3D Rendering Reference Manual
### Printing History

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3D Rendering Module

Overview

This module allows you to create a three dimensional view of your images. You will be able to visualise data easily in three dimensions and to create animated sequences of cell rotations.

The 3D Rendering module is not part of the core product, but can be purchased separately. Refer to Chapter 2 of the Openlab Core Guide for instructions on installing modules.

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The 3D Rendering Window

- Select 3D Rendering... from the Image menu.
- The 3D Rendering window is displayed.

Select the type of renderer from the pop-up menu
Enter required spacing value
Check to make image look more solid
Check for true stereo projection
Use the slider controls to set the range for each channel
Specify start values for the x, y and z angles of image in degrees
Specify the x, y and z angle increment values for each frame in degrees

Select the number of frames in the sequence
Click here to render all the frames in the sequence

Preview window
Select the quality for the preview from the pop-up menu
Tells you which frame is previewed with its x, y and z rotation
Click here to render the preview image at full size

Enter required spacing value
Check to enhance perception of depth
Specify the x, y and z angle increment values for each channel

Select the number of frames in the sequence
Click here to render all the frames in the sequence
Preview Window

The preview window allows you to view the effect of your rendering parameters before you render a sequence of images. It will cycle constantly through the layers that you have selected in the Layer Manager Palette until you click on one of the Render buttons.

The information under the window shows which layer/frame is currently being previewed, and its angles of rotation.

If you want to render the preview image, click on the Render One button. This renders the current frame and creates a new layer in the original document.

You can control the quality of the preview image from the Quality pop-up menu. Your choice will also affect the speed at which the preview is displayed.

Select High for the best quality preview images; select Low if you want to speed up the display. This will result in a slightly fuzzy image.

The Wireframe option, illustrated below, shows the volume, with no image data. It is useful if you want to check quickly that your x, y and z angle parameters are producing the required sequence.
Using 3D Rendering

1. Use the **Open** command to open the image file to which you wish to apply 3D Rendering.

2. Use the Layer Manager Palette to select layers for 3D Rendering.

   **Note:** You may select all the layers in the Layer Manager; 3D Rendering will ignore any video layers.

3. Select **3D Rendering...** from the Image menu. It will take a few seconds for the preview image to appear.

4. Enter a value for the distance between slices in the Slice spacing box.

   **Note:** If you have calibrated the original image, you will be able to enter the spacing value in calibrated units.

5. If you want to give the rendered image a more solid look, enable the **Fill gaps between slices** option (the check box has a tick in it). Openlab fills the gaps between slices by replicating the top layers. If you select this option, the rendering process will take longer to complete.

6. If you want a true stereo projection that can be viewed with coloured glasses, enable the **Stereo** option (the check box has a tick in it). This option may double the time taken to complete the rendering process.

7. If you want to create a “dark fog” effect, enable the **Depth cueing** option (the check box has a tick in it). This enhances the perception of depth in the rendered image, by making elements of the image that are further away appear darker. If you select this option, the rendering process will take longer to complete.

8. Use the Slider controls to set the range of values for the colour volume elements (or voxels) of each channel (**Red**, **Green** and **Blue**) until the preview picture is to your satisfaction. This allows you to mask parts of the image according to colour. The rendered image will only include colour voxels that are within the specified colour range.

9. Enter start values for the x, y and z angle of rotation in the **Sequence start** boxes.

10. Enter increment values for the x, y and z angle of rotation in the **Increment** boxes.
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**Note:** If you want the rotation to be anti-clockwise, enter a negative increment value.

11. Enter the number of frames for the rendered sequence in the **No. of frames** box.

12. Click on the **Render Sequence** button to render all the frames in the sequence. The new, 3D rendered images are stored as layers into the original document.

### 3D Rendering and Automator tasks

If you have the 3D Rendering module, you will be able to use the Render Selected task in your automation. The task will appear in the Task List in the Automator Window.

This section describes the Render Selected task. Refer to the Automator Reference Manual for further details about creating and running automations.
Render Selected Task

This task allows you to set up parameters to render a 3D version of a selected image. This task will only render a single image, however you can use it within an automation to create a sequence of rotated images. The example at the end of this section illustrates how to do this.

Use the Setup dialogue to:
- Select the type of renderer.
- Specify the required spacing value for each slice.
- Set a range for the colour voxels to be included in each channel, if required.
- Set a value for the x, y and z angle of rotation.
- Enter an expression to create a name for the new, rendered layer.

An Example Automation

The following example creates an animated sequence of cell rotations. It sets initial values for the x, y and z angles of rotation, and then loops 10 times on each axis, incrementing the rotation value by 9 degrees and rendering a 3D version of the selected layer on each loop.
Setting up the automation

The automation is set up as follows:

- The **Target image window** task targets the top-most window.
- The three **Variable** tasks set the initial values of the x, y and z axes to 0.
- The **Loop** task determines the number of times that the rendering task will be run for each axis.

![Setup task “Loop”](image)

- The three **Variable** tasks within each loop sequence increment the values of the x, y and z axes by 9 degrees.
The **Render selected layers** task sets up the parameters for 3D rendering and provides a naming expression for the rendered layer.

Note how we have incorporated the rotation of the layer in the expression for the new layer’s name.

“Rendered at “+str(x)”, “+str(y)”, “+str(z)””