

# **NeuroFlow User Manual**

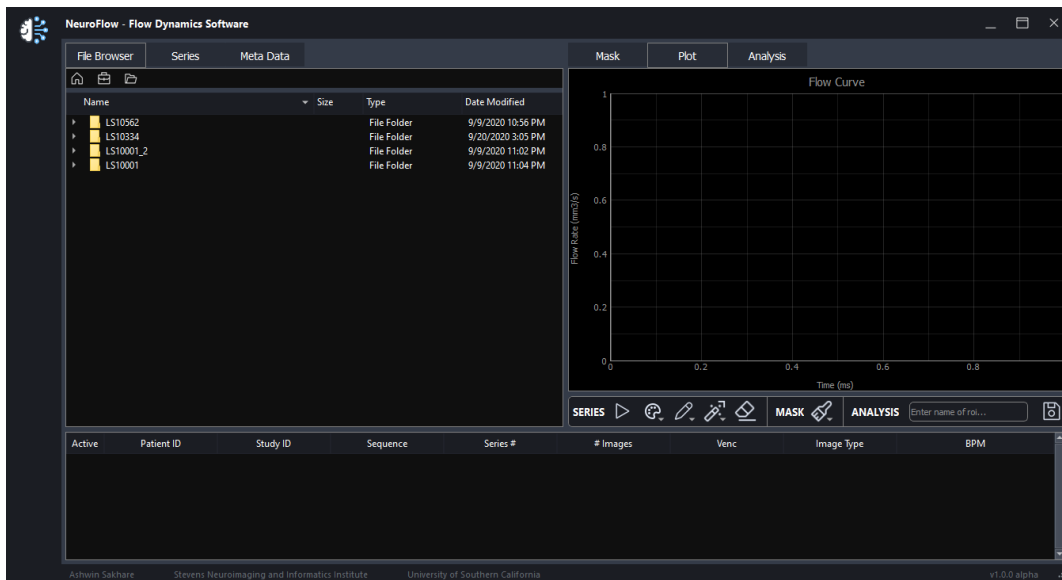
**Ashwin Sakhare**

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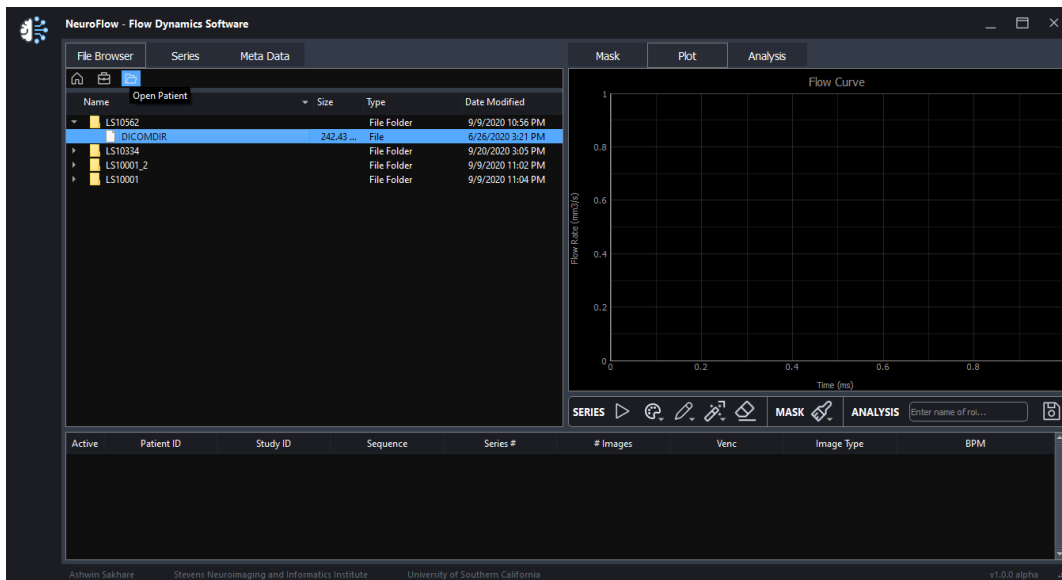
## I. Loading Patient Data

### 1. Open NeuroFlow.

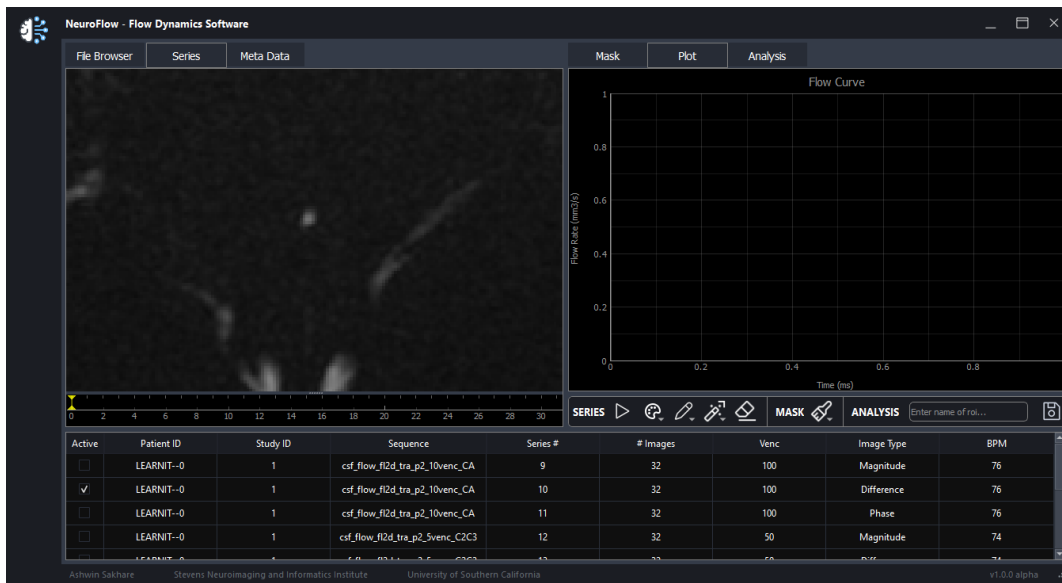


### 2. Select the File Browser tab. Select the DICOMDIR file associated with the patient to be analyzed. Select the icon to load the patient.

Note: Patient can also be loaded by double clicking the highlighted selection.




- Click inside the toggle box associated with the Series you would like to load. The toggle boxes for each available series are in the left most column of the patient table.

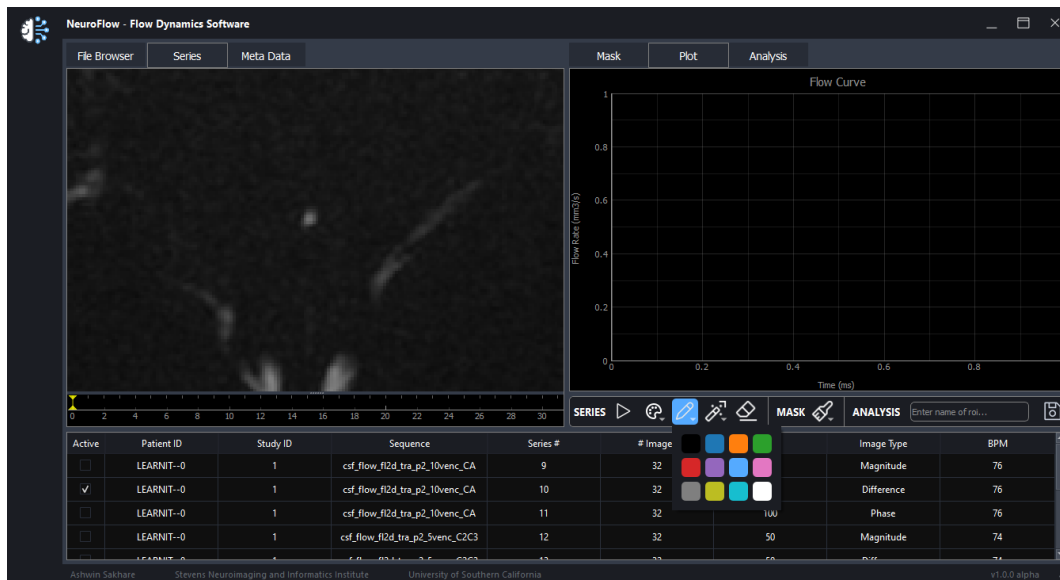


## II. Segmenting ROI

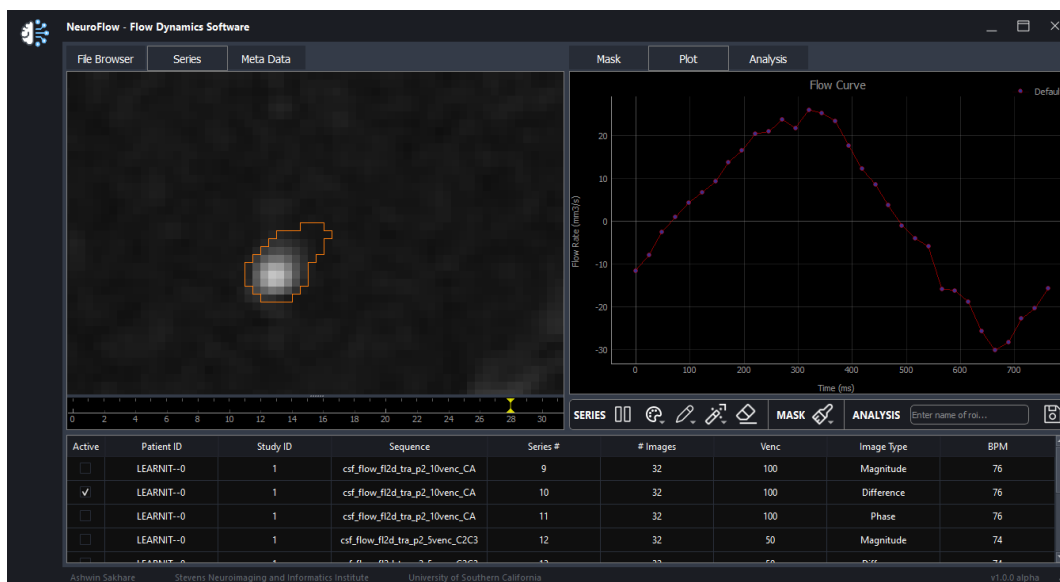
1. Select the Series tab. Click anywhere inside the left view panel.

Note: See *View Options* section for options regarding manipulating series and mask views.

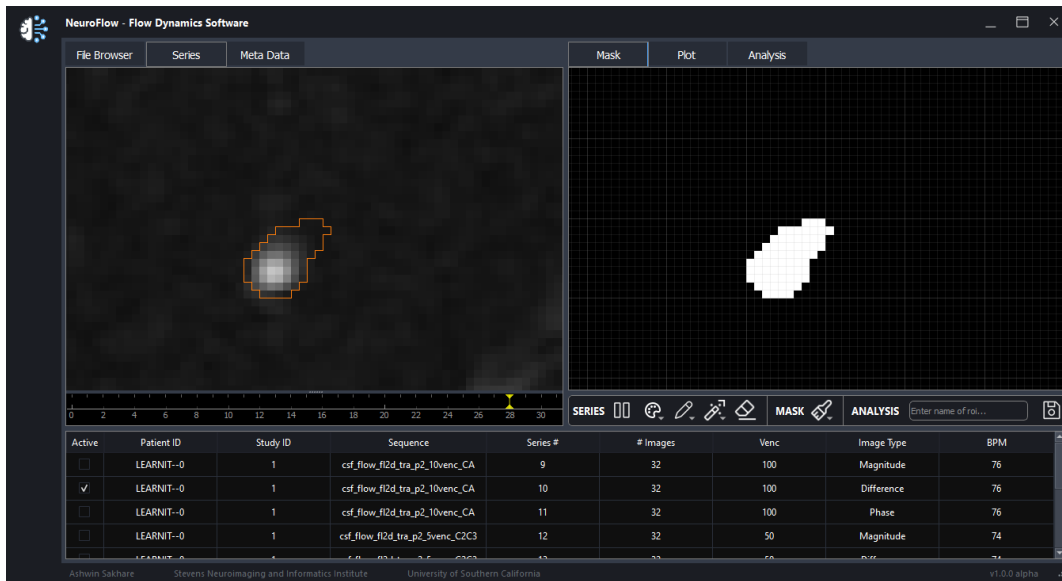
2. Select the  icon to display a color palette of available segmentation pens. Select a color.




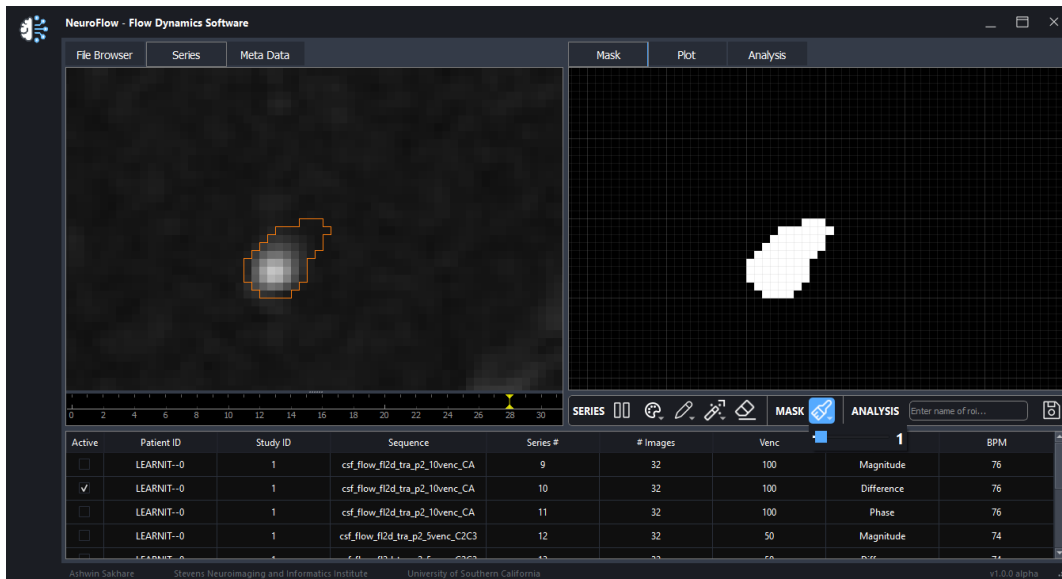
3. Press and drag the left mouse to draw a contour around the ROI.



4. To make fine adjustments to the segmentation, select the Mask tab.

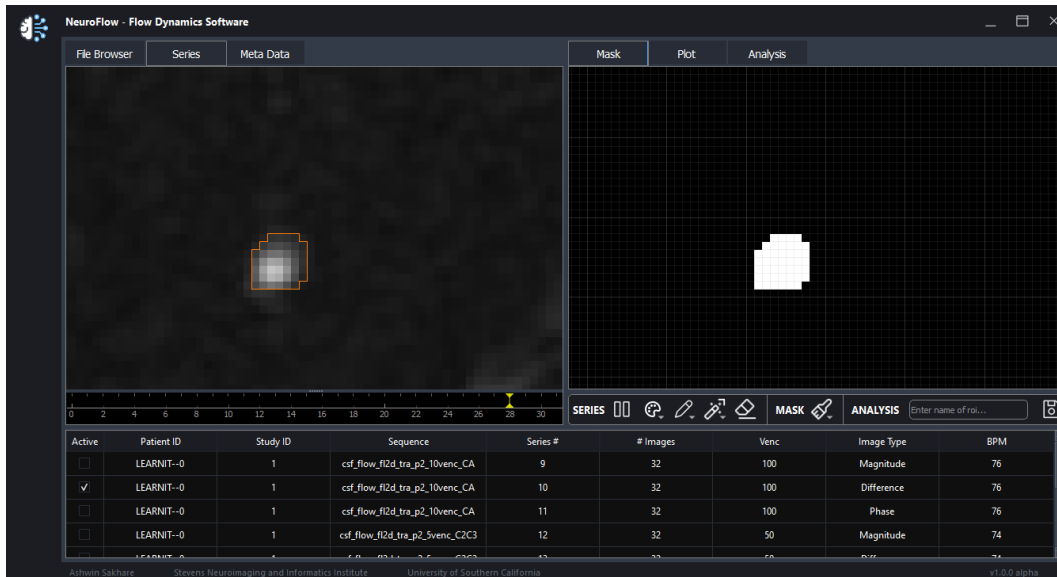


5. Select the  icon to display a slider of available stamp sizes. Select a size.

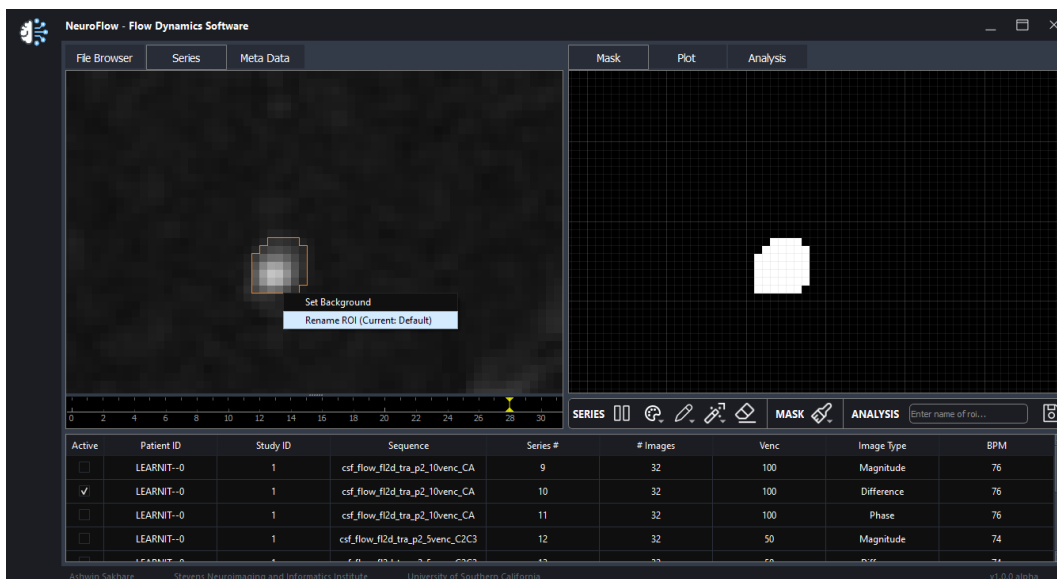


- Click the left mouse over the desired square pixel on the mask view to add/remove a mask.

Note: adjusting the Mask view will reset the colors in the Series view and any named ROI's will reset to "Default".

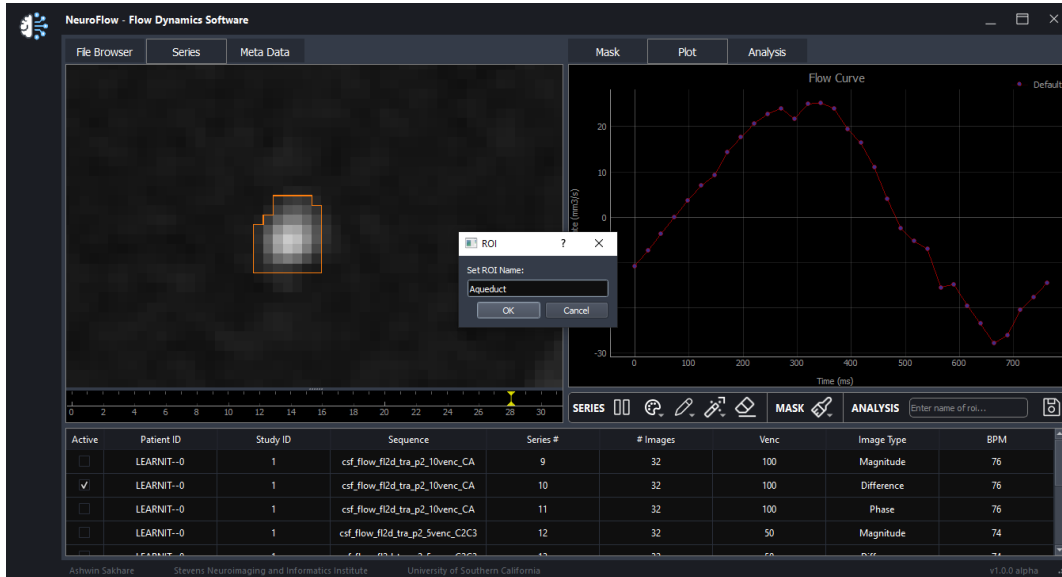


- Hover the cursor over the segmentation contour in the Series view. Right click and select Rename ROI (Current: Default)



8. Enter a name for the ROI and select Ok.

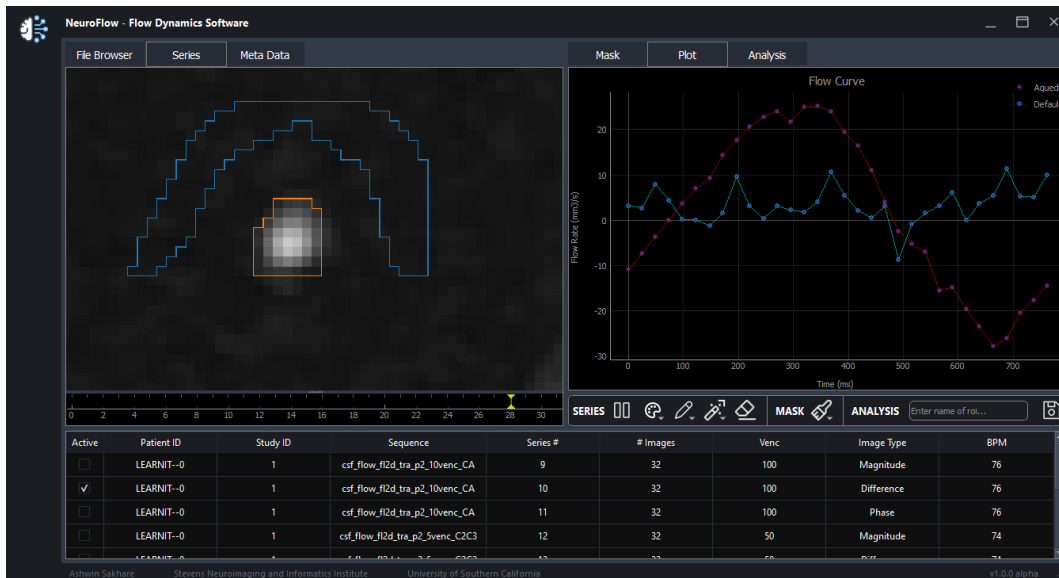
Note: Naming the ROI isn't necessary. A name of "Default" is used if no name is specified.



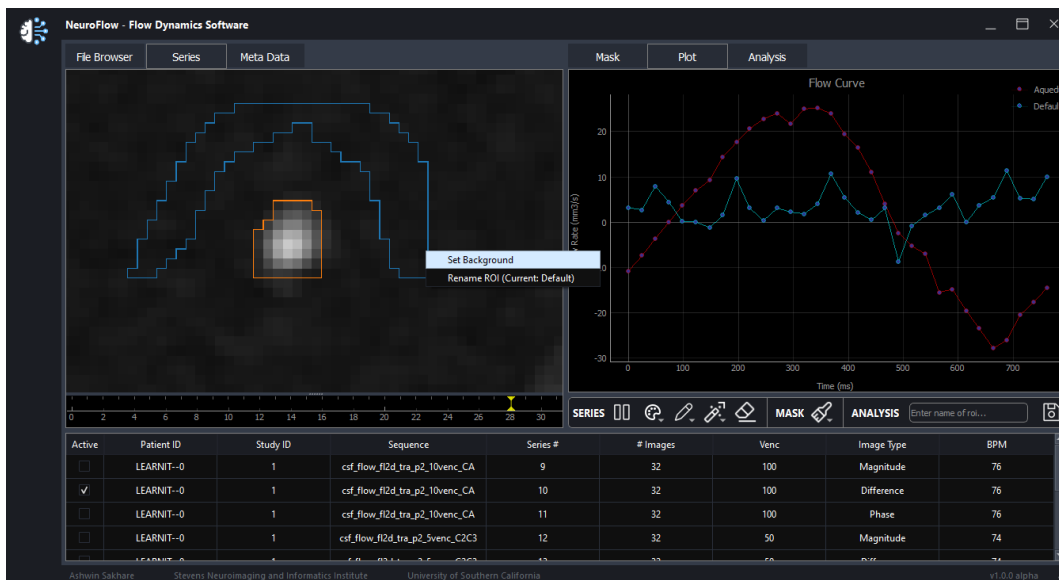


### III. Defining Background

1. Follow steps 1-6 in the *Segmenting ROI* section to add a new ROI to the Series view.



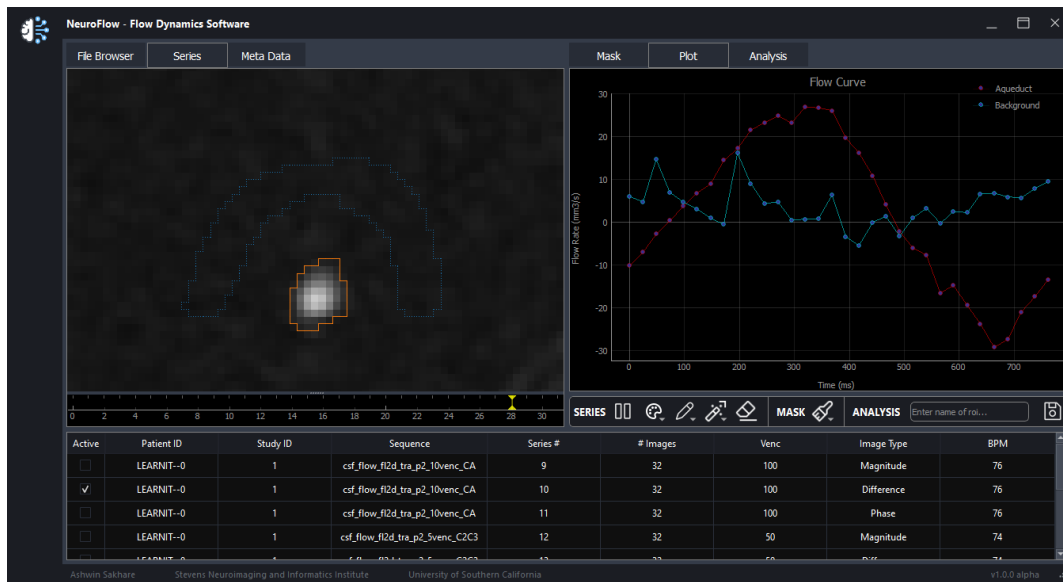
2. Hover the cursor over the new segmentation contour in the Series view. Right click and select Set Background.



## IV. Viewing Flow Plots

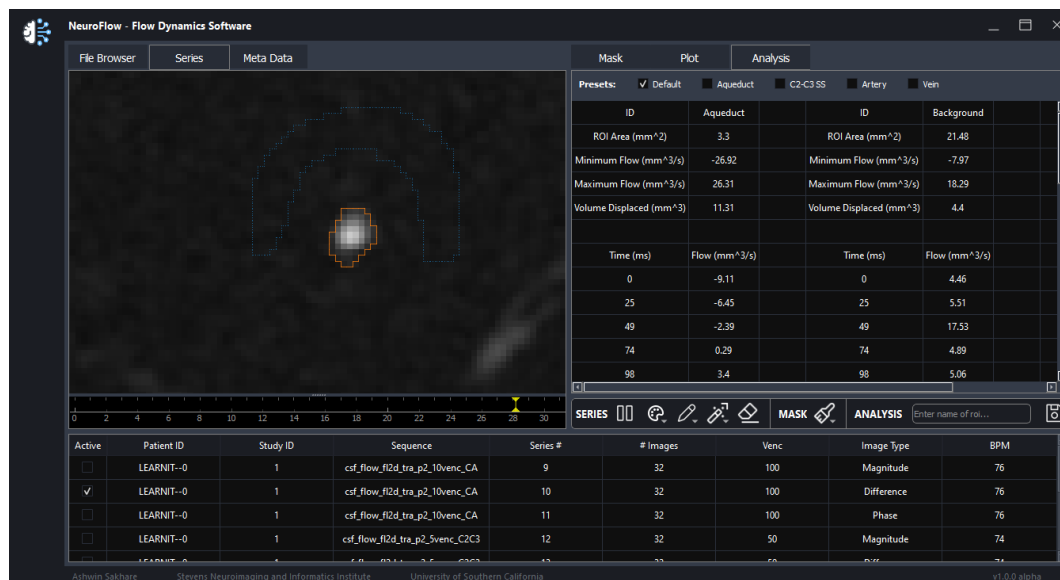
1. Select the Plot tab. A plot for each unique ROI will be displayed. Each named ROI is a unique ROI. If no ROI's are named, they are all named "Default". All ROI's with the same name is represented by one flow curve. Any ROI that is set to Background is named "Background" and has a unique curve.

Note: See *View Options* section for options regarding manipulating the plot view.

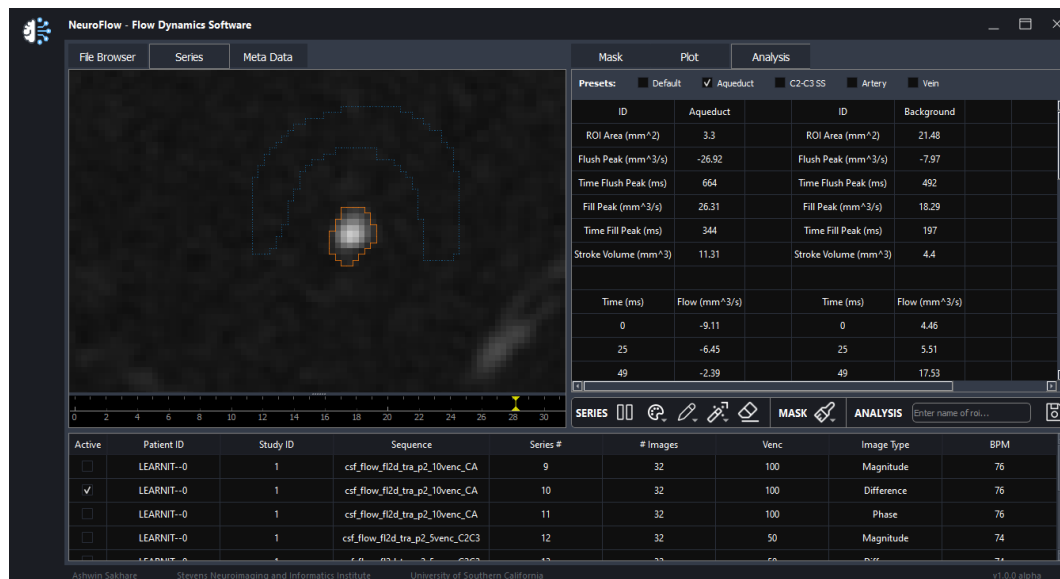


## v. Viewing Flow Analysis

1. Select the Analysis tab. Flow measures for each ROI are displayed in the table.

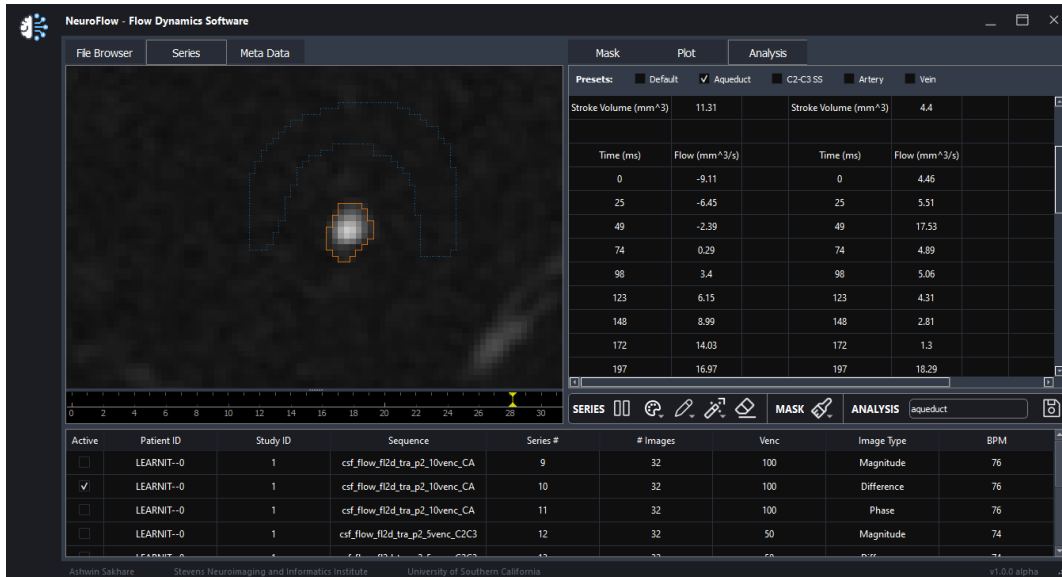



There are 5 preset options for flow measures. They are default, aqueduct, c2-c3 ss, artery, and vein. Each preset displays a different set of flow measures. As an example, the aqueduct displays the following:



## VI. Saving Flow Measures

1. Enter an ROI name into the  input box in the toolbar.  
Note: This field is used to set the filename prefix for the saved data.

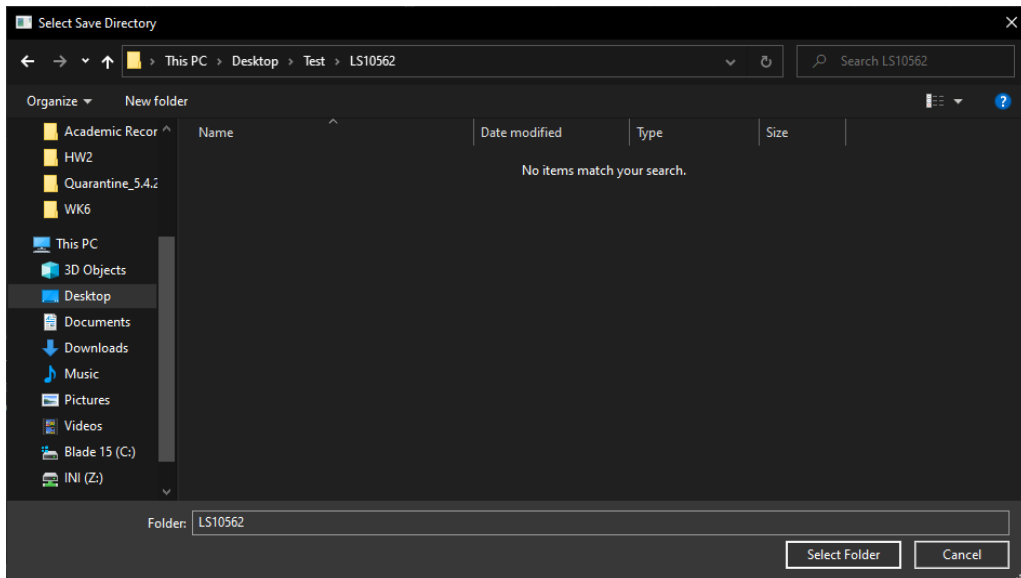


2. Select the  icon.



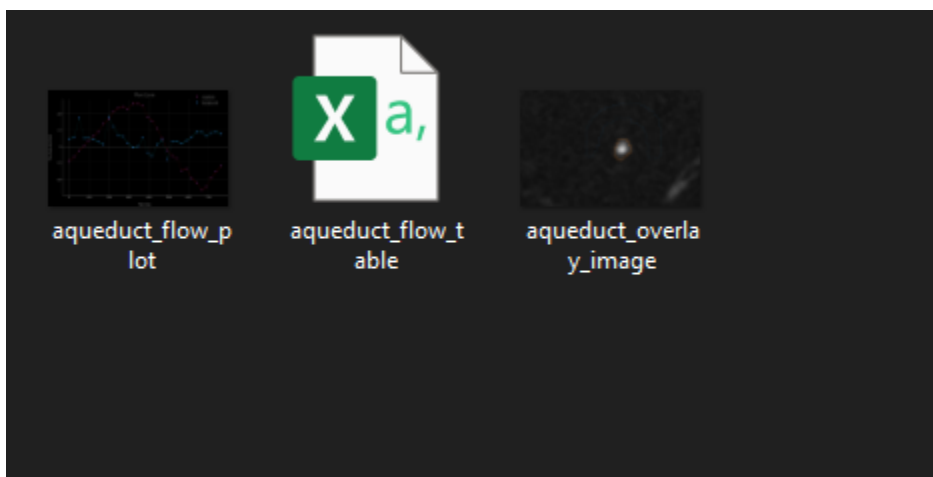
3. Select a save directory and select Save Folder.

Note: The default save directory is set to the same directory as the currently loaded DICOMDIR.



4. Files are saved to a folder named “nf\_output” located in the specified save directory. Three output files are generated: flow plots, ROI image with segmentation overlay, and flow analysis.

Note: There is no overwrite warning so be sure the save directory doesn’t contain an existing “nf\_output” folder.



## VII. Viewing Meta Data

1. Select the Meta Data tab. All meta data for the active series is displayed in the table.

The screenshot displays the NeuroFlow - Flow Dynamics Software interface. The 'Meta Data' tab is selected, showing a table of meta data for the active series. The table has columns for Tag, Description, VR, and Value. The data is as follows:

Tag	Description	VR	Value
(0008, 0005)	Specific Character Set	CS	ISO_IR 100
(0008, 0008)	Image Type	CS	['ORIGINAL', ...
(0008, 0012)	Instance Creation Date	DA	20200310
(0008, 0013)	Instance Creation Time	TM	090047.507000
(0008, 0016)	SOP Class D	UI	1...
(0008, 0018)	SOP Instance D	UI	1...
(0008, 0020)	Study Date	DA	20200310
(0008, 0021)	Series Date	DA	20200310
(0008, 0022)	Acquisition Date	DA	20200310
(0008, 0023)	Content Date	DA	20200310
(0008, 0030)	Study Time	TM	084022.592000
(0008, 0031)	Series Time	TM	090047.505000
(0008, 0032)	Acquisition Time	TM	085647.725000
(0008, 0033)	Content Time	TM	090047.507000



Below the meta data table, there is a table of active series. The table has columns for Active, Patient ID, Study ID, Sequence, Series #, # Images, Venc, Image Type, and BPM. The data is as follows:

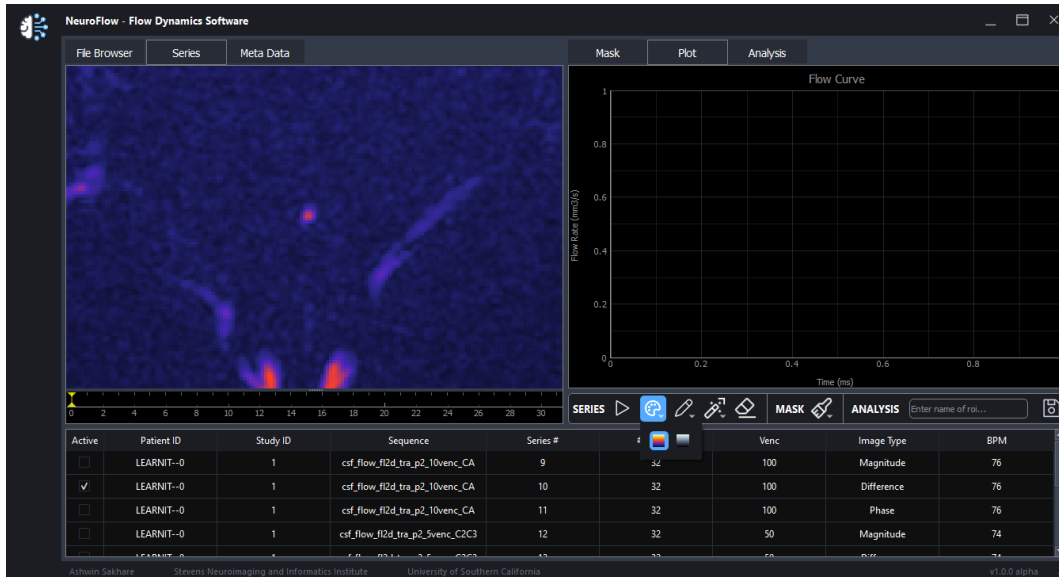
Active	Patient ID	Study ID	Sequence	Series #	# Images	Venc	Image Type	BPM
<input type="checkbox"/>	LEARNIT-0	1	csf_flow_f12d_tra_p2_10venc_CA	9	32	100	Magnitude	76
<input checked="" type="checkbox"/>	LEARNIT-0	1	csf_flow_f12d_tra_p2_10venc_CA	10	32	100	Difference	76
<input type="checkbox"/>	LEARNIT-0	1	csf_flow_f12d_tra_p2_10venc_CA	11	32	100	Phase	76
<input type="checkbox"/>	LEARNIT-0	1	csf_flow_f12d_tra_p2_5venc_C2C3	12	32	50	Magnitude	74


The bottom of the interface shows the footer with the text: Ashwin Salphare, Stevens Neuroimaging and Informatics Institute, University of Southern California, v1.0.0 alpha.

## VIII. Toolbar Options




- A. Select the  icon to automatically play the Series view frame-by-frame.
- B. Select the  icon to specify a color map for the Series view.

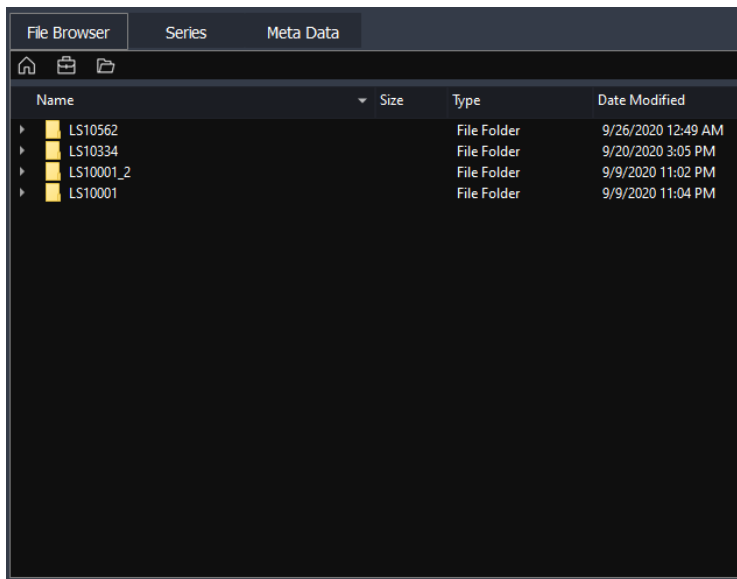



- C. Select the  icon to auto segment an ROI.

Note: To improve the accuracy of auto-segmentation, zoom in on the Series view until the ROI occupies as much of view box as possible. This prevents the auto-segmentation routine from searching for pixels outside the immediate ROI area.

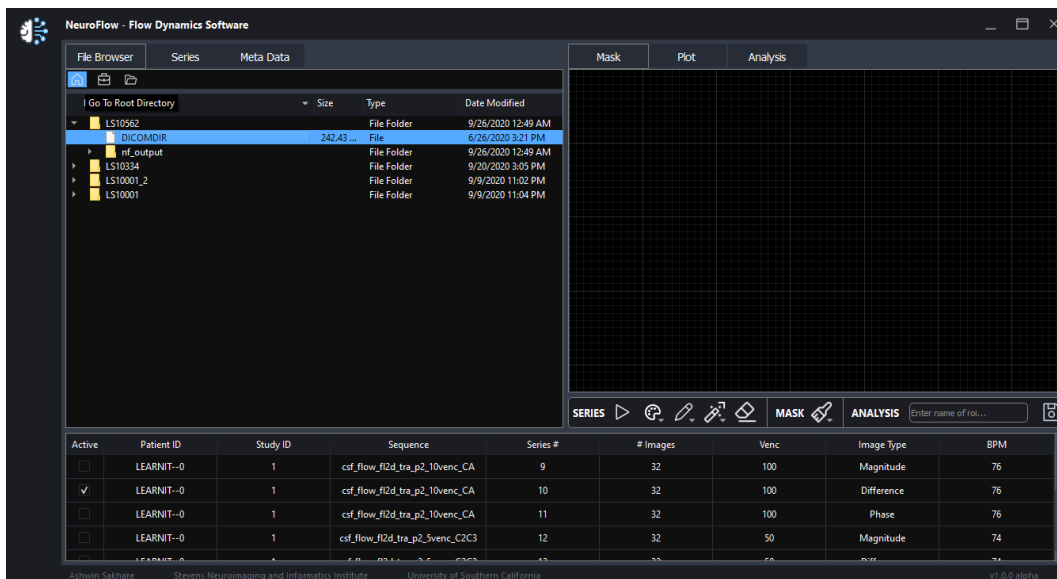
- D. Select the  icon to erase all drawn segmentations and masks in the Series and Mask views, respectively.

## IX. File Browser Options




- A. Select the  icon to set the working directory to the file system's root directory.

Note: This change will persist even after the app is closed for convenience.



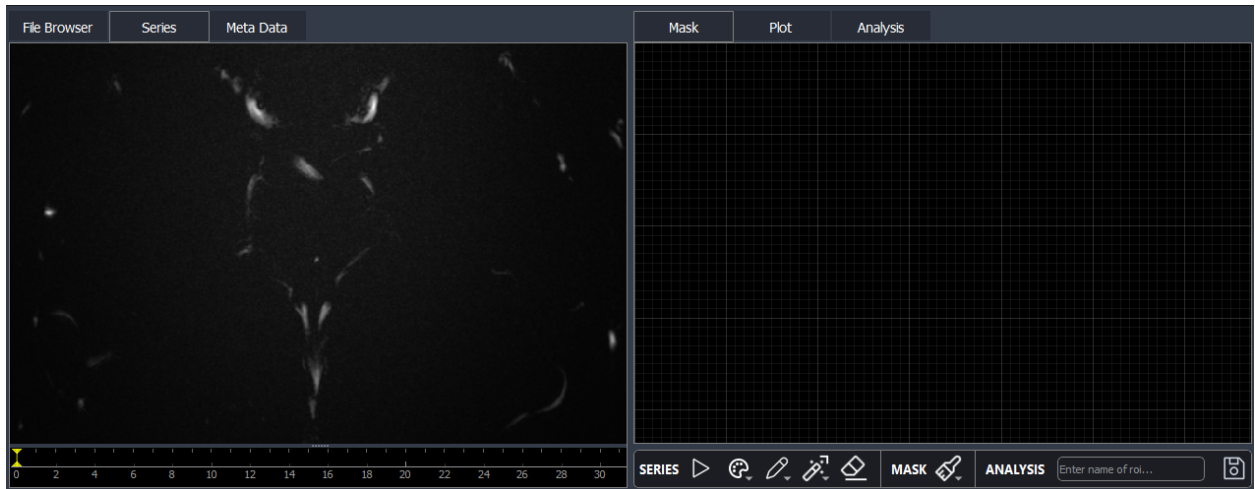
- B. Select the  icon to set the working directory to the selected directory.

Note: This change will persist even after the app is closed for convenience.

- C. Select the  icon to open the selected DICOMDIR file.



## X. View Options



1. The Series and Mask graphics views can be changed to accommodate the user's preferences. The options are shown in the table below.

Mouse Button	Action	Response
Left	Press and Drag	Pan Left/Right/Up/Down
Right	Press and Drag	Zoom In/Out
Middle	Press and Drag	Pan Left/Right/Up/Down
Wheel	Scroll	Zoom In/Out