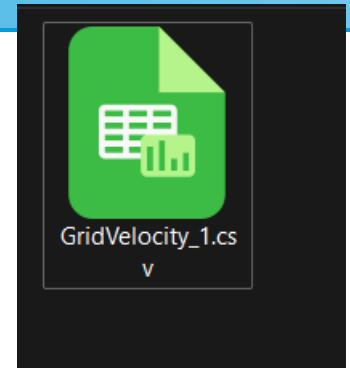
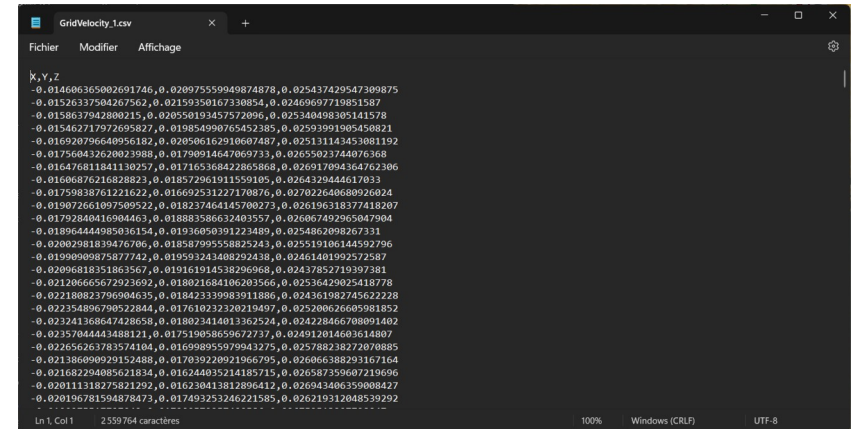


# How to mesh a .csv file

- Select a .csv files.
- Open it with notepad.

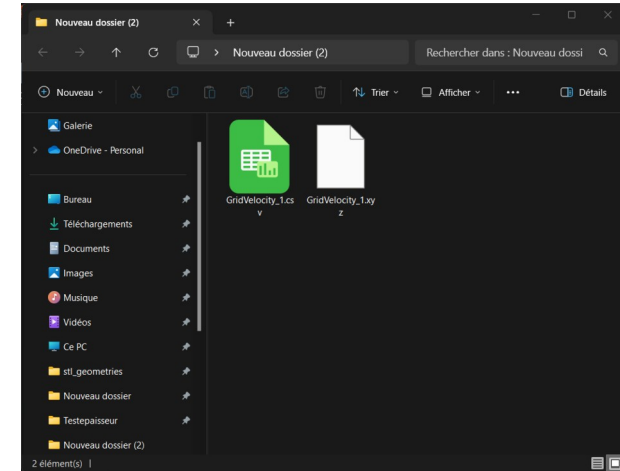


- Delete the first line  
(the one with « X,Y,Z »)
- Modify → replace
- Replace all the « , » with « »

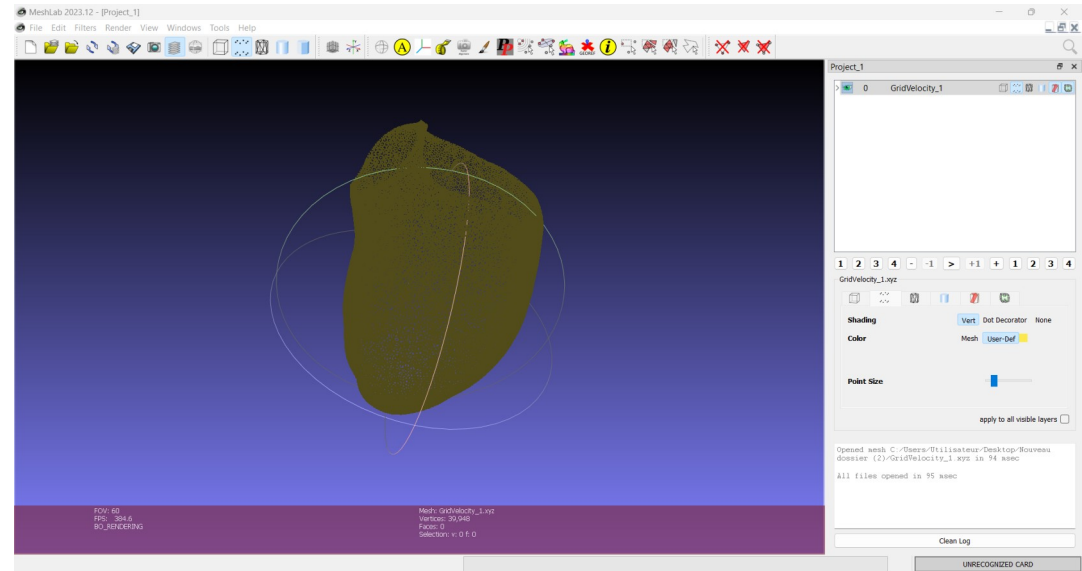


```
X,Y,Z
-0.014606365002691746,0.020075559949874878,0.025437429547309875
-0.0152633794267562,0.02159350167330854,0.02469697719851587
-0.0158637942800215,0.020550193457572096,0.025340408305141578
-0.015462717972695827,0.019854990765452385,0.02593991905450821
-0.016920796640956182,0.020506162910607487,0.025131143453081192
-0.017508412670023988,0.01798914647969731,0.02655021744076368
-0.016478111841130257,0.017105368422865868,0.026917084164762306
-0.01606876216828823,0.018572961911559105,0.0264329444617033
-0.01759838761221622,0.016692531227170876,0.027022640680926024
-0.019072661097509522,0.018237464145700273,0.026196318377418207
-0.01792840416904463,0.018883586632403557,0.026067492965047904
-0.01896444985016154,0.01936890391223489,0.0254862099267331
-0.02802981838476706,0.018587995558825243,0.025519186144592796
-0.01990909875877742,0.019593243408292438,0.02461401992572587
-0.02096818351863567,0.019161914538296968,0.02437852719397381
-0.021206665672923692,0.018021684106203566,0.02536429025418778
-0.022180823796904635,0.01842339983911886,0.024361982745622228
-0.022354896790522844,0.0176102232320210497,0.025208026605981852
-0.023241368647428658,0.018023414013362524,0.024228466708091402
-0.02357044443488121,0.017519858659672737,0.024912014603614807
-0.022656263783574104,0.016998955979943275,0.025788238272070885
-0.0213869090929152488,0.017039220921966795,0.026066388293167164
-0.021682294085621834,0.016244835211185715,0.026587359687219696
-0.020111318275821292,0.016238413812896412,0.026943406359080427
-0.020196781594878473,0.017493253246221585,0.026219312048539292
```

- File → save as : Save the new file with the « .xyz » extention.



- Go into Meshlab
- File → import mesh
- Choose the «.xyz » file



- Filter → Normals, Curvatures and Orientation → Compute normal for set points
- Apply

Compute normals for point sets

*Compute the normals of the vertices of a mesh without exploiting the triangle connectivity, useful for dataset with no faces*

Neighbour num

Smooth Iteration

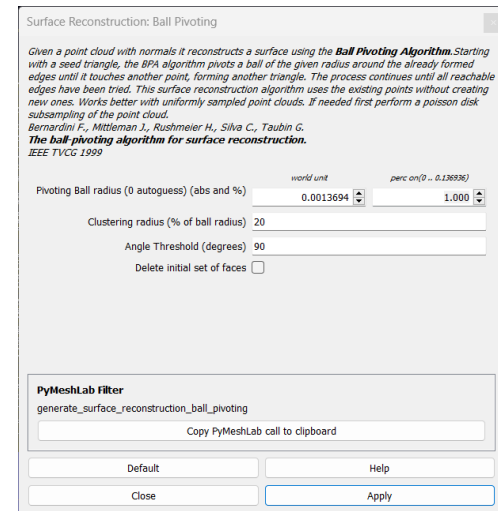
Flip normals w.r.t. viewpoint ☐

Viewpoint Pos.    View Pos.

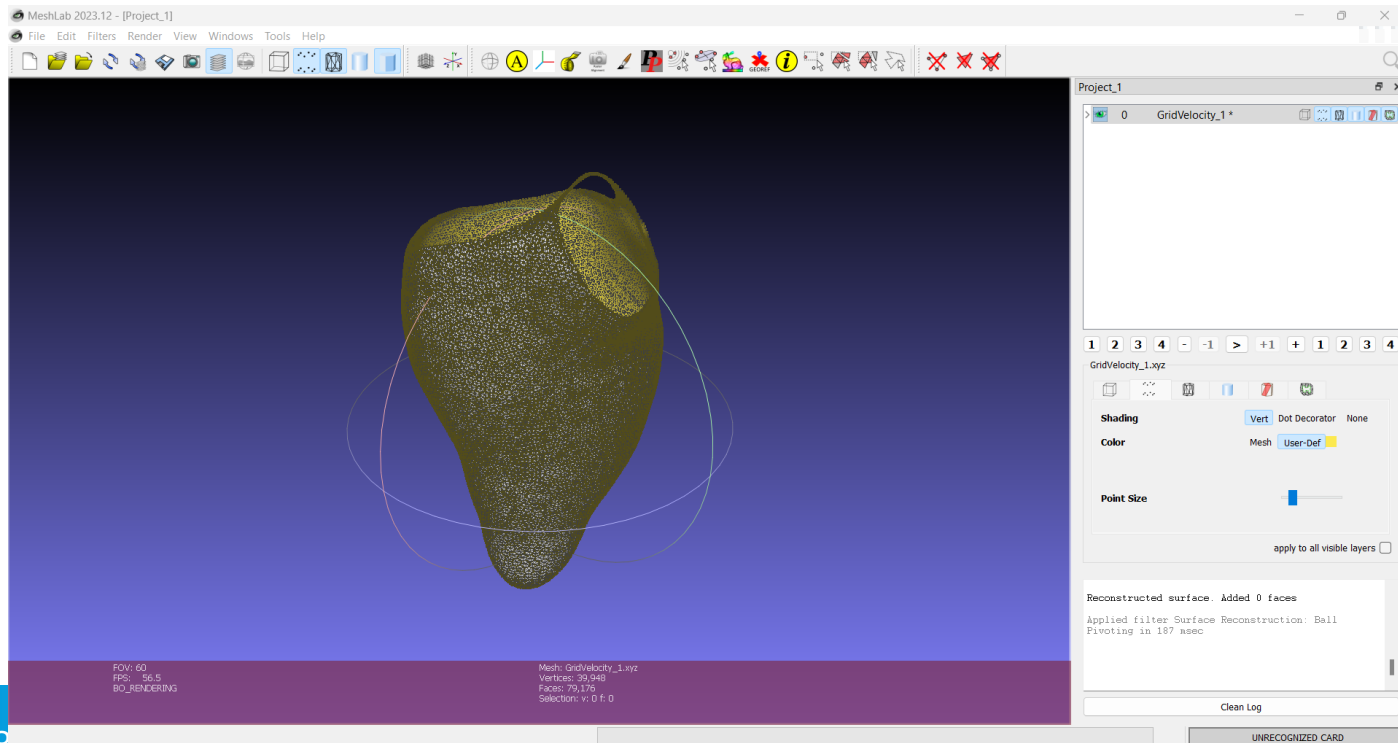
☐ Preview

**PyMeshLab Filter**  
compute\_normal\_for\_point\_clouds

- You can do smoothing at this point or anytime after, it's optional however.
- Filter → Remeshing, Simplification and Reconstruction → Surface Reconstruction : Ball Pivoting
- You want to change the « pivoting Ball radius » from 0 to 1 % (modify on the right).



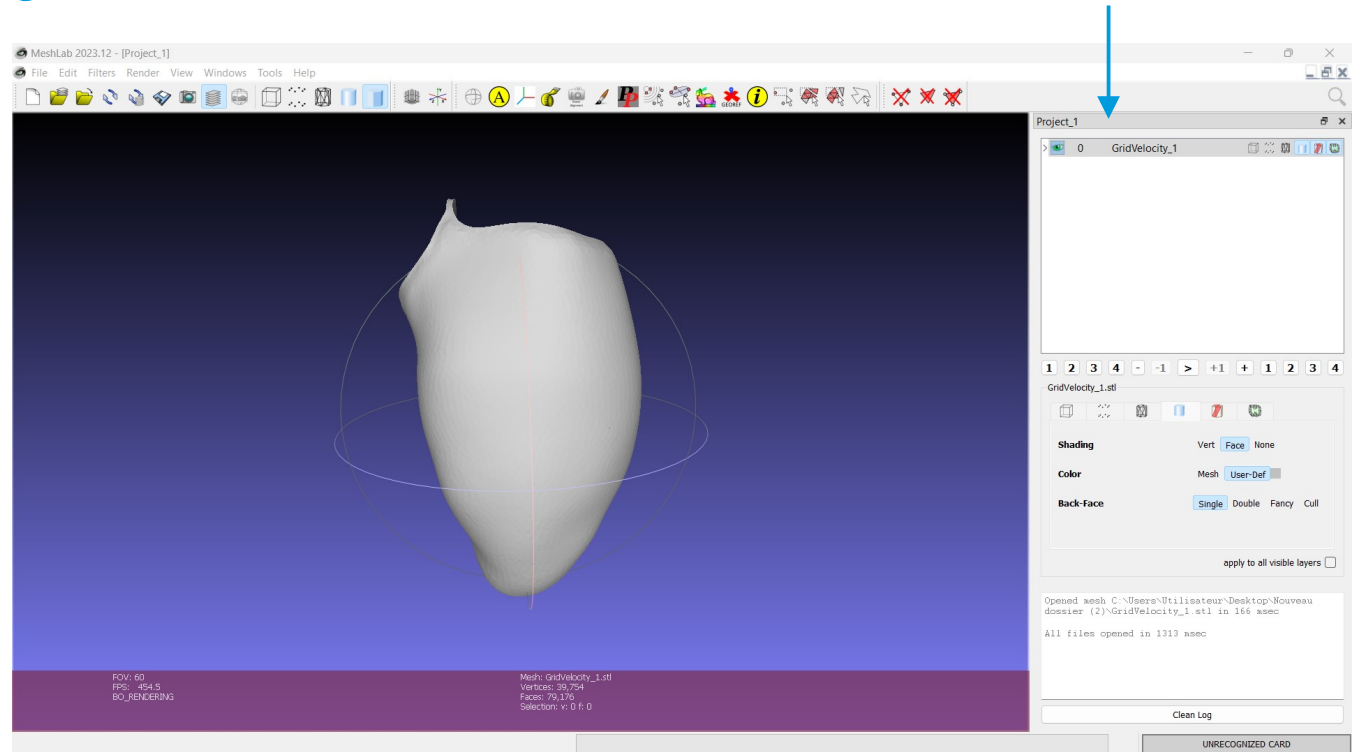
- If the ball radius is too small, you will have holes in your surface, if it's too big you will close all the valves of the heart.



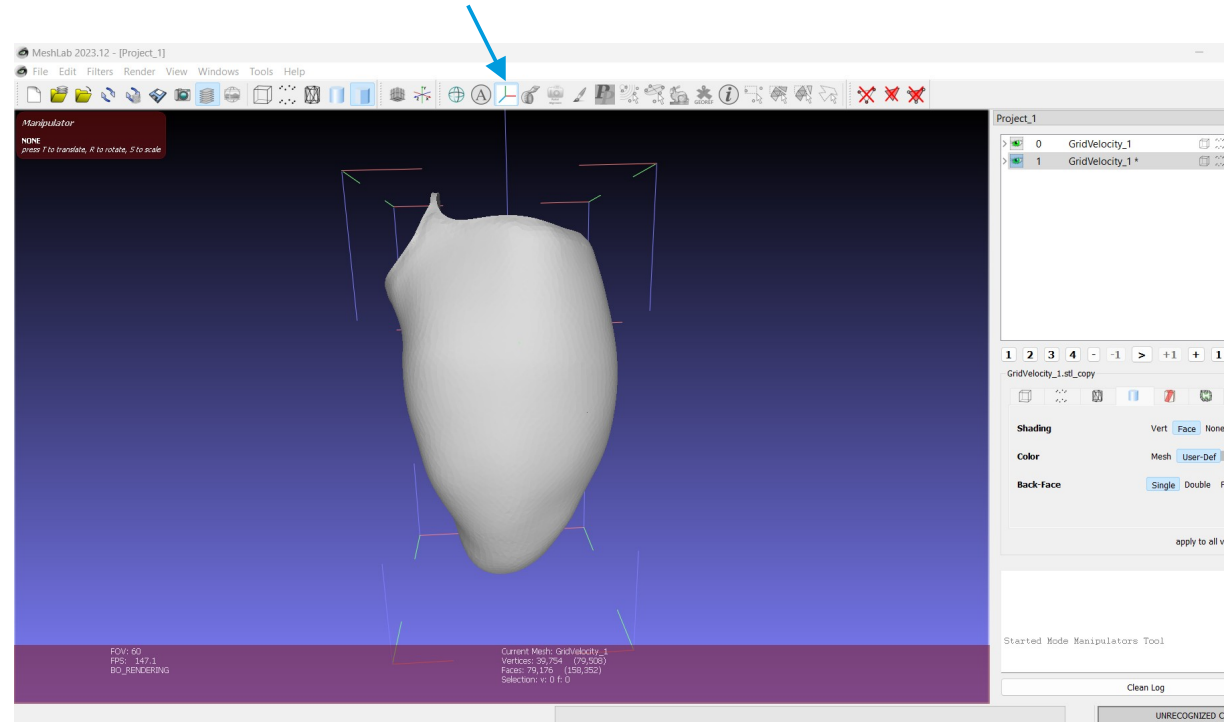




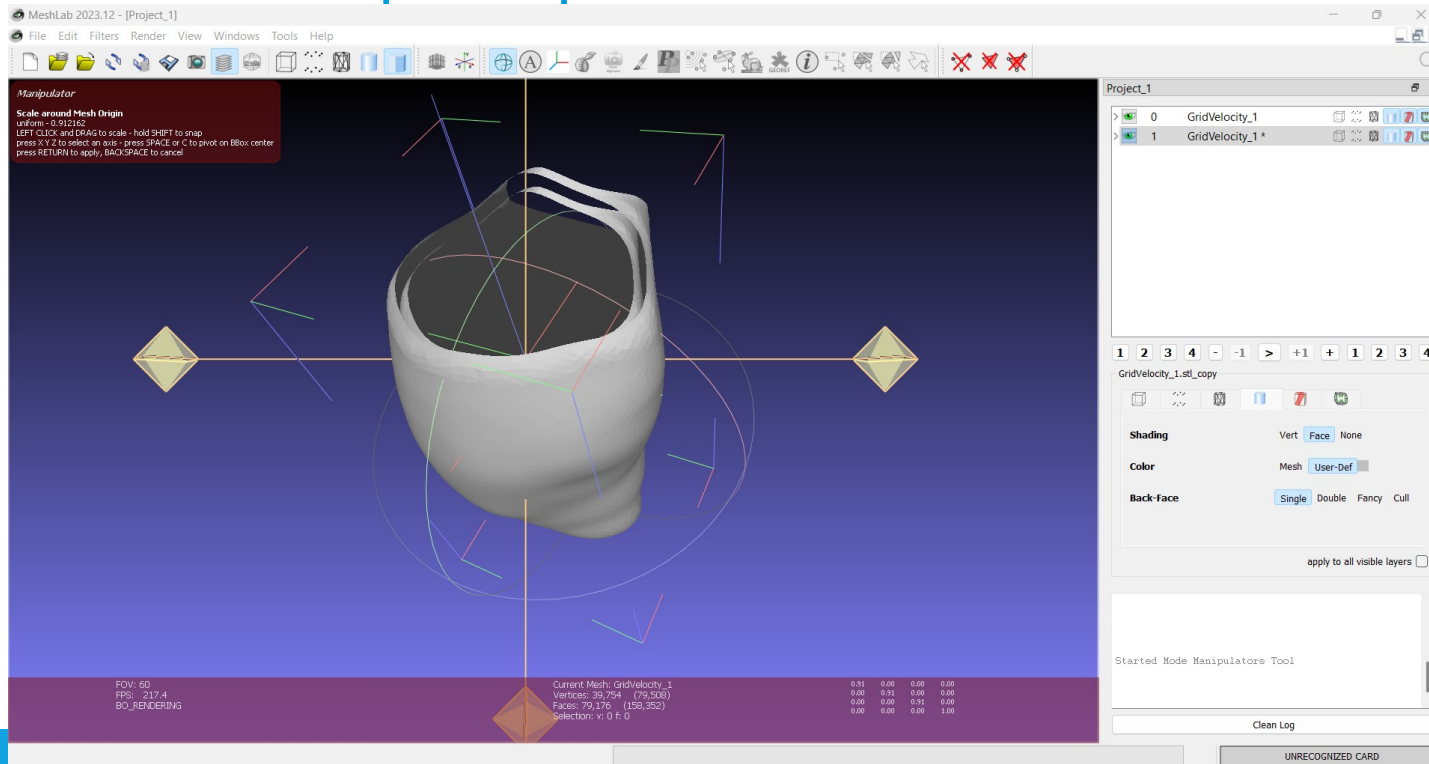
- On the right, do a right click on « GridVelocity »
- Duplicate current layer



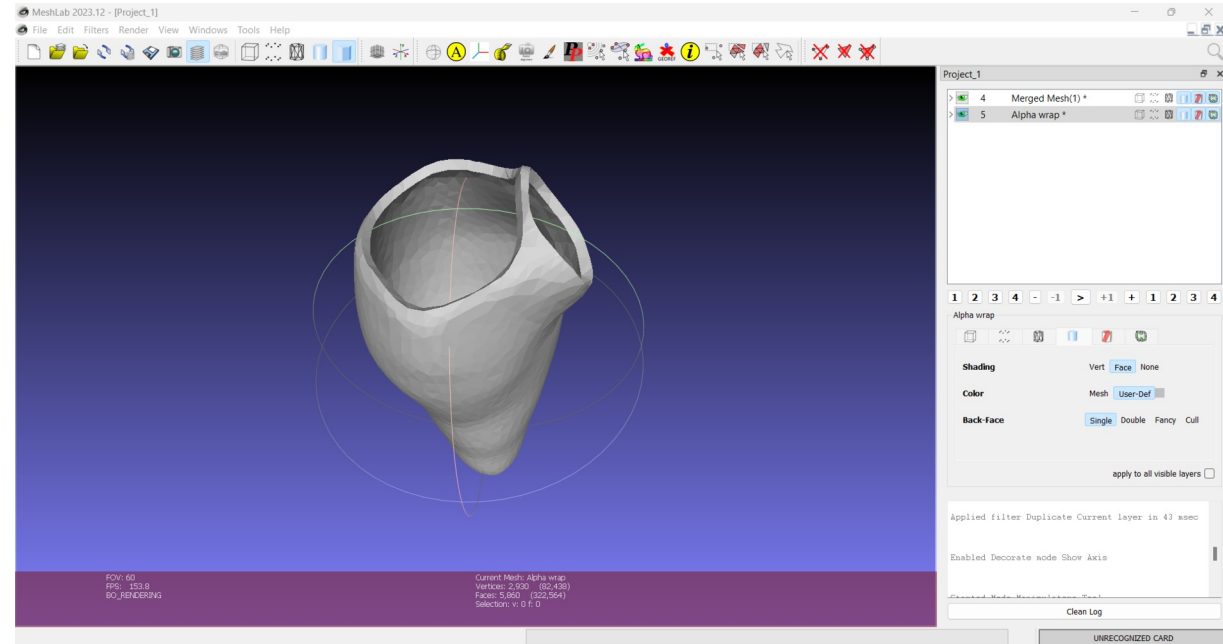
- Click on one of the layer
- Click on the manipulator tools
- Press « S » to scale



- Scale Down or up and press enter to validate



- Right click on one of the layer
- Flatten all visible layers
- Right click again
- Alpha wrap
- You can save or do some more smoothing.



# Closing words

- You can search tutorials on Youtube
- Here is one :  
<https://www.youtube.com/watch?v=38mt3kpsxd4>
- However it uses « Poisson » function for the remeshing, sadly it doesn't really works for us but you can try.
- MeshLab : <https://www.meshlab.net/>
- Gmsh : <https://gmsh.info/>