Image-Pro® Plus

Powerful and Customizable
Image Processing and Analysis Software

MediaCybernetics®
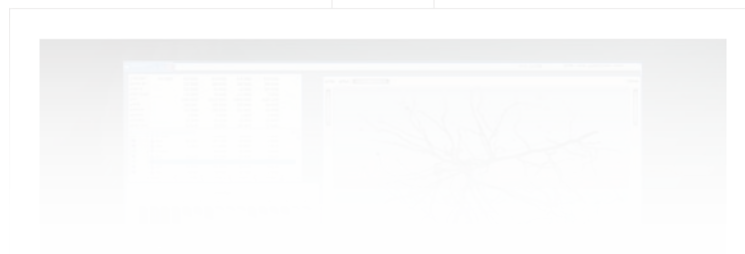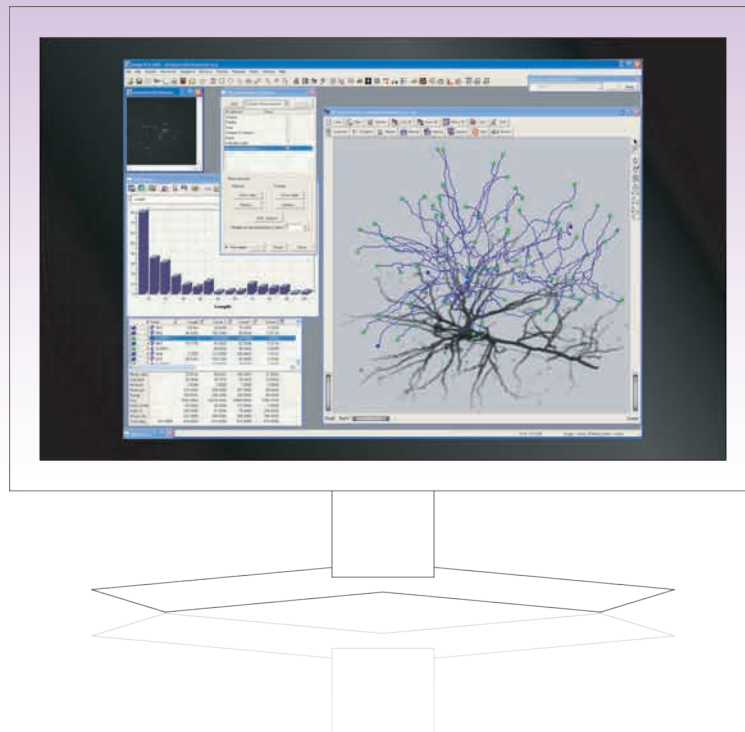
Image-Pro® PLUS

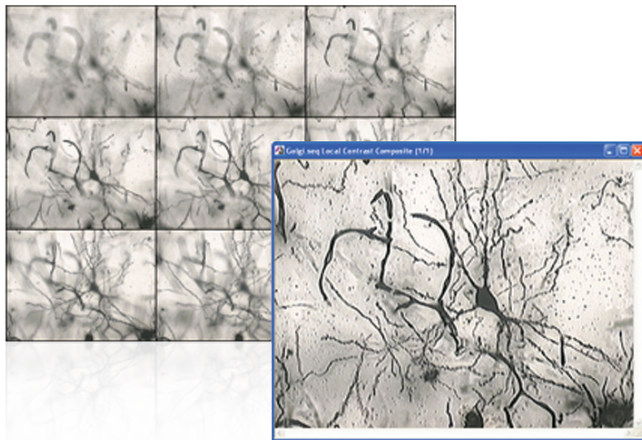## The Industry Standard for Image Analysis Software

Image-Pro Plus combines the latest tools for scientific and industrial image analysis into one intuitive software package. Reflecting over 20 years of development, evolution, and user feedback, Image-Pro Plus has the tools you need to easily capture, enhance, process, and measure images.
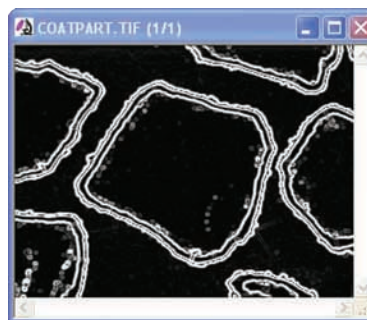
Easily Acquire Images

Utilize the full precision of your capture equipment with easy-to-use acquisition tools. Image-Pro Plus supports digital cameras, image capture cards, and other devices.

Process and Manage Multiple Images

Spend less time managing multiple images with Image-Pro Plus. Tile together a series of images to see a full representation of your research sample. Align individual or sequence images to gain a clear understanding of your image. Use Extended Depth of Field to create a focused image from a series of unfocused images. Manage multiple image sets with the Set Manager feature.

Apply edge filters to focus on image details.

Enhance and Eliminate Artifacts

Many imaging applications require you to remove noise or artifacts from images. Use the built-in SharpStack® 2D deconvolution, Nearest Neighbor, No-neighbor, and Inverse Filter algorithms to retrieve better data from your images. Use the Real-time 2D deconvolution tools to display live deconvolved imagery. The Fast Fourier Transform (FFT) feature in Image-Pro Plus allows you to perform forward and inverse FFTs to eliminate noise from your images. You can also use the background correction tool to extract background objects from your images. Apply a variety of enhancement filters, edge filters, morphological filters, and large spectral filters to extract features of interest. Voxel-based 3D filters can be used with 3D volumetric, timelapse, and other 3D image sets.

Create a focused image from a series of unfocused images with Extended Depth of Field. Image courtesy of Michael King, Ph.D., Dept. of Neuroscience, University of Florida, Gainesville, FL, USA.

Analyze and Visualize Image Data

Image-Pro Plus includes a full range of qualitative analysis tools that help you to better visualize your image data. The built-in OpenGL 3D viewer allows interactive 3D volume rendering. Display image intensity values in a 3D plot with the Surface Plot tool. Visualize image data with scattergrams, histograms, and line profiles. Define and manage multiple areas of interest (AOI) in a single image.
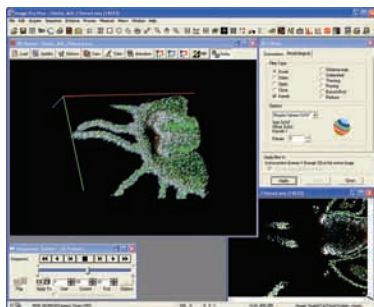
Work with 3D volume rendering and 3D filter tools. Image courtesy of Dr. Brian Matsumoto, Department of Molecular, Cellular and Developmental Biology, University of California, Santa Barbara, CA, USA.

*"My productivity has increased and turn-around time for analysis results has been reduced by 30%."*

John Phillips
Project Engineering
Corning Optical Fiber
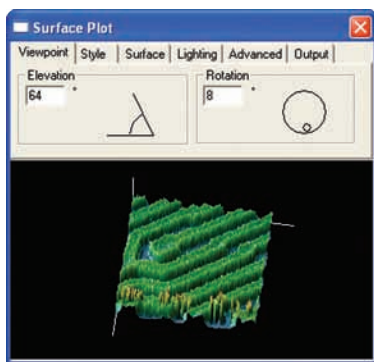
Visualize a 3D representation of your images using Surface Plot.

Calibrate Your Images

Image-Pro Plus includes intensity and spatial calibration tools that let you report measurement data in terms that are meaningful to your research. Create and display spatial calibration markers and system calibrations. You can use pre-defined spatial calibration units and calculate derived calibrations automatically.
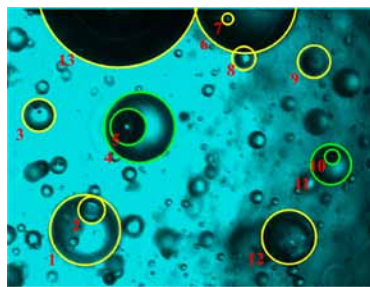

Use count/size tools to classify objects. Image courtesy of Dr. Gabriel Corkidi Blanco, Centro de Investigacion Aplicada y Desarrollo Tecnologico, UNAM, Morelos, Mexico.

Classify Objects

With Image-Pro Plus, you can manually or automatically characterize objects within your images. Count and size objects automatically, with the ability to identify over 100,000 objects per frame (memory dependent). Work with over 50 measurement tools, including areas, perimeters, lengths, roundness, major and minor axes, angles, centroids, holes, and population density.

Apply angle measurements.
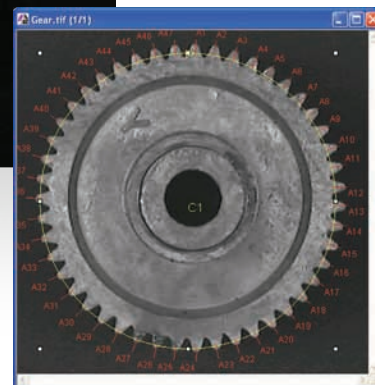
Caliper tool is used to count gear teeth.
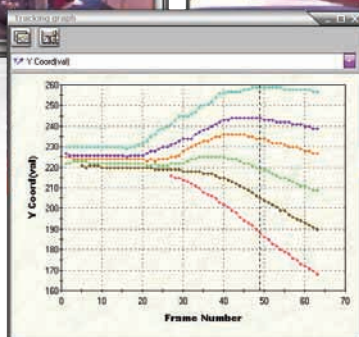
Apply Quantitative Measurements

Extract valuable data from your images using the many measurement functions found in Image-Pro Plus. Metrology tools allow you to measure best-fit line, arc, and circle. Detect edges and derive distance measurements using the Caliper tool. Measure co-localization of probes in separate grayscale images or within a color image.

Track Moving Objects

Manually or automatically follow an object in an image sequence as it moves through time and space using the built-in Object Tracking tools. Correlation tracking lets you track objects when image segmentation is difficult or not possible. You can also track and graph the changing of intensity parameters over time within an area of interest.

Follow objects in an image sequence as they move through time and space.

Customize Your Workflow

Image-Pro Plus offers convenient customization tools and a built-in programming language to streamline your imaging research. Save frequently performed operations using the Macro Recording tools. Easily edit recorded macros with the command recognition tools in the Intelligent Macro Editor. Image-Pro Plus' built-in IP Basic programming engine offers a debugger, full editor, and dialog builder. Use with COM objects such as Microsoft® Word® or Excel®, and integrate and customize macros with Microsoft Visual Basic or Visual C++.

Report and Publish Your Results

Share your findings with others using Image-Pro Plus' reporting tools. Export image data via DDE to Origin® and Microsoft Excel. Create custom reports and automatically grab screen captures of individual images or an entire screen.

"Automating the measuring process with Image-Pro Plus has allowed us to increase the accuracy and speed of measurements, take many more of them, and output the data to computers with no errors."

Dr. Bradley Stevens
National Marine Fisheries Service
Kodiak, Alaska, USA

Manage Your Valuable Images with IQbase®

IQbase image database will help you store, query, and share your images and related data. Archive from Image-Pro Plus with the click of a button. A six-month trial version of IQbase is available with Image-Pro Plus.
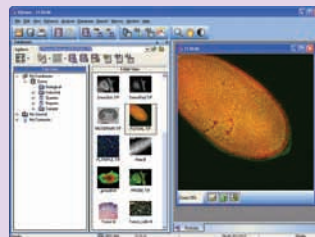
Manage your Image-Pro Plus images and data with IQbase image database.

Extend Image-Pro Plus
with Bundled Solutions

Further extend the power of Image-Pro Plus with Image-Pro Bundled Solutions. These convenient packages combine Image-Pro Plus with our popular advanced microscopy modules.

	Image-Pro® AMS *Advanced Microscopy Suite*	Image-Pro® MDA *Multi-dimensional Acquisition*	Image-Pro® MC *Microscope Control*	Image-Pro® 3D SUITE *3D Suite*
Image-Pro Plus	●	●	●	●
Microscope Control Tools as found in the Scope-Pro® Module				
3D z-stack acquisition	●	●	●	
Multi-well plate acquisition	●	●	●	
Multiple stage position acquisition	●	●	●	
Motorized microscope & stage control	●	●	●	
Independent focus motor control	●	●	●	
Independent shutter/filter control	●	●	●	
Multi-Dimensional Imaging Tools as found in the AFA® Module				
Multi-dimensional experiment configuration	●	●		
Multi-dimensional image acquisition	●	●		
Multiple wavelength acquisition	●	●		
Multiple time point acquisition	●	●		
Multiple microscope mode acquisition	●	●		
Multiple scan area acquisition	●	●		
6D acquisition	●	●		
Image Deconvolution Tools as found in the SharpStack® & SharpStack Plus Modules				
Nearest Neighbor algorithm	●	●	●	●
No-neighbor algorithm	●	●	●	●
Real-time 2D deconvolution	●	●	●	●
Inverse Filter algorithm	●	●	●	●
Spherical Aberration correction	●	●	●	●
2D Blind algorithm	option	option	option	option
3D Blind algorithm	option	option	option	option
Confocal PSFs	option	option	option	option
3D Rendering Tools as found in the 3D Constructor® Module & the OpenGL 3D Viewer				
3D image reconstruction/viewing	●	●	●	●
3D image oblique & orthogonal slicing	●			●
3D & 4D animation generator	●	3D only	3D only	●
Stereo viewing	●			●
Volume & intensity measurements	●			●
4D measurements	●			●

Image-Pro Plus Technical Summary

Image Acquisition

- Acquire files directly from camera, scanner, or disk
- Acquire, create, and play back a sequence (stack) of images
- Save and change settings based on camera or application
- Timelapse imaging with user-definable intervals
- Live image preview with measurements
- Live deconvolution display of preview image
- Automatic color balance and exposure
- Get an optimized view with dynamic auto-range
- User-defined live scaling for low-light acquisition

Image Processing

- Time- or z-based image sequence playback
- Tile a series of images
- Align individual or sequence images
- Extended Depth of Field (EDF) tools
- View entire image and magnified area with local zoom
- Create composite color images
- Organize, extract, and display multiple image sets

Image Enhancement

- Display dark mode for low-light laboratory environments
- Apply dye tints to grayscale images by choosing emission wavelength
- Enhancement filters
- Edge filters, large filters, and custom kernel editing
- Morphological filters
- Fast Fourier Transform (FFT) processing
- Pseudo-color tool
- Restricted Dilation feature
- Image Registration, and spatial and image alignment
- Manage inputs and outputs for your entire imaging system to achieve true color fidelity

Object Characterization

- Identify over 100,000 objects per frame (memory dependent)
- Measure lengths, roundness, aspects, angles, areas, perimeters, and holes
- Display measurements as histograms and scattergrams
- Auto-threshold
- Manually tag, count, and classify objects

Measurement

- Calibration wizards and tools
- Co-localization of probes
- Metrology tools for measuring best-fit line, arc, and circle
- Measure lengths, areas, perimeters, and angles
- Automatically trace outlines of objects with Auto-trace
- Calculate max, min, and average thickness between lines
- Caliper tool for edge detection and measurement

Object Tracking

- Manual and automatic Object Tracking tools
- Make morphological measurements on tracked objects
- Correlation tracking lets you track objects when image segmentation is difficult or not possible
- Track and graph the changing of intensity parameters over time within an area of interest
- Tracking via Gaussian fit centers

Image Analysis

- Measurement equation editor
- Export data via DDE to Origin or Microsoft Excel
- Collect data from multiple images with Data Collector
- Live data collecting and charting
- Displays image intensity values in a 3D plot
- Obtain the percent area of multiple threshold levels
- Display data or histograms

3D Image Processing

- Includes the real-time 2D deconvolution features from SharpStack
- Includes Nearest Neighbor, No-neighbor, and Inverse Filter deconvolution algorithms from SharpStack
- Voxel-based 3D filters for use with 3D volumetric, timelapse, and other 3D image sets
- Built-in OpenGL viewer for interactive 3D volume rendering
- Blind deconvolution and confocal modalities are optional

Auditing and Authentication Features

- Audit Trail
- Image and File Signature "fingerprint" images for authenticity

Memory Management

- Load and analyze image sets larger than your available RAM memory

Image Management

- Six-month trial version of IQbase image database

Documenting and Reporting Features

- Annotation tools
- Printing and publishing features
- Create customized reports with images, data, and text

Customization

- Customize your application with the interactive menu editor
- Automate your research with Macro Programming tools

Operating System and File Format Support

- Support for Windows® XP x64, Windows XP Pro SP2, Windows Vista Business 32- and 64-bit editions, and Windows Vista Ultimate 32- and 64-bit editions
- Read TIFF, IPW, JPEG, JPEG2000, EXIF JPEG, Flat (binary), TGA, BMP, PhotoCD, PICT, CUT, PCX, GEL, PCT, HDF QED, and FITS files
- Write and convert files to TIFF, IPW, JPEG, JPEG 2000, Flat, TGA, BMP, PICT, PCX, and EPS
- Stack and Confocal file read support for SEQ (Image-Pro Sequence), STK (MetaMorph Stack), PIC (Bio-Rad Confocal), LSM (Zeiss Confocal), DEB and AVZ (AutoQuant Stack), LEI (Leica Confocal), DM3 (Digital Micrograph), DeltaVision DV, and FluoView 1000 files
- Read and write SEQ and AVI files
- Support for 24-, 36-, and 48-bit color; 8-, 12-, and 16-bit grayscale as well as 32-bit floating point images
- JPEG, LZW, and RLE compression supported
- Batch convert files
- Output data to ASCII, WK1, or XLS for input for spreadsheets
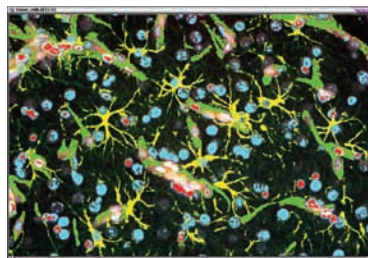
System Requirements

Operating System	Computer	RAM	Storage
Windows XP Pro	750 MHz or better	1GB RAM*	20 GB**
Windows XP x64	2.1 GHz	1GB RAM*	20 GB**
Windows Vista	2.1 GHz	2GB RAM*	40 GB**

- IBM-compatible PC
- 1280 x 1024, 32-bit color display device
- Windows-compatible mouse, keyboard, and CD-ROM drive
- *2GB RAM is recommended on all operating systems, 4GB is best on Vista 64*
- ** Suggested storage size for large image files generated by advanced cameras*

The information above is subject to change. Please contact Media Cybernetics or your local reseller for the latest features.

Exceptional Service and Support

Training

Our image analysis training courses provide valuable information you can apply towards your imaging research. Whether you are new to Image-Pro Plus or you are a more experienced imaging professional, our courses are designed to help you make optimum use of the latest imaging software techniques.

Technical Support

When you register your copy of Image-Pro Plus, you are entitled to 90 days of support through our Technical Support Program. Receive installation and configuration troubleshooting from our Technical Support Engineers via phone or email. Extend your technical support beyond 90 days to receive expert support year-round.

Collaborative Imaging Forum

The Media Cybernetics Image Analysis Forum is an online community of Image-Pro software users, Media Cybernetics technical staff, and other imaging professionals. Register today to start sharing ideas and learning from the experiences of other imaging software users.

User-Contributed Solutions Zone

Explore the Media Cybernetics Solutions Zone website to find a wealth of useful information about Image-Pro Plus. The Solutions Zone is an easily searchable online database of macros, device drivers, plug-in modules, application programs, and development consultants that support Image-Pro Plus and other Media Cybernetics software programs.
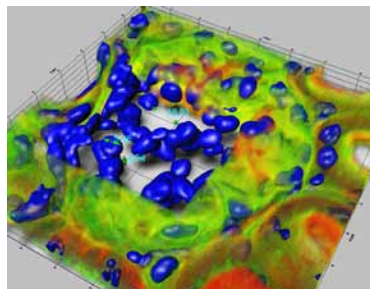
3D rendering of a kidney glomerulus using the 3D Constructor Plug-in Module. Image courtesy of Dr. Brian Matsumoto,Department of Molecular, Cellular and Developmental Biology University of California, Santa Barbara, CA, USA.

"Fingerprints, shoeprints, and other impression evidence can be degraded by color and pattern obstruction, and compressed dynamic range. Image-Pro Plus is the most complete, powerful, and easy-to-use software solution to these problems I have found in twelve years of application. It can make the difference between interesting similarity and identification."

Brian Dalrymple
Forensic Scientist
Brian Dalrymple & Associates
Ontario, Canada

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Rev A0