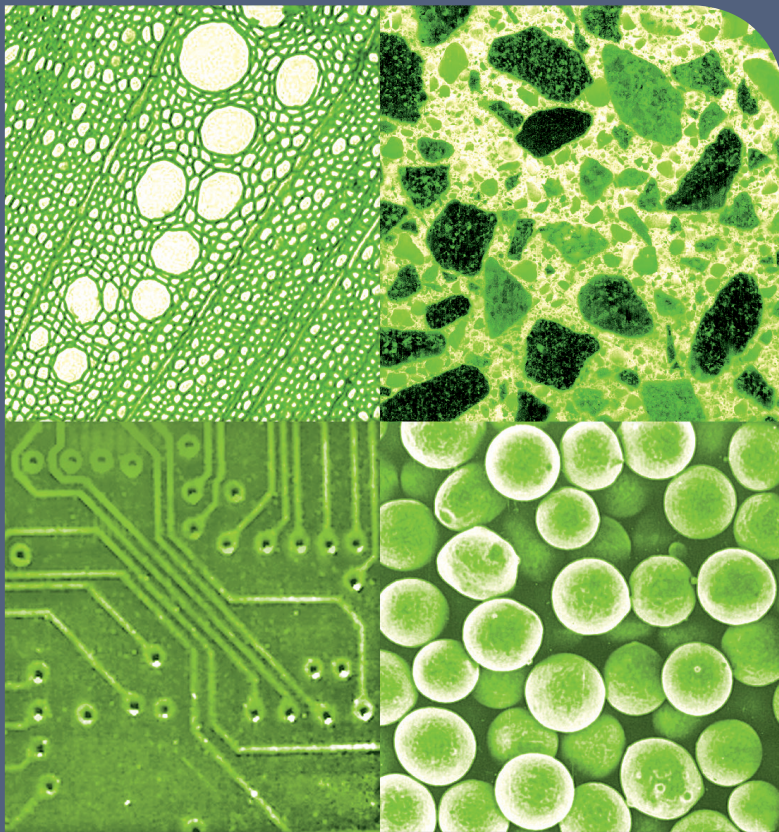# Aphelion Lab

IMAGE PROCESSING
AND IMAGE ANALYSIS SOFTWARE
FOCUSING ON RESULTS

BIOLOGY / COSMETICS / GEOLOGY
INSPECTION / MATERIALS SCIENCE

METROLOGY
OBJECT RECOGNITION

PHARMACOLOGY / QUALITY CONTROL
REMOTE SENSING / ROBOTICS

SECURITY / TRACKING

Image Analysis Software for Non-experts in Imaging

The image analysis software market has seen many products for advanced users, as well as products limited to specific functions for a specific application. Neither product type effectively addressed the needs of non-experts in imaging science and programming. For these persons, and for those who need to create effective, controlled, laboratory processes to extract data from digital images, now there is a software product to meet all of these needs—Aphelion™ Lab.
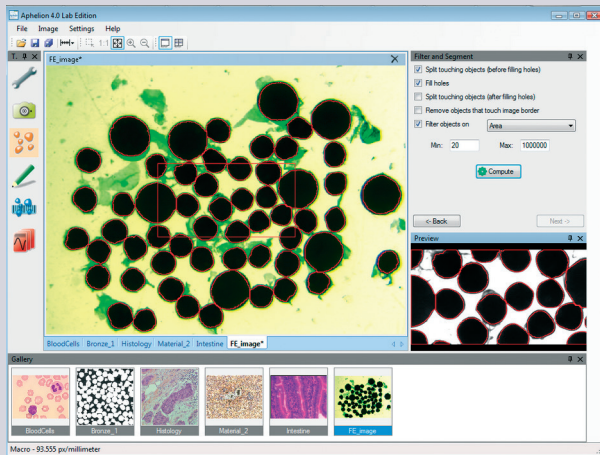
While based on the powerful Aphelion Dev image processing and analysis libraries, Aphelion Lab was specifically designed for use by non-experts in imaging, regardless of the user's own field of expertise. A set of context-based interfaces, guide the user through creation of an image analysis project. This includes steps for digital image acquisition, image processing operator selection and execution, image editing, measurement selection and computation, and analysis report generation. Users can also manually outline objects of interest to compute their shape and size parameters. While useful for virtually all image domains, Aphelion Lab is especially well-suited for metrology and microscopy applications.
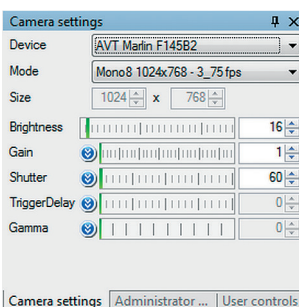
Settings

All data and measurements generated in the Aphelion Lab environment are automatically managed by the software to ensure high-quality analysis. Only users with administrator rights can configure the software, specifying where results will be saved, setting up the camera device, defining calibration profiles, and selecting the list of measurements to compute on images. Access to all these important settings is password protected. Once the system is fully configured, the user can proceed with analysis of images and concentrate only on the results. All image management tasks, which were cumbersome in the past, are done in a transparent way by the software.

Camera Settings

Since Aphelion Lab complies with a large panel of acquisition device interfaces, most popular digital cameras are plug-and-play in Aphelion Lab. Once the proper camera driver is installed, a live image can be displayed in the Aphelion Lab interface on demand. The user has only to select the right camera configuration settings and adjust the exposure parameters to acquire high-quality images.

Calibration Settings

A powerful tool enables users to quickly and easily create calibration profiles. Aphelion Lab uses these to report measurements in real-world units for all captured images. Using a pop-up ruler overlaid on an image of a known item (e.g., a micrometer), the user correlates the size of the item in the image (i.e., in pixel unit) with its real-world size (e.g., in metric unit) to define the calibration profile. There is no limit on the number of calibration profiles that can be saved, enabling the generation of accurate real-world measurements for any calibrated acquisition device used with Aphelion Lab.
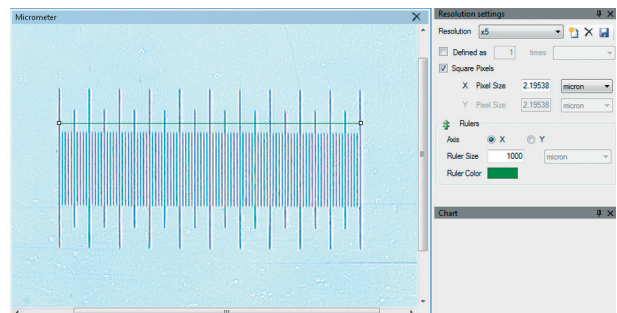
Measurement Settings

Aphelion Lab includes a set of object measurements (e.g., length, area, perimeter, maximum, minimum). The user selects those measurements that are to be performed automatically during image analysis. More than 50 different measurements can be computed per object, and there is no limit on the number of objects per image or sample. If a calibration profile has been selected, all measurements are provided in real-world units.

Image Acquisition

Capturing an image using image processing/analysis software has never been so easy and intuitive. Select the camera mode (image size and frame rate), define the exposure parameters, start the acquisition to display a live image, focus the camera, apply a shading correction to get an even background, and then capture the image to be analyzed. The current calibration profile is automatically applied to the captured and subsequent images. Images previously captured and stored on media can also be analyzed with Aphelion Lab.

Object Extraction

The Object Extraction task available in Aphelion Lab extracts objects of interest in three steps. First, the user selects one of the available color channels to process; then the Object Extraction task executes to locate objects in the image. Finally, the user picks one or a combination of the following operations:

- Disconnect objects that are touching or overlapping
- Remove objects touching the image border
- Fill the holes occurring in objects
- Filter objects based on a measurement value specified by the user

A preview of results is available at each step of the Object Extraction task to enable user adjustment of parameters before execution of the next process.

Object Editing

The Object Editing task provides tools for modifying the set of objects that were extracted. Adding, removing, and altering objects can be easily performed using mouse operations. An undo function is always available to go back to the previous step of the editing process. Using these tools, no image is too complex to be analyzed.

Measurements

Object Measurements

Aphelion Lab's computing of object measurements is very quick and is transparent to the user. Measurements are displayed in a grid format for the objects that were detected or drawn in the previous steps. Grid rows correspond to objects while columns correspond to their measurement values. The interface (see beside) displays the grid, its associated image, its objects (as an overlay on the image), and a chart that displays a histogram or scatter plot of object measurement values (i.e., values in a grid column).

Any object can be highlighted simultaneously in both the image overlay and the grid by clicking on the object in either the overlay or the object's row in the grid. An export feature saves grid data in Microsoft® Excel® or CSV Text file format.

Interactive Measurements

Interactive measurement tools are also provided that let users draw on an image overlay to quickly and directly compute calibrated measurements. This is especially useful when there are only a few objects to be analyzed. The drawing tools allow the user to draw objects of virtually any shape. The measurements computed for the user-drawn objects are displayed in a simple grid format. Here, the rows correspond to the objects drawn (e.g., lines, angles, circles).
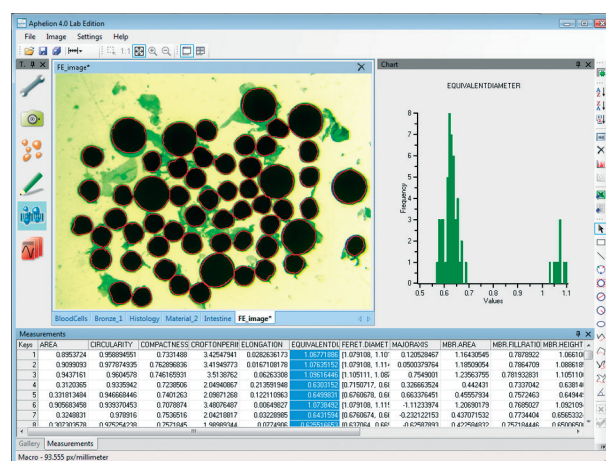
Report Generation

The final step of a typical image analysis project is to generate a report of the results obtained from the analysis. In the past, this was often done by using multiple software products, requiring multiple data exchange steps between the various products. With Aphelion Lab, generating a report can be done by only specifying the data needed (i.e., measurements and image). Then Aphelion Lab automatically launches Microsoft® Excel®, runs the default template or user macro, and generates the analysis report. Alternatively, the Report Generation task can either export grid values to a text or Excel file, or the image along with the associated overlay to the Windows® clipboard or in a file.

Upgrade Path for Advanced Capabilities

Aphelion™ Lab provides a basic set of image operators used in its analysis of images. Should your image analysis needs become more demanding, the Aphelion product family provides you with an upgrade path to a more advanced product, Aphelion Dev. The Dev product provides much greater capabilities, including more than 400 image operators, a scripting language, a runtime version, support for both 32-bit and 64-bit systems, and a large set of optional extensions (e.g., tools for microscope automation, 3D image processing and display, image noise reduction, image registration, color segmentation, Deep Learning processing).

Product Distribution

Aphelion Lab is compatible with the most recent Microsoft® Windows® operating systems[1], and cameras compliant to DirectShow and IIDC 1394 Specifications (FireWire)[2]

Licensing:	Single User license (locked to a single computer system)
	Site license
	USB license key (for non-concurrent use of a Single User license on multiple computers)
Standard package:	DVD containing the Aphelion Lab installation program, a full range of supported acquisition device drivers[2], and a User Guide hardcopy.
	The Aphelion Lab installation program and user guide are also available at https://www.adcis.net

[1]Refer to https://www.adcis.net/en/aphelion-dev/ for the list of Windows version compatibility

[2]Microsoft DirectShow protocol and IIDC 1394 Digital Camera Specification Version 1.31 as published by the 1394 Trace Association. Optional interfaces for digital cameras are also available (Refer to https://www.adcis.net/en/applications/image-acquisition-device-interfaces/)

Design SOUAMI KOUVATAS +33 2 31 44 00 71

ADCIS S.A.
3, rue Martin Luther King
14280 Saint-Contest - France
Phone : +33 2 31 06 23 00
www.adcis.net