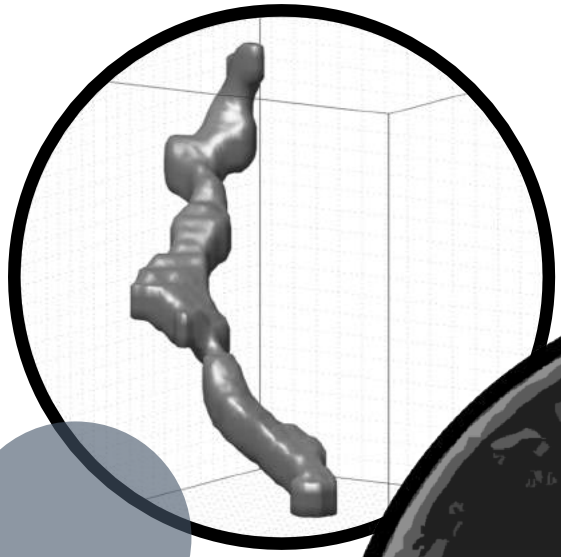
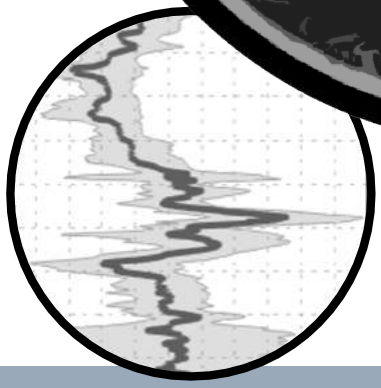


CORE CT



USER GUIDE

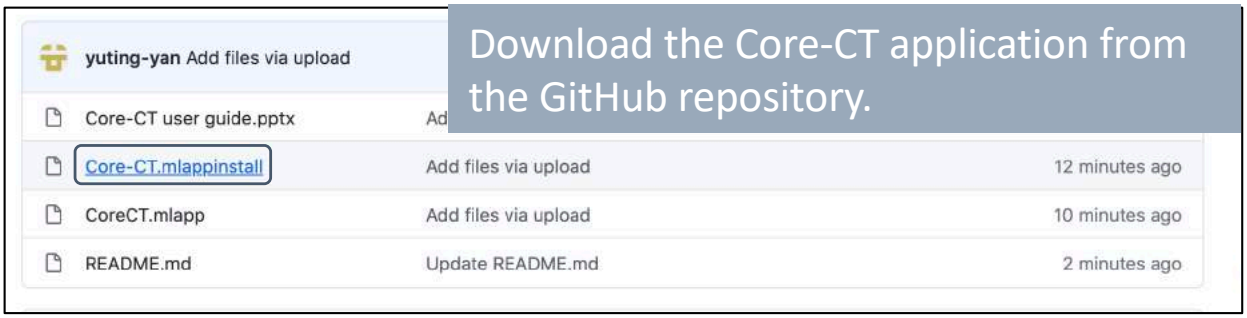
INSTALLATION

Core-CT requires Matlab 2019a and newer version.

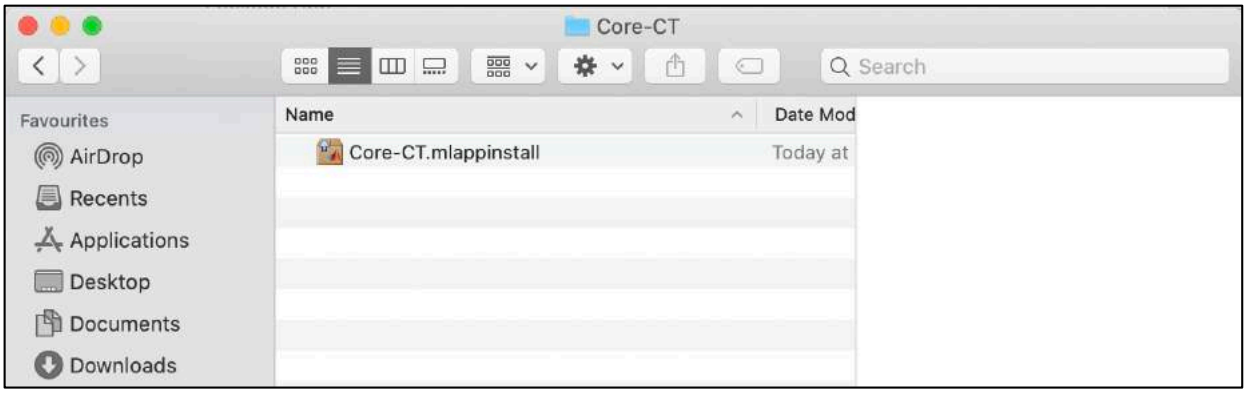
Toolbox required:

- Image processing toolbox
- Signal processing toolbox

GitHub repository: https://github.com/yuting-yan/Core-CT

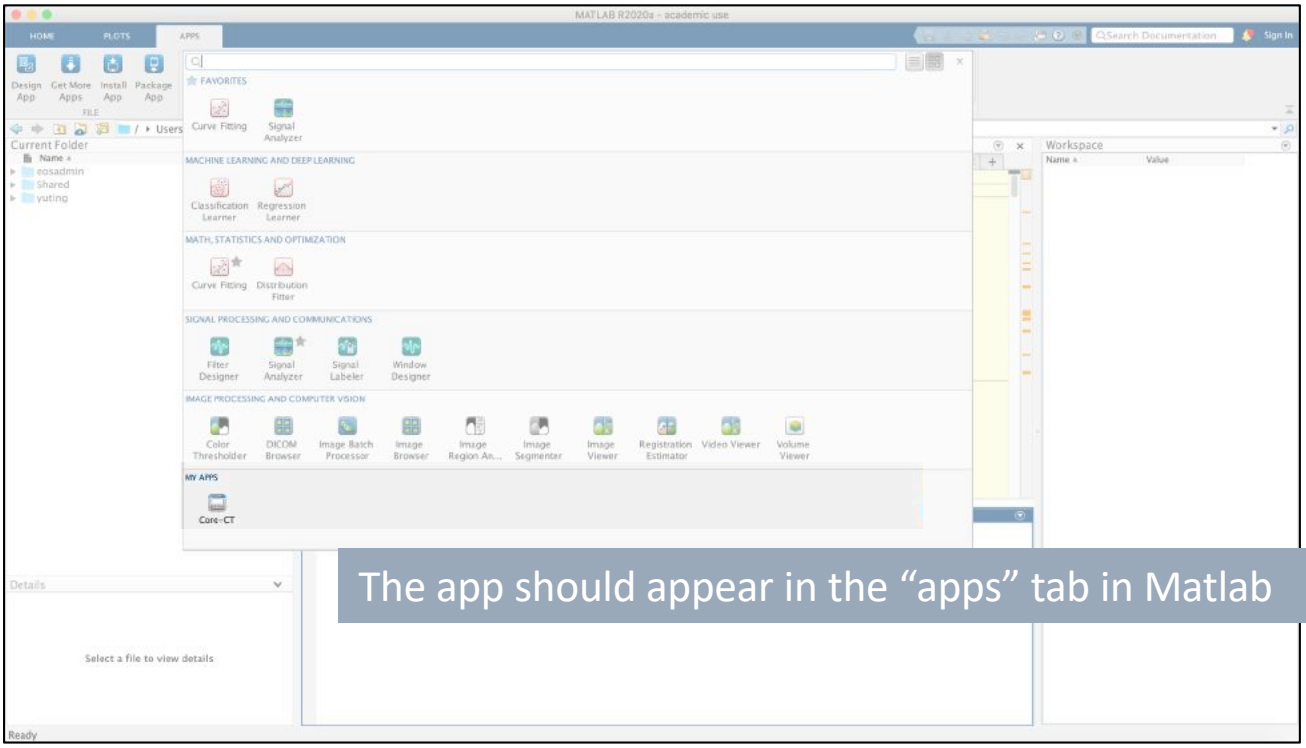


Download the Core-CT application from the GitHub repository.



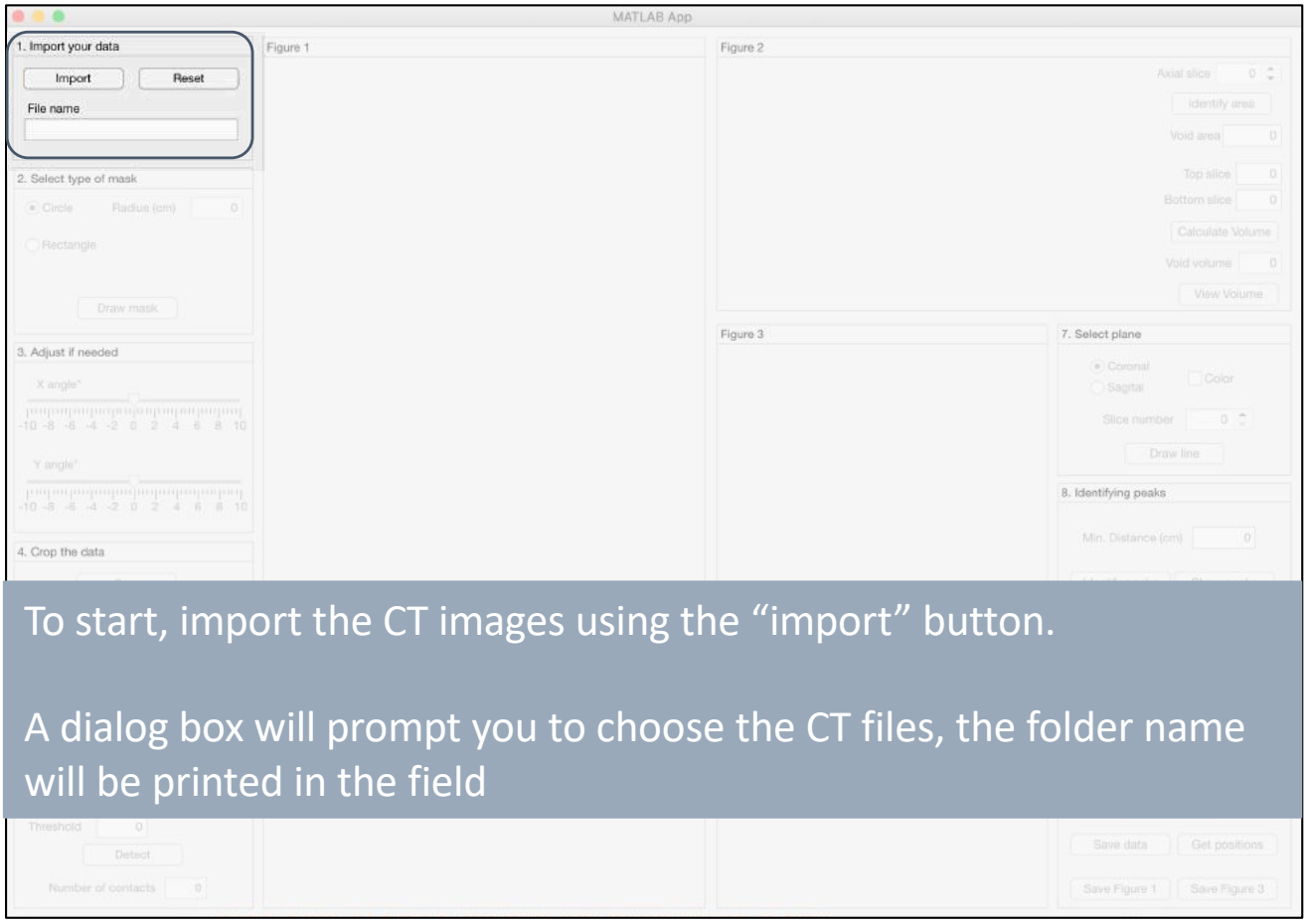
Double click on the folder and you will be prompted to install the application. Click “install”.

USING CORE-CT



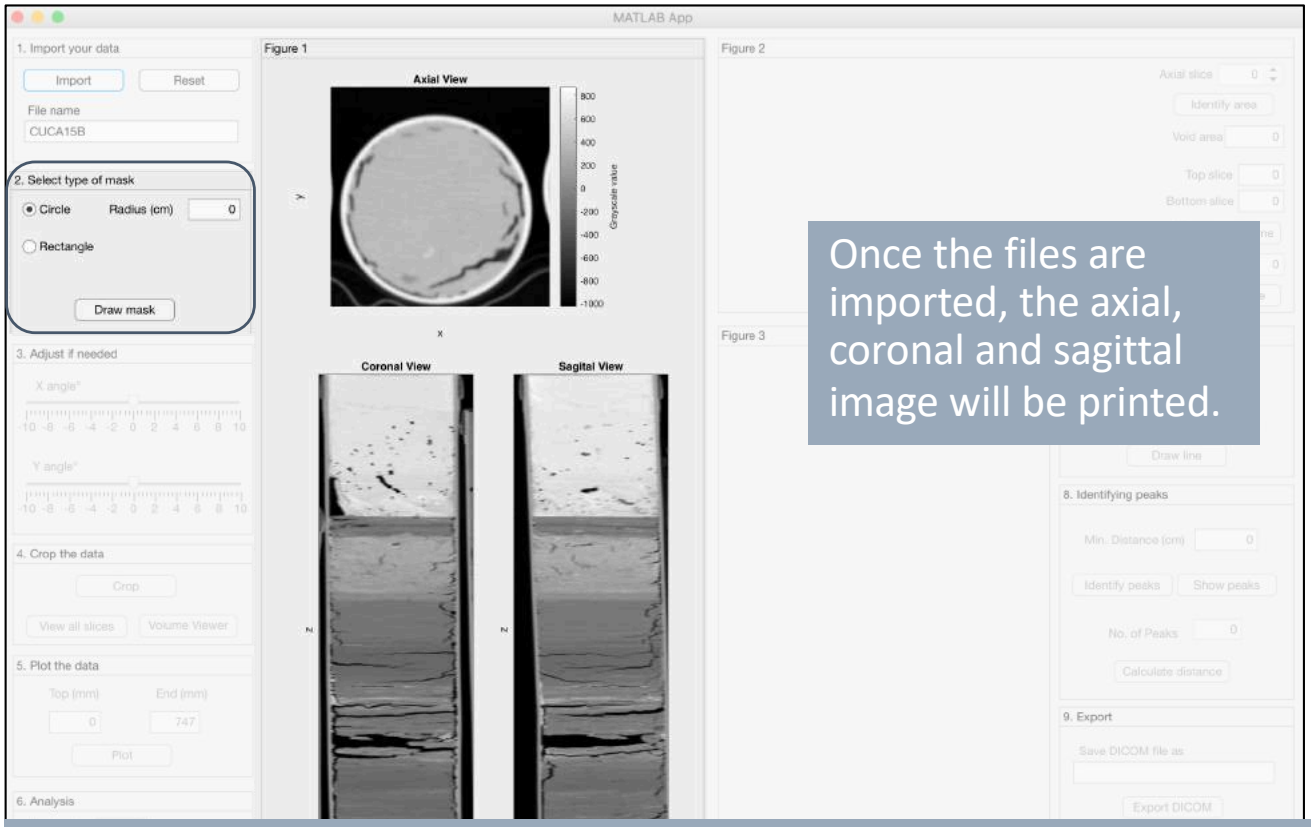
The app should appear in the “apps” tab in Matlab

A graphic user interface will launch when you click on the icon



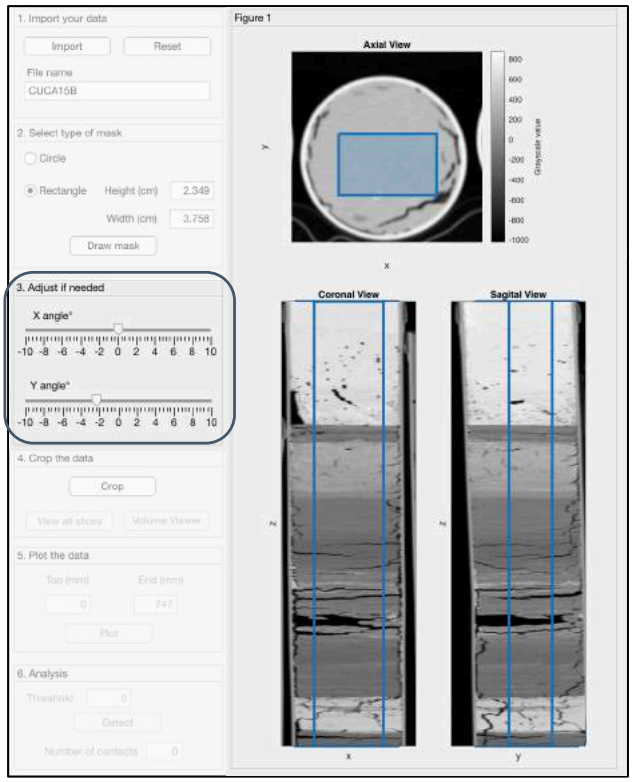
To start, import the CT images using the “import” button.

A dialog box will prompt you to choose the CT files, the folder name will be printed in the field



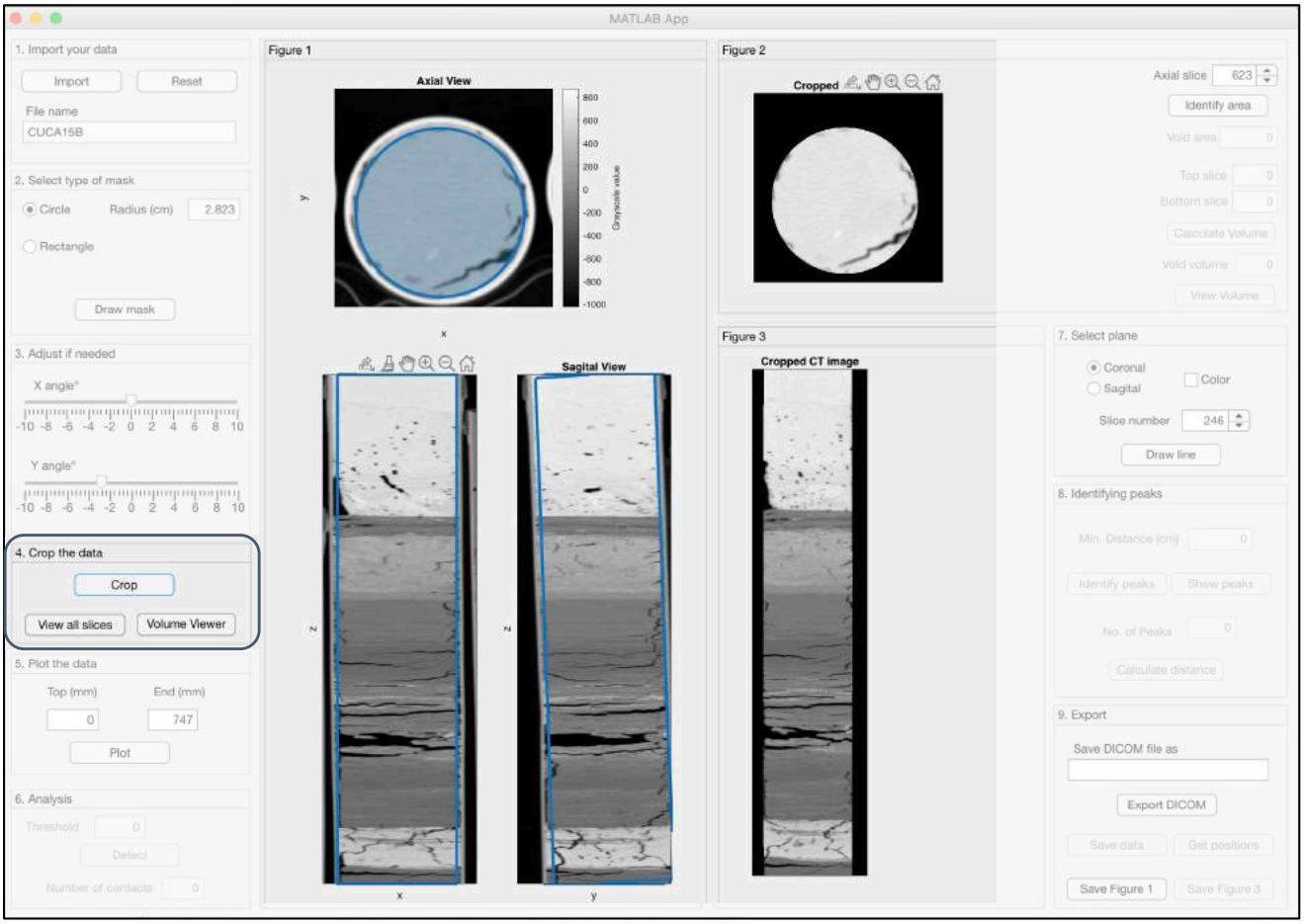
Once the files are imported, the axial, coronal and sagittal image will be printed.

Choose either a circle or rectangle mask and click the “Draw mask” button to start drawing on the Axial image. Rectangle are printed on the sagittal and coronal images to allow user to visualize the mask down the core.

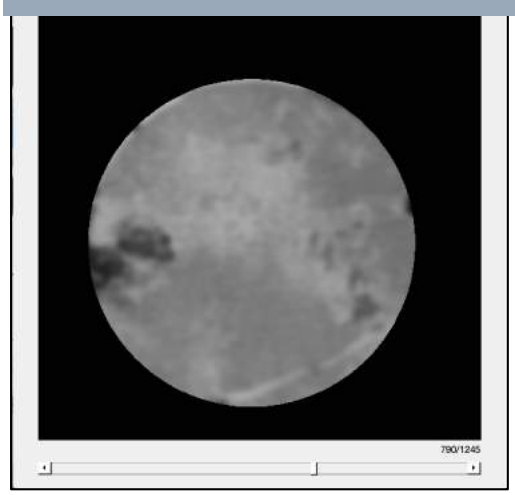


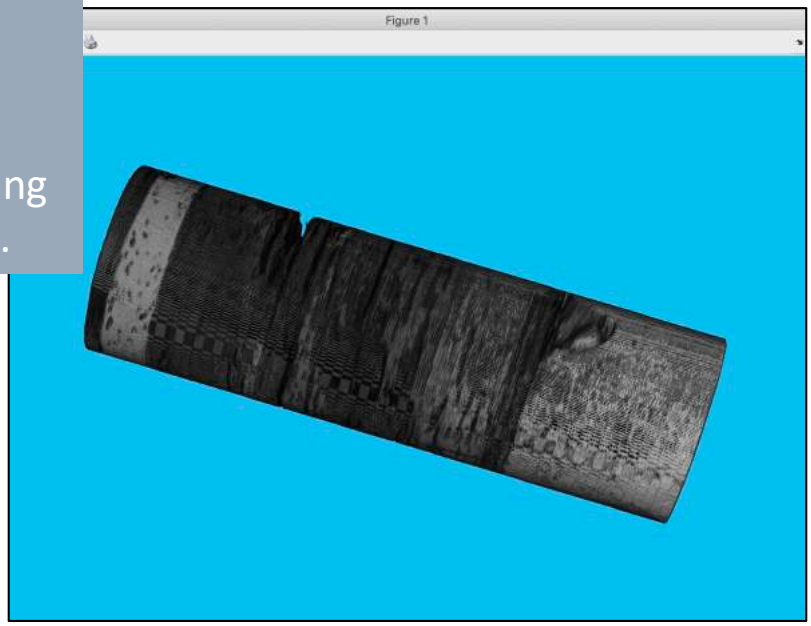
Mask can be tilted in X and Y direction using the sliders

After the mask is created to satisfaction, cropping can be done by clicking the “crop” button. A cropped axial and coronal image will be printed on figure 2 and 3.

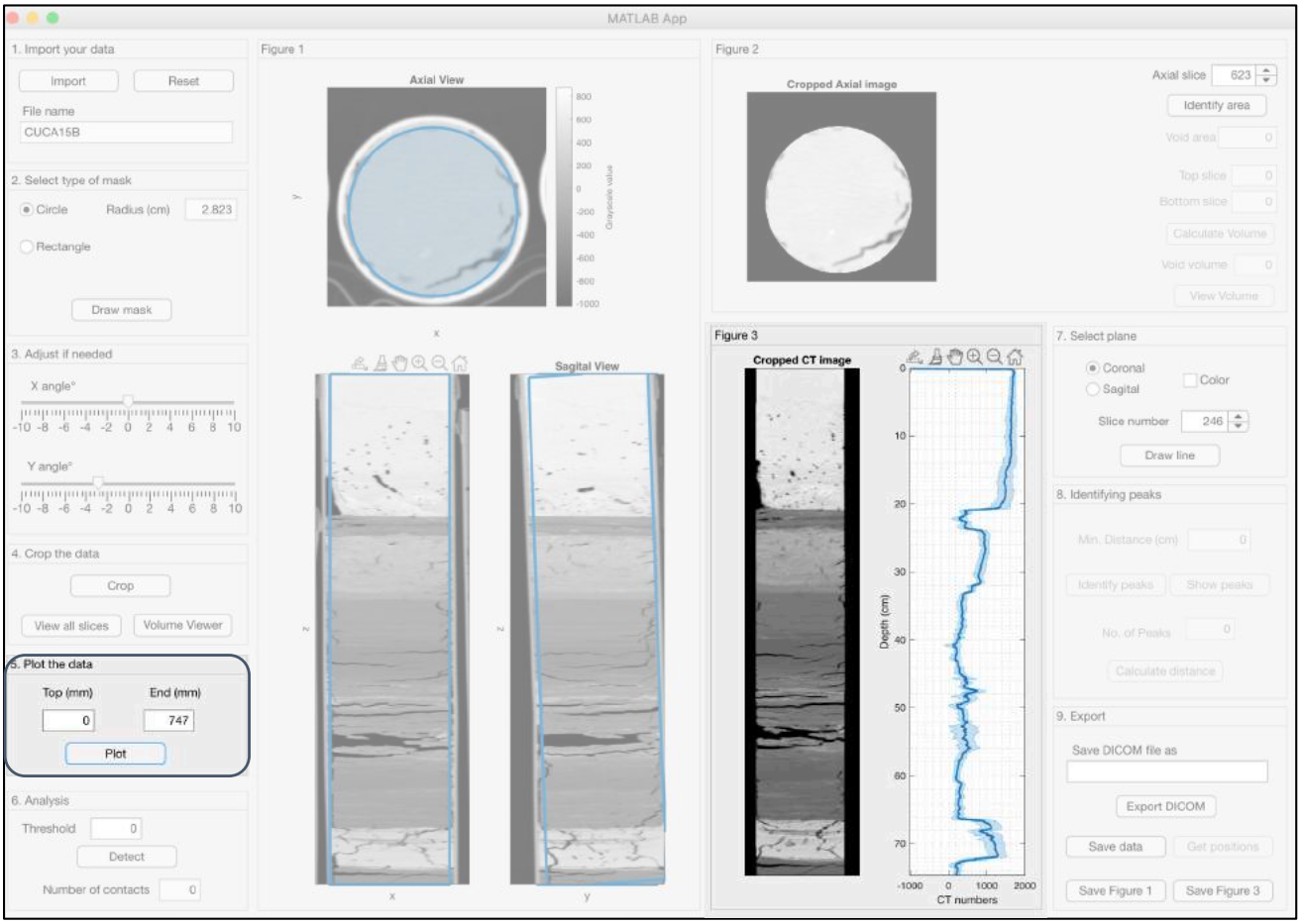


Users can see the cropped volume using the “Volume Viewer” button or see the image slice by slice by clicking the “View all slices” button.

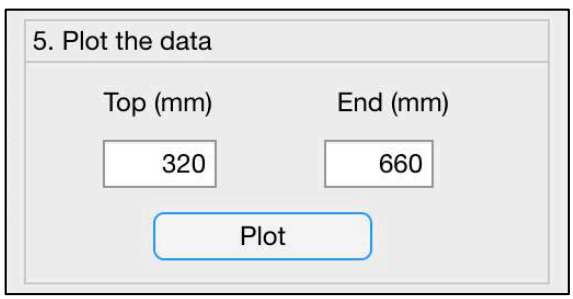


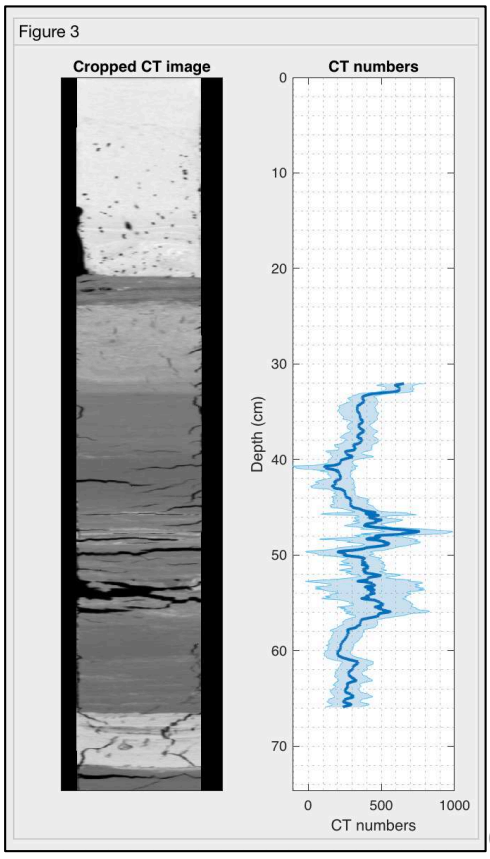


After the cropping is done, click “Plot” to plot the mean CT number profile.

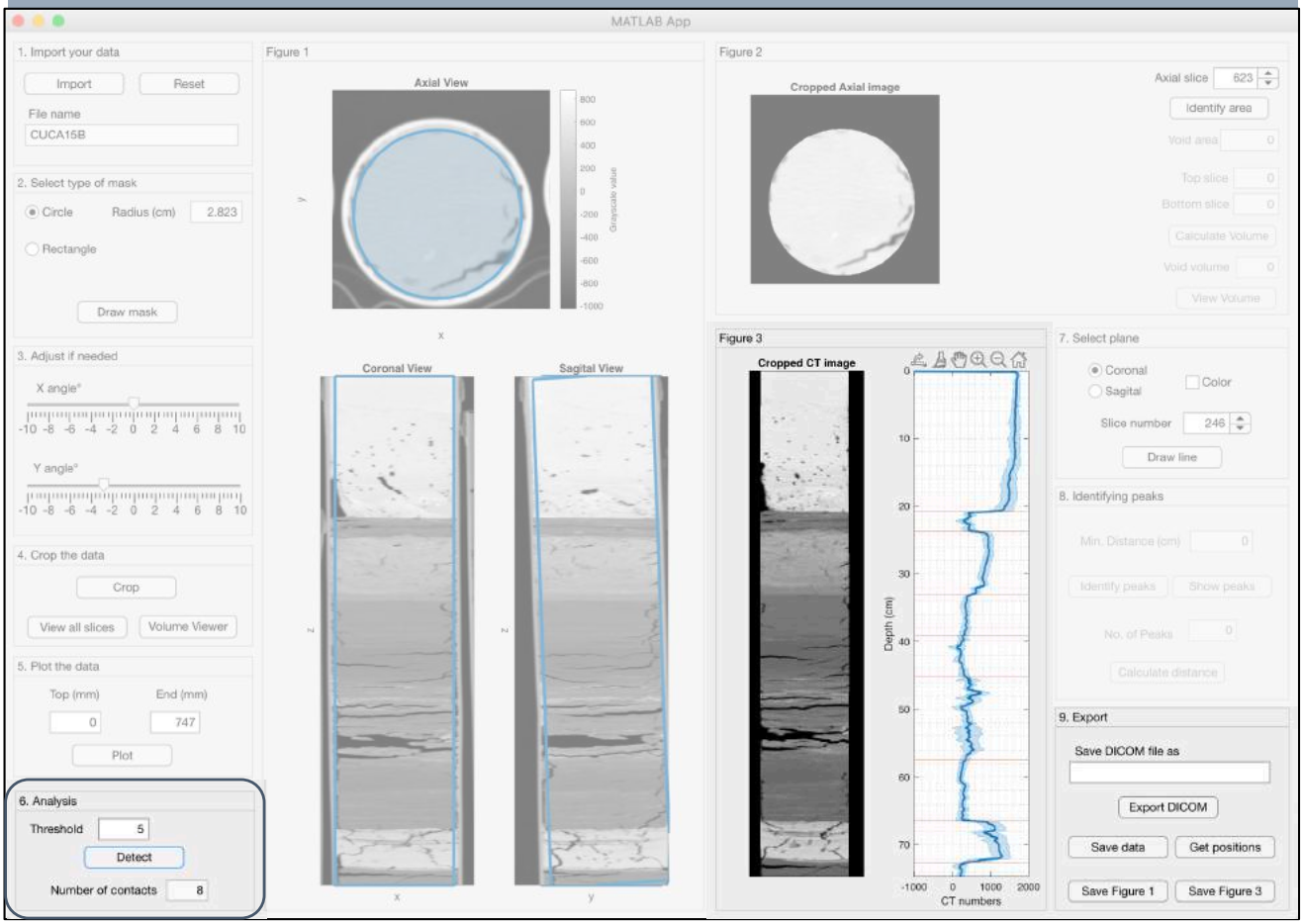


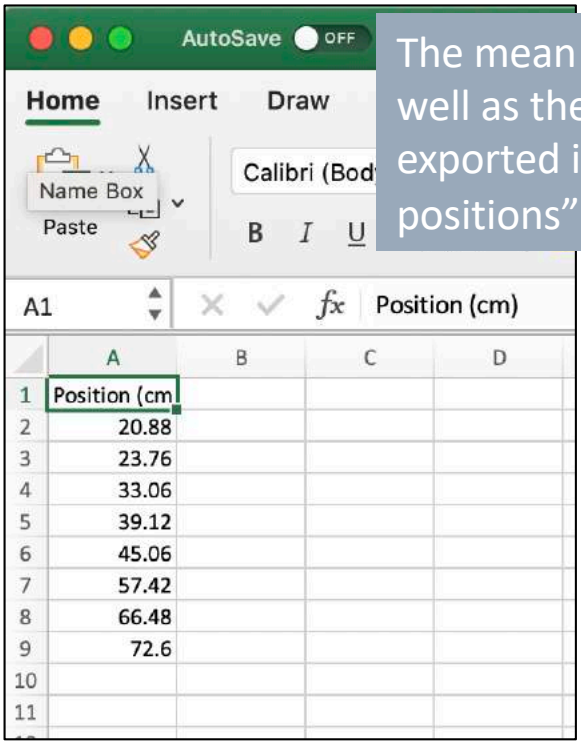
Plotting can be done for certain sections of the cropped core by editing the ”top” and “end” edit fields.





Potential contacts can be detected by clicking the “detect” button. Threshold values can be changed to control the sensitivity of the function. The number of contacts detected will be printed on the interface.

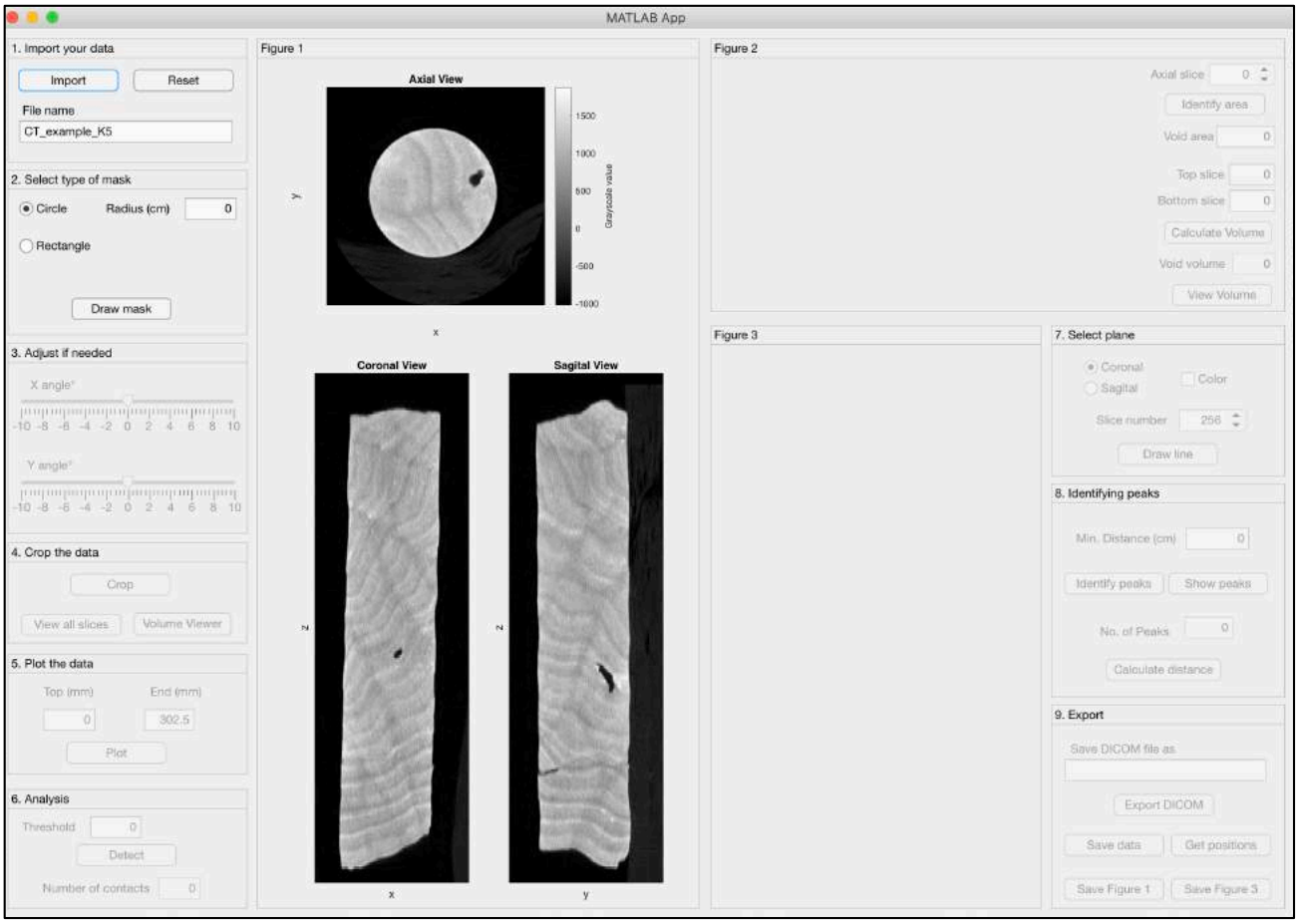




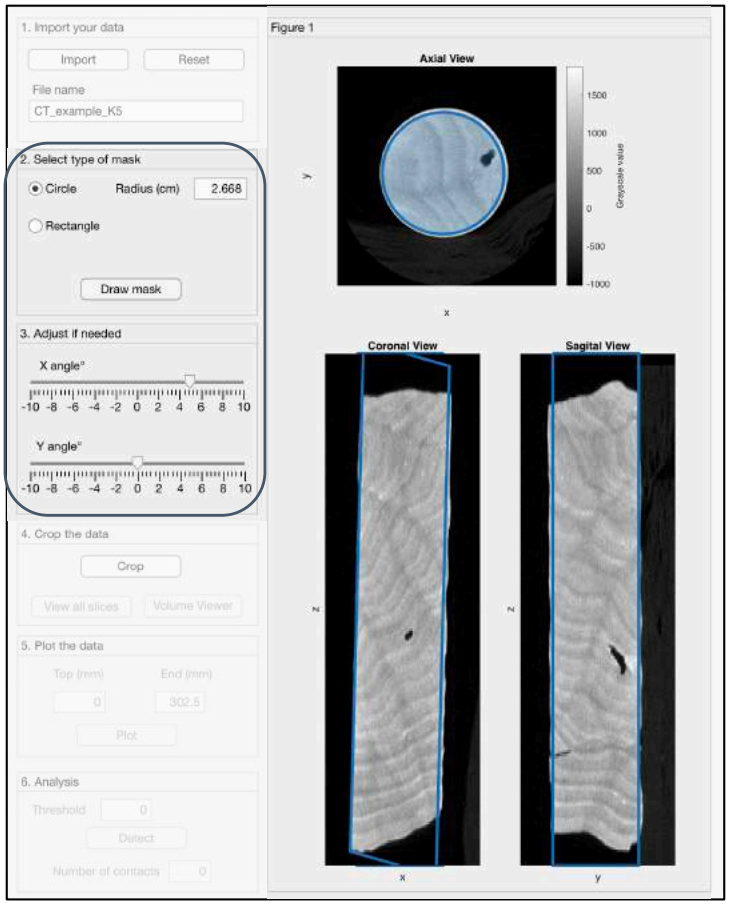
	A	B	C	D
1	Position (cm			
2	20.88			
3	23.76			
4	33.06			
5	39.12			
6	45.06			
7	57.42			
8	66.48			
9	72.6			
10				
11				

The mean CT number and standard deviation values, as well as the positions of the identified contacts can be exported into a csv file using the “Save data” and “Get positions” button respectively.

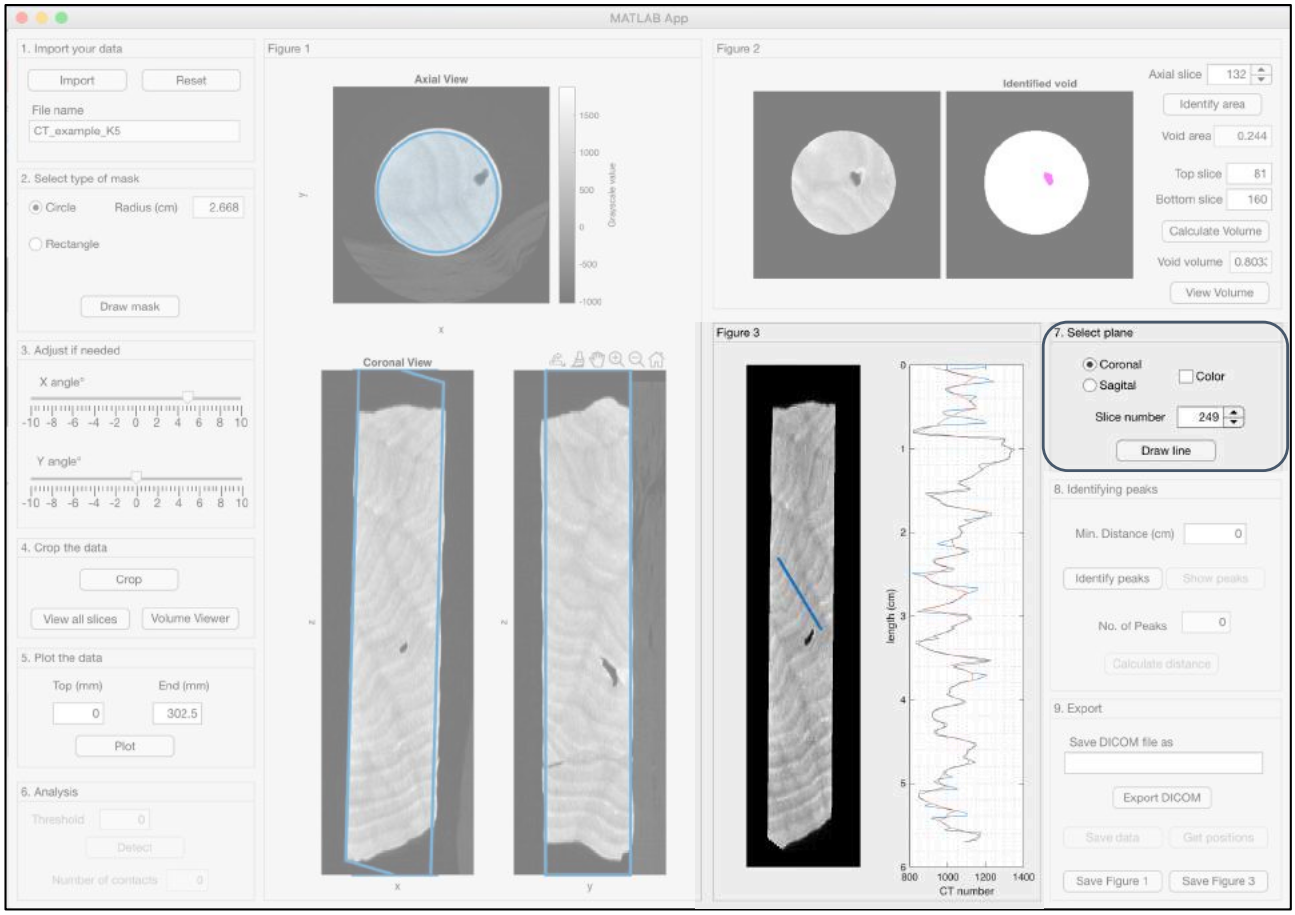
	A	B	C	D
1	Depth (cm)	Mean	Std	
2	0.06	-1006.2977	10.5586238	
3	0.12	-1007.0507	10.9318105	
4	0.18	1512.01033	176.825292	
5	0.24	1638.39904	73.316644	
6	0.3	1678.26124	58.3092004	
7	0.36	1693.64022	54.6720264	
8	0.42	1700.49394	53.2794163	
9	0.48	1706.77096	52.3121896	
10	0.54	1712.01448	50.5410518	
11	0.6	1714.45738	50.16078	
12	0.66	1714.95105	49.4750085	
13	0.72	1713.86155	49.595894	
14	0.78	1710.55245	49.9251057	
15	0.84	1706.23396	51.1076737	
16	0.9	1704.42899	51.0041858	
17	0.96	1704.1844	50.358059	

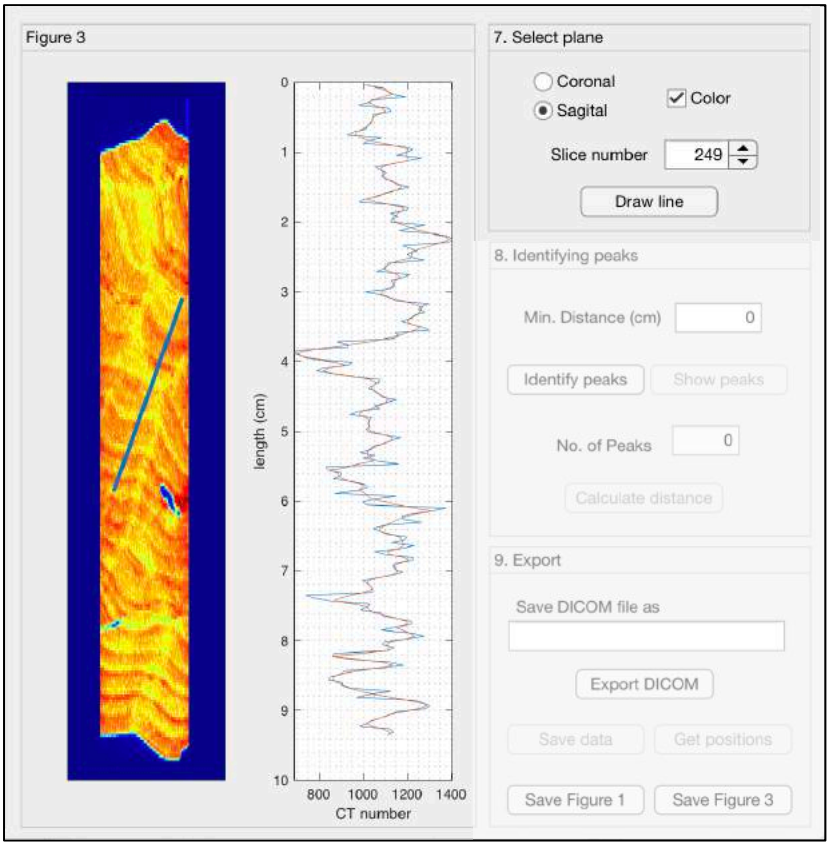


Similarly, choose a mask to crop the volume and adjust it if need be using the sliders.



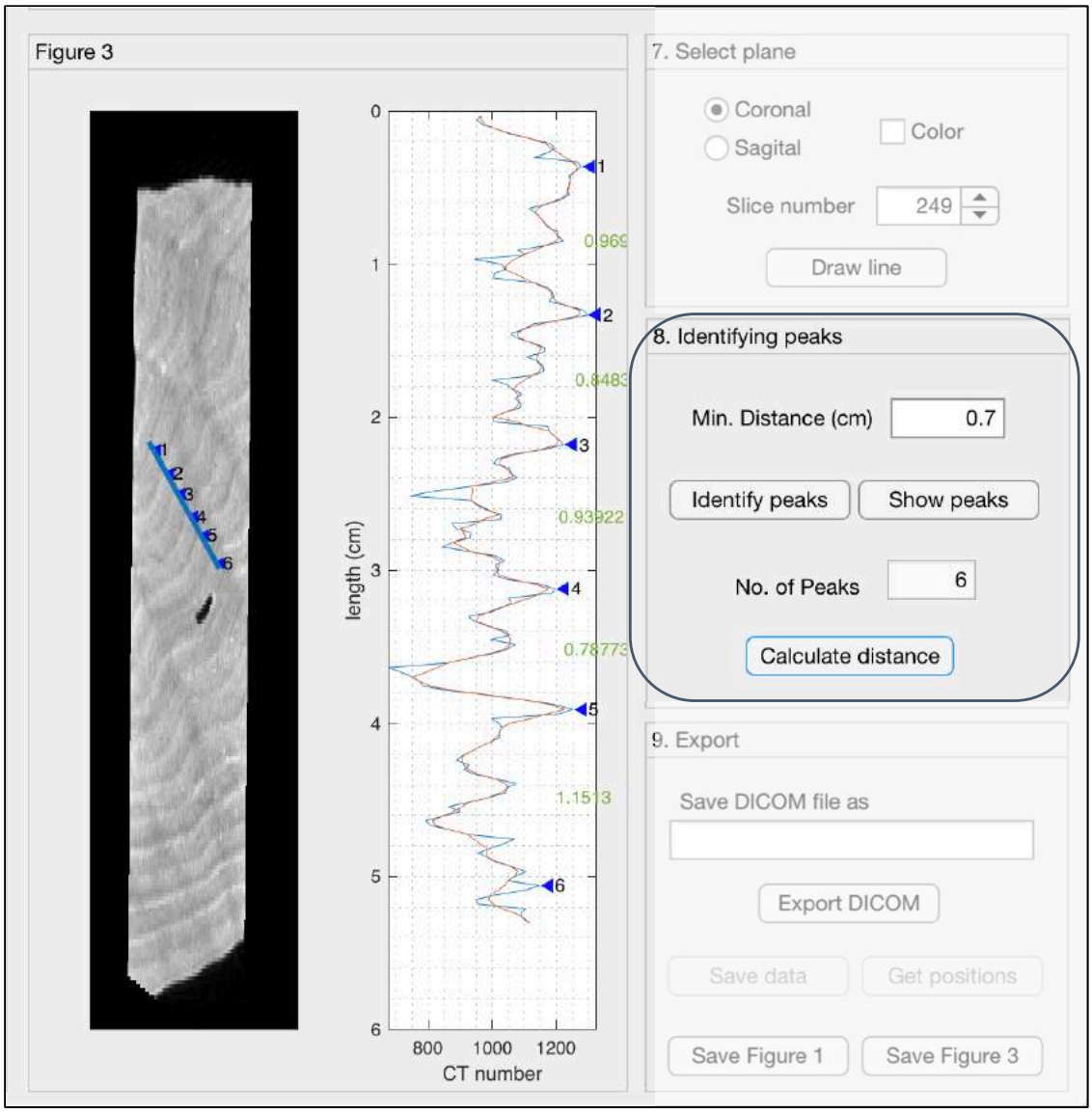
After cropping is done, user can draw on the display image in Figure 3 to obtain a CT number profile by clicking the “Draw line” button. By default, the display image is the middle coronal image.





User can choose the sagittal image and the slice number by toggling the radio button and spinner. False color can also be applied by checking the “color” checkbox.

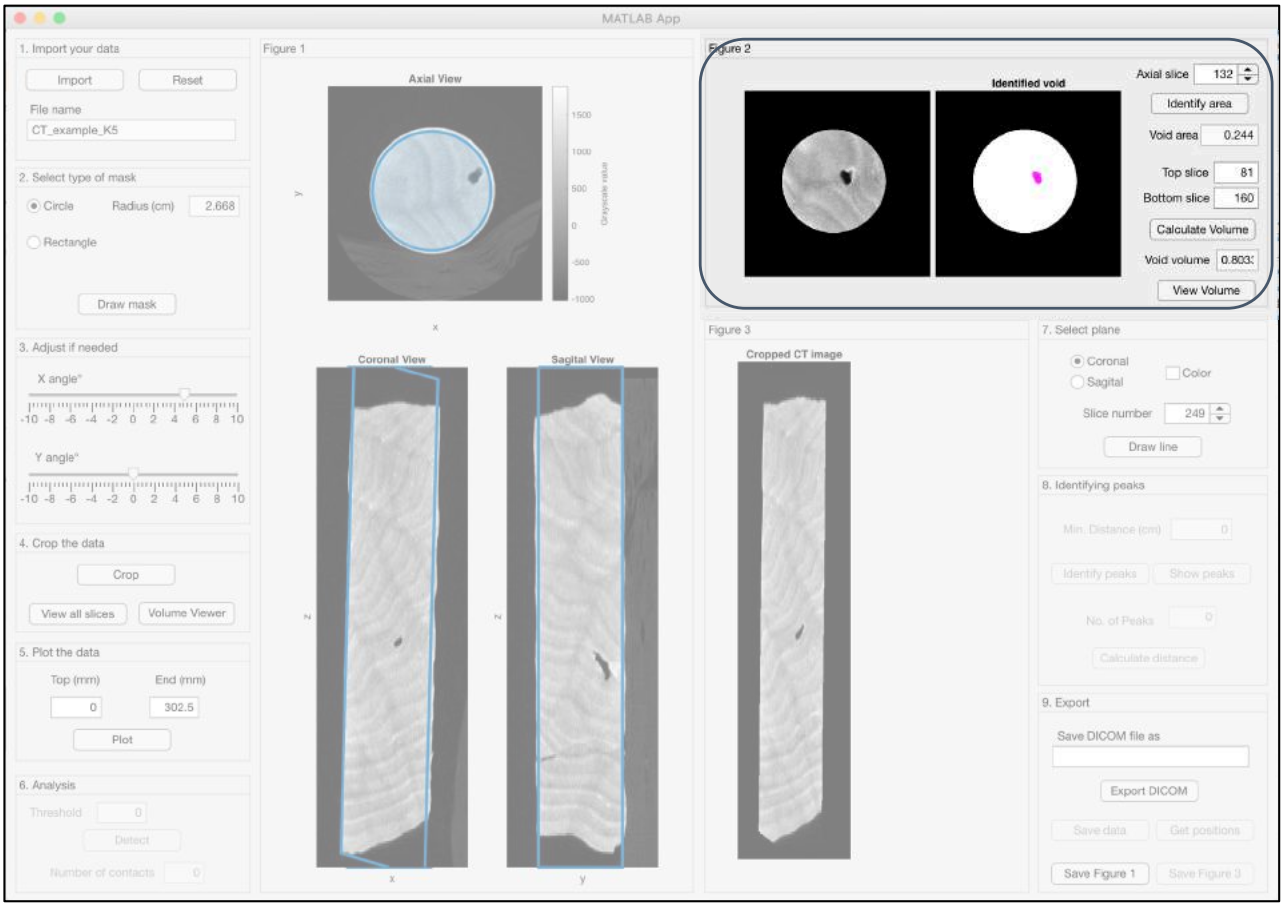
Peaks along the CT number profile can be detected by filling in the ”Mini. Distance” edit field and clicking on the “Identify peaks” button. The total number of peaks identified will be printed automatically on the “No. of Peaks” edit field.

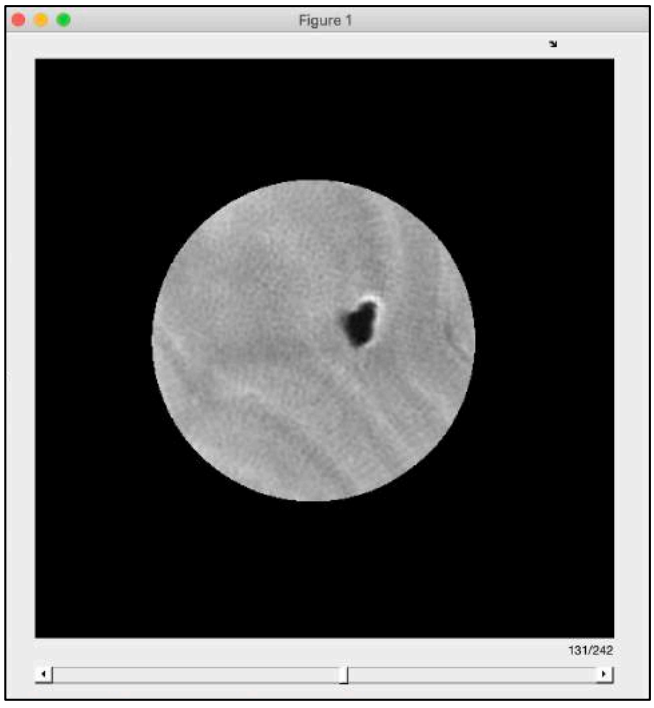


The “Show peaks” button will label the corresponding peaks on the display image.

To calculate the distance between the peaks, simply click the “Calculate distance” button.

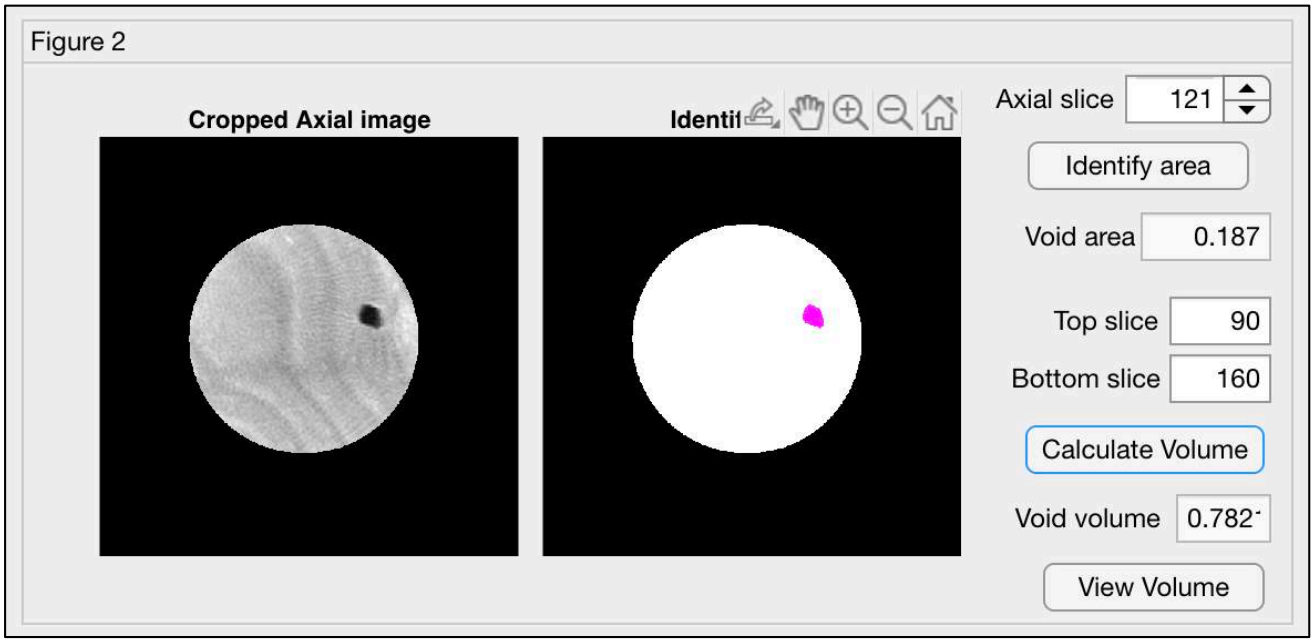
After cropping is done, user can identify and compute the area of void in an image slice by using the “Identify area” button. The default slice number is determined by the middle slice and can be changed using the spinner.

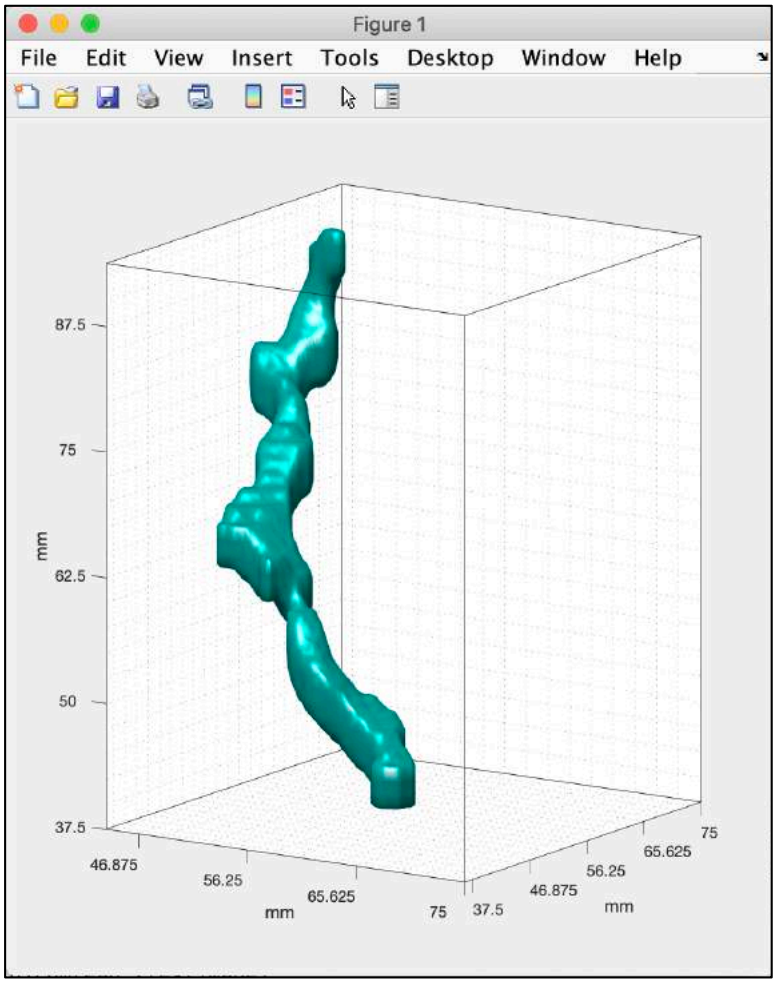




Alternatively, user can use the “View all slices” button to toggle through each image slice in a separate window.

To calculated the volume, user need to first specify the range of image slices by filling in the “Top slice” and ”Bottom slice” edit fields. The volume of the identified structure can then be computed using the “Calculate Volume” button, which will be printed on the interface.





“View Volume” button will open a new window with a 3-dimensional plot of the structure.