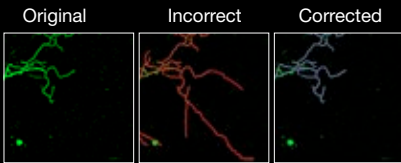
FilamentTracer

The Intelligent Way to Visualize and Measure Filamentous Structures



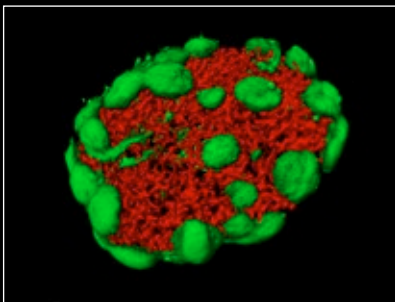
Construction

The creation wizard helps choosing the optimal parameters for the automatic filament detection. During this selection process all modules of Imaris and Surpass are available as a preview for intermediate results.

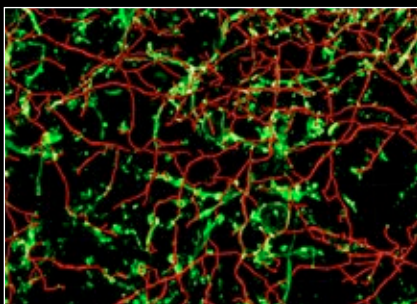


Control and Quality

Use the powerful creation wizards to correctly detect filamentous structures, even when the image quality is sub-optimal. Use the "Remove Disconnected Segments" option to dynamically improve the quality of your automated detection analysis protocol.



Lymph node visualized in FilamentTracer. Vessels (red) have been traced to give insights into the filamentous network while B-cell follicles (green) were detected with Surfaces.



Tracing the meshwork of filaments. Myelin is seen here labelled green and partly overlapping with the neuronal processes (red). Image courtesy of Denise Fitzgerald and Craig Ledgerwood from the Johnston group at Queens University Belfast.

Your Benefits

Increase accuracy of visualization and measurement for all kinds of filamentous components of your specimen.

Save time by automatically detecting and segmenting these structures.

Retain full control over the automatic filament detection process (i.e. start and mid points, diameter, max gap between disconnected filaments).

Reveal information about the topology (e.g. branching and connectivity) of the filaments. Use the results of **FilamentTracer** as input for additional downstream analysis.

Augment your analyses with **Imaris MeasurementPro**, **ImarisTrack** and **ImarisXT** for the most challenging and complex filament data processing.

Filament Detection

- Segmentation based on connectivity and intensity.
- Dynamic control over the maximum gap allowed between disconnected filament segments.
- Automatic, Auto-Path, Auto-Depth and manual filament tracing.
- AutoNetwork tracing mode maps out the connectivity network and allows for rapid and time-saving changes of traces.
- Waypoints for filament tracing through specified key locations

Measurements

- Statistical values – including neuroscience-specific dendrite thickness and volume, spine length and density, branch level, Scholl analysis as well as other, non-neuroscience statistics.
- Analyze filaments in 3D+time (4D) - examine changes over time with **ImarisTrack** in any statistical parameter calculated.
- Filtering and classifying of individual objects or object groups with **Imaris MeasurementPro** and **ImarisXT**.
- Data export - filament statistics on branch points and segments can be exported as .csv, Excel .xls or native Excel .xls files or to selected modelling programs (neuron).

Visualization

- Visualize filaments using any of the **Imaris** surpass objects to show surrounding cellular or tissue components and superimpose filaments over the original volume rendering.
- Display filaments as lines or constant-width cylinders or real-diameter cylinders (showing the actual diameter measured from the structure).
- Create advanced and informative key-frame animations and movies for your presentations.

Interaction / Editing

- Selection and modification of individual segments, entire branches or single points as well as loops or segments based on sizes. Automatically select loops and smaller branches.
- Filament processing – manual and automatic merging, splitting, smoothing of filaments and segments.
- Selection processing – traced components can be deleted, joined and centered or have their diameter matched to the original data.
- Classifications – define segments as dendrites or spines, classify them as distinct points (e.g. branching points) and combine with **ImarisXT** spine classifier.

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Software requirements

FilamentTracer requires **Imaris** and **Imaris MeasurementPro** for statistical output. **ImarisTrack** is required for tracking filament objects in 4D and **ImarisXT** can be added for customer-specific analyses and classifications involving **MatLab** scripts.

Operating system requirement

FilamentTracer 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