

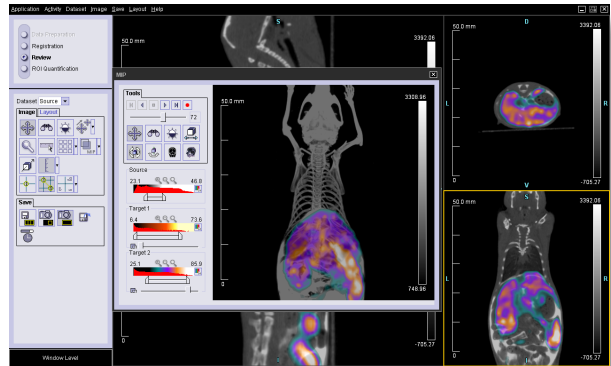
**SIEMENS**

# Inveon Research Workplace 4.0

Product Specifications

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## Inveon Research Workplace

Inveon Research Workplace is a powerful multimodal image review, fusion and analysis package. Its comprehensive tools and integrated approach to workflow design make it a total solution for researchers using CT, PET, SPECT and MR image data to conduct all types of preclinical research. Its focus is to maximize productivity by addressing three crucial steps in the preclinical imaging workflow—(1) Image Visualization, (2) Image Analysis and (3) Collaboration—and create an intuitive transition from one workflow step to the next.

Inveon Research Workplace is available in three configurations ranging in functionality from standard data review and analysis to complex 3D segmentation and kinetic modeling. The configurations can be tailored to users' specific application needs and are fully upgradeable to easily adapt and grow as their research needs develop.

## Inveon Research Workplace 4.0 Standard Package

The Standard Package is the foundation of Inveon Research Workplace. This module is designed to increase research efficiency by consistently performing every step of the image visualization and analysis process. Its easy-to-use tools are presented in an intuitive interface, enabling users to analyze static, gated and dynamic data quickly and easily. To streamline analysis, users can load and register up to three different data sets simultaneously, while producing repeatable and reliable results.

The Application Programmable Extension (APEX) toolkit within Inveon Research Workplace provides an interface that enables users to create new equations for custom applications that can be saved, recalled and shared with other researchers.

The APEX toolkit also comes with built-in automated segmentation routines for use with common applications. A user-programmable interface enables users to design their own automated segmentation routines and applications. This gives Inveon Research Workplace users the unique ability to easily share data between many standard analysis programs and to create their own custom applications. Inveon Research Workplace is designed for easy interfacing with other software packages with built-in support for launching third-party software.

## Functions

Visualization
Easy image review and region of interest (ROI) segmentation
Automatic registration, for up to three datasets simultaneously
Quick launch import with simple double-click and drag-and-drop functionality
Maximum Intensity Projection (MIP) and Fusion MIP capabilities for all supported data types
ROI display on MIP
Dynamic data creation from a series of static images
Easy data rotation, cropping and arbitrary reorientation
Comprehensive visualization tools, including selectable orthogonal views, gallery views, cine modes and support for complex data types, such as dual-gated dynamic imaging studies

Quantification and Analysis
ROI statistics, including: mean, max, min, standard deviation
Activity concentration in nCi/cc or Bq/ml
Percentage of injected dose per gram (%ID/g)
PET Standard Uptake Value (SUV) (body weight, body surface area, lean body mass)
Time Activity Curve (TAC) analysis
Colorbars and scale bars on display and snapshots
User-defined color maps
Ruler for measuring linear distances
Line profile plots

ROI Tools
ROI Math tool (APEX Toolkit) for creating custom equations for use with regions of interest
Image Math tool (APEX Toolkit) for performing volumetric voxel by voxel calculations on image data
Automatic segmentation (APEX Toolkit), including rodent heart segmentation and advanced thresholding
Threshold tool allowing image thresholding and thresholding within an ROI-based compartment
Fixed shape: circle, ellipse, rectangle, sphere, ellipsoid, cuboid, cylinder

## ROI Tools (continued)

Easily transfer regions drawn on one supported modality to another for analysis
Seed point ROI for generation of an ROI based on characteristics of specified point
General editing functions including addition of voxels, erasure, adjustment of color, transparency and reshaping a defined region
Erosion, dilation, island and void removal within segmented regions
Duplicate ROIs
ROI arithmetic operations for combining, subtracting or finding intersects of ROIs
Contour tool for drawing and tracing complex regions
Limit line definition to create 2D boundaries
Atlas support for group rotation/translation/resizing of ROIs
Dictionary of predefined ROI names
TACs can be plotted from ROIs drawn in dynamic datasets

Collaboration
DICOM 3.0 compliant data from DICOM database or Quicklaunch
DICOM query/retrieve and DICOM "push" via network with SCP/SCU functionality
Full screenshots of data and individual orthogonal views
Full screenshots at custom resolutions
ROI data as image file or CSV
Full ROI voxel data as CSV
Time activity curves as image file or CSV
Full export of calculated volumes from the Image Math tool (APEX Toolkit)
Flexible data import through DICOM Retrieve, Folder Search, File Import or Raw Data Converter

## Applications

### Oncology

Tumor segmentation with quantitative analysis (SUV, %ID/g, Bq/cc, nCi/cc)

Disease progression tracking

Treatment efficacy monitoring

Necrotic core segmentation

Linear measurements for estimates of disease staging

Dynamic image analysis with time activity curves

Analysis of novel tracers

### Cardiology

Analysis of gated and dual-gated cardiac images

Orientation of the heart along desired axis

Cardiac uptake using dynamic, dynamic gated or dynamic dual-gated imaging

Collection of data for use in calculating glucose SUV, ejection fraction and (heart weight / body weight) ratio

Analysis of myocardial infarction

Analysis of atherosclerotic plaques or inflammation due to plaques

### Bone Research

Track changes in bone development or treatment

Basic bone segmentation

Bone erosion due to inflammation

Fetal skeletal evaluation

### Drug Discovery

Cell trafficking

Treatment effects tracking

Effect monitoring of receptor uptake

### Neurology

Receptor binding studies

Alzheimer's research

Parkinson's research

# Pharmacokinetic Modeling Option

Researchers who need more in-depth analysis of their dynamic data can extend the core kinetic analysis capabilities of Inveon Research Workplace with the addition of the pharmacokinetic modeling module. This option gives users from diverse backgrounds the ability to perform pharmacokinetic modeling and parametric mapping using nine standard pharmacokinetic models fully integrated within the kinetic analysis workflow.

The pharmacokinetic modeling module's intuitive interface makes it ideal for users with little or no experience in kinetic modeling, and can create opportunities that may not have been possible for labs with other software packages.

## Functions

Visualization
Model-fitted data
Parametric maps of model-fitted regions of interests and volume data

Quantification and Analysis
Extended kinetic analysis functionality (compared with standard package)
Time to maximum mapping function for protocol optimization and other analysis
Advanced options and customizable parameters enable more control over individual models

Collaboration
Export model-fitted data as standard image file
Export model-fitted data in CSV form for sharing between applications

## Applications

Oncology
Perform pharmacokinetic modeling of tracer uptake in tumors
Model tracer metabolism studies
Parametric mapping
Time-to-maximum calculations
Glucose transport and phosphorylation

Cardiology
Perfusion analysis
Myocardial uptake

Neurology
Receptor ligand studies (neuroreceptor studies)
Receptor binding

Drug Discovery
Efficacy of novel compounds
Dosage and protocol optimization
Pharmacokinetics of novel compounds

Nine Standard Pharmacokinetic Models
Two-Compartment Reversible
Two-Compartment Irreversible
Multi-Exponential
Simplified Tissue Reference
One-Compartment
Patlak
Reference Patlak
Logan
Reference Logan

# 3D Visualization and Analysis Option

The powerful suite of tools in the 3D Visualization and Analysis option lets users define regions of interest and perform complex volumetric segmentation for 3D surface rendering and quantitative analysis of multiple static or dynamic volumes of CT, PET, SPECT, and MR modalities. Available as a native 64-bit application, the software is capable of displaying large data sets, limited only by the amount of memory installed on the workstation, and can create impressive 3D renderings and generate publication quality images. The package also includes a specialty application tool for analysis of bone images using a series of standard trabecular bone parameters. The bone imaging tools can also be utilized for angiogenesis research applications as they are able to measure neo-vascularization parameters such as vascular density, vessel spacing and number.

## Functions

Visualization
Multimodality 2D and 3D volume-rendered data
Surface-rendered segmented organs

Quantification and Analysis
Comprehensive region and volume of interest statistics
Integrated bone morphometry toolset for analysis of basic trabecular bone metrics

Collaboration
Publication-ready image files and eye-popping movies of plane clipping and rotating 3D or 4D objects
Segmented regions for use in other IRW modules

## Applications

Oncology
Volumetric tumor segmentation and rendering within image volume

Neurology
Anatomical brain reference using contrast
Whole brain segmentation

Bone
Bone morphometry
Trabecular bone analysis
<i>In vivo</i> bone development
Implant research

Trabecular Bone Parameters:
Ratio of total trabecular bone volume to total tissue volume (BV/TV)
Ratio of trabecular bone surface area to trabecular bone volume (TSA/TBV)
Trabecular thickness
Trabecular number
Trabecular spacing
Trabecular pattern factor
Cortical wall thickness

## Inveon Viewer Option

Inveon Viewer provides users with a set of visualization tools for simple review of image data. Inveon Viewer is installed as a standard item on the acquisition workstation for Inveon imaging systems, which enables ready visualization of image data immediately after image reconstruction. Inveon Viewer facilitates easy sharing of data between users of Inveon Research Workplace and their collaborators. This software enables generation of consistent quantitative results between analysis performed on a primary Inveon Research Workplace workstation and the Inveon Viewer. For current users of Inveon Research Workplace, Inveon Viewer is an optional solution available for purchase.

### Functions

#### Visualization

On demand viewing of image data

MIP, Fusion MIP and ROI display on MIP

#### Quantification and Analysis

Create, edit and save ROIs

Generate ROI statistics

#### Collaboration

Easily share data with collaborators using a common analysis platform

Customer controlled licensing system for easy and flexible delivery of viewer software

Siemens and DICOM 3.0 formats supported for a wide range of compatibility

## Inveon Research Workplace Product Comparison

	IRW Standard Package	Pharmacokinetic Option	3D Visualization Option	Inveon Viewer
Multimodal Image Review	✓	✓	✓	✓
DICOM 3.0 Compliant	✓	✓	✓	✓
Multi-OS Support	✓	✓	✓	✓
Automatic Registration	✓	✓	✓	
MIP & Fusion MIP	✓	✓	✓	✓
ROI on MIP Display	✓	✓	✓	
Quick Launch	✓	✓	✓	✓
Comprehensive ROI Tools	✓	✓	✓	✓
Interactive Thresholding ROI Tool	✓	✓	✓	
Image Math (APEX toolkit)	✓	✓	✓	
ROI Math (APEX toolkit)	✓	✓	✓	
Automatic Segmentation (APEX toolkit)	✓	✓	✓	
Programmable Interface (APEX toolkit)	✓	✓	✓	
Time Activity Curves	✓	✓	✓	
RAW Data Converter	✓	✓	✓	
Static to Dynamic Converter	✓	✓	✓	
Image Cropping	✓	✓	✓	
Atlas Support	✓	✓	✓	✓
ROI Dictionary	✓	✓	✓	✓
3rd Party Application Support	✓	✓	✓	
Pharmacokinetic Modeling		✓		
Parametric Review		✓		
3D Segmentation			✓	
3D Volume Rendering			✓	
Bone Morphometry Tools			✓	
Customer Controlled Licensing				✓

## Minimum Recommended Workstation Configuration

**Operating System:** Microsoft Windows XP Professional x64 Edition or Microsoft Windows XP Professional Edition, Service Pack 2

**Processor:** Dual core Intel or AMD processors. Recommended configuration - Dual quad-core Intel or AMD processors

**Memory:** Minimum 2 GB DDR-SDRAM. Recommended - 32 GB DDR-SDRAM

Inveon Research Workplace is certified for use with the following graphics cards:

- NVIDIA Quadro PCIe graphics cards: models FX3400, FX3450, FX4400 or FX4500, with graphics driver: NVIDIA driver 81.67 or higher
- NVIDIA Quadro FX2500M (mobile) with graphics driver 156.83 or higher (e.g. Dell M90 laptop)
- NVIDIA GeForce GTX 280/285 and GTS 250 with graphics driver 186.18 or higher



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