IMARIS

At the cutting edge of 3D and 4D interactive analysis and visualization in various application fields

Imaris for 3D Visualization, Measurements, Tracking and Interactive Data Analysis

• Reconstruct your images in 3D (datasets over 50 GB supported).
• Precisely detect objects using one of more of the wizard-driven segmentation tools in Imaris: Surfaces, Spots, Cells or Filaments.
• Calculate size and shape parameters, signal intensity, and relative position in space for all detected objects.
• Track objects over time (4D tracking) using the highly reliable Imaris algorithms.
• Display motion related parameters: speed, displacement vectors, track straightness.
• Check colocalization of fluorescent signal from various components in 3D over time.
• Use interactive 5D plots (x, y, z, color, scale) to discover hidden relationships.
• Automate your workflow by using the same image analysis settings for similar datasets.
• Present results in an engaging and recognizable way by creating stunning snapshots and video animations.

Operating system requirements

• Imaris runs on PCs with Microsoft Windows XP, Vista, 7 and 8 (64-bit), and MacOS (10.6 or later)
• Windows systems – we recommend using 64-bit OS with 16 GB RAM, 3.3 GHz (or faster) 4 Core CPU with 64-bit support
• Mac systems – we recommend using Intel 2.8 GHz (or faster) CPU and 16 GB RAM
• Graphic boards – ATI Radeon HD 7950 3072 MB.

For the full list of supported hardware please visit bitplane.com/go/support/system-requirements

Imaris Infinity

Find out more today at bitplane.com/infinity

Much more than a maintenance contract

Each Imaris licence contains a one year Infinity contract, which includes:

• Two upgrades per year to the latest and most advanced version of Imaris
• On-site training and remote Imaris support including*:
  • Imaris Open Day (on-site)* - benefit from dedicated, expert hands-on advice and training in your laboratory or imaging center
  • Video conference with a Bitplane scientist* - learn about advanced features of Imaris and new ways to analyze your data
  • Priority Technical and Applications Support, including video and printed tutorials
  • Priority access to the annual Imaris User Group Meeting (attendance fee required)
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Case Study: 3D Visualization and Measurements

Imaris was used to create a 3D image reconstruction of bacterial colonization (*Burkholderia terricola*) of sugar beet roots. Fluorescence signal was represented by Surfaces (blue – root) and Spots (color coded based on size of the bacteria) in 3D space, which enabled detailed measurements of size, shape and relative location of objects (distance between the root surface and bacteria).

**Keywords:** Environmental sciences, Ecosystem functions, Rhizosphere processes, Root colonization, 3D models, Space measurements, Surface rendering, Spots rendering


Case Study: Particle tracking in 3D

The highly reliable tracking algorithms of Imaris were used to evaluate changes in asphalt concrete microstructure under accelerated pavement tests. The original X-ray CT image was analysed with Surfaces which were then tracked over time (4D). Aggregates in asphalt concrete were represented as Surfaces colored according to their area. Distribution of displacement vectors is shown (red/blue arrows) for the aggregates after pressure was applied (HVS - Heavy Vehicle Simulator).

**Keywords:** Engineering, Performance prediction models, X-ray tomography, Concrete, Material science, 3D particle segmentation, 3D tracking, Vantage

Case Study: 3D Particle tracking and motion analysis

Imaris was used to visualize the interactions between filamin A (FLNa) and the hemokine receptor CCR2B in dynamic membrane structures. The left image shows cells expressing FLNa-GFP (green) and surface representation of nucleoli (blue). The right image shows CCR2B (red dots) tracked in 3D (track color represents time).

Keywords: Cell Biology, Particle tracking, 3D

Reference: Planaguma J, Aragay AM et al. PloS one 2012; 7(8), e40864

Case Study: Analyze dendritic spines in 3D, provide detailed measurements

Imaris was used to study the 3D morphology (shape, length, volume) of thousands of dendritic spines from a sample of human brain cortex. Spines could be further classified based on predefined shape parameters. The image on the right shows a dendrite (green) with spines color-coded based on spine volume and length measurements.

Keywords: Neuroscience, Spine Analysis, Segmentation

Reference: Benavides-Piccione R et al. Cerebral Cortex 2013; 23(8):1798-1810
Case Study: Quantitative analysis of solid-in-oil nanodispersions in 3D

Imaris was used to reconstruct a skin sample in 3D (blue); the left and central image represent a Surface reconstruction (green Surfaces - bovine serum albumin (FITC-BSA) and red Surfaces – TRICT-IPM oil). On each image the combination of green and red channels is shown as brown. The image on the right is a side view of the skin sample where the penetration of FITC-BSA and oil-TRICT is easily detected.

**Keywords:** Nanotechnology, Molecular dynamics of nanodispersions, Protein delivery systems, Surface rendering, 3D image reconstruction


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Case Study: Analyze material structure using image reconstruction in 3D

Comprehensive, multi-modal characterization of materials is a key process in understanding the three-dimensional structure of samples. Imaris 3D image reconstruction and Surface object detection were used to inspect multi-modal images. The images combined the use of focused ion beam (FIB) / scanning electron microscopy (SEM) with X-ray spectrometry. Imaris enabled scientists to analyze various parameters and visualize the smallest defects (corrosion sites and other structural discontinuities) in materials.

**Keywords:** Material science, Tomographic spectral images, Phase distributions, 3D image reconstruction

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