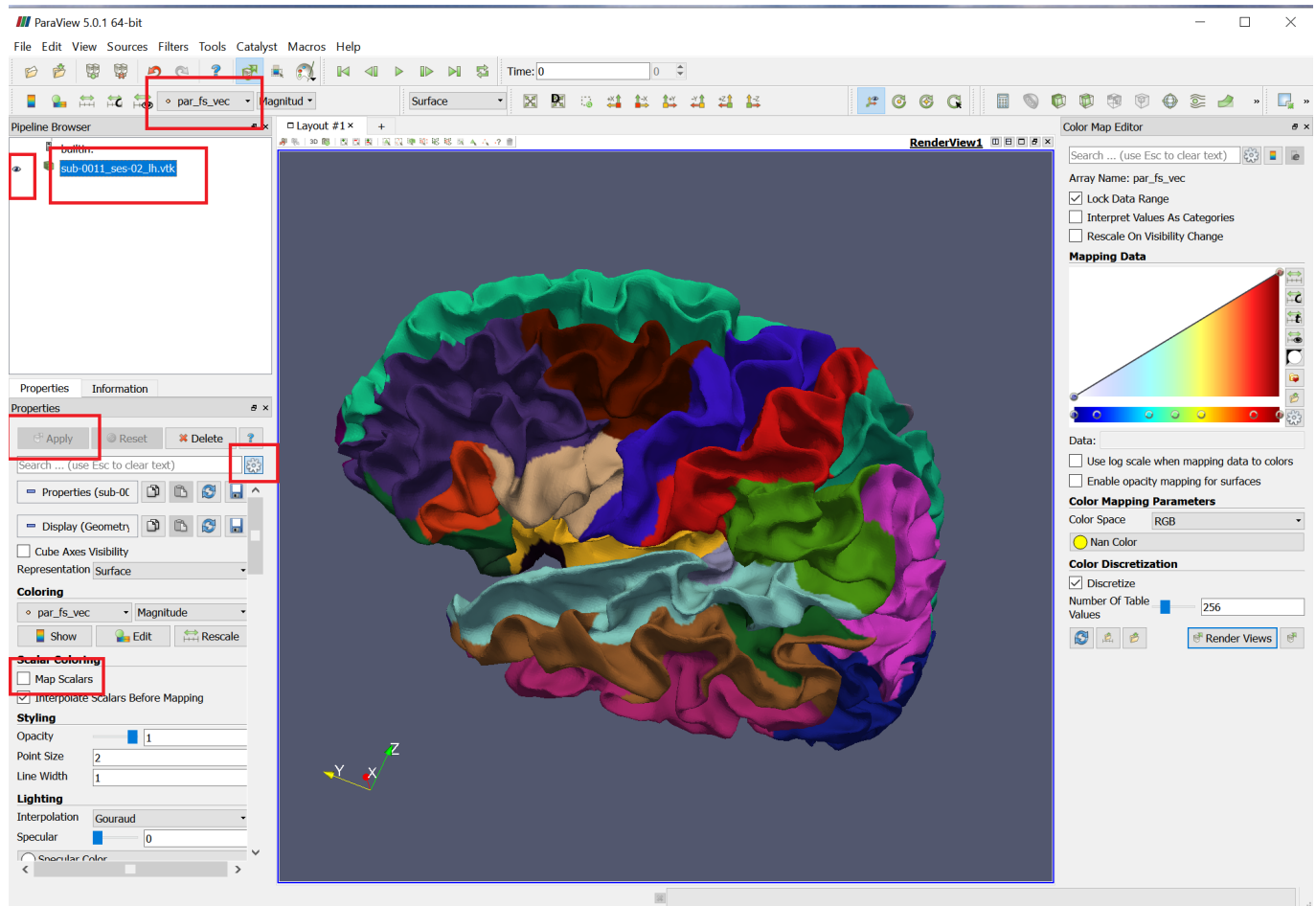


Visualize the surface and ROI

Our reconstructed cortical surface is mainly in **vtk** format. You can directly load them into the **paraview** to visualize. I attached a screen shot in the appendix and marked the key settings with red box. To visualize the ROI, you can simply following the following screenshot settings.



Getting the ROI feature

After the pipeline processing, we have the surface files named as **subjectname.InnerSurf.WithPar.vtk**. In this file, the cortical thickness and vertex area is provided; Also, the popular Freesurfer parcellation label is also attached.

You can visualize this surface using **paraview** by simply load the surface in it.

The surface file we provided is a legacy ascii vtk file, which is created by the **kitware**. You can get the detailed illustration of the vtk file format in **vtk file format**.

To facilitate the operation over the results, I shared a matlab toolkit named **mvtk**. The **mvtk** is originally contributed to Guillaume Flandin **mvtk original**. Because its original version only support single point-wise attribute, I did some modifications to extend it for supporting multiple point-wise attributes. Basically, there are two major read and write functions, i.e., the **mvtk_read** and **mvtk_write**.

To get the ROI feature, you can use the **mvtk_read** to read the corresponding surface file like:

```
pVTK=mvtk_read('surface_file');
```

After reading, the `pVTK` is a struct, which contains several fields. The `vertices` contains the x-y-z coordinates of each vertex on the surface. The `faces` contains the triangles that forms the surfaces. Generally, you can also get the `thickness` and `vertexArea` field, which stores the point-wise thickness and area of each vertex on the cortical surface. Also, there are some parcellations. For each parcellation, it consists of two fields, the typical one is `par_fs` and `par_fs_vec`. The `par_fs` is a $M \times 1$ vector, where M is the vertex number. Each component is a very large integer, which represents the id of the ROI. The `par_fs_vec` is a $M \times 3$ matrix, where each row represents the RGB color to show this ROI.

The typical Freesurfer parcellation ROI label name and its corresponding id and RGB color is listed in the file `FreesurferLabelName.csv`, which is also included in this repository.

The typical code to get the average thickness of the `Left Fusiform` is like the following:

```
pVTK=mvtk_read('surface_file');
pThickness=pVTK.thickness;
pFSROI = pVTK.par_fs;
pFusiform_vertex_idx_set=find(pFSROI==9231540) % Get the ROI name and id mapping
in FreesurferLabelName.csv.
pFusiform_mean_thickness=mean(pThickness(pFusiform_vertex_idx_set));
```

For other ROIs, you can use the similar code by changing the ROI ID, where all freesurfer parcellation ROI id can be found in `FreesurferLabelName.csv`.