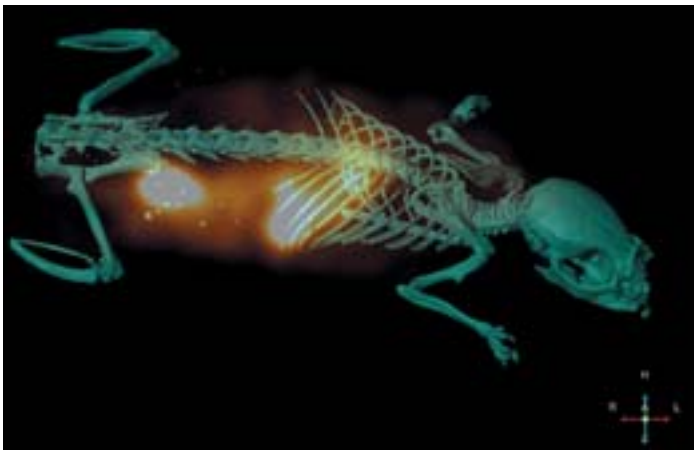
Rigorous analytics for reproducible results

IMALYTICS Workspace

PHILIPS

In vivo imaging becomes indispensable

Philips IMALYTICS Workspace combines excellent imaging and excellent analytics to allow you to do more than ever before in translating in vivo research results to clinical reality through predicting, developing, and improving the performance of novel diagnostics and therapeutics.



Fused PET and CT

Images courtesy of Axel Weber[1], Timo Paulus[2], Alexander Fischer[2]
[1]Nuklearmedizinische Klinik und Poliklinik, Klinikum rechts der Isar der Technischen Universität München, Munich, Germany [2]Philips Research Europe, Aachen, Germany

Accurate quantification is essential for reliable evaluation of acquired data. Reproducible results, enabled by rigorous analytics, are critical to improving the effectiveness of in vivo imaging in medical research and discovery.

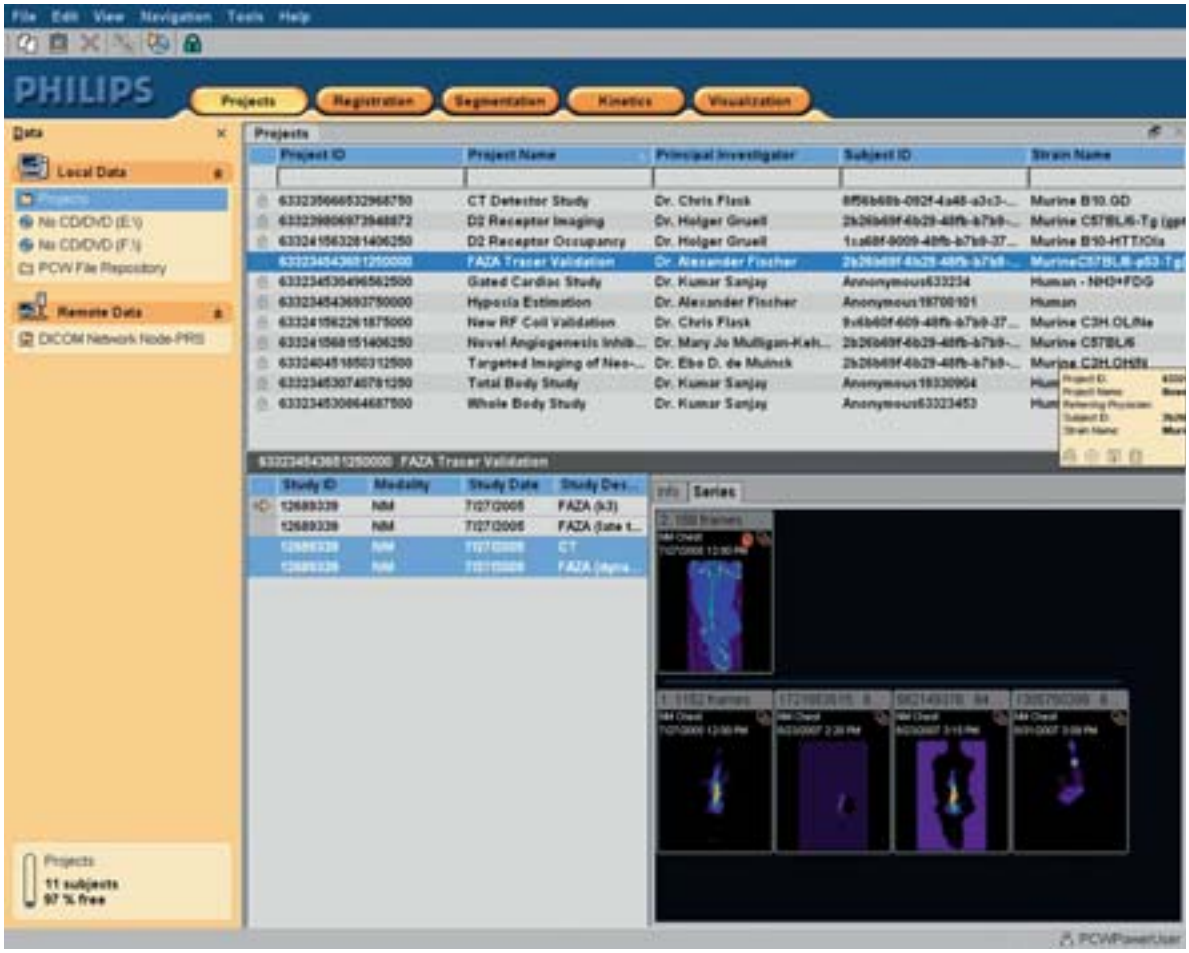
The workspace offers advanced image analysis, quantification, and visualization tools dedicated to research and discovery, with support for preclinical PET, CT, SPECT and MRI. With the reproducible and accurate data this system helps produce, you'll be helping to accelerate development of the new compounds and technologies that are the future of predictive, preventative, and personalized medicine.

The Philips IMALYTICS Workspace brings together powerful tools in a new paradigm to benefit a variety of research applications in oncology, cardiology, and neurology for the kind of discoveries that will drive patient care in the future. Simplicity is accurate, reproducible data from every preclinical study.

Philips IMALYTICS Workspace makes the most of every preclinical study

The promise in medicine today is predictive, preventative, and personalized medicine. Discovery is required to enable this promise. Medical research institutions and the pharmaceutical industry are in need of innovative tools to perform advanced research more efficiently than ever before.

Preclinical Imaging has emerged recently as a powerful tool that enables discovery. Up to this point, it has been in an exploratory, qualitative and observational phase. There is a "sea change" on the horizon in which researchers will go beyond the image and use the information more efficiently to accelerate discovery. Researchers look for systems that help them to be more hypothesis-driven, quantitative, and reproducible. Philips solutions will get you there, faster. With our advanced preclinical imaging systems, powerful yet easy to experience imaging analytics tools, you can gain new insights in biology, disease processes, and molecular medicine.

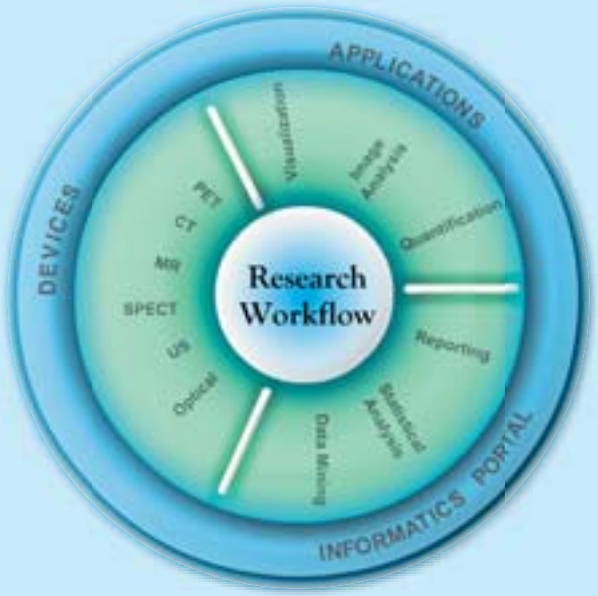


An intuitive graphical interface designed around the researcher

Hosted on a Windows-based platform*, the user interface and underlying storage model are designed to accommodate research workflow. Discovery projects are accessed and stored by name, allowing imaging subjects to be stored by project for simpler data management. The user interface also allows easy movement between tools for greater flexibility in workflow.

Philips solutions make in vivo preclinical imaging more real and reliable than ever before, reducing your R&D costs for the development of novel diagnostics and therapeutics. These solutions help you focus more on your research rather than dealing with complexities related to animal handling, imaging equipment and workflow. For example, with our IMALYTICS Workspace you can extract statistically sound information out of images, so that you can interpret your research data with confidence, and improve the accuracy of your research results.

Philips gives you the tools to do what matters, allowing you to focus on making the promise of predictive, preventive, and personalized medicine a reality.



Advanced tools to accelerate discovery

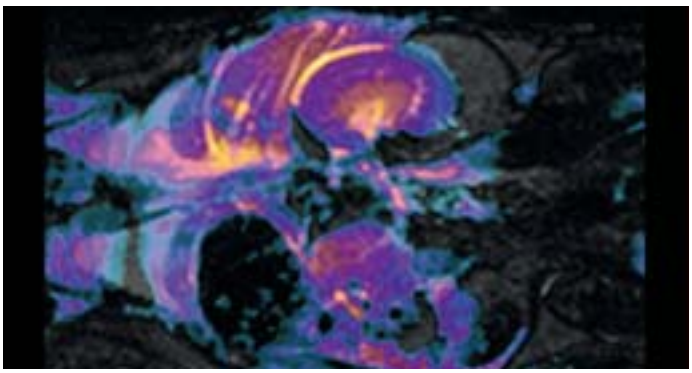
Designed to help streamline preclinical workflow for busy research labs, the Philips IMALYTICS Workspace is a comprehensive multimodality processing workspace based on project-oriented workflow that can expand to meet future preclinical needs

Project-oriented workflow

- Intuitive graphical user interface includes advanced image processing tools necessary to transition from imaging studies to statistically sound research and development findings
- A processing and analysis workstation for DICOM-compliant imaging systems, including Philips MOSAIC HP and NanoSPECT/CT® from BioScan
- Best-in-class image processing and quantification tools that can be used separately or in combination to suit specific needs of the principle investigator or development team
- Open architecture that accommodates rapid integration of advanced applications needed to further research and discovery

Comprehensive and flexible image registration

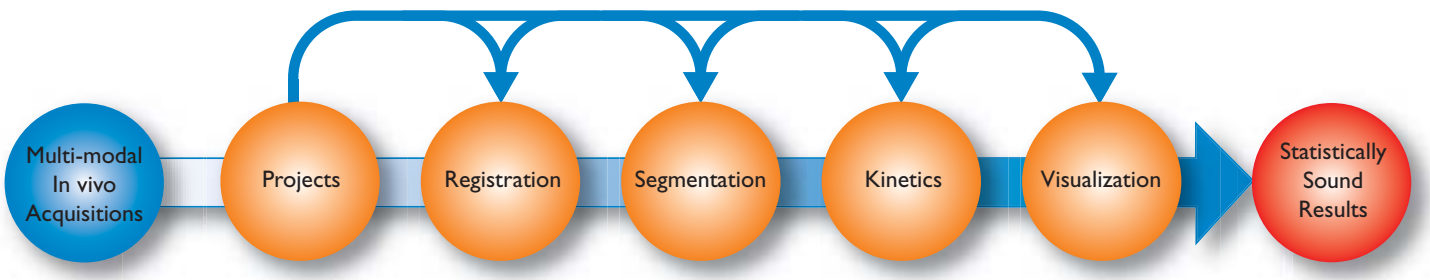
- Visual alignment using six degrees of freedom (translation and rotation along X-, Y-, and Z-axes)
- Rigid registration using mutual information and normalized cross-correlation
- Landmark-based registration using anatomical features
- Non-rigid registration using non-linear partial differential equation on individual voxels
- 3D display of fused volumes with "alpha blending" to adjust the relative contribution of each fused image
- Enables segmentation and quantification in functional modalities to be guided by anatomical references in higher-resolution modalities
- Registration across subjects in a group for correlated measurements
- Registration of longitudinal studies, of a subject, tracking changes over time



MRI contrast study in a mouse using Gadolinium, fusion with and without contrast. The data were acquired from the abdomen of the mouse. The kidneys are visible in the middle of the image, showing contrast changes in the kidney and liver.

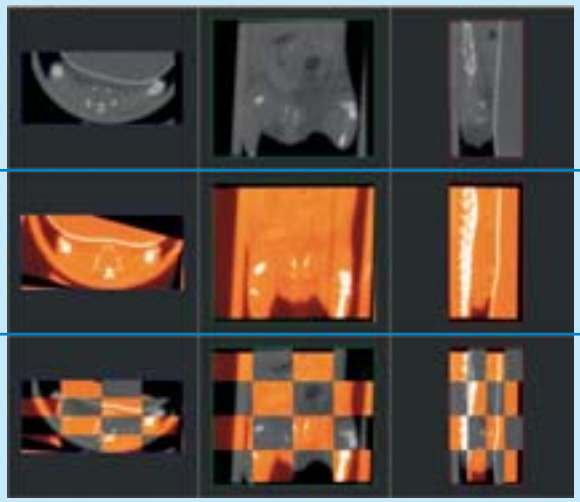
Image courtesy of Philips Research in collaboration with University of Maastrict

The IMALYTICS Workspace allows data to be shared across applications

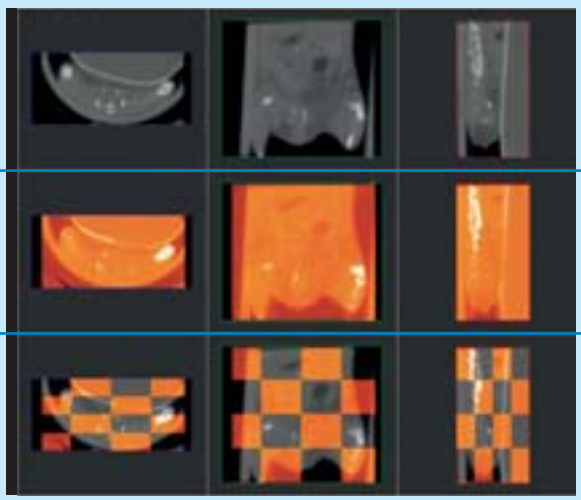


Output from one application can easily be used as input for other applications, giving users maximum flexibility.

Correlated measurements across experimental groups



Before registration (different subjects)

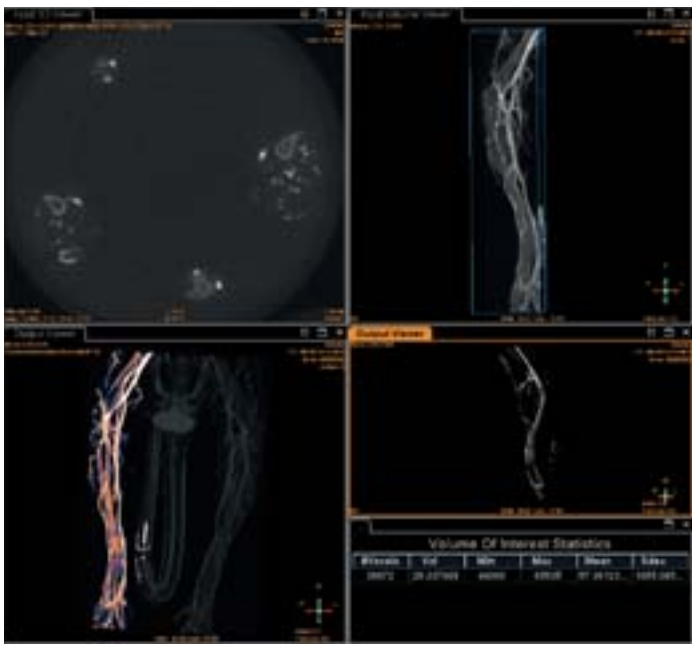


After non-rigid registration is applied
(CT of two different subjects)

Subject 1 displayed in grey
Subject 2 displayed in orange
Subjects 1 and 2 combined as indicated by checkerboard display

Advanced Image Segmentation

- Bezier curve (manual), thresholding, seeded region growing and morphological operators for region and volume of interest
- Gaussian-smoothing
- Volume statistics of segmented objects can be exported to Microsoft Excel compatible format
- Segmented structure can be exported in various formats, including DICOM, Analyze, and AVI



Segmentation of neo-vasculature in CT angiography of hind limb ischemia model of a rat

Images and analysis courtesy of Ebo D. de Muinck, Ph.D[1],
Lyubomir Zagorchev, Ph.D[2]

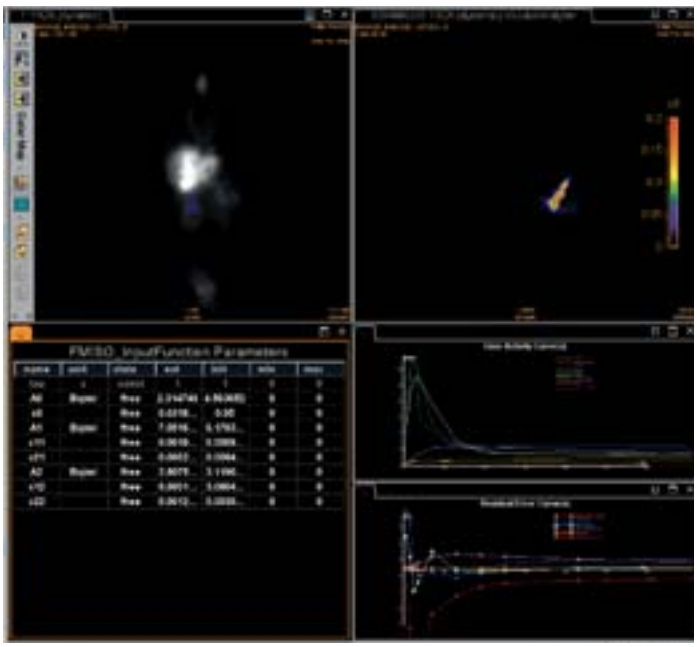
[1]Dartmouth Medical School/Dartmouth Hitchcock Medical Center in Lebanon, NH USA

[2]Philips Research, Clinical Sites Research program, Briarcliff, NY USA

Tools to see and quantify biological processes more completely

VOXULUS™ pharmacokinetic modeling and analysis

VOXULUS software, developed at Philips Research Laboratories, provides biological parameters, rather than uptake images, and is useful for hypoxia, tumor cell proliferation, tumor metabolism, perfusion and receptor binding studies. It also offers generic tissue compartment models that can be applied to new tracers. VOXULUS estimates functional or biological tissue parameters from dynamic data based on a compartment model of the behavior of the tracer or imaging agent in the tissue of interest.



Phamacokinetics with PET dynamic data

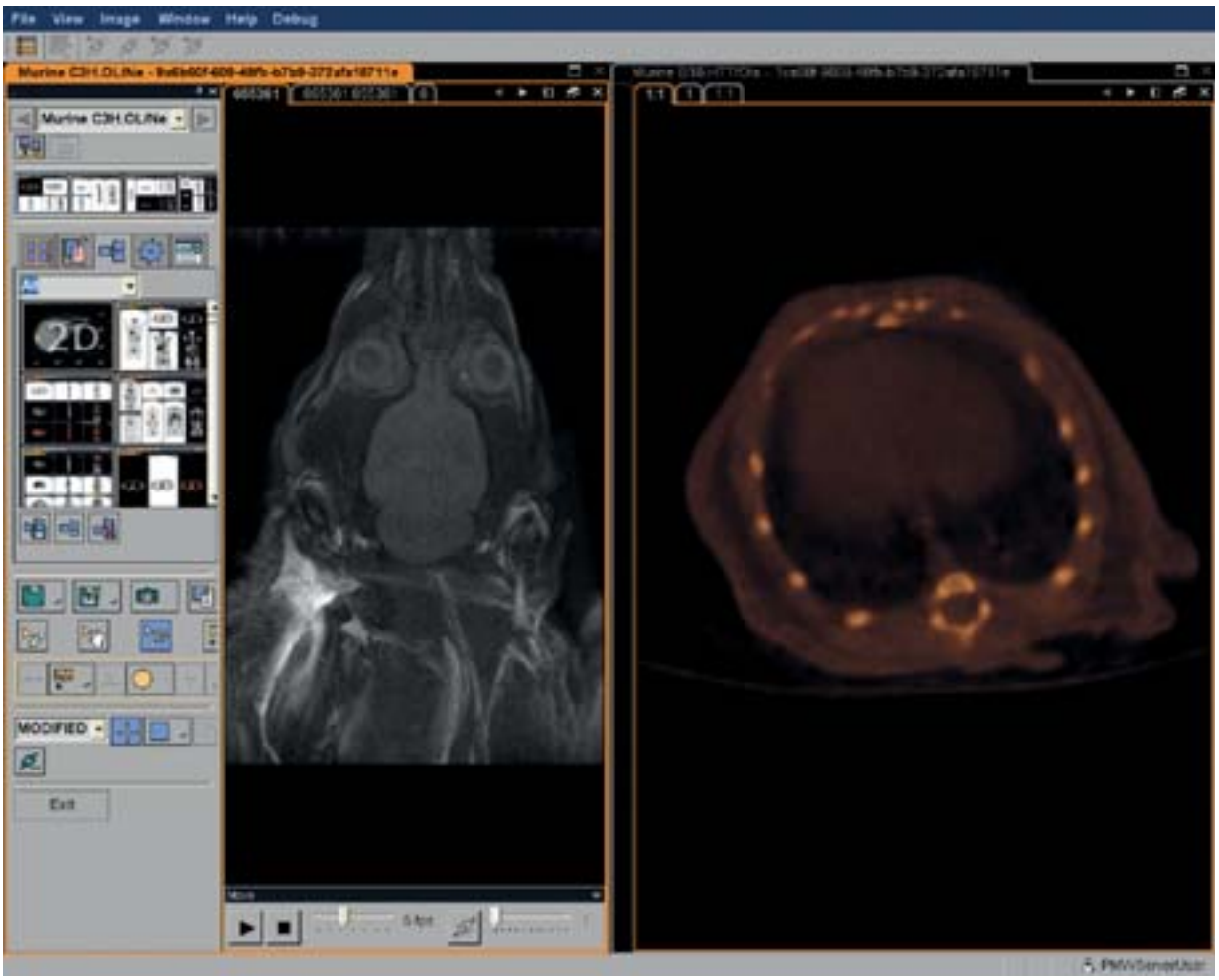
Images and analysis courtesy of Axel Weber[1], Timo Paulus[2], Alexander Fischer[2]
[1]Nuklearmedizinische Klinik und Poliklinik, Klinikum rechts der Isar der Technischen Universität München, Munich, Germany [2]Philips Research Europe, Aachen, Germany

- Separation of specific and non-specific tracer uptake allows usage of tracers with complex uptake characteristics (e.g. FLT) and/or low signal-to-background ratio
- Biological parameters allow earlier and more precise assessment of drug efficacy and treatment response
    - Surrogate end-points based on quantitative parameters instead of qualitative uptake images
    - Built-in flexibility and efficiency features to meet your needs:
        - Efficient and fast computation of parametric maps
- Flexible usage of models
    - Parameters can be constants or linked
    - Voxel-wise and regional parameter estimation for all models
- Various modes of analysis
    - Detailed control of analysis parameters and steps ("expert mode")
    - Execution of pre-configured analysis protocols ("user mode")
- Supports translation from preclinical to clinical setting
- Time activity curve analysis
- Parametric image generation at individual voxel resolution

Easy to experience using advanced and intuitive visualization tools

IMALYTICS Workspace offers advanced visualization tools that allow you to view images acquired from multiple modalities with ease. You can perform image analysis and measurements on PET, SPECT, CT, and MRI images; review co-registered images using the alpha blending tool; and compare and review various studies, from either the same or different subjects.

- Predefined and personalized display templates
- Reformatting cardiac and brain studies
- Image annotation
- ROI analysis tools
- Multiplanar review of maximum intensity projection
- 3D volume-rendering techniques



Side-by-side visualization of multiple imaging studies

Images courtesy of Principal Ivestigators: Zhenghong Lee[1], Ray Muzic[2], Chris Flask[3]

[1]Case Center for Imaging Research [2]Case Western Reserve University [3]University Hospitals of Cleveland

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