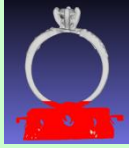


Recommended software

For post processing 3D scans: Meshlab (Freeware) - meshlab.net

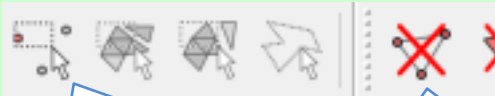
For comparing scans to CAD: CloudCompare (Freeware) - cloudcompare.org

Cropping



Using MeshLab

1. Open your scan.



2. 'Select vertices', then select points to delete with the mouse, (ESC to cancel).

3. 'Delete vertices'

Resizing

Using MeshLab

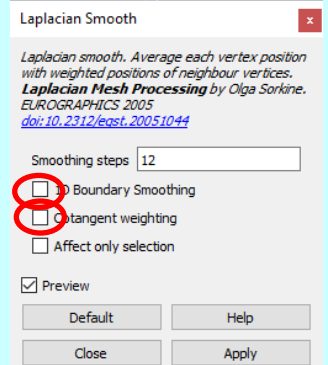
1. Open your scan.
2. Filters -> Normals, Curvatures, and Orientation -> Transform: Scale, Normalize
3. To scale up by 2x (for example), put 2 in the X,Y, and Z Axis boxes.
4. Apply.

Smoothing



Using MeshLab

1. Open your scan.
2. Filters -> Smoothing, Fairing and deformation -> Laplacian Smooth
3. Set it up like this (increase 'Smoothing steps' for more smoothing).
4. Apply.



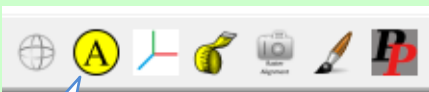
Saving from Meshlab

Use File -> Export Mesh As...

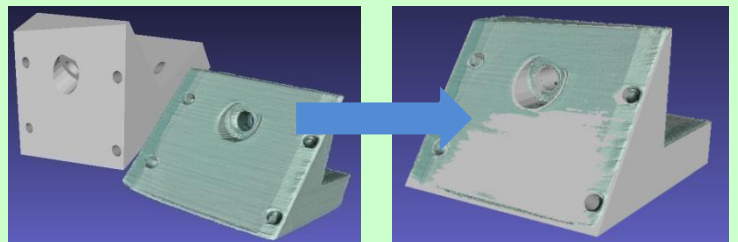
Aligning two 3D objects

Using Meshlab:

1. Open the two scans.



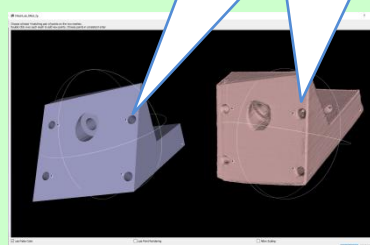
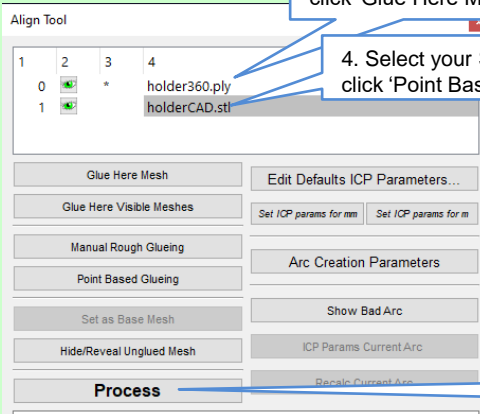
2. Click Align.



3. Select your Scan1 and click 'Glue Here Mesh'.

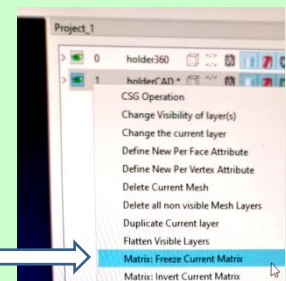
4. Select your Scan2 and click 'Point Based Glueing'.

5. Double click on each scan to mark matching points, 4 of them. This defines a rough alignment.



6. Process – to fine tune the alignment.

7. To save the new alignment, you must right click the scan name, and select 'Matrix: Freeze Current Matrix', then save as usual.

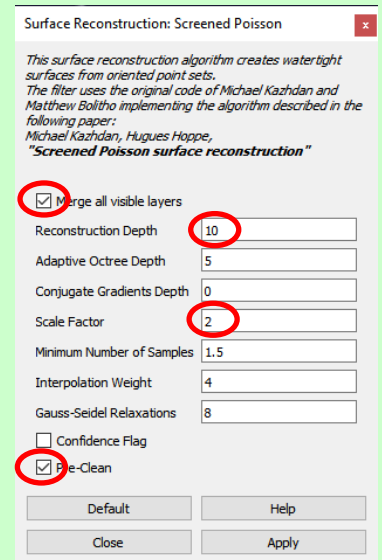


360 scans

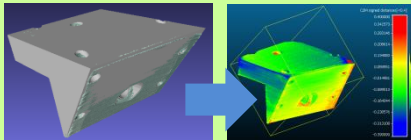


To create a scan that captures an object from all sides (left right top bottom), we need to make 2 scans and merge them together.

1. Reduce "Hole Filling" (in Tupel3D Settings), to minimum.
2. Scan your object, then flip it over to show the obscured under side, and scan it again, so you have 'Scan1' and 'Scan2'.
3. Load both scans into MeshLab.
4. Crop away the holder from both scans.
5. Align the 2 scans.
6. Merge the 2 scans...
 - Filters -> Remeshing, Simplification and Reconstruction -> Surface Reconstruction: Screened Poisson.
 - Set up as shown – changes to default are circled in red.
 - Apply.
6. The merged scan is called 'Poisson mesh', you may select it with the mouse and then save.

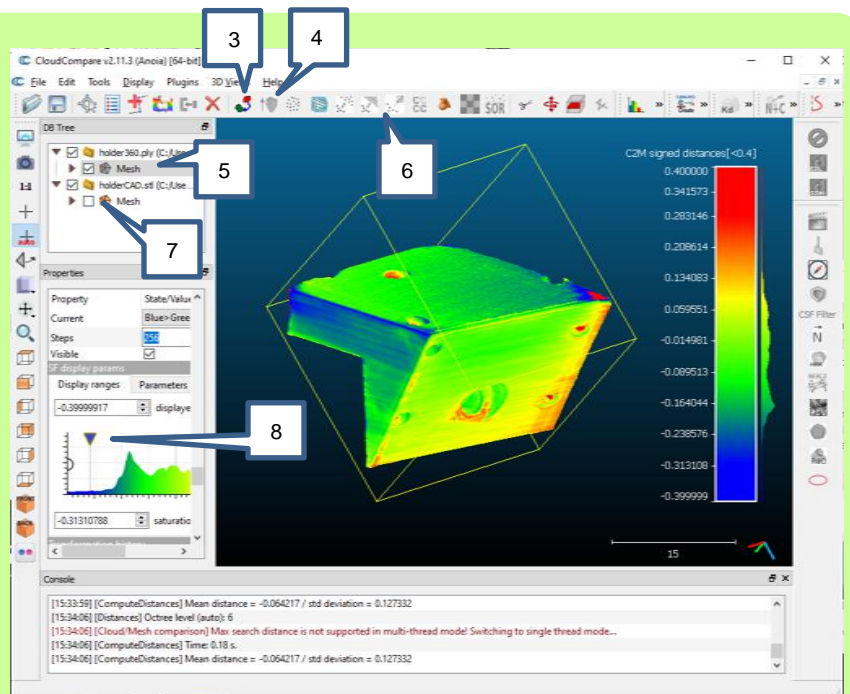


Comparing an object with its CAD



The example here shows a 3D printed part versus its CAD file. The heat map show where warping has occurred.

1. Make a 360 scan of your part.
2. Load the scan and the CAD into CloudCompare. Click 'Apply All' if prompted.
3. Course align by selected both models, and clicking the course icon.
4. Fine align by selecting both models and clicking the fine align icon.
5. Select both scan and CAD meshes using CTL and mouse clicks. ! When doing this, select the scan first, then the CAD.
6. Click 'Compute cloud/mesh distance'. At 'Choose role', click OK. At 'Distance Computation' click 'Compute', and OK.
7. Adjust the check boxes to only the heat map is visible.
8. Adjust the heat map properties.



3D printing from a scan

Scan your object to an STL file (or use MeshLab to Export As an STL file).
If it is a 360 scan there should be no holes and it should print fine.

If it is a regular scan and there are holes you can fill them using MeshLab:

- Filters -> Remeshing, Simplification and Reconstruction -> Surface Reconstruction: Screened Poisson.
- Set up as shown in the "360 scan section".

If necessary close the hole at the base using MeshLab:

- Filters -> Remeshing, Simplification and Reconstruction -> Close holes
- Set up as shown.

Export Mesh As... To save as an STL file.

Your scan should now open in your 3D printing slicer ok.

