Tutorial Guide

Featuring Image Studio
Analysis Software
Version 3.1
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Chapter 1: Getting Started

Install the Software
IMPORTANT: You must be logged in using an administrator account. If necessary, log out and log back in using an Administrator account.

Windows® 7, XP, or Windows Vista® Operating Systems
Installing via CD:

1) Place installation CD into drive.
2) If installation does not start immediately, browse to the CD and double-click on Win_Image_Studio_Installer_3.x.x.exe.
3) Click Next and follow the instructions in the Setup Wizard.

Installing via download:

1) Download and double-click on the Win_Image_Studio_Installer_3.x.x.exe file on your computer.
2) Click Next and follow the instructions in the Setup Wizard.

Macintosh® Computers
Installing via CD:

1) Place installation CD into drive.
2) If installation does not start immediately, browse to the CD and double-click on MacImageStudio-3.x.dmg.
3) Click Agree to accept the license agreement.
4) To install, drag the Image Studio icon into the Applications folder (below).

5) (Optional) If you are updating Image Studio software and have purchased additional application keys, you will need to import those keys again to utilize their functionality.

Installing via download:

1) Go to your Mac® System Preferences and click Security & Privacy to open the Security & Privacy window.
2) Click the lock in the bottom left corner of the window to allow editing, if necessary.

3) Under the General Tab, click **Mac App Store and identified developers** under the **Allow applications downloaded from** option.

4) Download, and double-click on the MacImage Studio-3.x.dmg file on your computer.

5) Click **Agree** to accept the license agreement.

6) To install, drag the Image Studio icon into the Applications folder

7) Open the Image Studio Application by double-clicking on the Image Studio icon.

8) If a window appears that says “ImageStudio.app is an application downloaded from the internet. Are you sure you want to open it?” click **Open**.

9) (Optional) If you are updating Image Studio software and have purchased additional application keys, you will need to import those keys again to utilize their functionality.

**Set up a Work Area**
The first time you start the software you will need to create the first Work Area. The Work Area is a folder on the hard drive or network where all of the images, analyses and settings are stored. Click **Create New...** in the **Set Active Work Area** dialog box to browse to a folder on the hard drive or network to use as the Work Area. Click the New Folder icon to create a new folder for the Work Area. This folder will now appear in the **Available Work Areas** window each time the software is opened. Select the folder and click **OK** to set it as the Work Area. (To remove a Work Area from the window, select it and click **Remove from List**. Removing the folder from the window does not delete the folder or its contents.)

**Note:** Each user should create their own Work Area, as the previous settings for the instrument, analysis, image display, etc. from the last session will be applied to the next session in the same Work Area.

**Connect to the Pearl® Impulse Imager**
The first time you connect, power the Pearl Impulse Imager on and wait several minutes to allow the instrument to establish a network address. Click the Image Studio Application button, hover over **Instrument**, and click **Connect**. The software searches for and discovers the Pearl Impulse Imager on the same LAN automatically. If you experience connection problems, wait several minutes and then click **Connect** again. Check that IPv6 is enabled on the computer. The next time you connect, the software will automatically detect the Pearl Impulse Imager.
Optional Key Tips

Activate Key Tips to use the keyboard to access the ribbon tabs and other features of the Image Studio software. Press ALT (alt/option key on Mac® computers) to display the Key Tips for all ribbon tabs and application quick launch buttons. Press the letter key next to the application quick launch buttons to select that application (e.g. press ‘G’ to open the Image tab, as shown below).

Press the letter key next to the ribbon tabs to view the ribbon for the selected tab and the key tips for the commands on that ribbon. Press the letter key next to the commands to activate the commands or open another menu. For Key Tips with two letters, press the keys sequentially on the keyboard.

In this manual, instructions refer to selecting tabs and commands with the mouse. Press ALT at any time to use the Key Tips to select the tabs and commands with the keyboard.
Chapter 2: Image Acquisition

Refer to the Pearl® Impulse Operator’s Manual for instructions on setting up the Pearl Impulse Imager, connecting an anesthesia system, and using the imaging bed or Pearl Clean Box. Check that the Pearl Impulse Imager is turned on and that the Image Studio software is running and connected to the instrument. The Pearl Impulse Operator’s Manual contains guidelines and techniques for placing a mouse in the imaging bed or Pearl Clean Box and imaging with the Pearl Impulse Imager.

Acquire the Image
Click the **Acquire** tab to display the Acquire ribbon. In the **Status** group, **Ready** indicates the instrument is connected and not currently acquiring an image.

Setup
Click **Image Table Info** to open the **Image Table Information** dialog.

[Image of the Acquire ribbon and Image Table Information dialog]

Enter information in the fields that will appear in the Images Table cells for this acquisition. Enable the check box and all acquisitions will include this information until you exit Image Studio. You can add additional custom columns to the Images Table; see **Chapter 7: Tables** for more information.
Note: You can enter or edit information at any time by double-clicking the cell in the Images Table. See Chapter 7: Tables for instructions on pasting information into multiple Table cells.

Heater Plate
Place the imaging bed or Pearl® Clean Box in the Pearl Impulse Imager. Toggle On/Off button in the Heater Plate group to highlight it to turn on the heater plate in the Pearl Impulse Imager. Click the Set button and select the desired temperature from the drop-down menu. The Actual button displays the current temperature of the heater plate.

Note: It may take several minutes for the heater plate to warm to the set temperature.

When the heater plate reaches the selected temperature and you are ready to acquire an image, place a mouse on the imaging bed or in the Pearl Clean Box.

Channels
Enable the check box next to the desired channel or channels.

Camera Controls
Use the drop-down menu to set the resolution to 170 μm for most images. Set the focus offset to the value that gives the best image. If you are not sure what focus offset is best, click the focus offset (f) button and the Pearl Imager acquires images at each focus position. View the images and select the focus offset that offers the best images for your subject.

Click the Time Series button and choose Single Image from the drop-down menu. You can also choose Standard Time Series... to acquire multiple images automatically or Fast Time Series... to rapidly acquire images of a short time event in one channel only.
Camera
After the parameters have been set, click **Acquire Image** to start the scan. Click **Pause** to stop the acquisition momentarily. Click **Pause** again to restart the acquisition. If necessary, click **Stop** to stop the acquisition before it finishes, or **Cancel** to stop the scan and delete the image.

Click the arrow (>) on the **Camera** group to open the **Camera Options** dialog. Enable the check boxes to automatically start the acquisition after closing the drawer or to open the drawer automatically after the acquisition.

![Camera Options dialog](image)

View the Image and Data
*When the acquisition is complete, the image appears on the screen. The image data appear in the Images Table below. Change the Image Name to easily find the image later.*

1) Double-click in the field under **Image Name**.
2) Enter a new name. Press Enter when finished.
3) Refer to Chapter 4: Image Display for complete information on adjusting the image appearance.
Chapter 3: Image Files

Import an Image

Tutorial images are provided on the Image Studio CD in the Image Examples folder. The folder name for the Small Animal Image is ‘9999996_01’.

1) Click the Application Menu Button and then hover over Import. Hover over Image Studio and click Acquisition Folder.

![Image Studio Import Dialogue Box](image)

**Note:** Images from the Pearl® Application Software (versions 1.x or 2.x) can be imported into Image Studio software for analysis by clicking Import > Pearl.

2) Browse to the Image Studio CD, open the Image Examples folder, and select the folder ‘9999996_01’. Click Open to display the image.

3) The image opens and the file appears in the Table.
Export Acquisition Data and Images

In the Images Table, click on a row to select an image acquisition. To select multiple image acquisitions, click and drag over the rows or press the Ctrl key on the keyboard and click on each row to select it. Click the Image Studio Application Button and hover over Export to view the Export image and analysis data menu.

1) To make a copy of the image acquisition, click Copy Image and choose Folder or Zip File. Click Zip File to save the image acquisition(s) as a compressed (zip) file. Either choice opens a window where you can select the folder to which to copy the image acquisition.

Note: Use Copy Image to move image acquisitions to another Work Area or to make a zip file to share with another Image Studio user.
2) To make a copy in another folder and delete the image acquisition from the Work Area, click on Move Image and click Yes in the Move Selected Acquisitions menu. Select the folder to copy to in the browse window.

3) To save the image to a graphics file, click Single Image View to view a choice of Current Image, Selected Images in Images Table, or Color Bar Only. Each choice opens a window where you can select the folder to copy to, as well as the file type (TIFF, PNG, or High Quality JPEG) and resolution.

**Note:** Images saved as these file types (TIFF, PNG, or High Quality JPEG) are for presentation purposes and should not be used for further analysis.

4) To save a tiled image file from images in the Table, click Multiple Image View to open a browse window where you can select the folder to copy to as well as the file type (TIFF, PNG, or High Quality JPEG) and resolution.

**Note:** Data can be quickly and easily exported from the Tables to a spreadsheet. Refer to Exporting Data in Chapter 7: Tables.
Chapter 4: Image Display

View the Image
Click the *Image* ribbon tab to display the *Image* ribbon.

In the *Zoom* group click the magnifier icons to enlarge or reduce the displayed image. You can also scroll the mouse wheel or use the scroll function of a keypad to zoom in or out. Click *Restore* to automatically fit the image to the window.

Display
*The Choose Display and Adjust Display Assistants are alternate ways to adjust the Look Up Tables (LUTs).*

Click *Choose* in the *Display* group and select the *800 channel* to open the Choose Display Assistant.

**Note:** *This image example was acquired in one channel. The drop-down menu lists all channels acquired for the image. An image acquired in more than one channel will have multiple channels listed in the drop-down menu.*

1) Click the view with the best display. The Adjust Display dialog will open for further adjustment. You can choose to not open the Adjust Display dialog automatically by disabling *Automatically launch the Adjust Display dialog* at the bottom of the window. You can also click the arrow (>) on the *Display* group on the *Image* ribbon to open the *Display Options* dialog and disable the automatic launch of either the Choose Display or Adjust Display.
Click **Adjust** in the **Display** group and select the **800 channel** to open the Adjust Display Assistant.

Select **Signal** at the bottom left to adjust the maximum point on the curve in the Look Up Tables, **Background** to adjust the minimum point, or **Midtones** to adjust the K value. Click **Dimmer** or **Brighter** to change the visual appearance of the image. When finished, click **Done**.
Adjust the Image Appearance

The Look Up Tables (LUTs) display histograms of the pixel intensities for each channel acquired for the image. The LUTs are on the right side of the screen.

1) Click the **Image LUTs** tab to view the Image Look Up Tables as either histograms overlaid with a curve or sliders. To hide this view, click the double arrows in the top right corner.

2) To change the Image LUTs from histograms (Curves) to Brightness/Contrast sliders, click the arrow (>) on the **Display** group on the **Image** ribbon to open the **Display Options** dialog.
3) Click the appropriate colored button above the graph to select a different color scheme for each channel, or to disable a specific channel.

**Note:** *Multiple channels can be viewed, printed, and exported in gray scale.*

To adjust the intensity of the image in the histogram view,

a. Drag the left (min) dot on each graph to adjust the lower threshold of pixel values that will shade to the same color on the viewed image. Shading the lower intensity pixels to the same color will create a visually cleaner background on the image.

**Note:** *Changing the visual image will not change the data collected for that image or the quantification of that data. It only changes the mapping of raw image pixels to display pixels.*

b. The rightmost (max) dot on each graph adjusts the upper threshold of pixel values that will shade to the same color on the viewed image.

c. Click and drag the middle dot on each graph vertically to change the K value.

**Note:** *Further explanation of the K value can be found in the online Help system by clicking the question mark in the upper right-hand corner of the screen.*
To adjust the intensity of the image in the Brightness/Contrast view, click and drag each slider.

View Mode
Select **Single** in the View Mode group to view and analyze a single image. Click the Multi-Image View button and select the number of images to view from the drop-down menu.

*Note: Analyses cannot be done in Multi-Image View.*

**Link the Look Up Tables (LUTs)**
*You can link multiple images and the settings for the appearance of those images will be the same. Adjust the histograms (Curves) or Brightness/Contrast sliders and all of the linked images change appearance.*

1) Click **Copy** in the Create group to create a copy of the image.
2) Apply a filter in the Images Table by holding the Ctrl key and clicking 9999996_01 and 9999996_02 in the Images Table to select them. Click the Table tab to open the Table ribbon. Click Selection. See Chapter 7: Tables for more information on applying filters.

3) Click the Image tab to open the Image ribbon. Click the Multi-Image View button in the View group and select 2 across in the drop-down menu.

4) Enable the check box by Link LUTS Across Filtered Images on the Image LUTs tab.

5) The image settings for all of the filtered images change to the current image’s settings. Adjust the current image’s settings and the settings for all of the linked images change as well.

Slide Show

Click Start and the images in the Table will appear in the window sequentially. Click Stop to return to normal viewing. Click the arrow (>) on the Slide Show group to open the Slide Show Parameters
menu. Choose to display the images in the Table and stop at the end, or return to the beginning of the table and continue displaying the images (Loop continuously). Adjust the slider to modify the amount of time each image is displayed.

![Slide Show Parameters](image)

**Create**

Click a button in the Create group to create a new image acquisition file with the designated action applied. The original image acquisition remains unchanged. Click Copy to create a copy of the image. Click Rotate or Flip to open the Rotate or Flip Options menu and select an orientation.

![Create and Rotate or Flip Options](image)
Click **Free Rotate** to open the **Free Rotate Options** dialog box and click the arrow buttons to rotate the image clockwise or counterclockwise. **Warning:** Free rotations change the image data for the new image and may affect quantification results.

![Free Rotate Options](image)

Click **Reduce Noise** to open the **Reduce Noise Options** dialog box and select an option. Hover over each option to open a tooltip explaining the method. Click **OK**. **Warning:** Reducing noise changes the image data for the new image and may affect quantification results.

![Reduce Noise Options](image)

Click **Align Channels** to open the **Align Channels** menu. Select one channel as the static reference and adjust the other channel using the arrow buttons. Click **OK**.

**Crop the Image**

Click **Crop** to create an image that contains only the area within the bounding box. Adjust the crop area by dragging the boxes in the corners or at the center. Click **OK** to crop the image.
Crop Marks

Place crop marks on the image to indicate the area of the image to print or export. These crop marks can apply to the selected image, or all images in the images table.

1) Click **Apply** and marks indicating the corners of the cropped area appear on the image.
2) Click **Modify** to open the *Edit Image Crop Marks* dialog. Two boxes appear as dotted lines on the image.
3) Drag the small box in the middle of the image to center the crop marks. Drag the corners of the large box to surround the marker and bands.
4) Click **Current Image** to mark this image with these crop marks and click **OK**. Small crop marks indicating the corners of the cropped area appear on the image at the new location.

**Note:** If **Images in images table** is selected, this crop definition applies to all images in the Images Table.

**Note:** These small crop marks will appear on the image as long as **Apply** is selected. The crop area will apply to any print or export action. To remove the small crop marks and print or export the full image, click **Apply** again to toggle it off.
Chapter 5: Data Analysis

Add and Manipulate Shapes Manually

1) Click the Shapes tab to open the Shapes ribbon. Set the Analysis Type to Manual.

2) Click Auto Add Rectangle to add a rectangle to the image or Auto Add Ellipse to add an ellipse. Click in the center of a feature to place the rectangle or ellipse around it. After adding the desired shapes, click Select or press the Esc key on your keyboard to return the cursor to the selection tool.

3) To move or resize a shape, first select the shape by clicking on it once. Dotted lines indicate the shape is selected.
   a. To move the shape, drag the four-pointed cursor within the selection shape.
   b. To resize the shape, hover over any corner or side of the shape. Drag the double-sided yellow arrow to resize.

Note: To find the double-sided yellow arrow, the cursor must be on the selection tool (click Select in the Shapes group or push the Esc key on the keyboard).
c. To view the shapes and labels on the image, enable the **Shapes** and **Labels** check boxes in the *Show* group. Disable the check marks to remove the shapes and labels from the image.

d. To edit the label, click the **Shapes** tab at the bottom of the screen to view the Shapes Table. Under the column *Name*, double-click on the cell for this shape and edit the text. Press *Enter* and the new text will appear on the image. To change the location of the label, click the small arrow on the *Show* group to open the *Image View Labels* menu.

**Note:** You must press Enter or click on another cell in the Table to save the change to the Table cell before saving the acquisition.

```
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>16</th>
<th>1.13E+6</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td>01000277</td>
<td>800</td>
<td>2</td>
</tr>
<tr>
<td>77</td>
<td>01000277</td>
<td>800</td>
<td>2</td>
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<td>77</td>
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<td>2</td>
</tr>
<tr>
<td>77</td>
<td>01000277</td>
<td>800</td>
<td>2</td>
</tr>
</tbody>
</table>
```

**Note:** Select **Draw Rectangle**, **Draw Ellipse**, or **Draw Freehand** to manually draw Shapes. Drag the mouse to create the shape. The resulting shape can be moved or resized in the same way that an auto shape is moved or resized.

4) To copy the same shapes to the 700 channel:
   a. Click **Select All** in the *Edit* group to select the shapes. Dotted lines indicate the shapes are selected.
   b. Click **Duplicate** in the *Edit* group or right-click on the image and select **Duplicate** from the pop-up menu.
   c. Click the *Show this Channel in Red* thumbnail for the 700 channel to see the bands.

5) To quickly add shapes in one or both channels, use the **Add Selection** tool.
   a. Drag a rectangle around the shapes to select them. Dotted lines indicate the shapes are selected.
   b. Click **Add Selection** in the *Create* group.
   c. Click the image to add the shapes to the image.
d. To move the shapes, drag the four-pointed cursor that appears within either shape. The selected shapes move together.

![Diagram of shapes](image)

6) To rotate the shapes in the 800 channel...
   a. Click the *Don't show this channel* thumbnail for the 700 channel, leaving only the 800 channel displayed on the image.
   b. Drag a rectangle around the shapes to select them. Dotted lines indicate the shapes are selected.
   c. Click *Rotate* in the *Edit* group or right-click on the image and select *Rotate* from the pop-up menu.
   d. Drag inside the circle to rotate the selected shapes.

*Note: You can also rotate shapes by selecting them, pressing the Ctrl key, and scrolling with the mouse.*

**Profiles Tab**

1) Select ‘Shape 2’ by clicking on the shape with the selection arrow until it changes to a dashed line.
2) On the right side of the screen, click the *Profiles* tab to view two graphs of the pixels within a selected shape. The top graph is a cross section of the pixel intensities from top to bottom. The bottom graph is a cross section of the pixel intensities from left to right.
3) Adjust the size of ‘Shape 2’ by dragging the arrows on the corners of the shape. Notice how the graph changes.

**Note:** The small black marks indicate the boundaries of the shape. Move the shape around the band so that the small black marks are close to the edges of the peak to capture the entire signal for that band.

**Auto Adjust**
*The software moves selected shapes to fully enclose areas of fluorescence near the shapes.*

1) Drag a rectangle around the shapes to select them. Dotted lines indicate the shapes are selected.
2) Click **Auto Adjust** and the shapes will move slightly to better enclose nearby areas of fluorescence.

**Subtract the Background**
*Subtract the background of the animal from the shapes to obtain consistent data. The software will not calculate Signal for the shapes if a background method is not selected.*

**Note:** The black line in the Profiles indicates the background that will be subtracted.

**Subtract a User-Defined Background**
*Choose a region of the image for the background that is similar to the area of fluorescence. For example, if the area of fluorescence is on a shaved area of the animal, the background shape should also be on a shaved area.*

1) Click the first button in the Background group and select **User-Defined** from the drop-down menu.
2) Using what you’ve learned from *Add and Manipulate Shapes Manually* in this chapter, place a shape on the image in the region that you have chosen as the background.

3) Select the shape by clicking on it with the selection arrow until the shape outline becomes a dashed line.

4) Click *Assign Shape* in the *Background* group.

Show

In the Show group, enable all check boxes, indicating all items will appear on the image. To specify the location of the labels, click on the arrow at bottom right to open the Image View Labels menu.

Annotate the Image

Click the *Annotation* tab to open the *Annotation* ribbon.

Click *Add Text* in the *Text* group and click on the image. Type the desired text in the *Text:* box. Click *OK* to add the text to the image.

Click *Add Arrow* and click on the image to add an arrow to the image. Click *Select* or press the *Esc* key on the keyboard to toggle the cursor back to the selection tool. Click the text or arrow that was added to the image with the selection tool. A dashed box appears around the text or arrow. Use the tools in the *Font* group to change the appearance of the text or arrow.
Click **Rotate CW** or **Rotate CCW** in the Text group to rotate the text or arrow. Click **Edit** in the Text group to view the Text Properties menu for the selected item. Insert different text or add a border to the text with this menu. If the selected item is an arrow, click and drag the sides of the dashed box to change the size of the arrow.
Chapter 6: Small Animal Image Analysis

Apply a Small Animal Image Analysis

Tutorial images are provided on the Image Studio CD in the Image Examples folder. The folder name for the Small Animal Image is ‘9999996_01’.

1) Open the small animal image imported in Chapter 3: Image Files by clicking the appropriate row in the Images Table. To quickly find this image, hover over the Images Table to view a thumbnail of each image.

2) Adjust the look of the table in the Image LUTs on the right side of the screen. Refer to Chapter 4: Image Display for more information.

3) Click the Shapes tab to view the Shapes ribbon.

4) Click Small Animal Image to open the Small Animal Image Analysis ribbon and apply the Small Animal Image analysis to the image. Or, click the quick launch button at the top of the window and select Small Animal Image from the drop-down menu.

Note: The Small Animal Image Analysis is automatically applied after an image acquisition.

Set the Background Shape

Draw a shape on the animal and designate it as the background shape. Draw the shape with an area similar to the area of fluorescence. For example, if the area of fluorescence is on a shaved part of the mouse, draw the background shape on a shaved part of the mouse.

1) Click Draw Ellipse in the Shapes group.

2) Drag a shape onto the image as shown below.
3) Click **Assign Shape** in the **Background** group to assign the shape as the background.

**Use the Auto Shape Tool**

1) Click **Define New** in the **Auto Shape** group.

2) Click the center of the area of fluorescence.

3) Click **Select** in the **Shapes** group to toggle back to the selection tool.

4) Click anywhere on the image to set the Auto Shape indicated by a solid line.

*Note:* The feature created by the Auto Shape tool can be changed interactively by adjusting the **Std. Dev. Multiplier** in the **Auto Shape** group. In general, larger **Std. Dev. Multipliers** increase the
threshold, reducing the size of the feature on the image by excluding more pixels of lower intensity. Similarly, decreasing the **Std. Dev. Multiplier** increases the size of the feature on the image.

**Use the Trim Tool**

1) Click Shape 2 to select it. The dashed line indicates it is selected.
2) Click **Trim** in the **Shapes** group.
3) Drag a line that transects the shape in two places as shown below.

4) Click on the image to the left of the line to remove that side of the shape as shown below.

5) Click anywhere on the image to set the shape indicated by a solid line.
Chapter 7: Tables

Image data are stored in the folder selected as the Work Area when Image Studio is opened. The data are easily accessed in the Tables below the image window. In the Images Table, each row represents one image. Various fields in that row contain identifying information about the image. These fields are grouped as columns that can be moved, added, deleted, sorted, or filtered.

Images Table

1) Click the Images tab at the bottom of the screen to show the Images Table. Click the double arrow to hide the Table from view.

Or, click Table to open the Table ribbon and select Images from the drop-down menu on the first button in the Display group. Click Hide to hide the Table from view.

2) Hover the mouse over any row to display a thumbnail picture of that image.

3) Click any cell to select the entire row and display that image in the window.

4) Click the corner button to select all of the images or press Ctrl+A on the keyboard.

5) Right-click any cell to view a menu with options that include copy an image, delete images, or view the properties of an image.

6) To move a column, drag the column header to the new location.
The fields in each row contain information about the image and are organized as columns across all of the images. Some of the columns are properties of the image and cannot be edited. Examples of these columns include Image ID, Acquire Time, Channels, Resolution, and Instrument Name. Other columns can be edited with information for that image.

7) To edit a field, double-click on the cell so that a cursor appears. If a cursor does not appear, that field cannot be edited.

8) Add text where the cursor appears. Press Enter when complete.

Note: To easily find images later, enter identifying information in one or more fields after acquiring an image.

Add or Remove a Column

1) Click the Table tab to view the Table ribbon.

2) Click Add/Remove in the Columns group.

3) To add the Experiment column, click the column description to enable the check box, indicating that column will appear in the table.

4) To remove the Resolution column, click the column description to disable the check box and remove that column from the table.
5) Click **Save**. The table now appears as shown below.

![](image)

**Edit the Image Title**

1) Click the **Table** tab to view the **Table** ribbon.

2) Click **Add/Remove** in the **Columns** group.

![](image)

3) Click **Use an additional image column with the Image ID** to enable the check box.

![](image)

4) Click the down arrow in the selection box to choose a column to add to the Image ID to form the Image Title. 

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**Tutorial Guide**
5) Click Project. Text in the Project column will be added to the title of every Image.
6) Click Save.

Add Custom Columns
1) Click the Table tab to view the Table ribbon.
2) Click the Customize icon in the Columns group to view the Custom Columns menu.

3) In the Custom Columns menu, replace Custom Field0 with Department.

4) Click Save.
5) To add this custom column to the table, click the Table tab to view the Table ribbon.
6) Click Add/Remove in the Columns group.

7) To add the Department column, click the column description to enable the check box, indicating that column will be in the table.
8) Click Save. The Department column will be added to the right of the existing columns.

Paste Data in a Column
Use Paste in the Data group to quickly fill a column with information.

1) Double-click the first cell in the Department column so that a cursor appears in the cell.
2) Type ‘Tutorial’ at the cursor position using the keyboard.
3) Drag the mouse over ‘Tutorial’ to highlight it. The cursor should still appear in the cell.
4) Press Ctrl+C on the keyboard to copy the data to the clipboard.
5) Drag the mouse over the cells in the **Department** column (or press the **Ctrl** key while clicking each cell once) to select which cells to fill with ‘Tutorial’.

6) Click **Paste** in the **Data** group, press **Ctrl+V** on the keyboard, or use the right-click menu to paste the data in the selected cells.

![Image showing 'Tutorial' added to cells in Department column.]

**Paste Data from a Spreadsheet to a Column**

1) In a spreadsheet, select data and press **Ctrl+C** on the keyboard to copy the data to the clipboard.

2) In the Table, drag the mouse over the cells in the **Department** column (or press the **Ctrl** key while clicking each cell once) to select which cells in a column to place the data.

3) Click **Paste** in the **Data** group, press **Ctrl+V** on the keyboard, or use the right-click menu to paste the data in the selected cells.

**Copy Data to a Spreadsheet**

*Use **Copy** in the **Data** group to quickly copy rows to a spreadsheet.*

1) Drag the mouse over the rows or press the **Ctrl** key while clicking on each row once to select which rows to copy. To copy all rows, press **Ctrl+A** on the keyboard.

2) Click **Copy** in the **Data** group, press **Ctrl+C** on the keyboard, or use the right-click menu to copy the data to the clipboard.

3) In a spreadsheet, press **Ctrl+V** on the keyboard to paste the data in the selected cells.

*Note: The column headings will be pasted above the data.*

**Sort by Column**

1) To sort by any column, click once on the header. The table will be sorted by that column. **Note**: *No change will be made if the fields in a column are all the same.*

2) To change the direction of sorting, click the small box in the header with the up or down arrow. Or, right-click on the header and select **Sort Ascending** or **Sort Descending**.
Filter the Table Manually
1) To manually choose images, drag to highlight the rows to select the desired images. Or, select the desired images by pressing Ctrl on the keyboard and clicking once on each row.
2) Click the Table tab to choose the Table ribbon.

3) Click Selection to show only the selected images in the table. The Filtered button in the Display group will be highlighted.
4) Click the Filtered button to toggle between showing only the selected images and showing all images in the table.

5) To remove the filter, click Clear Selection to remove only the Selection filter, or Clear All to remove all filters in place.

Define Filters
One or more defined filters can be applied to the table to show only the images of interest.

1) Click the Table tab to choose the Table ribbon.
2) Click Define to view the drop-down menu of all of the column headings. Select Analysis to filter using the Analysis column.

Note: Right-click on any column header in the Table to drop down a menu for that column.

3) Deselect None and Western by disabling their respective check boxes.
4) Click **OK**. Only images with *Shapes* in the *Analysis* column will appear in the Table.

**For more Filter Options…**

1) Click **Define Filters…** in the *Filter* menu.
2) Click one of the filtering phrases to show the *Column Filter Analysis* menu.
3) Select filtering phrases from the drop-down menu by clicking on the down arrows next to each box, or type your own phrase.

4) Click **OK**.

*Note: If you close Image Studio, your filtering criteria are preserved.*

**View the Shapes Table**

1) Click the **Shapes** tab in the Table to view the data for each shape.

2) The default columns are defined below.
   a. *Image Name*- Original acquisition name
   b. *Channel*- 700, 800, or Chemi
   c. *Name*- Shapes are assigned a number in sequential order. Double-click on the number in the column to edit the shape name.
   d. *Signal*- The Signal is the sum of the individual pixel intensity values (**Total**) for a shape minus the product of the average intensity values of the pixels in the background (**Bkgnd**) and the total number of pixels enclosed by the shape.
   e. *Total*- Sum of the individual pixel intensities for the shape
   f. *Area*- Total number of pixels enclosed by a shape
   g. *Bkgnd*- Designated background subtraction
h. **Type** - Signal or Background  
i. **Conc. Std.** - Value of the concentration standard assigned for this shape  
j. **Concentration** - Calculated value of the concentration based on the standards for the shape  

3) Move, add, delete, sort, and filter the columns in the same way as in the Images Table.

## Exporting Data

*Use Export File* or *Launch Spreadsheet* in the Data group to prepare or open an ‘.xls’ file with the selected data.*

### Export File

1) Click the arrow (>) on the Data group to view the *Data Options* menu. Choose the file format (text or xls) and whether to export all rows or selected rows.

![Data Options](image)

2) In the Table ribbon, click *Export File* to open the *Table Export* menu.  
3) Select the folder destination. Click *Save*.  
4) The file will be saved in the selected folder.

### Launch Spreadsheet

1) Click the arrow (>) on the Data group to view the *Data Options* menu (see Step 1 above).  
   Select to either export all rows or selected rows. Click *Save*. If necessary, select the rows in the table to export.  
2) In the Table ribbon, click *Launch Spreadsheet* to open the *Launch Spreadsheet* menu.  
3) Select the folder destination. Click *Save*.  
4) An application that uses these types of files will open with the selected data and corresponding column headings.
Chapter 8: Print Images and Create Reports

Print an Image

1) To open the Print menu, click the printer icon in the quick access tool bar, press Ctrl+P on the keyboard, or click the Image Studio Application Button, hover over Print, and click Print.

2) Click Print to print the currently displayed image.
Save an Image as a PDF File

1) Click the *Image Studio Application Button* and select *Save As PDF*.

2) Click *Save* to save the current image in pdf format.
Print a Report
In the Print menu, select Small Animal Lab Book and click Print to print the default Western report for the current image.

To create a custom report, click Add Lab Book... to open the Print Format builder menu.
1) Type a report name in the Lab Book Name: field.
2) Items that are available to add to the report appear under Available in the right-hand column. Select an item and click Add to move it to the In Use column on the left.
3) Click Save to include the items in the In Use column in the report.
4) In the Print menu, click Print to print the custom report for the current image.
Save a Report as a PDF File

1) Click the Image Studio Application Button and select Save As PDF.

2) In the Save as PDF dialog box, select Small Animal Lab Book and click Save to save the default Small Animal report for the current image.
To create a custom report, click **Add Lab Book**... to open the **Print Format builder** menu. Follow the example above to create a custom report. Click **Save**.