The confocal microscopy data are 3D image stacks. There can be multiple channels in one dataset, containing differently stained tissues or cells, such as neurons, muscles, etc. In addition to TIFF as a common exchange format, FluoRender also supports several confocal raw formats, such as Olympus and Zeiss formats.

For each confocal channel, there are five parameters to adjust its transfer function shape. The transfer function is evaluated on-the-fly.

The volume-rendered results are filtered for a smoother look. Since the filtering is calculated in 2D, real-time interactions are retained.

The volume-rendered results are tone-mapped to adjust brightness/contrast and enhance details. Gamma, luminance and scale-space equalization are combined into one post-processing pass for real-time performance.

To enhance shape and depth perception, a shading pass and/or a shadow pass can be layered on top of maximum intensity projection rendering results. Since the calculations are in 2D, real-time performance is retained.

4D confocal data have decreasing brightness due to bleaching of the dyes. Using scale-space equalization as 2D post-processing of the volume-rendered results, brightness and contrast can be equalized through time.