This tutorial contains navigation buttons that enable you to move throughout the tutorial. Please use the navigation buttons and not the page up/page down or arrow keys to navigate through the tutorials.

This is the 'Next' button. It takes you to the next frame or stop point.

This is the 'Previous' button. It takes you to the previous frame or stop point.

This is the 'Go to frame' button. It takes you to a specified frame.

This is the 'Go to URL' button. It takes you to a website link.

Press the 'Next' button below to start this tutorial.
This tutorial will introduce the functions on the 3D Tools window of the ZcorrectorGui.

This tutorial assumes that you have already read through the tutorial on the main window and know how to load and prepare your data.

See the tutorial ZcorrectorGui_01_MainPage for more information.
This is the 3D Tools panel. Additional options are available after you create your first 3D plot.
To start, select the peak(s) you want to plot in 3D.

Click on a peak to select it.
You can select multiple peaks by using ‘Shift + Click’ or ‘Ctrl + Click’.

Here we select the 58 and 184 peaks.
Once you have selected the peaks you want to plot, press the "View in 3D" button to see the 3D plot.

This button can be used to reset the 3D plot back to its original form at any time.
The 3D plot is created and other options are shown.

The 3D plot can be rotated at any time by clicking and dragging on the 3D plot.
By checking this box you can use data smoothing in the 3D plot. This does a simple smoothing of the data, and is basically for visual appeal.

NOTE: The value of Min cannot be more than Max.
To update the plot, press the 'View in 3D' button.

Tools To Isolate Specific Voxel Intensities

Use the sliders below to select the intensity range that you want to isolate in the 3D plot. Then hit the update button.

The value of Min cannot be more than Max

MIN: 1
MAX: 43
Update

Take Snapshot

Rotation and Scaling Options

0 Rotate Left/Right: 360
Horizontal Rotation: 322.5
0 Rotate Up/Down: 360
Vertical Elevation: 30

Transparency Options
Be Patient This Works Very Slowly!

Top slice: 56
Alpha down: 1
Alpha up: 1

Bottom slice: 66
Alpha: 0.5

Update

Choose Color

Current color: Green

Choose Background Color

Current background color: Black

Choose Colormap

Hot

Multicolor Overlay Panel

Create 3D Movie
The smoothed data is shown in the 3D viewer.
The default color map is “Hot”. This can be changed at any time by selecting a new color map from the drop down menu.

The color map defines the colors used in the plot.

The default color map is “Hot”. This can be changed at any time by selecting a new color map from the drop down menu.

The color map defines the colors used in the plot.
This is the smoothed data shown with the 'Gray' colormap.
Let's reset the plot by selecting the 'Hot' colormap again and unchecking the smooth data option and pressing the 'View in 3D' button.
Now, let's look at some of the other options available on the 3D Toolbox panel.

Here you can find controls to rotate the 3D view and adjust the Z scale factor.

Be Patient This Works Very Slowly!
The Z axis scale in the Matlab 3D volume plots is somewhat arbitrary. It scales according to the number of layers in the 3D profile. With more layers the plot will become taller. This however may not be realistic based on the sample.

The Z scale factor slider allows the user to change the aspect ratio of the Z axis. This is purely for visual appearance since the Z scale has no physical meaning in these plots.
Here we have changed the Z scale factor to 3.
Since it does not affect the data, we will change the Z scale factor back to 1.
This box contains the Transparency Options. It allows the user to change the transparency of the 3D image and select different slice(s) for display in the 3D plot.
Because of how Matlab sliders work, this can be a bit confusing.

The Alpha down defines the alpha value for the slices starting at the top of the 3D volume. To change the alpha value of the whole volume, all slices must be selected (Top slice = 56). This is the default.

The Alpha up defines the alpha value for the slices starting at the bottom of the 3D volume.
Rotating the sample makes the transparency affect clearer to see.
Let's reset the 3D plot by hitting the 'View in 3D' button.
Now let's explore how to look at different slices of the data. First let's set the Top slice slider number to something around the middle. Here we choose 32.

The Alpha value is set at 0.04.
Now we press the 'Update' button to update the plot.
Now only the top 32 slices of the data set are shown with the current alpha value (0.04).
By selecting all slices in the Alpha up Bottom slice slider (56 in this data set) we can make the bottom of the cell visible. The Alpha down settings overides the Alpha up for the top slices (here 32).
Rotating the data set (click and drag) shows this more clearly.
Different sets of slices can be visualized by using the sliders. Here we set it up so the top 23 slices of the cell is transparent and then the next 14 are opaque (37 - 23 = 14).
By setting the Alpha down Alpha setting to 0, you can isolate a set of slices in the middle of the volume. Here we select 14 slices near the middle (37-23=14).
By adjusting the transparency of the Alpha settings you can make the slices transparent. Here we set it to 0.25 to give a semi-transparent view.
Another way to visualize the 3D volume is to select and plot a subset of voxel intensities. This is analogous to viewing an isosurface. In the ZcorrectorGUI you can select a single intensity or a range of intensities to plot.

This enables you to look at regions of the volume that differ in intensity. Sometimes this is useful to isolate different features within the volume. Though it should be noted that differences in intensity could be due to matrix effects and may not be due to chemical differences. However even if they are due to matrix effects, it often makes it easy to isolate out different part of the volume.

For this the 'Min' value must be smaller than or equal to the 'Max'.
Set the min and max sliders to the values you want to visualize, and press the 'Update' button.
All of the voxels within the intensity range selected are plotted in the color chosen within the 'Tools to isolate specific voxel intensities' box.
As usual you can rotate the 3D volume by clicking and dragging to get a different perspective view of the data.

This intensity range seems to somewhat isolate voxels within the center of the cell.
Let's change the intensity ranges to 13 to 30 and press the 'Update' button.
This intensity range seems to isolate voxels on the outer part of the cell.
It's a bit hard to see here, but this is the bottom view of the 13-30 intensity range data. The underside of the volume is empty and looks like it is coming mostly from the outer cell membrane.
Now that we have seen a couple of different intensity ranges that seem to isolate different parts of the cell, let's use the "Multicolor Overlay Panel" to create an overlay plot.
This is the multicolor overlay plot panel. The multicolor overlay differs from an RGB overlay plot in that the multicolor overlay is an overlay of different intensity values using different colors. While the RGB overlay plots in the ZcorrectorGui are RGB overlays of different peaks.
You can choose how many colors you want to use in the overlay by checking the box for the colors you want to include.
Enter the intensity range in the boxes provided (min first then max).
Here we'll show a 3 color overlay. You can change the colors for the overlay if you want, by pressing the respective color button ('Color 1', 'Color 2' or 'Color 3').

### Rotation and Scaling Options
- Rotate Left/Right: 360
- Horizontal Rotation: 322.5
- Rotate Up/Down: 360
- Vertical Elevation: 30

### Transparency Options
*Be Patient This Works Very Slowly!*
- Alpha down:
  - Top slice: 56
  - Alpha: 1
  - Bottom slice: 37
  - Alpha: 0.246
- Alpha up:
  - Bottom slice: 56
  - Alpha: 1
  - Top slice: 66
  - Alpha: 1

Update
Here we lower the alpha value for each color. This is not required, but can make it easier to see overlapping colors. These alpha values are independent of those in the 'Transparency Options' box.
Once the desired settings are chosen, press the 'Create Multicolor Overlay' button.
If we rotate the plot, we can see the green is not showing up too well. So we should lower the red alpha value.
Here we lowered the red alpha value to 0.03 and press the 'Create Multicolor Overlay' button to update the plot.
Now the green data is easier to see.
The file is automatically saved as 'Corr3DViewSnapShot.tif' in the currently active Matlab directory.
The image is saved as desired.
Once you are done you can close the 'Multicolor Overlay Panel'.
Let's reset the plot by pressing the main 'View in 3D' button and look at how to make a movie of the 3D view.
First check the axes you want to rotate the data around and enter the number of degrees to rotate in the field provided (default = 360).
A popup window appears and shows the movie as it is rendered.
A popup window appears and shows the movie as it is rendered.

NOTE: The value of Min cannot be more than Max.
When it is done choose where to save the file, give the file a name and press the 'Save' button.
When it is done saving you can close the popup window.
When you are done with the 3D Tools panel, you can close it by pressing the "Close Panel" button.

NOTE: The value of Min cannot be more than Max.

Take Snap Shot
That's it for the 3D Tools panel of the ZcorrectorGui.

Continue on to another tutorial to learn how to use the Overlay Tools.

Press the green button on the left to go back to the previous step. Press the button on the right to go back to the beginning of the tutorial.