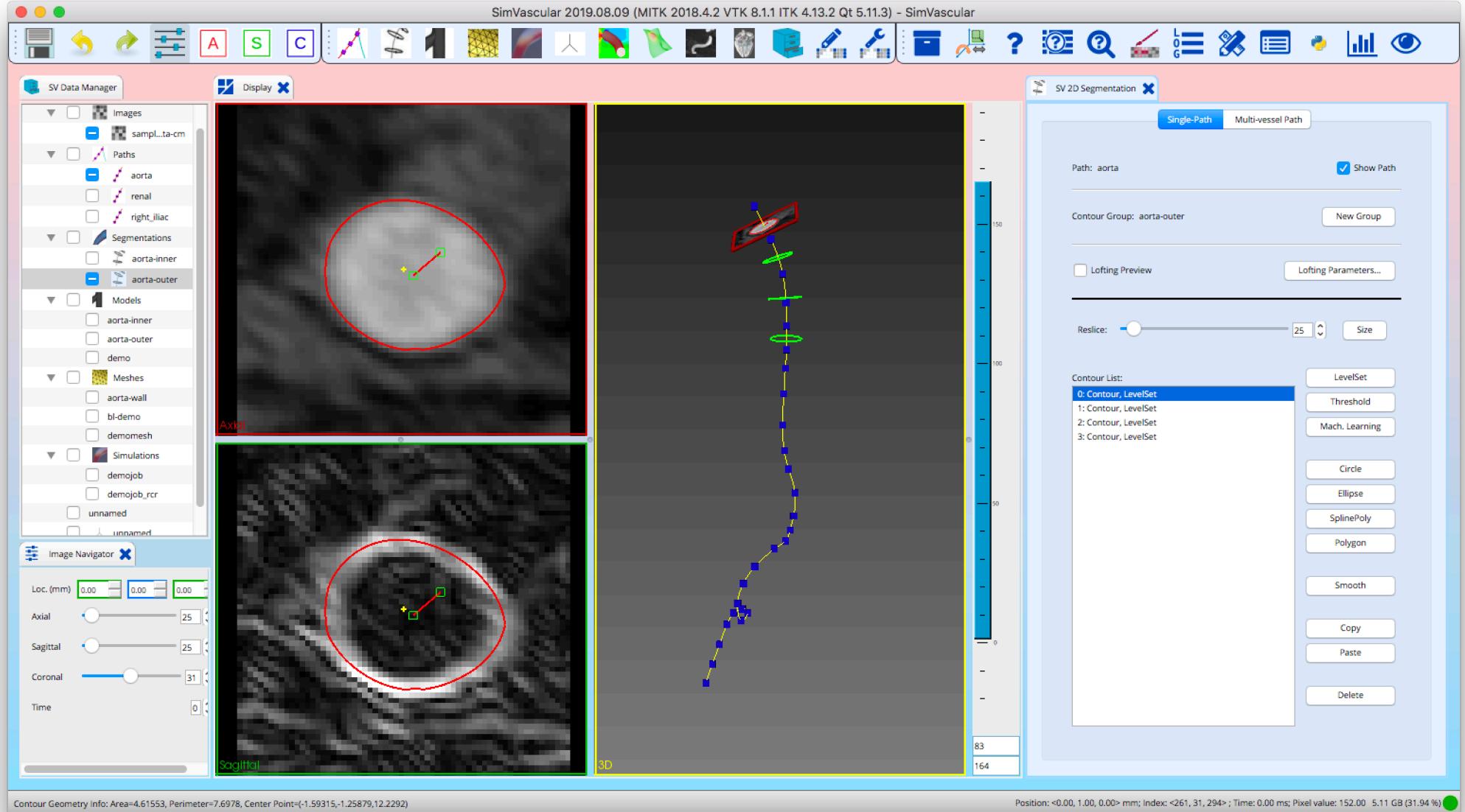


Creating a model of a vessel wall a using the SimVascular Python API

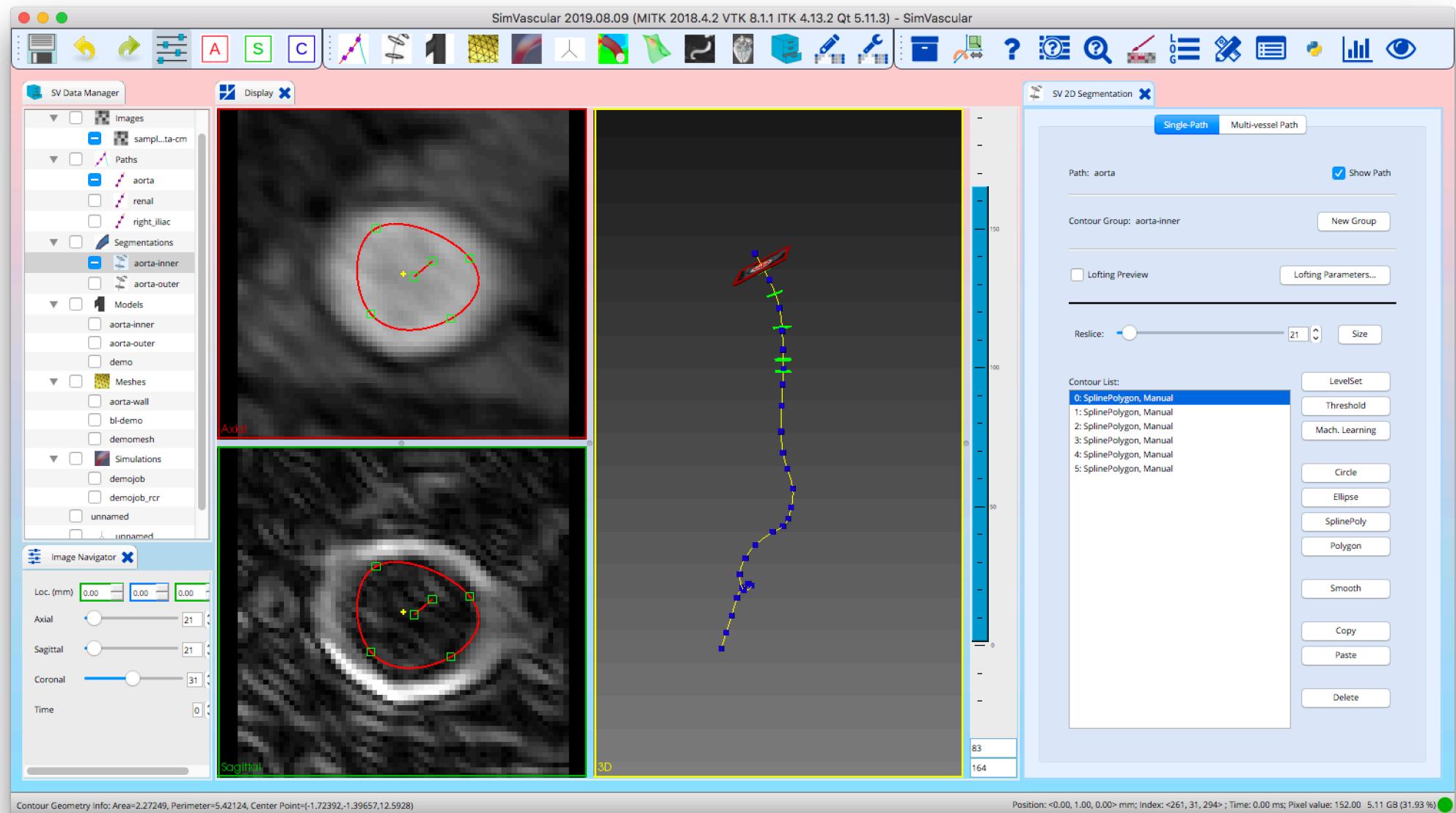
This document describes how to use the SimVascular Python API to create a model of a vessel wall using the **create-vessel-wall.py** Python script.

The **create-vessel-wall.py** script reads in two VTK .vtp format files created by the SimVascular **Models** tool for models of inner and outer vessel segmentations.

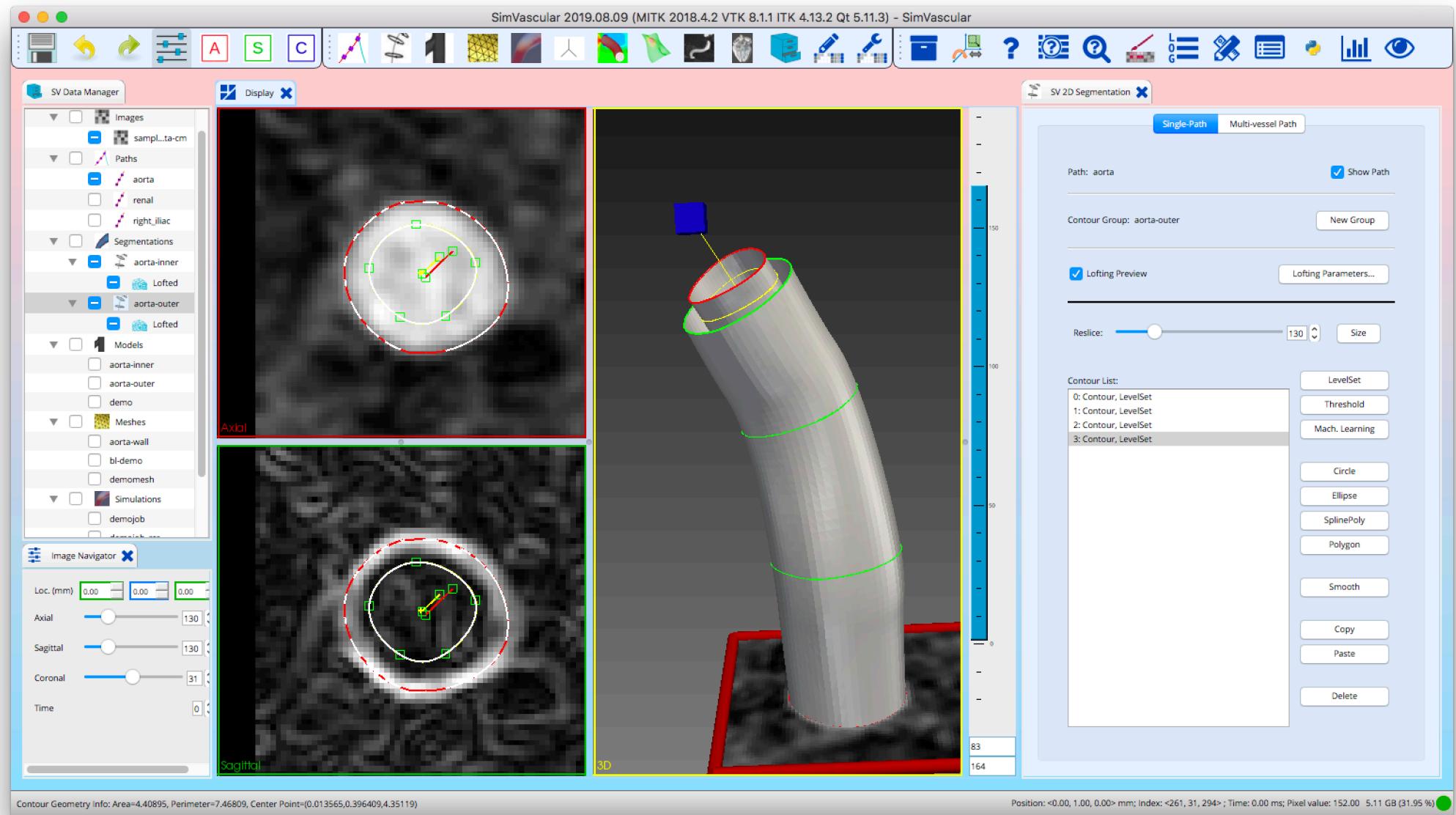
We will use the SimVascular Demo Project (https://simtk.org/frs/download_confirm.php/file/5113/DemoProject.zip?group_id=930) to create the models of inner and outer vessel segmentations.



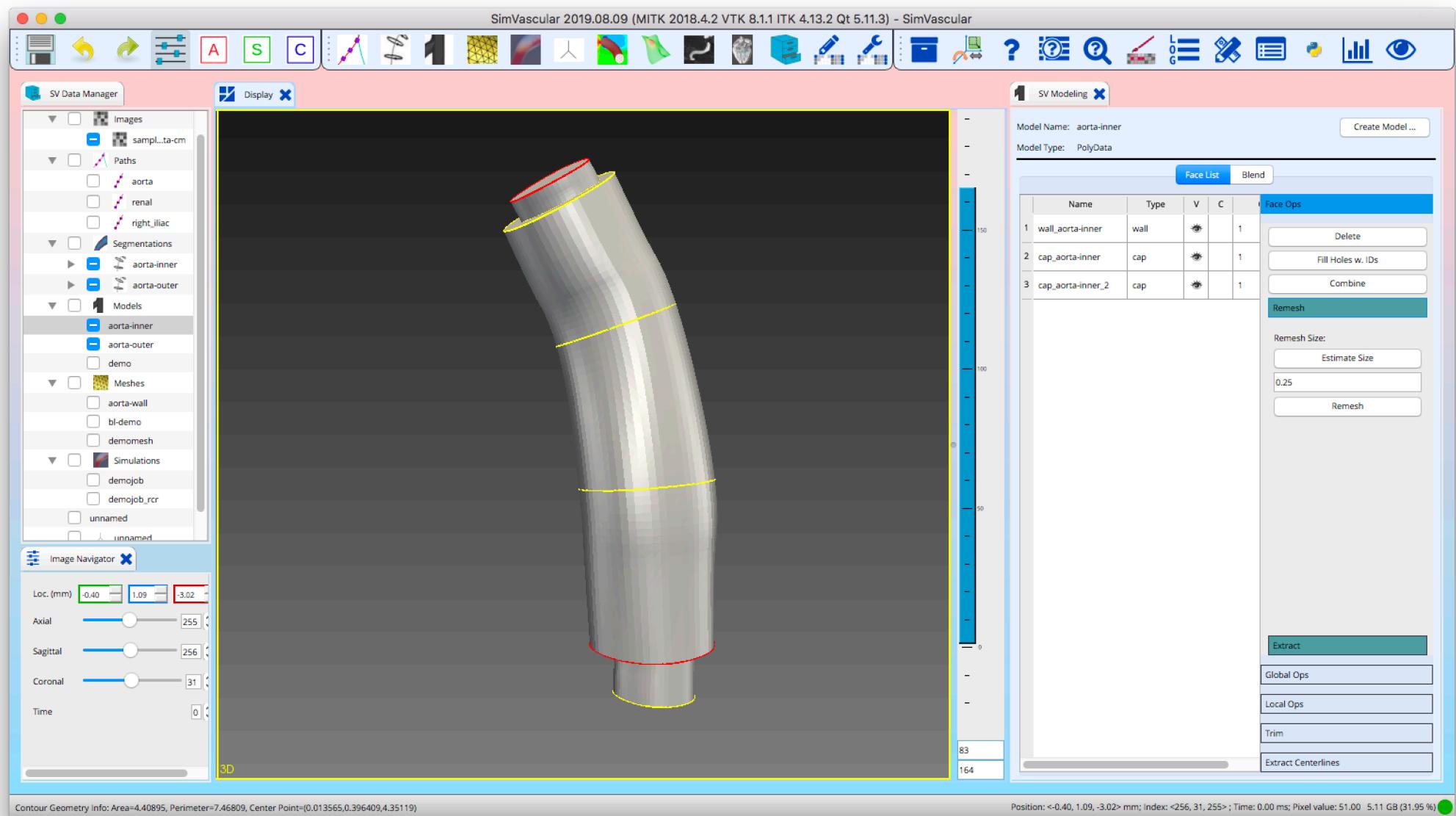
Create four segmentations representing the vessel outer wall.



Create six segmentations representing the vessel inner wall.

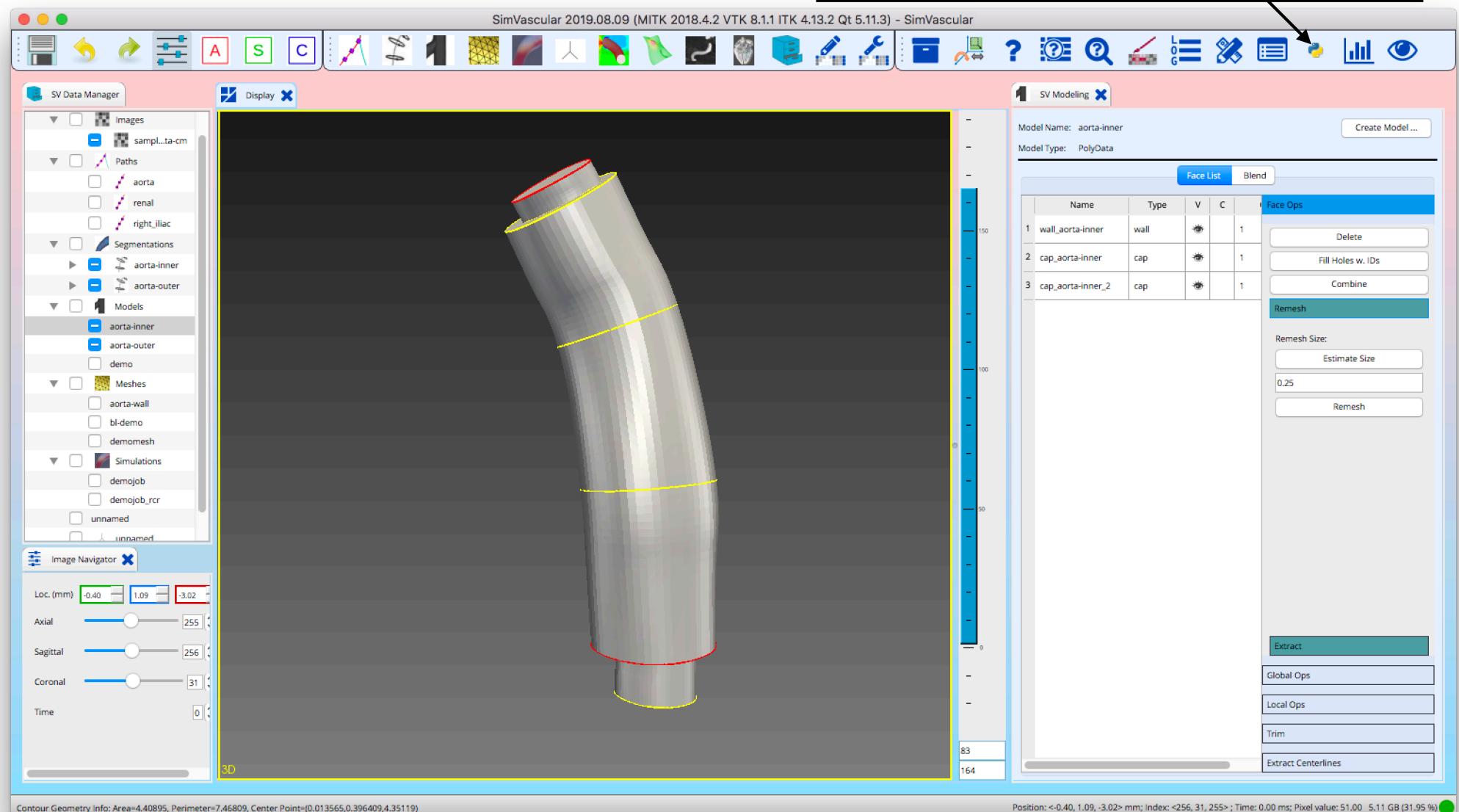


Create inner wall segmentations a bit beyond the ends of the outer wall. This will prevent any numerical problems when subtracting the two models. You can do this using the **Copy** and **Paste** buttons towards the bottom of the Sv 2D Segmentation panel.



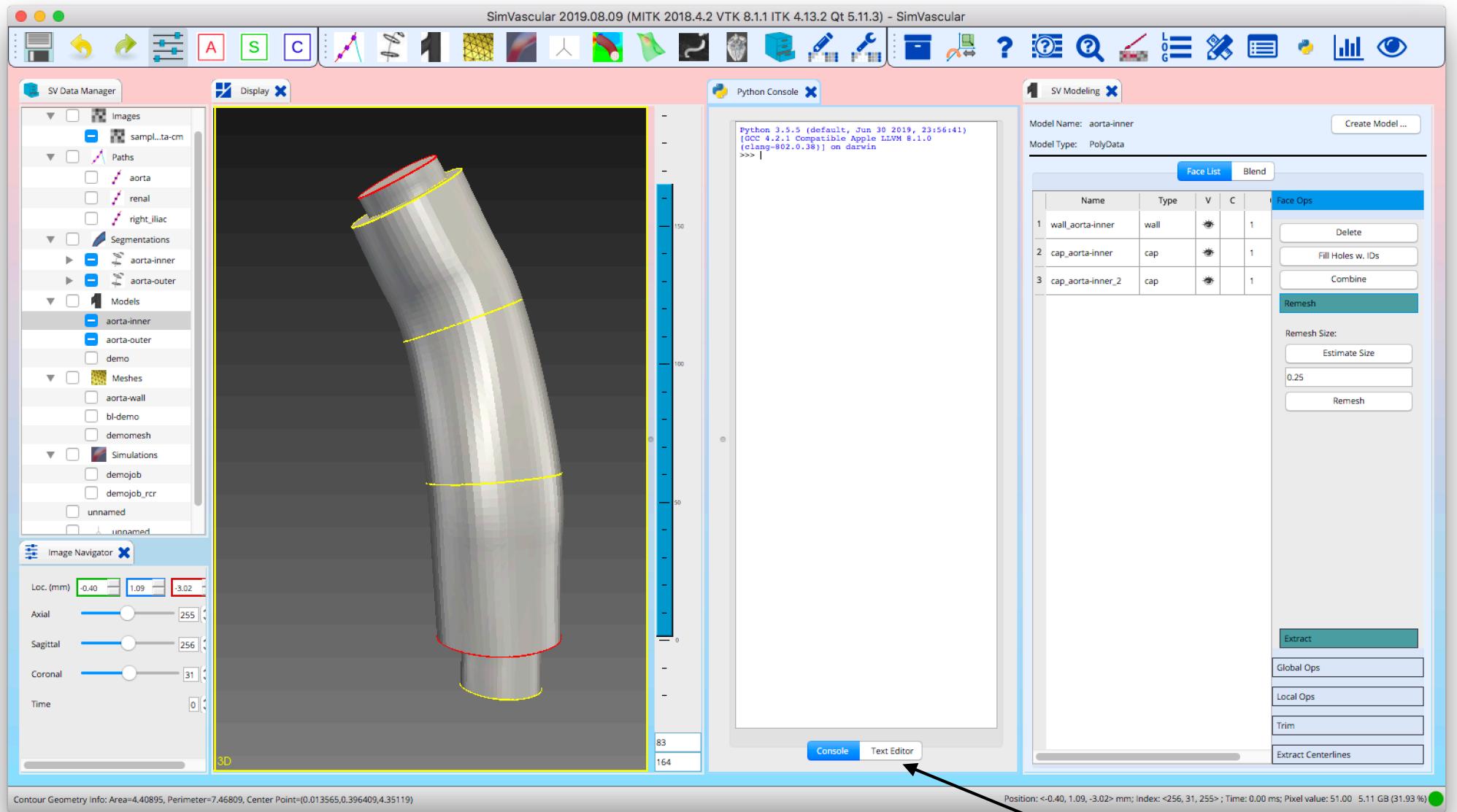
Create separate models from the inner and outer wall segmentations. And save the project. This creates two files named **aorta-inner.vtp** and **aorta-outer.vtp** in the Demo projects **Models** directory.

Open Python console



Open the Python console by selecting the Python icon located on the tool bar in the upper right of the SV window.

The Python console is used to read in the **create-vessel-wall.py** Python script.

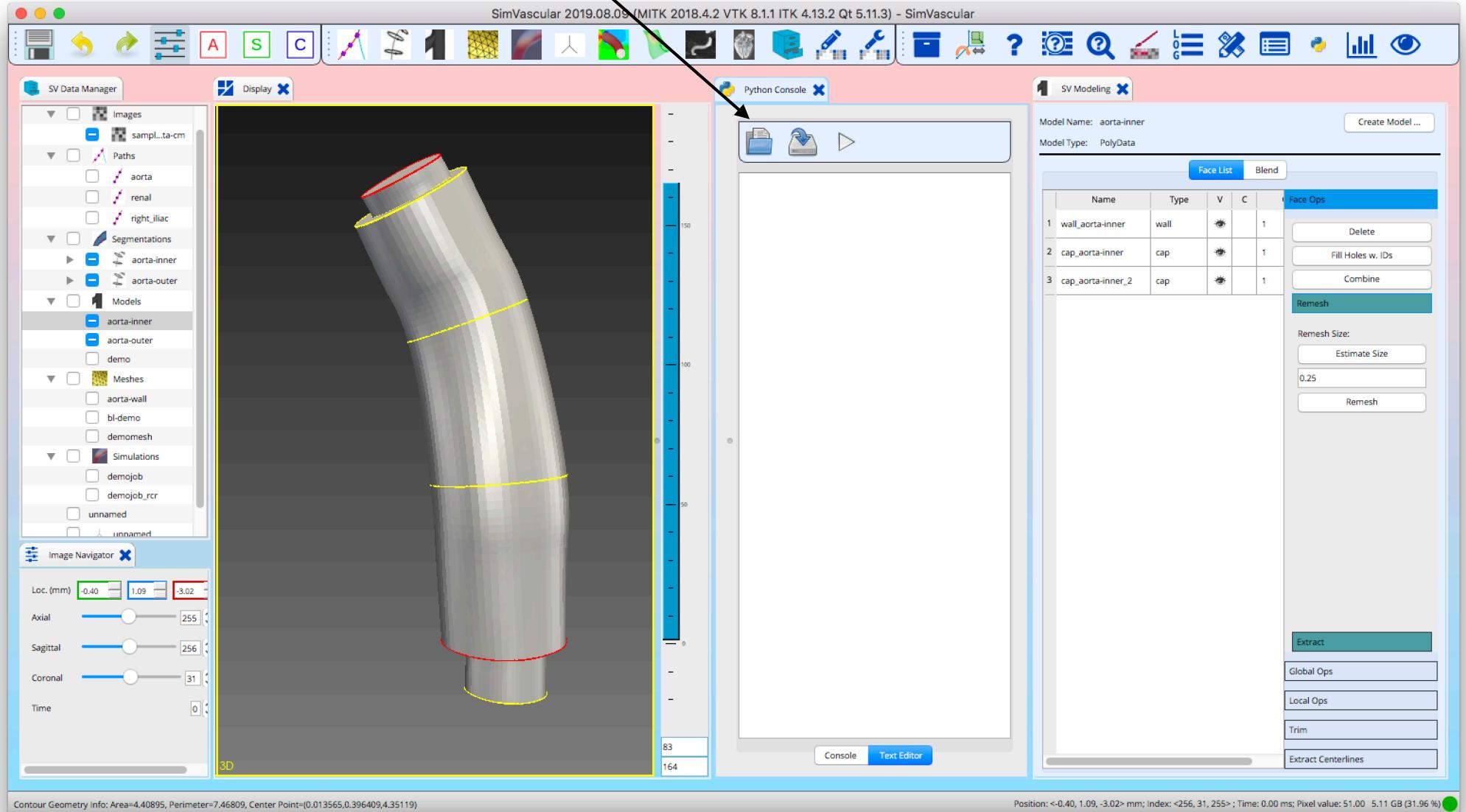


Select Text Editor

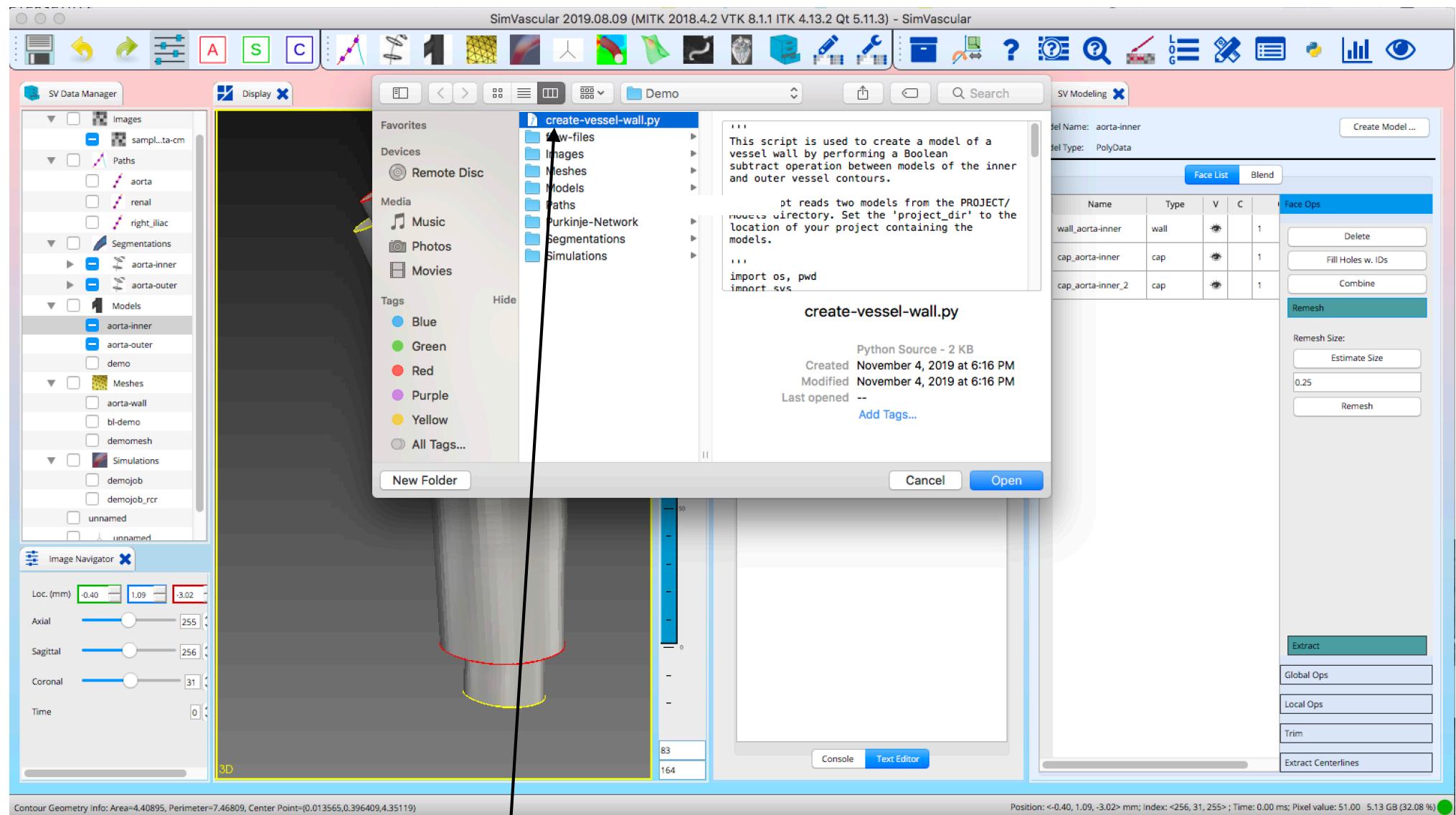
We now want to read in the the **create-vessel-wall.py** Python script.

Select the **Text Editor** button at the bottom of the SV Python Console.

Select to read in a Python script

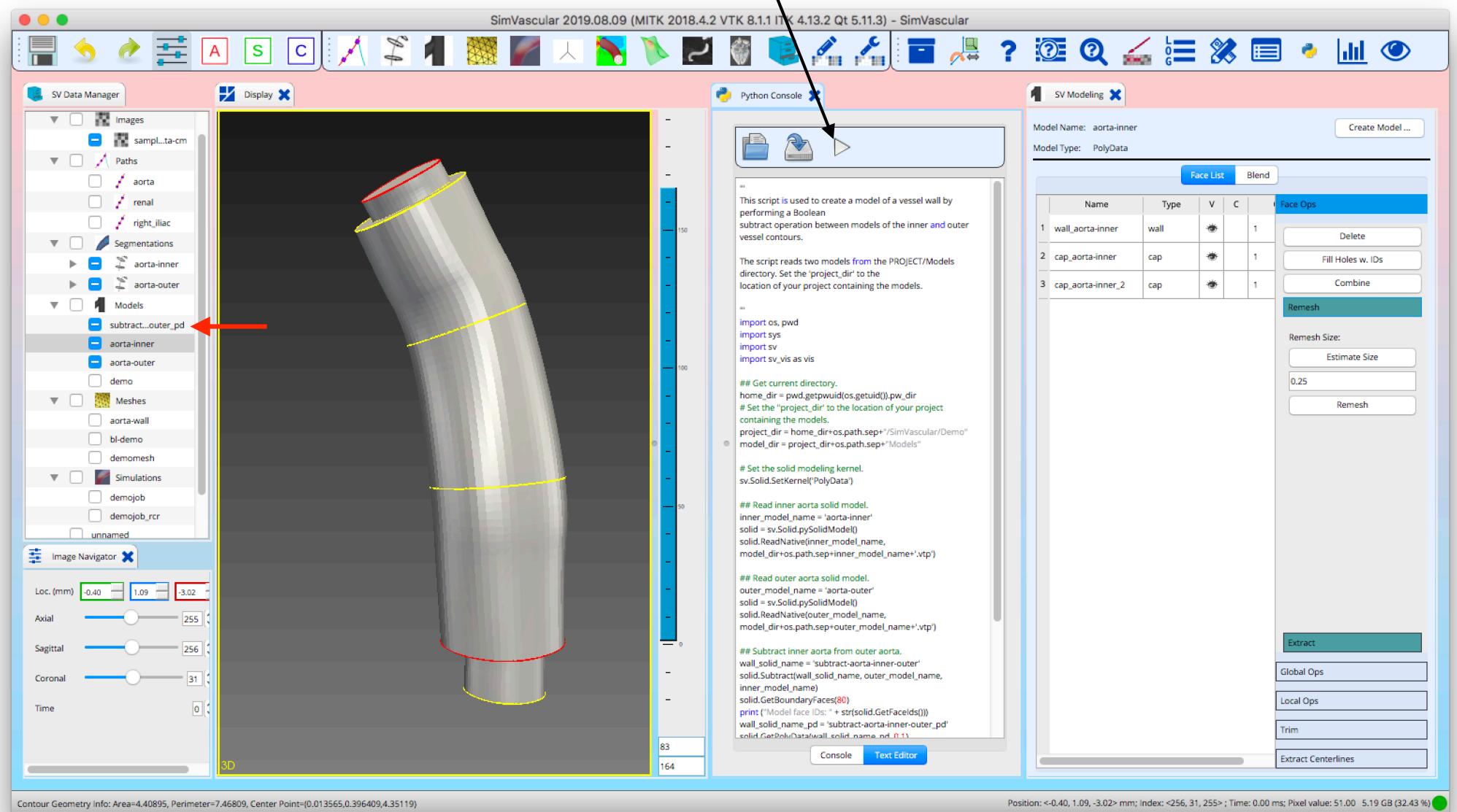


Select the  icon to open a file browser used to select the script.

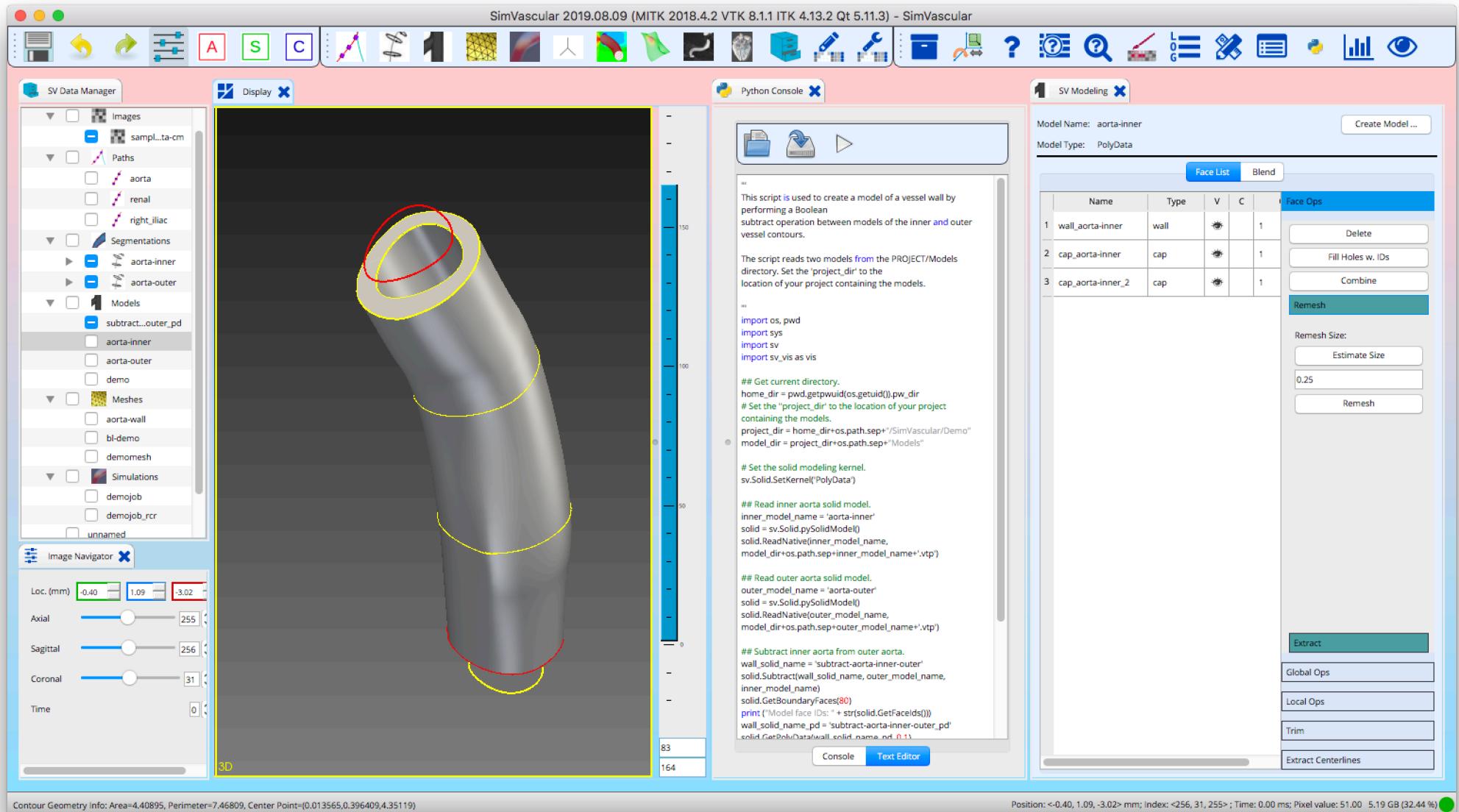


Select Python the script to read in.

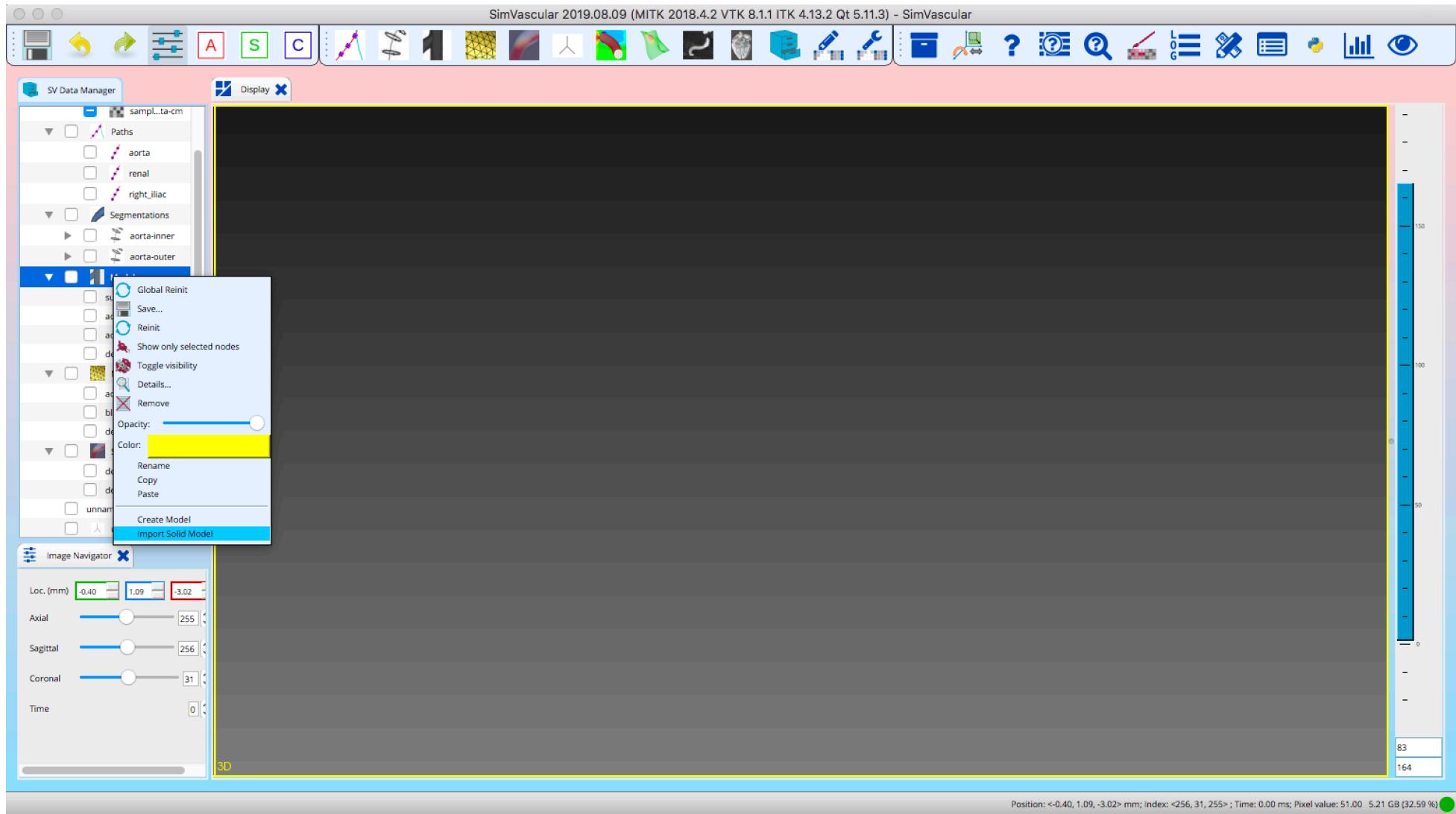
Select the play button to execute the script.



Select the icon to execute the script. This creates a **subtract...outer_pd** node (red arrow) under the SV Data Manager **Models** node and writes a file named **aorta-wall.vtp** to the Demo projects **Models** directory.

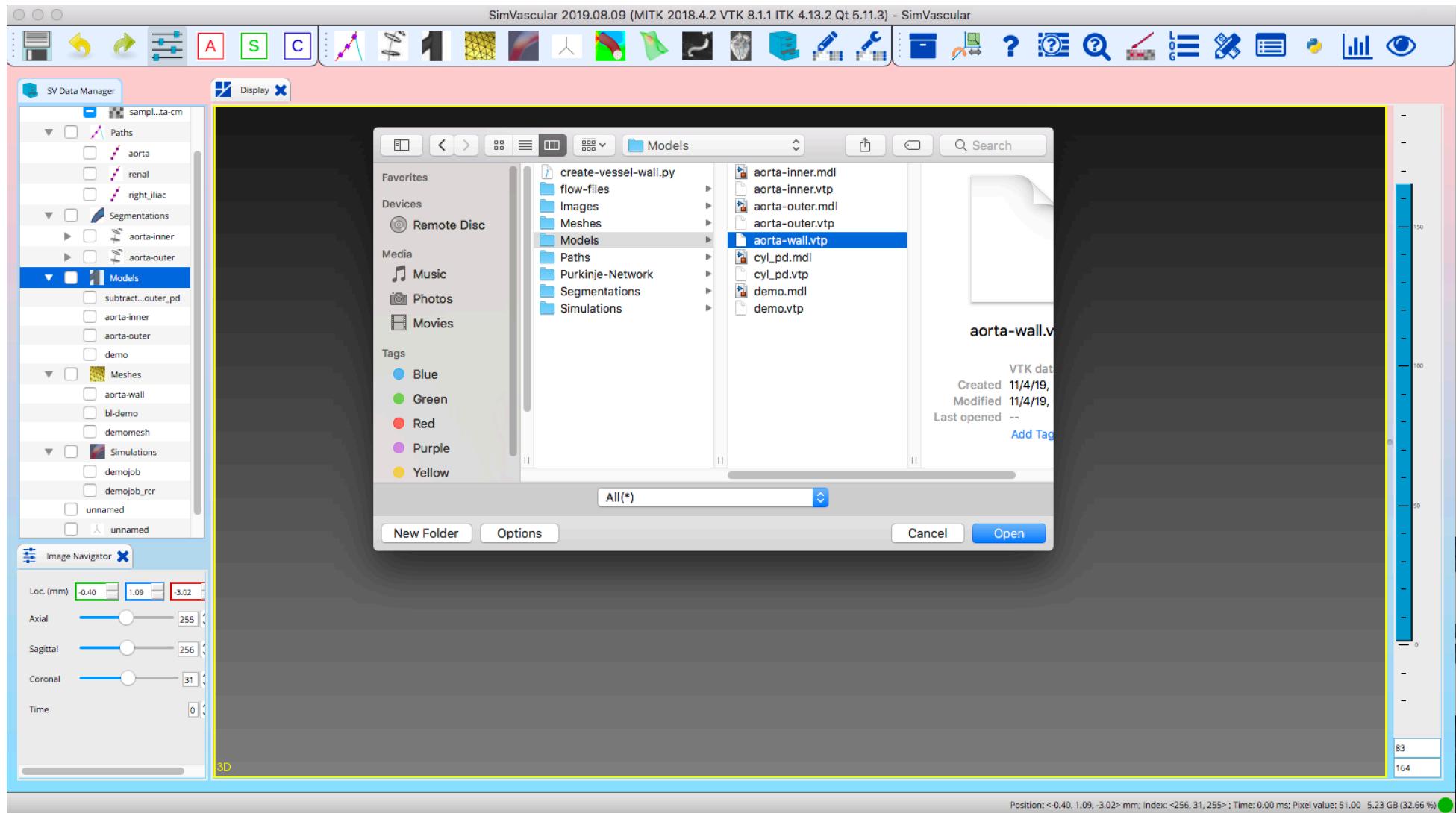


Hide the **aorta-inner** and **aorta-outer** Models by clicking on the box in front of them.

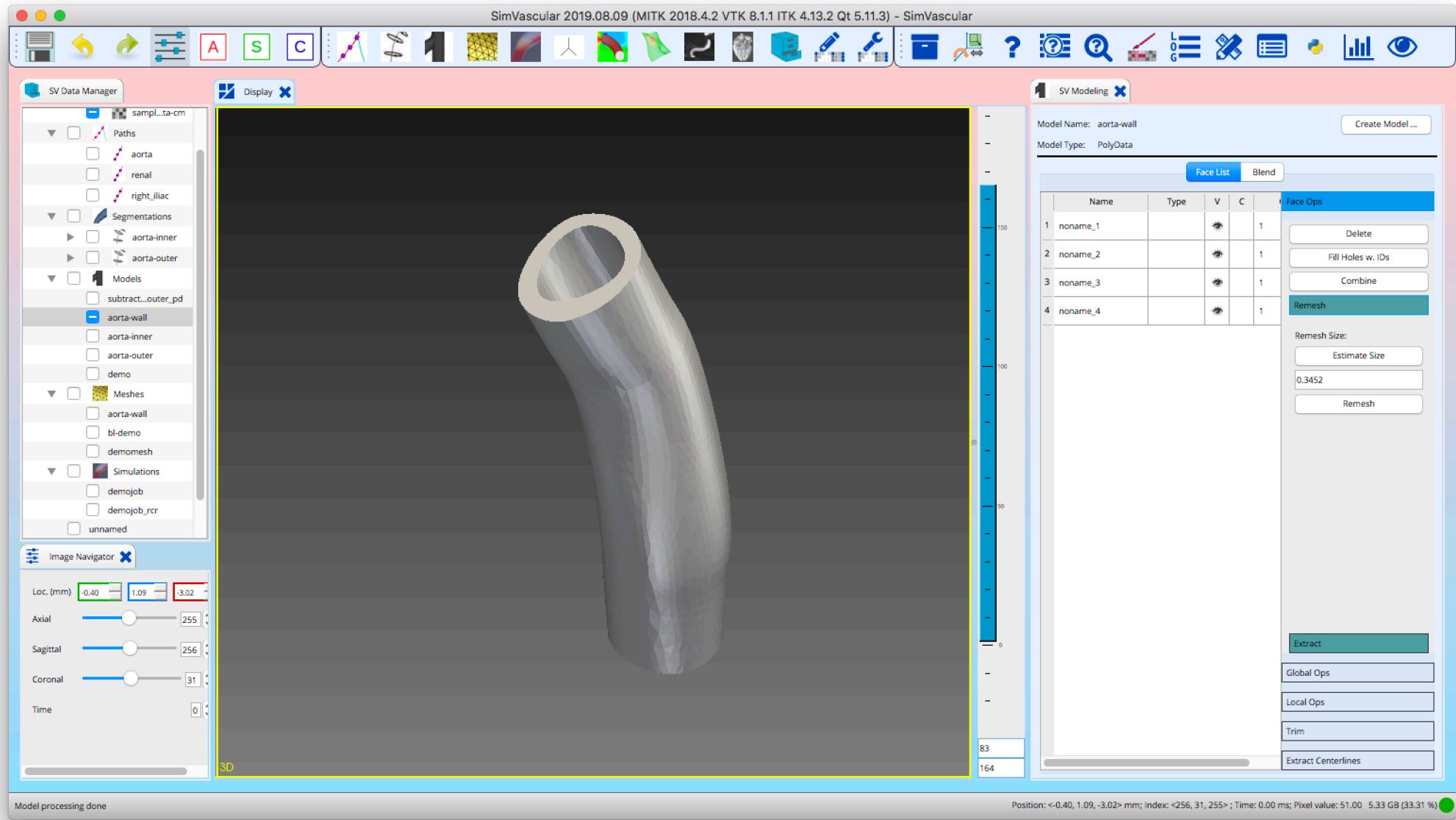


We can't use the **subtract...outer_pd** model directly because it does not have face information (I don't know why) so we need to create a new model from it.

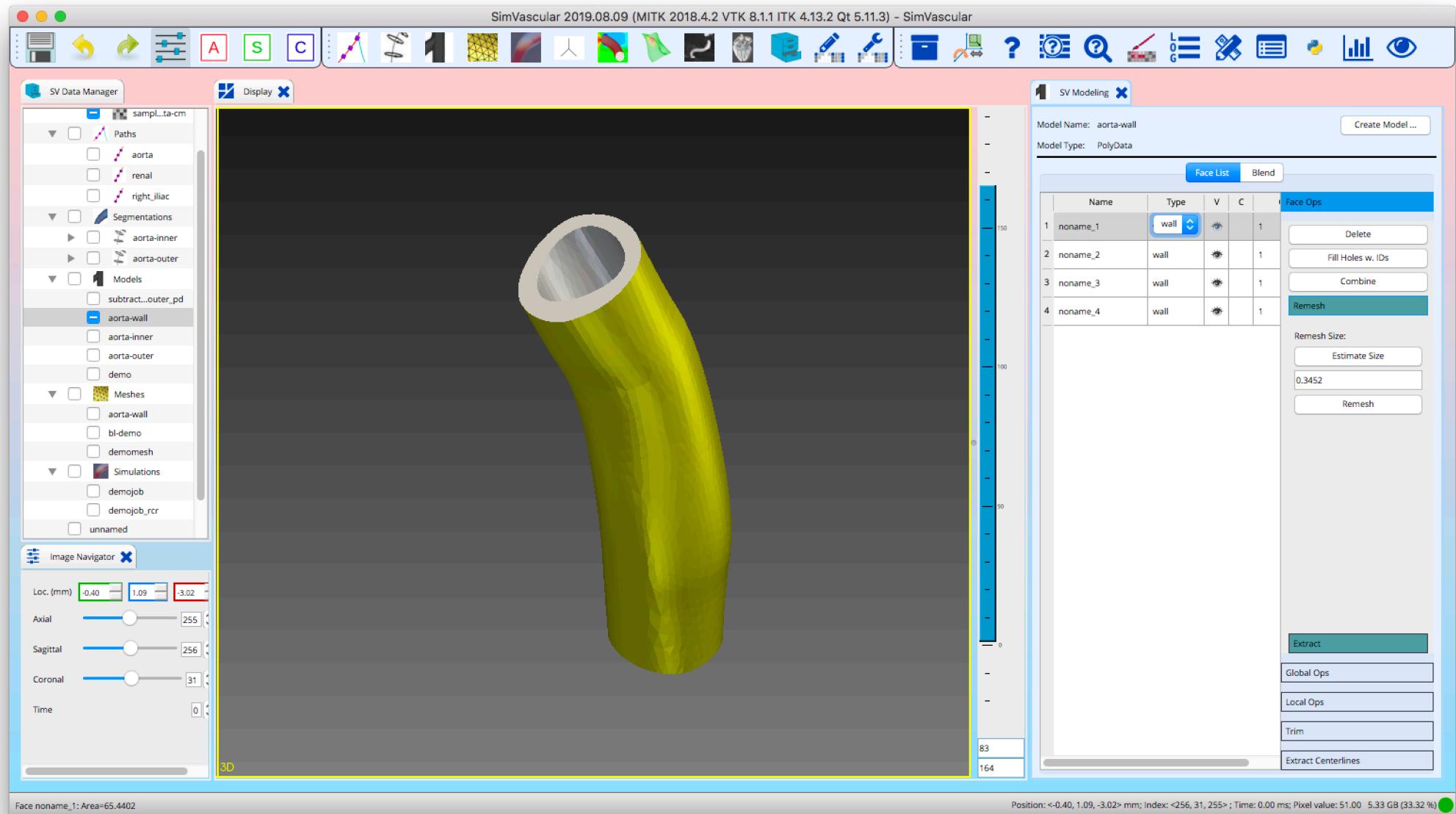
Hide the segmentations and the **subtract...outer_pd** node. Now right click on **Models** and select **Import Solid Model**. the **aorta-wall.vtp** model



Select the **aorta-wall.vtp** file under the Demo project **Models** directory and name it **aorta-wall**.



Click on **Estimate Size** and **Remesh** buttons to clean up the geometry.



Double click the **Type** column for each face and set it to **wall**. Save the project.