# MAXIM Tutorial

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1. Software interface

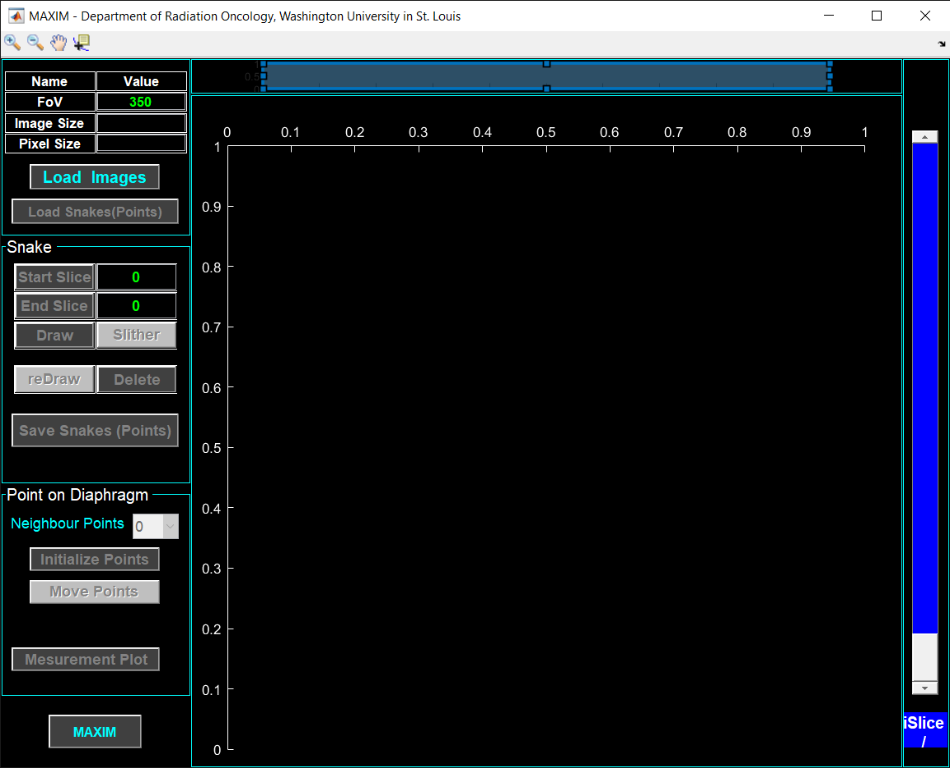
The main Graphic User Interface (GUI) is shown in Fig. 1

Slice slider

Image panel

Contrast bar

Image tools (zoom, pan, pixel info)



About MAXIM

Point panel

Snake panel

Image info. panel

Figure. 1 Main GUI

1. Loading image file

Before loading any images, enter the value of Field of View (‘FoV Value’ Image info. Panel). The unit is mm.

To load images, click ‘Load Images’ button in Image info. Panel, then navigate and doble click the image file (.mat) on harddrive. The images file contains a stack of MR image slices with contours on each slice shown in Image panel in the GUI (Fig. 2). Image slices can be flipped through using the Slice slider’. Image information is shown in the ‘Image Info. Panel’, while slice numbers are shown on the bottom of the ‘Slice slider’ bar.

There are 3 types of contours, red for reference, green for tracking, and blue for gating. Every slice should have a reference (red) contour. Most slices should have either a tracking (blue) or a gating (blue) contour, and some slices with bad image quality only have reference contours. When an image set is being loaded in, all the contours are also processed and shown in ‘Contour panel’ on ‘Measurement plot’ as shown in Fig. 3. Contour plot has all contours overlaid as shown in red, blue, and green. It also has all contours as binary image overlaid. The ‘profile line’ in the ‘Contour panel’ is a cross line over the overlaid contour plot, while the profile plot shown in ‘Profile panel’ is the overlaid binary image intensity variation along the profile line. The red vertical lines in ‘Profile panel’ correspond to the reference contour (red) in ‘Contour panel’, while the numbers are the measured values for uprise and fall of the intensity profile across the profile line.

The profile line is an interactive object, which can be moved/stretched by holding the line’s body/ends. The profile plot on ‘Profile panel’ will respond the change of the profile line change in real time. The radio buttons in ‘Contour panel’ can be used to turn on and off ‘binary overlay’ and contours, while the pushbuttons ‘hProfile’ and ‘vProfile’ are for setting the profile line to ‘horizontal’ and ‘vertical’ position, respectively. The ‘Save Data’ button in ‘Contour panel’ will save the measurement data as ‘.mat’ file on harddrive.

The ‘Measurement plot’ can be hidden by click the close icon ‘x’, and be restored later by click the ‘Measurement Plot’ button in ‘Point panel’ on the main GUI.

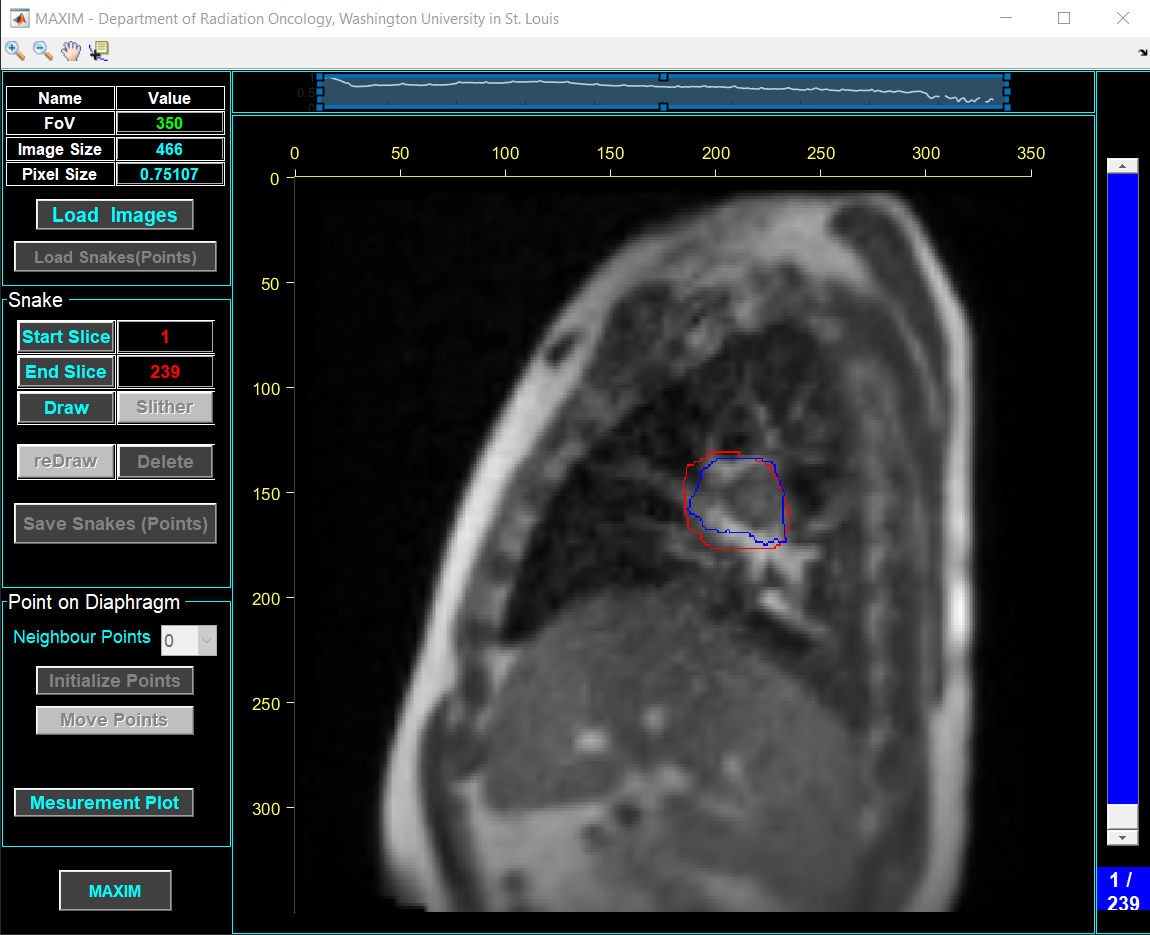
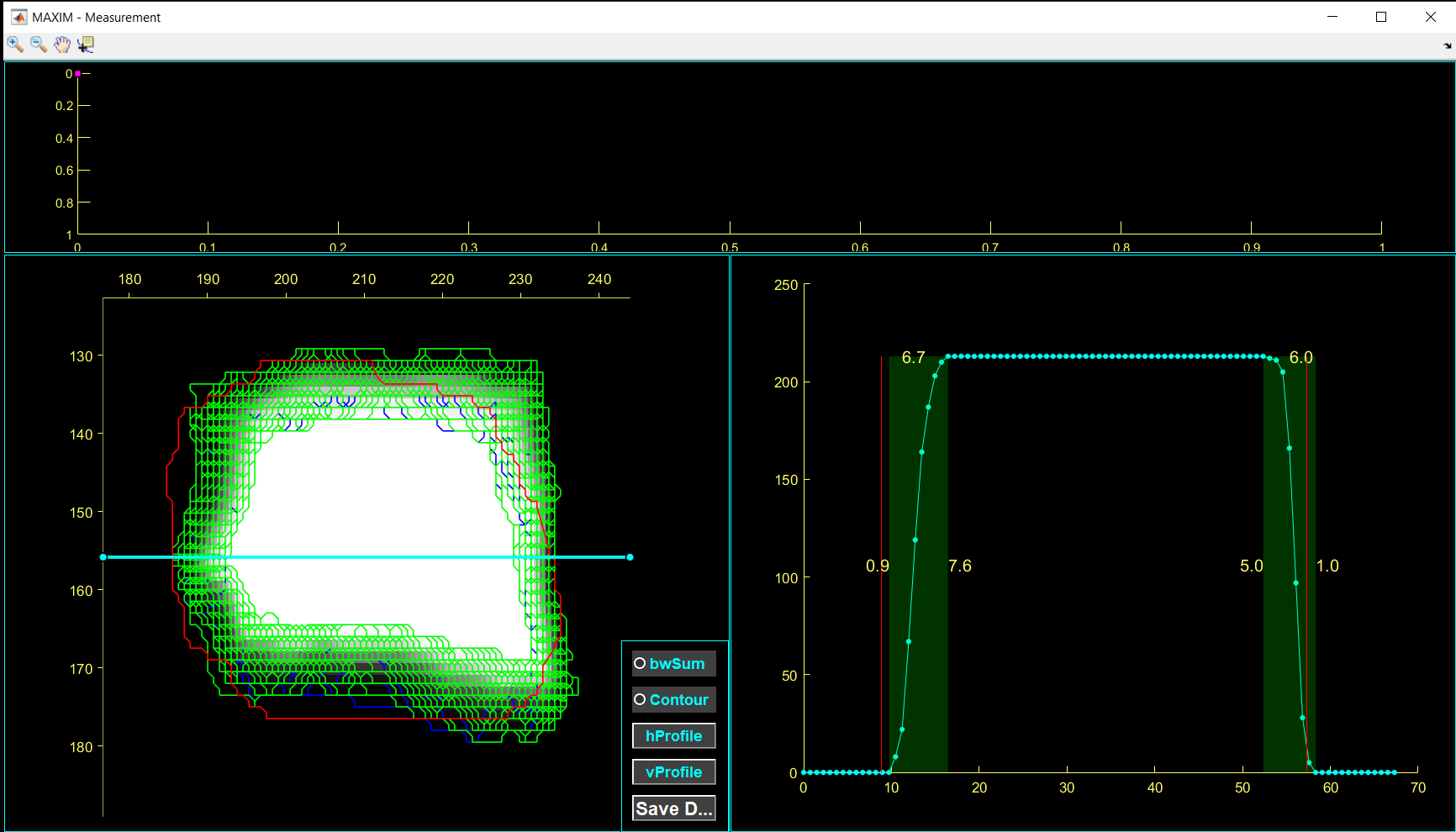


Figure. 2 GUI with an image file loaded



Point plot panel­

Profile line

Contour panel­

Profile panel­

Figure. 3 Measurement plot

1. Snake

One functionality of this GUI is to find diaphragm on MR images. First, a guided hand-drew curve (snake) will be place along the diaphragm on an image. Then the program will automatically find diaphragm on other images. The algorithm is based on Active Contour Model, also called Snake. The process is as following.

* 1. Click ‘Draw’ button on ‘Snake panel’, then use mouse to draw a curve by clicking along diaphragm. Right-click the mouse when finishing the drawing as shown in Fig. 4. The curve can be drawn on any slices with a tracking (green) or gating (blue) contour.
  2. Click ‘Slither’ button to let the snake slithers (finding diaphragms) on other images as shown in Fig. 5. The ‘Slice slider’ shows the whole progress during ‘slithering’.
  3. The ‘Slithering’ process can be stopped by click the red ‘Stop’ button. Then the above steps need to be repeated to slither over all images.

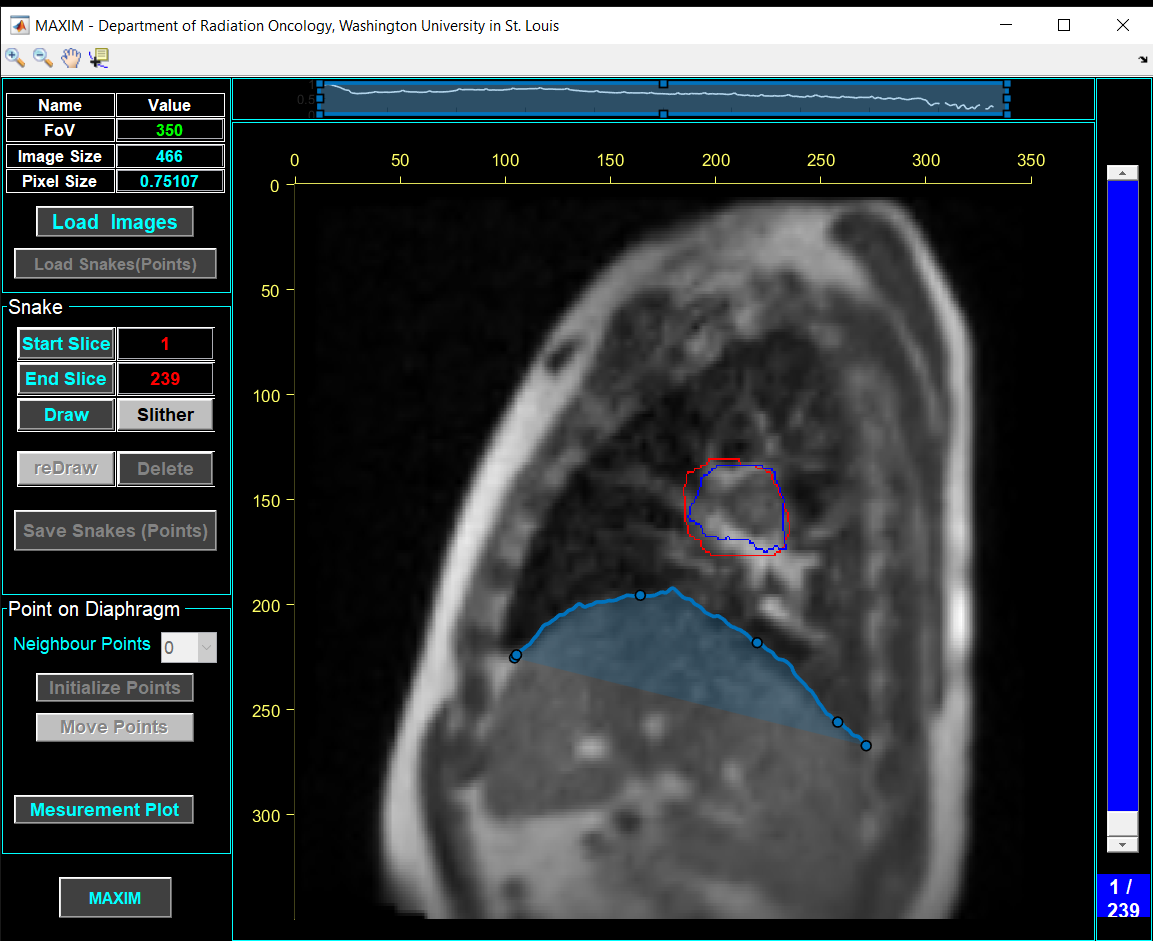


Figure. 4 Drawing a snake as a start point

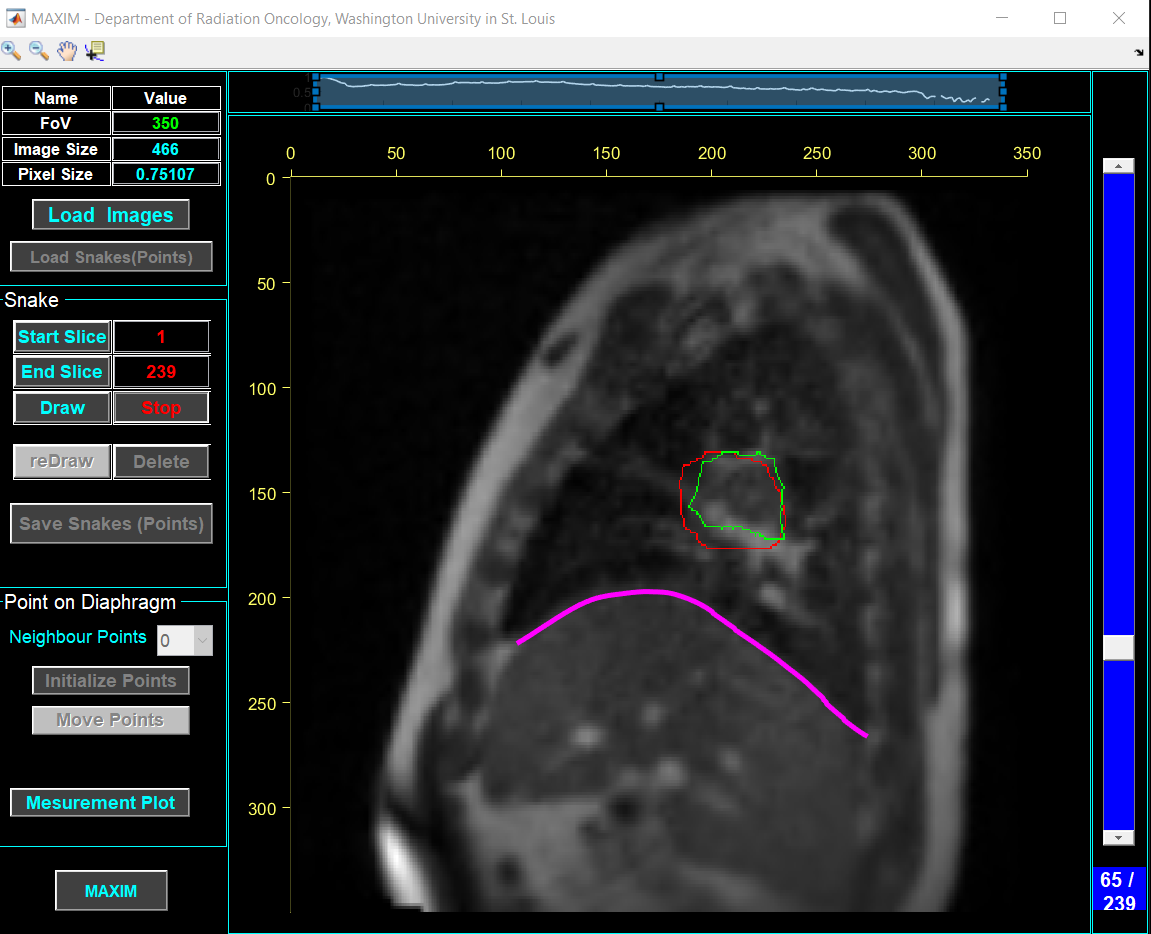


Figure. 5 Snake slithering

1. Points on diaphragms