Off-Line feature measurement with the Phenom™

The Phenom™ provides qualitative image data of microscale structures as well as the capability to do quantitative measurements. Images taken with the Phenom may be analyzed using a variety of software programs to provide measurement data. Calibration information for making measurements is provided by the Phenom both on the databar and in the image files saved by the system.

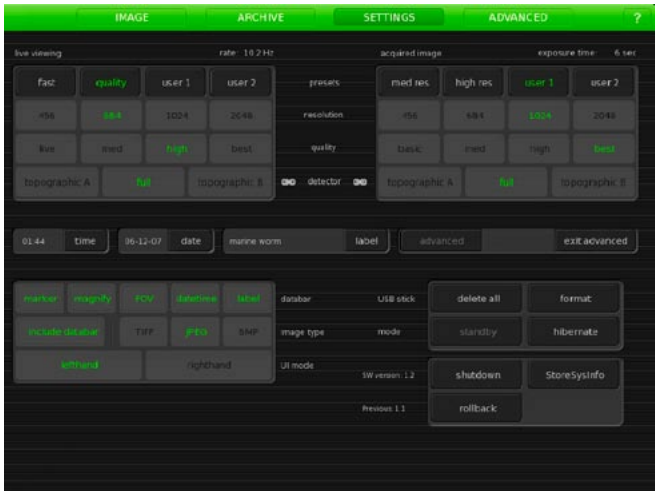
The Phenom saves images as standard TIFF, Bitmap, or JPEG files which can be analyzed in a number of software packages. One such image analysis program, ImageJ, can be used for such a purpose. ImageJ is an open source, freely available, multi-platform software package developed by the National Institutes of Health that provides a number of analysis options useful for measuring features with the Phenom. The base ImageJ program can be used to measure length, angles, and areas, and has a number of additional measurements available through customized plugins. The ImageJ program and documentation can be found at: http://rsb.info.nih.gov/ij/

Acquiring Images for Measurement

When saving images for later measurement there are two primary databar elements that should be enabled on the Phenom Settings page. The “Marker” and “FOV” elements are useful for setting the image scale. The “Marker” option enables the scale bar on the left side of the databar, and the “FOV” option shows the Field of View for the saved image. These databar elements can be used to calibrate the image scale for making measurements.

Calibrating Image Scale

To make a measurement on Phenom images, the analysis software in use needs to be calibrated to the image scale. This can be done automatically by reading the file header, or manually using the data contained in the databar. To set the image scale in ImageJ Open up the Analyze > Set Scale dialog box. Set the Distance in Pixels field to the image width in pixels, this is available from the upper-left corner of the ImageJ image window. Set the Known distance field to the FOV of the image, and enter an



appropriate unit into the Unit of Length field. If you have multiple images at the same magnification the Global box can be checked, thereby setting the scale for all open images. Hitting the OK button will set the image scale and return to the main image window.

Feature Measurement

ImageJ has a number of measurement capabilities. For a straight point-to-point length measurement the “Straight Line Selection Tool” can be selected by clicking on the 5th button in the main ImageJ window. The distance between two points can be measured by clicking and dragging from the first point of interest to the second point. The distance will be reported in the main ImageJ window next to the cursor coordinates. Angles appropriate toolbar button.

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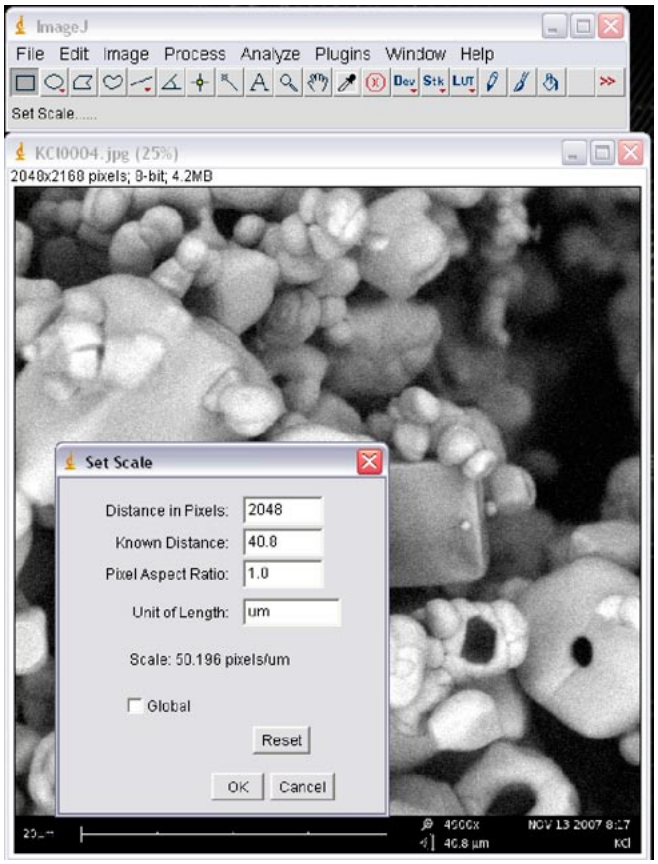
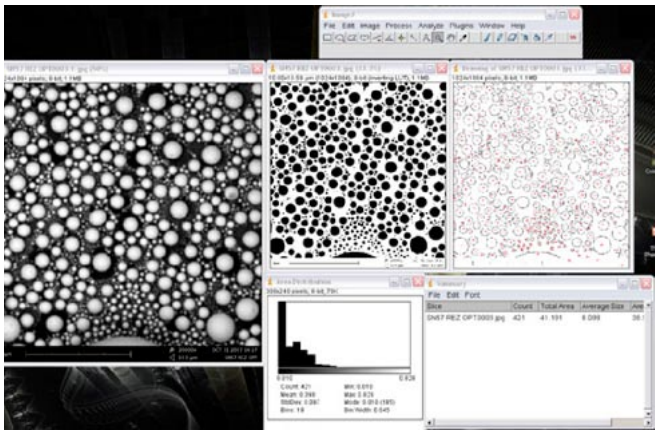
Characterizing Samples with ImageJ and the Phenom

More advanced feature characterization is also available with the Phenom and image analysis software. The following image shows particle size distribution measurement using ImageJ's Particle Analysis function. ImageJ can provide size distributions, image histograms, profile plots and a host of other data about your samples. The Phenom and ImageJ are a perfect combination for powerful data collection and rapid characterization of your samples.





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Phenom-World BV
Dillenburgstraat 9E
5652 AM Eindhoven
The Netherlands

Find your Phenom-World contact information at
www.phenom-world.com

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