Learn Photoshop CS4

# Using the medical analysis enhancements

Adobe® Photoshop® CS4 Extended offers several enhancements for performing medical analysis. In this tutorial, you will learn how to use the scale, measurement, and count features.

### REQUIREMENTS

To complete the task(s) demonstrated in this tutorial, you will need the following software and files:

- **Products** – Adobe Photoshop CS4 Extended
- **Sample file** – lrvid4009_ps.zip
- **Prerequisite knowledge** – Intermediate knowledge of tools in Photoshop CS4

## Opening a DICOM image

Photoshop CS4 Extended offers a number of enhanced medical analysis tools for working with Digital Imaging and Communications Medicine (DICOM) images. To open a DICOM image:

**1.** Choose File > Open and select a DICOM image (.dcm file), and then click Open. The DICOM Open dialog box opens.

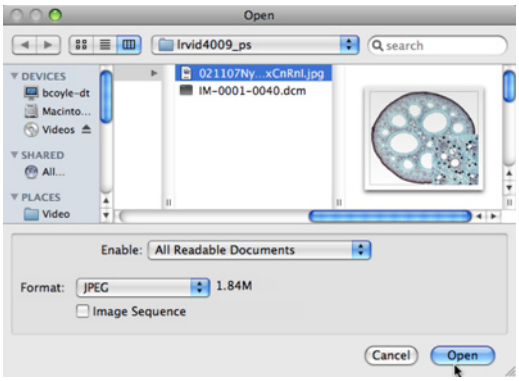


*Figure 1: Selecting a DICOM image*

**2.** Select all frames associated with the DICOM image by clicking Select All at the top of the dialog box.

**3.** Click Import As Volume in the top-right corner of the dialog box.

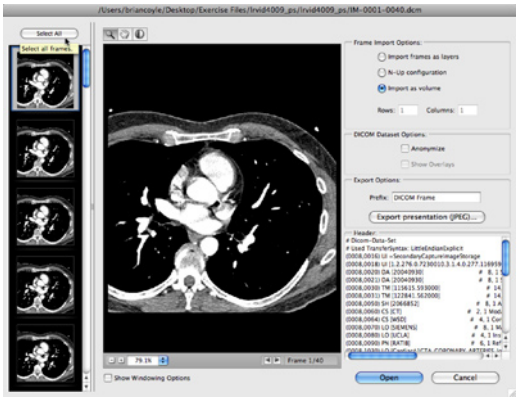

*Figure 2: Importing multiple images*

**4.** Click Open to apply the import specifications and finish opening the image.

***Note:*** *Photoshop opens the image as a fully-rendered three-dimensional object.*

## Using the 3D Rotate and Set Scale tools

Photoshop CS4 Extended allows you to rotate and scale DICOM images in order to examine them in greater detail. To rotate an image:

**1.** Select the 3D Rotate tool from the Photoshop toolbar.

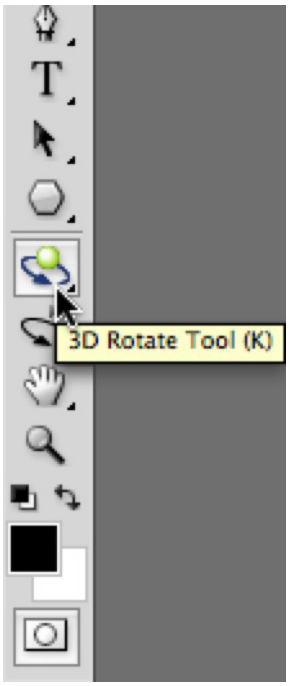


*Figure 3: The 3D Rotate Tool*

**2.** Drag the image to rotate it on-screen. Notice it rotates on three axes; x, y and z.

**3.** If the DICOM image contains scale information, Photoshop CS4 Extended automatically applies that scale to the image. You can view this information by choosing Analysis > Set Measurement Scale > Custom. A Measurement Scale dialog box opens.

**4.** To change the custom scale, enter your preferred unit of measurement, such as microns, in the Logical Units box of the Measurement Scale dialog box. By default, Photoshop uses a 1-to-1 pixel-to-logical unit ratio (for example, 1 pixel is equal to the length of 1 micron). However, you can enter different values in the Pixel Length and Logical Length boxes. Additionally, if there is object in your image you'd like to use as the standard for all measurements, click in the Pixel Length box and drag across the object. Photoshop activates the Ruler tool, which measures the exact pixel length of the object. When you are finished setting up your custom scale, click OK to apply the changes.

**5.** To set up a scale marker in the lower-left corner of the document window, choose Analysis > Place Scale Marker. The Measurement Scale Marker dialog box opens.

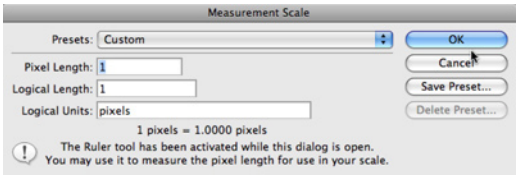


*Figure 4: The Measurement Scale dialog box*

**6.** You can also change the font of the scale marker. The default setting is Helvetica. You can change the text to which the font is applied after the text is converted to editable live text (see Step 9).

**7.** If the default settings for Text Position and Color are selected (as shown in Figure 5), the marker will appear in black at the lower-left corner of the page. Click OK to add the marker.

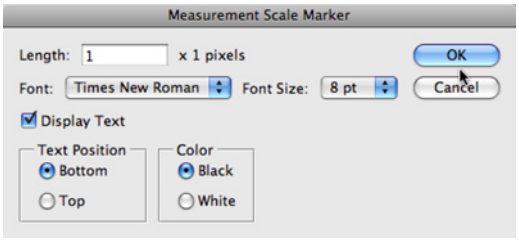


*Figure 5: Setting the text position and color*

**8.** To adjust the position of the marker, choose the Move tool from the toolbox. Drag the scale marker away from the DICOM image.

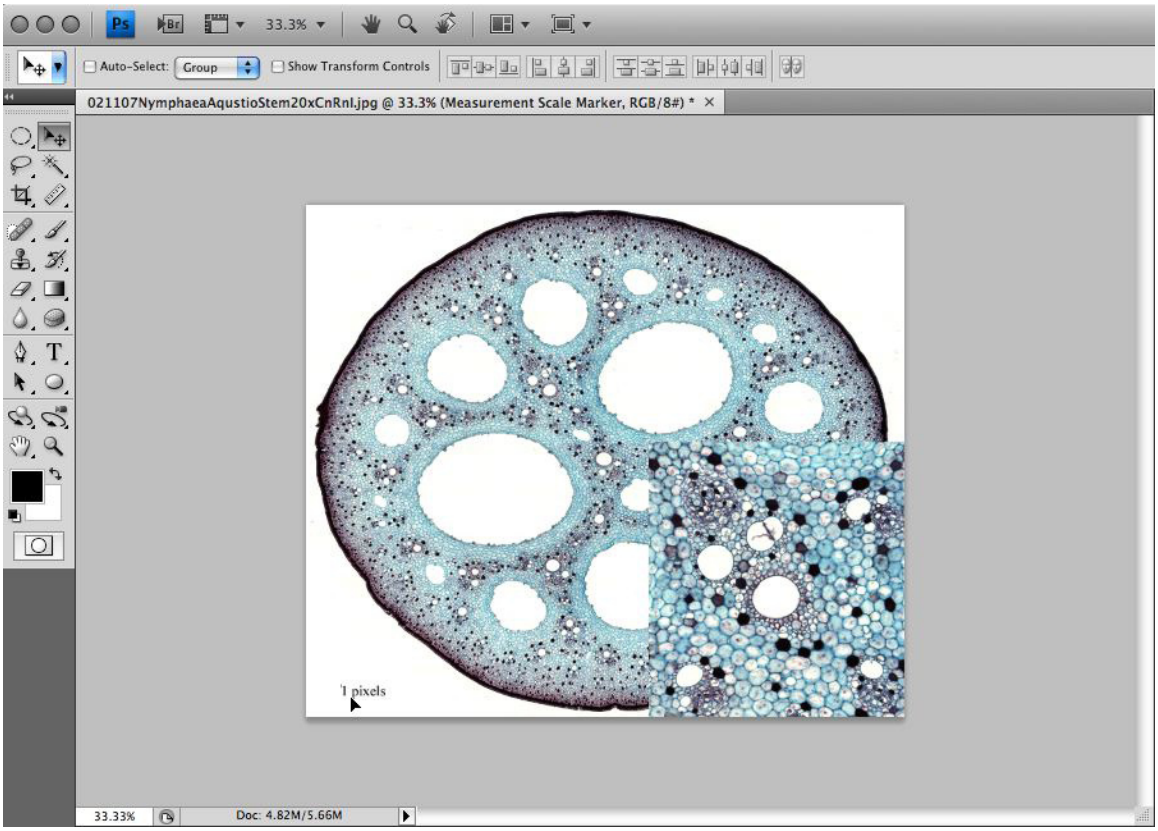


*Figure 6: Moving the scale marker*

**9.** Choose the Text layer from the Layers palette. Press the Down Arrow key to move the text away from the marker so that it is easier to read. Note that you can also edit the text at this point.

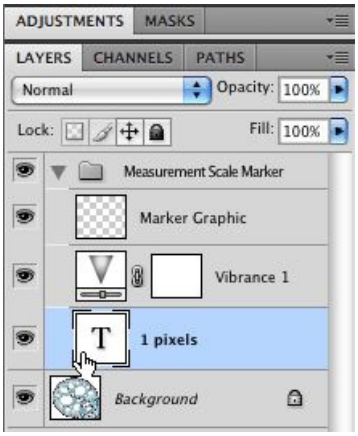


*Figure 7: Choosing the Text layer*

## Measuring objects

You can measure objects within a DICOM image using the new measurement tools. To use the measurement features:

**1.** Close the Text layer group and choose the background layer in preparation for the next section.

**2.** Choose the Ruler tool from the Eyedropper tool pop-up menu in the toolbox.

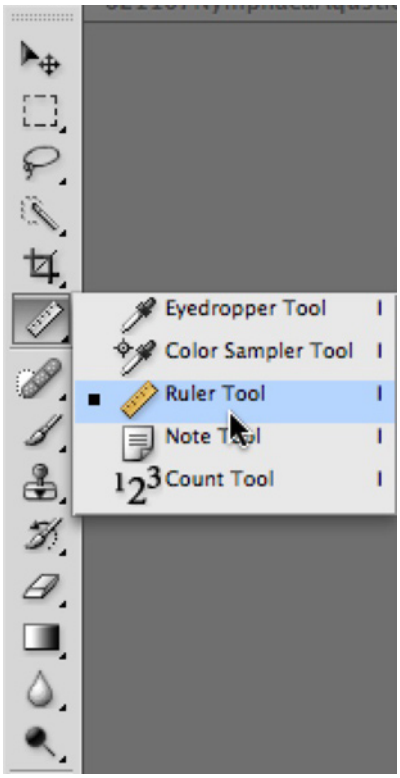


*Figure 8: Using the Ruler tool*

**3.** Drag across the width of the object to be measured within the DICOM image. Note you may want to zoom in on the object prior to measurement to make a more precise selection.

**4.** Choose Window > Measurement Log. The Measurement Log panel opens at the bottom of the Photoshop CS4 window.

**5.** Click Record Measurement in the Measurement Log panel. Metadata, the length and angle of the measurement you just made, appear in the Measurement Log panel.

**6.** To measure an angle, Option-drag/Alt-drag a new line at an angle from one of the endpoints of your previous measurement with the Ruler tool. Click Record Measurements again. Three new measurements appear in the Measurement Log panel, recording the length and angle of both lines, and then each line individually.

**7.** You can also measure selected areas in an image. To select an area, choose the Magic Wand tool. Make sure the tolerance is set to 50 and the Anti-Alias checkbox is deselected to minimize edge artifacting.


*Figure 9: Selecting an area*

**8.** Select the object to be measured by clicking it.

***Tip:*** *To add any areas the Magic Wand tool might have missed to the selection, choose the Rectangular Marquee tool and Shift-drag around them.*

**9.** With the Magic Wand tool, Shift-click inside another object in the image. Two objects inside the image are now selected for measurement.

**10.** Click Record Measurements in the Measurement Log panel. Three new measurements are added to the panel. The first measurement represents the combined dimensions of both selected objects. The other two measurements represent each individual selected object. Typically with selections, Photoshop records data such as Area, Perimeter, and Circularity.

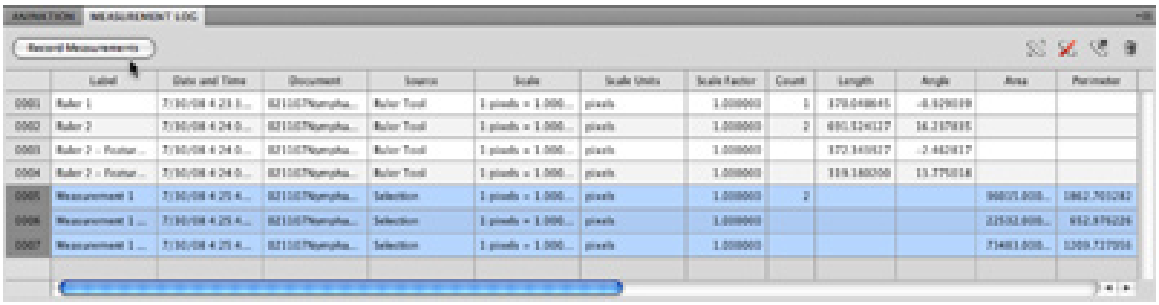

*Figure 10: The Measurement Log panel*

***Note:*** *If you look at the metadata associated with each measurement, you will see that the Source for each measurement is a selection.*

## The Count tool

The Count tool has been enhanced for Photoshop CS4 Extended. To use the Count tool:

**1.** Deselect the objects in the DICOM image by pressing Ctrl/Command+D.

**2.** Collapse the Measurement Log panel by clicking the empty area to the right of the tabs.


*Figure 11: Collapsing the Measurement Log panel*

Choose the Count Tool from the Ruler Tool pop-up menu as shown in Figure 8. Click once inside each of the objects you want to count.

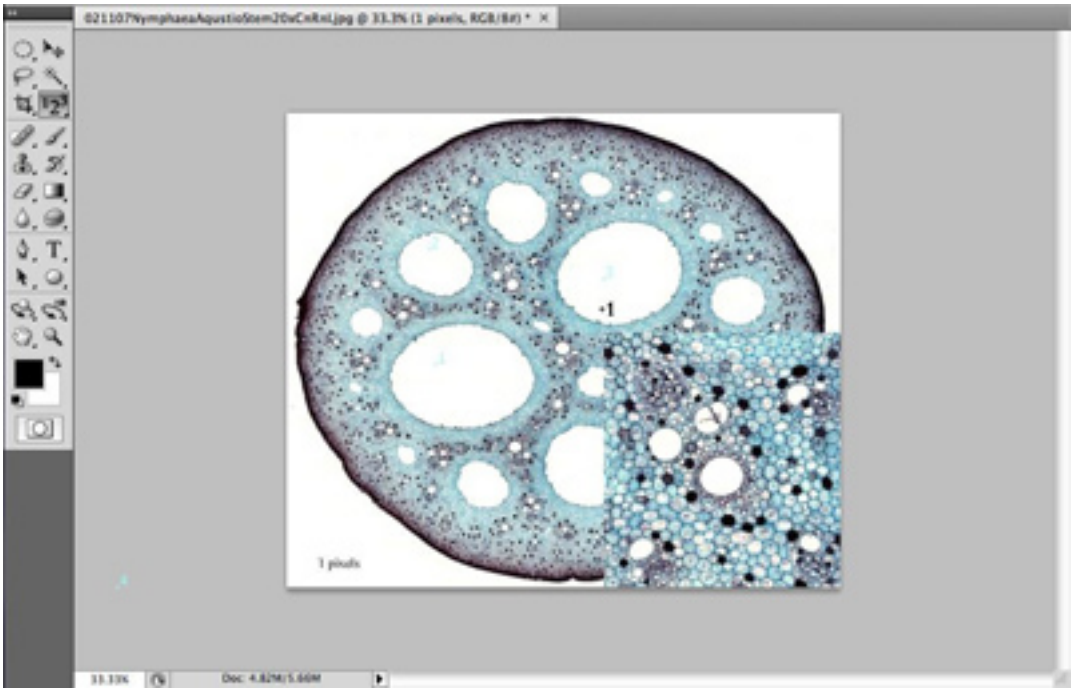

*Figure 12: Using the Count tool*

**3.** To make tally points more visible, you can assign them a different color from that of the image background. To change the color of the points, click the color fill box in the Options bar. A Select Count Color dialog box appears.

*Figure 13: The Color Fill box*

**4.** Select a color that differs significantly from the background color of the DICOM image and click OK.

**5.** To make the tally markers and labels larger, increase the marker and label size by entering new values inside the Marker Size and Label Size boxes in the Options bar as shown in Figure 13.

**6.** To assign the count group a name, click the Count Group menu on the Options bar, and choose Rename. A dialog box prompting you to rename the Count Group appears. Enter the new name in the Count Group Name box and click OK.

*Figure 14: Renaming the Count Group*

**7.** To start a new count group, click the Create New Count Group icon in the Options bar. When the Count Group Name dialog box opens, type the new group name in the Count Group Name box.

***Note:*** *You may wish to assign a different color to the new count group tally markers. To assign a new color, repeat steps 3-4. You can also assign new label and marker sizes by repeating step 5.*

**8.** To add the counted items to the Measurement Log panel, expand the panel by clicking on the empty area to the right of the panel tab as shown in Figure 11.

**9.** Click Record Measurements or use the keyboard shortcut, Ctrl/Command+Shift+M. Photoshop records the count and displays the count total in the Measurement Log panel.

**10.** Choose File > Save to save the file. Photoshop CS4 saves the count and all other measurement data with the image, so it will be readable by other users.

**11.** You can select all of the measurements by clicking the Select All Measurements icon in the upper-right corner of the Measurement Log panel.

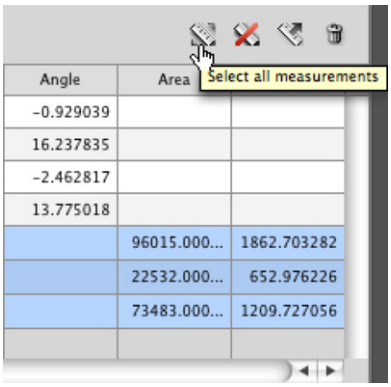


*Figure 15: The Select All Measurements icon*

**12.** To export the measurements as a tab-delimited text file, click the Export Selected Measurements icon, the second icon from the right in the Measurement Log panel.

## Where to go from here

Photoshop CS4 Help and Support Center

Learn Photoshop CS4

Introducing Photoshop CS4, by Deke McClelland

Using advanced 3D techniques, by Chad Perkins

Converting from 2D to 3D, by Chad Perkins

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