MeshLab

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MeshLab

- Last version
  - http://www.meshlab.net/
    - https://github.com/cnr-isti-vclab/meshlab/releases
- Video Tutorial
  - https://www.youtube.com/user/MrPMeshLabTutorials

MeshLab

MeshLab doesn't have a undo.
Please save your project frequently
otherwise if MeshLab crashes or if
you apply wrongly a filter that
modifies your mesh you lose all your
works.

MeshLab – Mesh Data

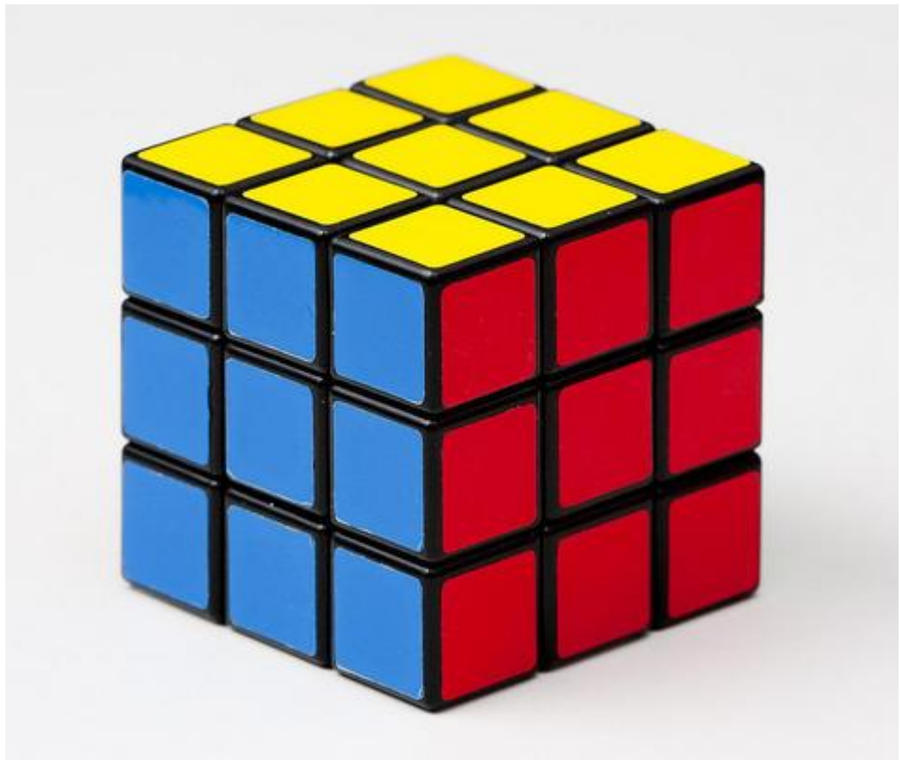
- Per-vertex attribute
  - Position
  - Normal
  - Color (VN)
  - Quality (VQ)
  - Texture Coordinate (VT)
  - Vertex Radius (VR)
  - Curvature value (VK)
  - Curvature direction (VD)

MeshLab – Mesh Data

- Per-face attribute
- Vertex reference
- Normal
- Color (FC)
- Quality (VQ)

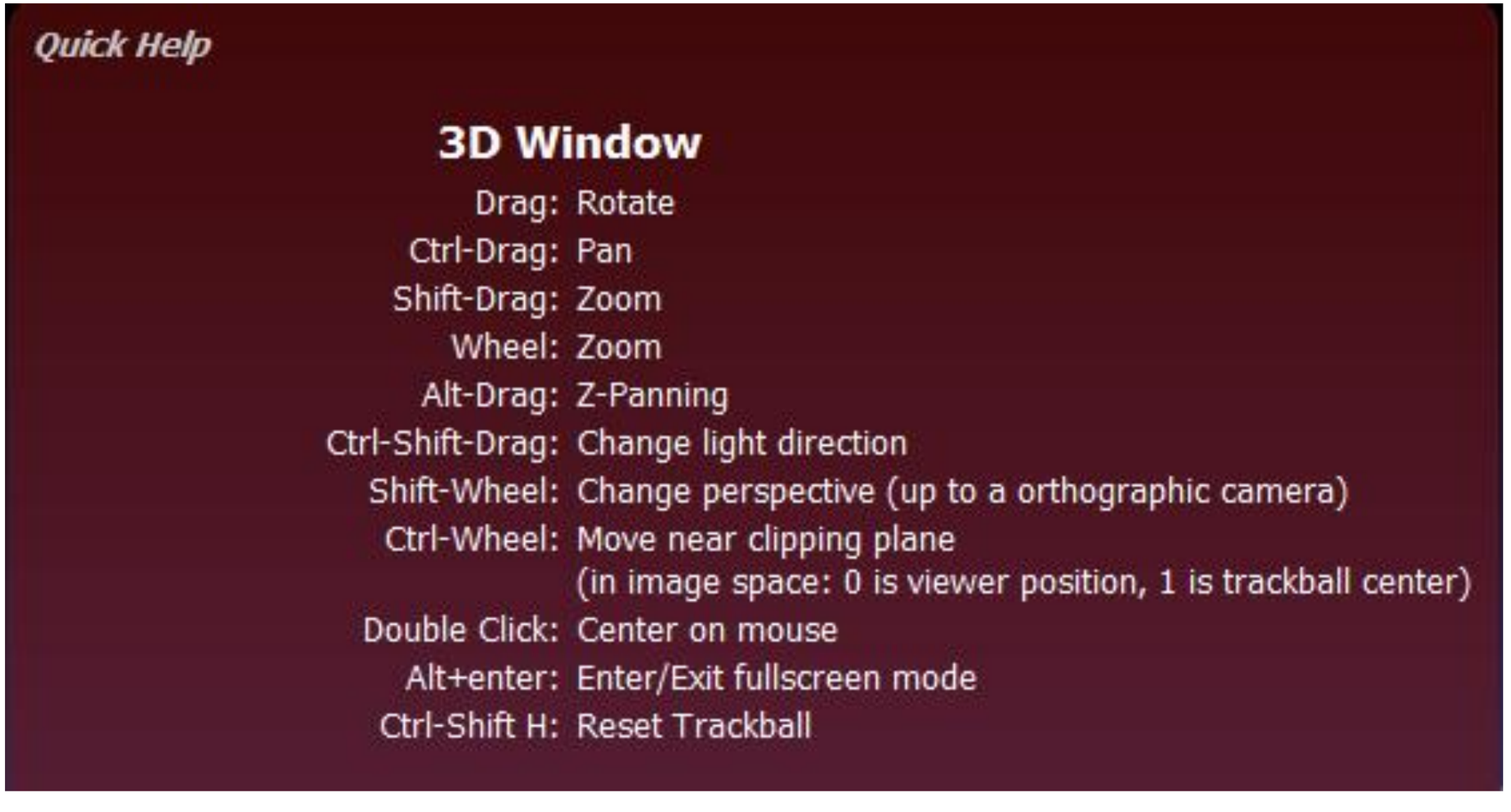
MeshLab – Mesh Data

- Wedge – To assign a different attribute to the vertex depending on the face
  - Color (WC)
  - Texture Coordinate (WT)
  - Normal (WN)



Trackball

- Paradigm: Object in-hand
- Help → On screen quick help



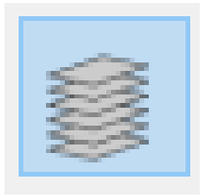
Edit Tools

Interactive tools

- Click on the tool icon to enter
- Click again to the icon to exit
- Click on the trackball icon to temporarily suspend from the edit mode, or press ESC
- Click again to the trackball icon to reactive the edit mode, or press ESC

TRACKBALL MODE

Layers

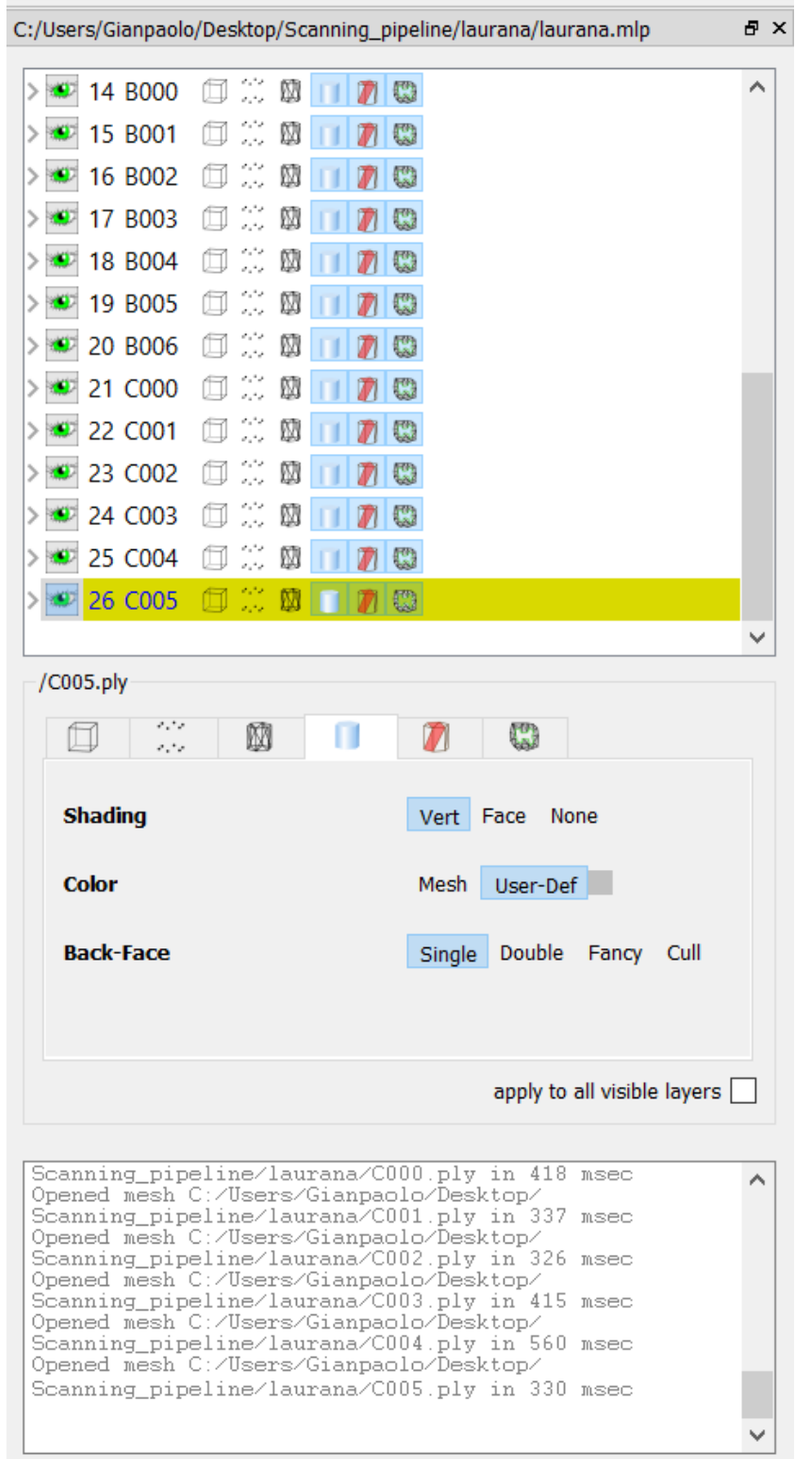


Layer icons dialog

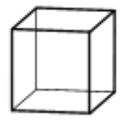
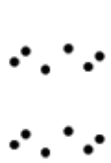
- Load different mesh on several layer
- Manage the layer visibility and rendering
- Help → On screen quick help

Layer Window

Click on eye icon: Toggle visibility status of the layer
Ctrl-Click on eye icon: Make Invisibile all other layers
Alt-Click on eye icon: Make Visibile all other layers
Shift-Click on eye icon: Invert visibility status of all the layers



Rendering Modes

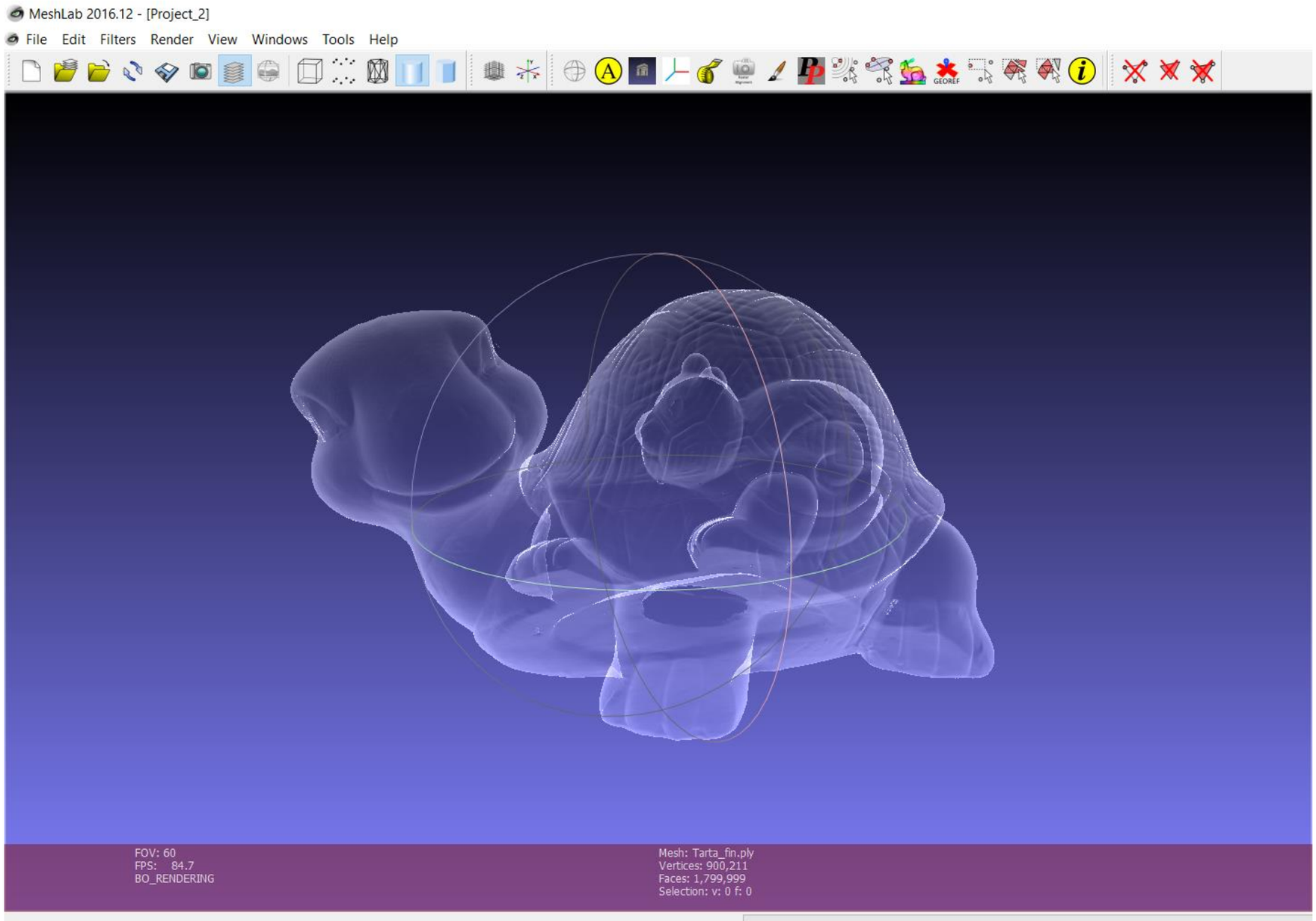
- Visualization of different data globally and for each single layer
  - Bounding box 
  - Point 
  - Edge 
  - Triangle 
  - Selection data 
  - Edge decorators 

Decorator

- Visualization of additional information
  - Normal
  - Camera position
  - Quality information
  - Axis
  - Bounding box

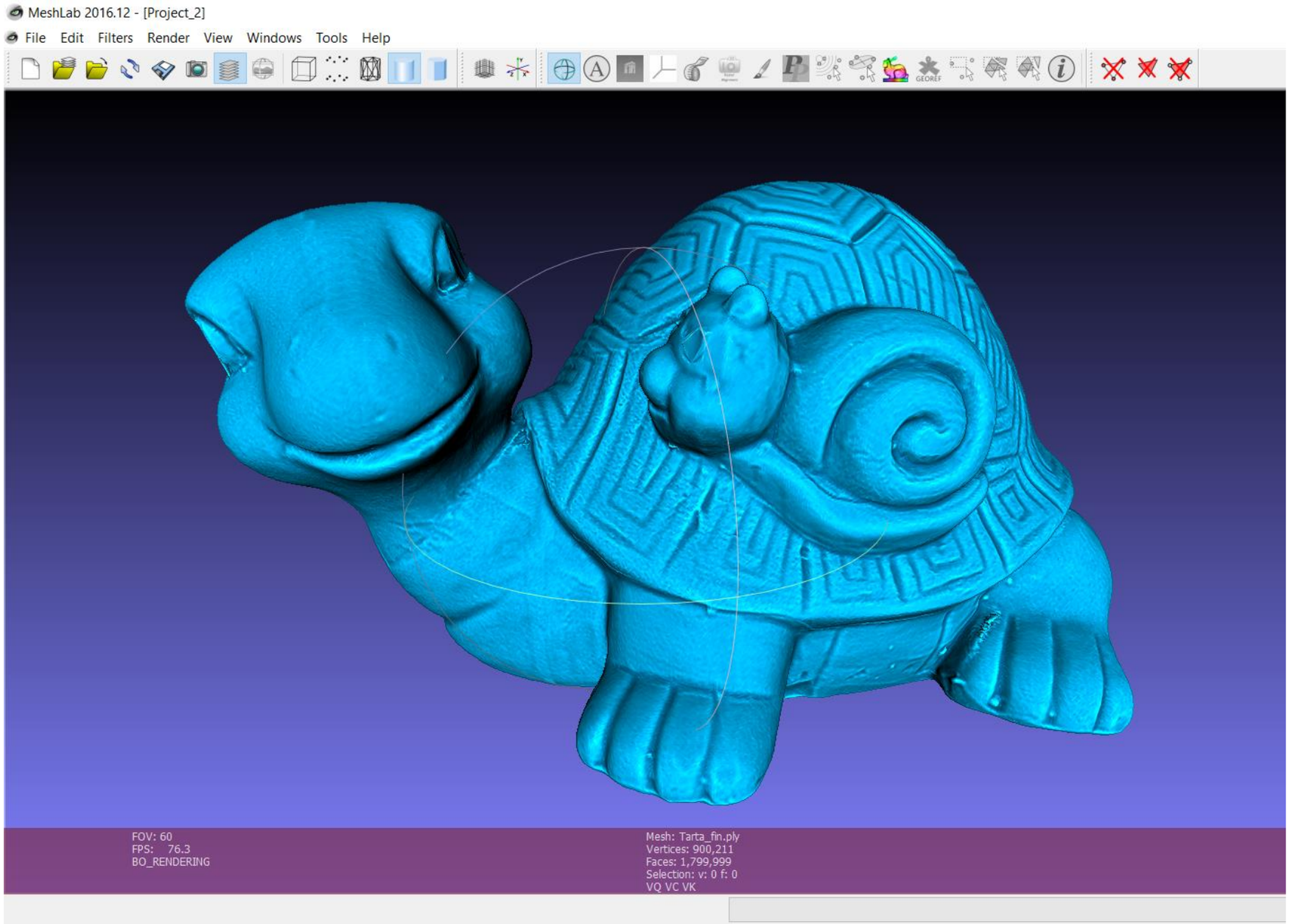
Advanced Shading

- Render → Shader → xray

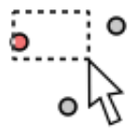


Advanced Shading

- Render → Shader → Radiance Scaling



Selection

- Interactive tool to select
  - Point 
  - Triangles 
  - Connected Component 

- Selection of all the element on the frustum of the selection area
- Keep pressed CTRL to add to the current selection
- Keep pressed SHIFT to remove from the current selection
- Keep pressed ALT to select only visible elements

Selection

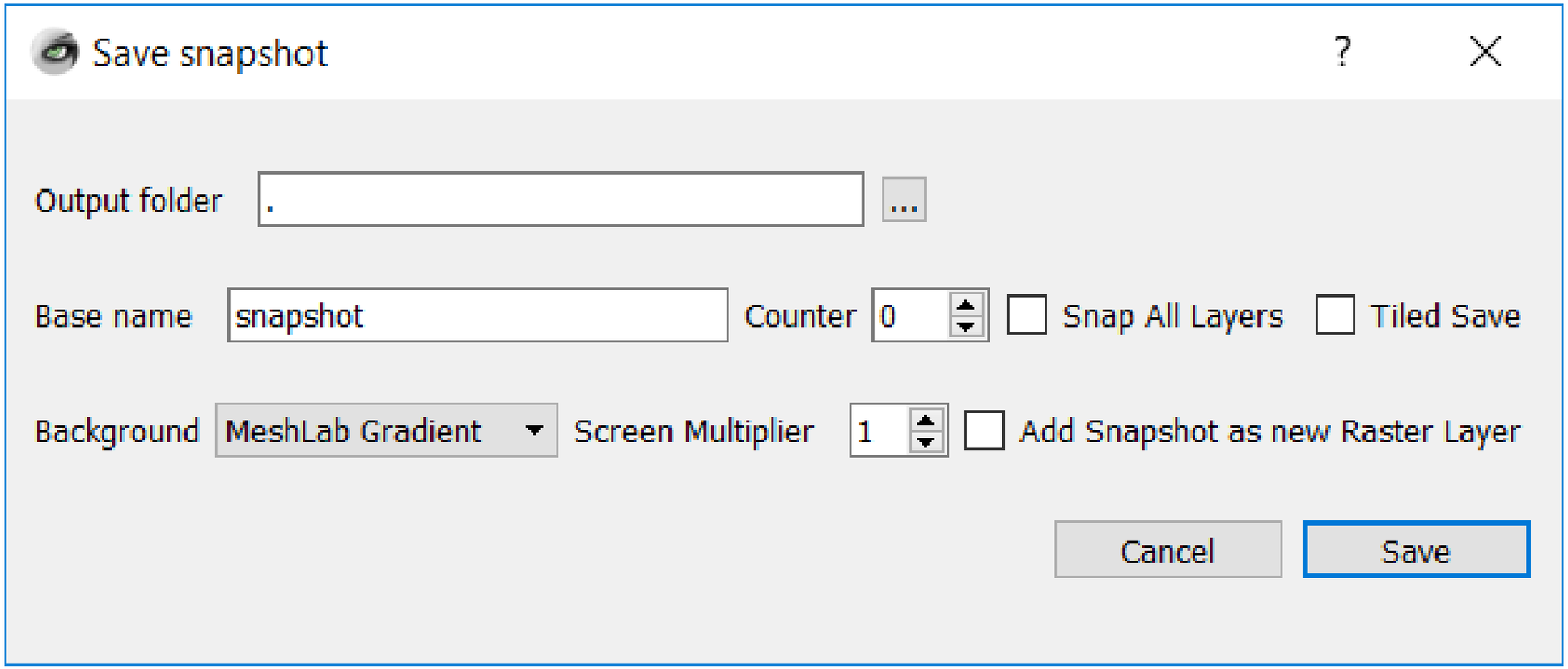
- Automatic filter (Filter->Selection)
  - Dilate
  - Erosion
  - Invert, None, All
  - Border
  - By view angle
  - By quality

Delete Selection

- Delete the current selection
  - Only selected points and the incident faces 
  - Only the selected faces but no the unreferenced vertices 
  - The selected faces and the referenced vertices by the selected faces 

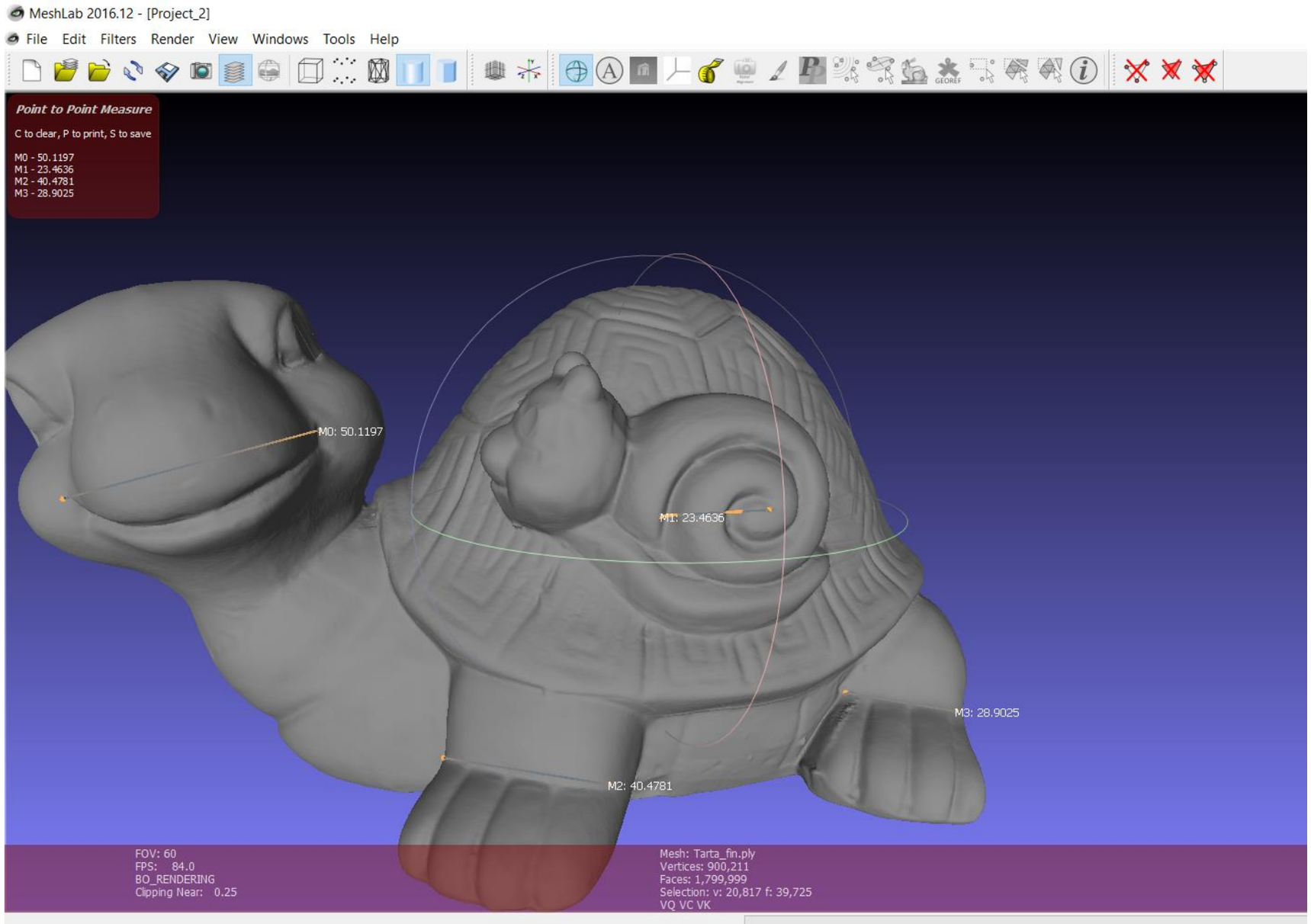
Snapshot

- Save the current rendering as png image
- Save high resolution images using tiling



Measuring Tools

- Take measure on your mesh 

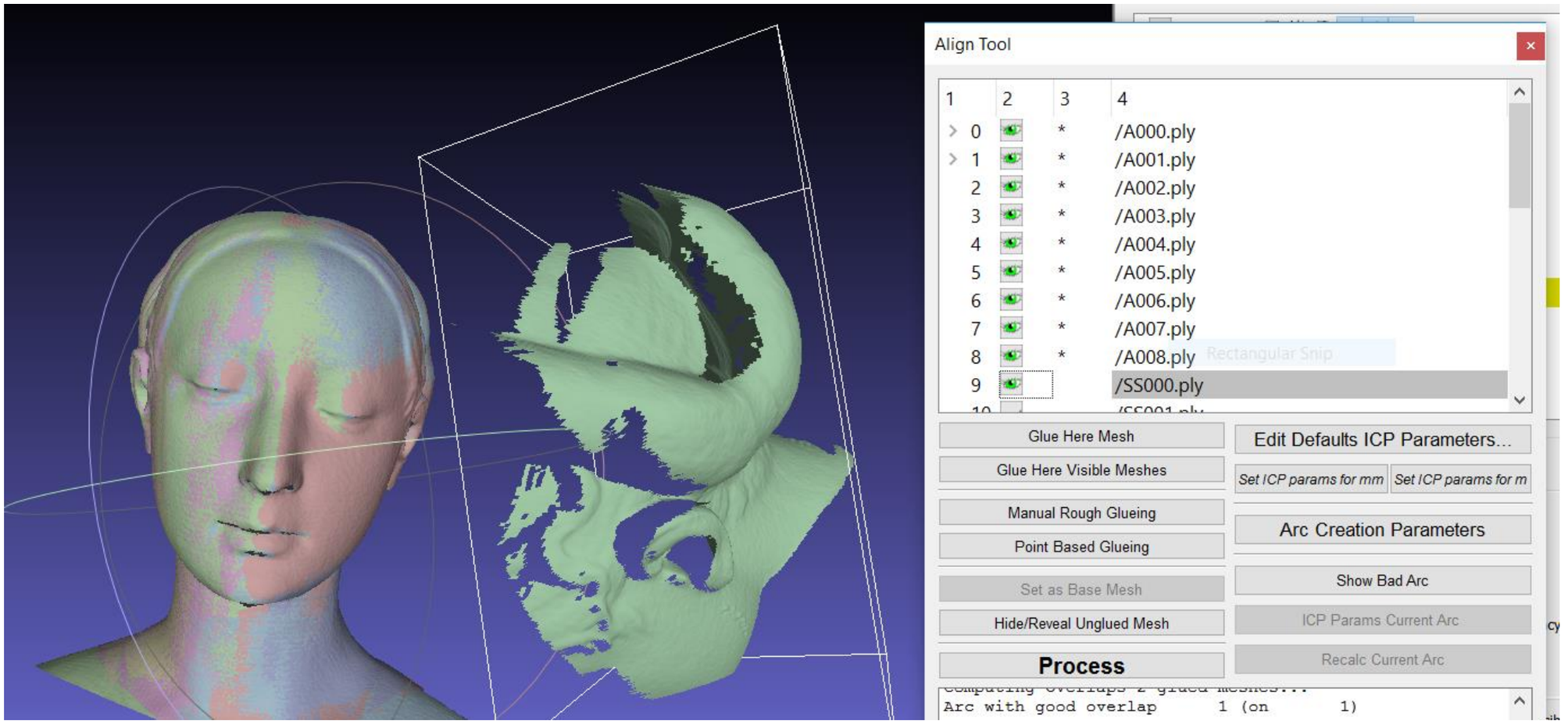


Smoothing

- Filter → Smoothing,Fairing,Deformation →
  - Laplacian smooth
  - Scale dependent laplacian smooth
  - Taubin smooth
  - Laplacian smooth (surface preserve)

Alignment Tools

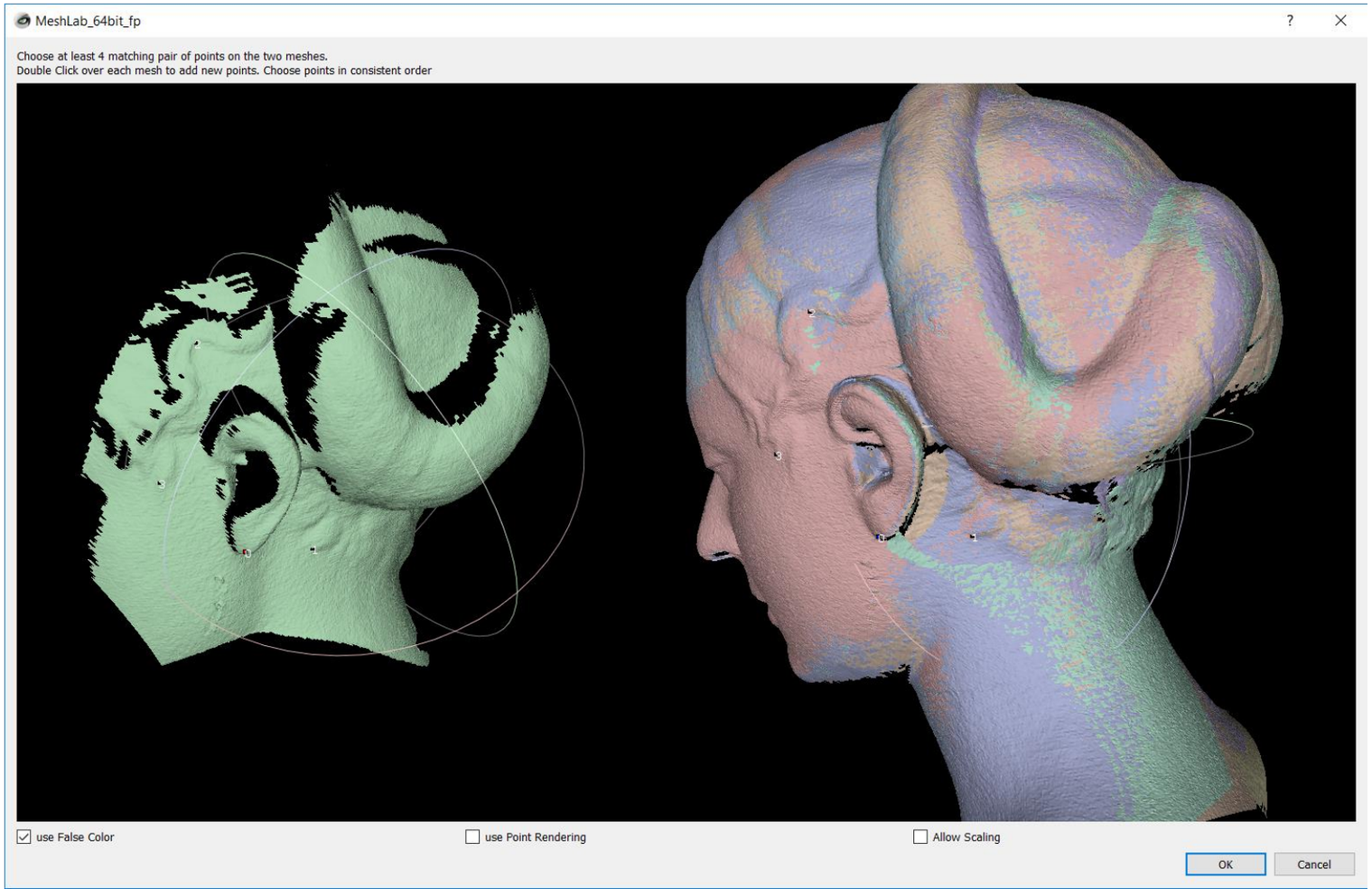
- Glue the first mesh
- For each other mesh, use Point Based Glueing to find the rough alignment
- Launch Process



Alignment Tools

Point based Glueing

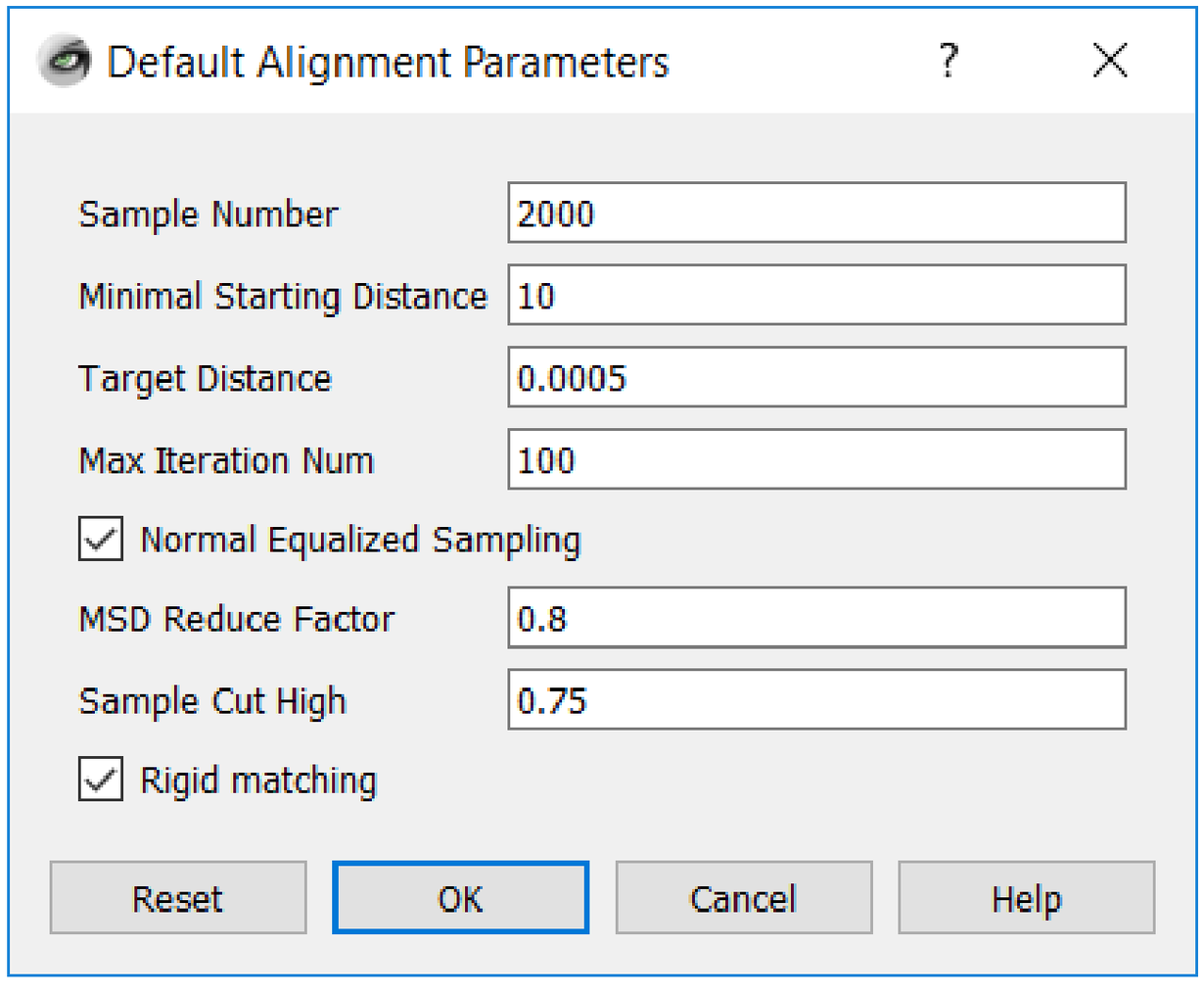
- Select by double click the correspondences, the order is important
- Keep pressed CTRL to remove a point



Alignment Tools

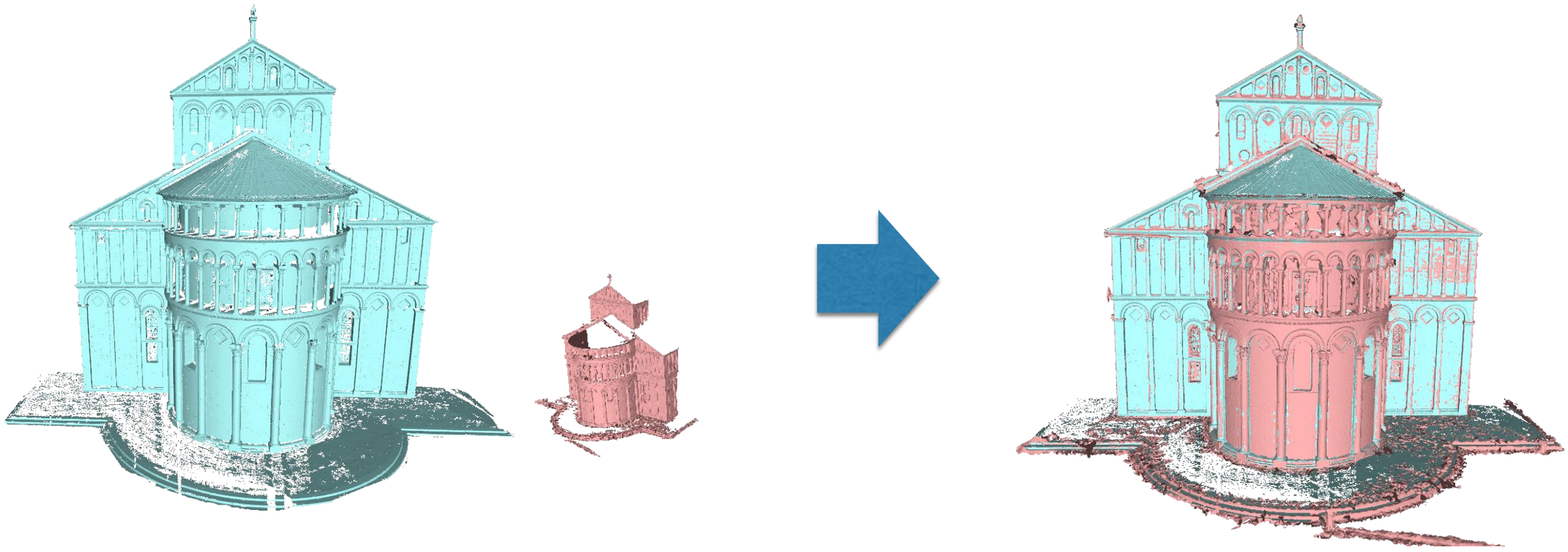
Launch Process

- Adjust the parameters (Edit Default ICP Parameters)



Alignment with scale

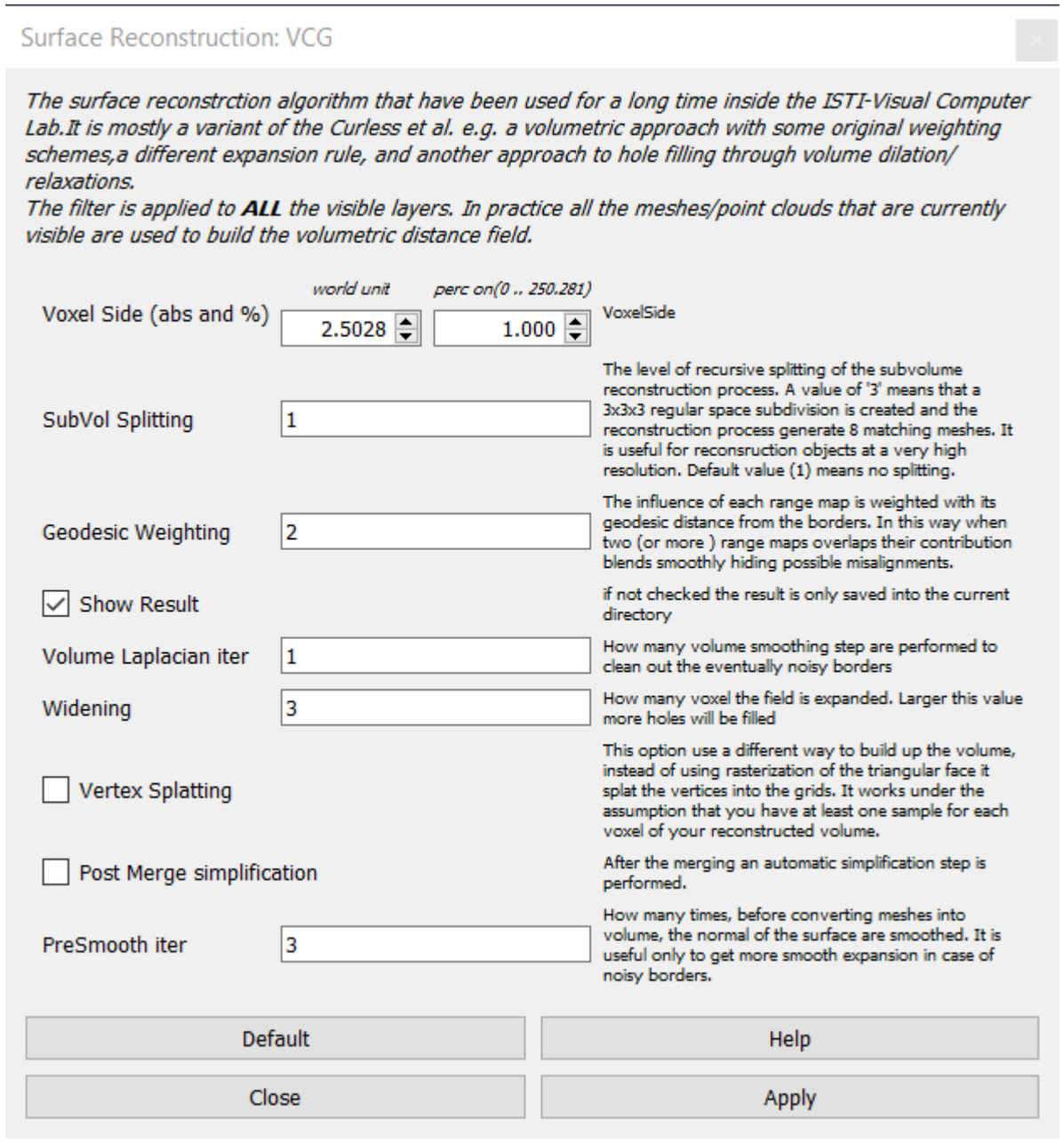
- Measure a common feature between the mesh
- Compute the scale and apply the scale
  Filter → Normal,Curvature, Orientation → Transform:Scale, Normalize (uniform scale)
- Run the alignment procedure with no-rigid-option



3D Reconstruction

- Weighted average of per-scan distance field

Filter → Remeshing,Simplification, Reconstruction → Surface reconstruction:VCG

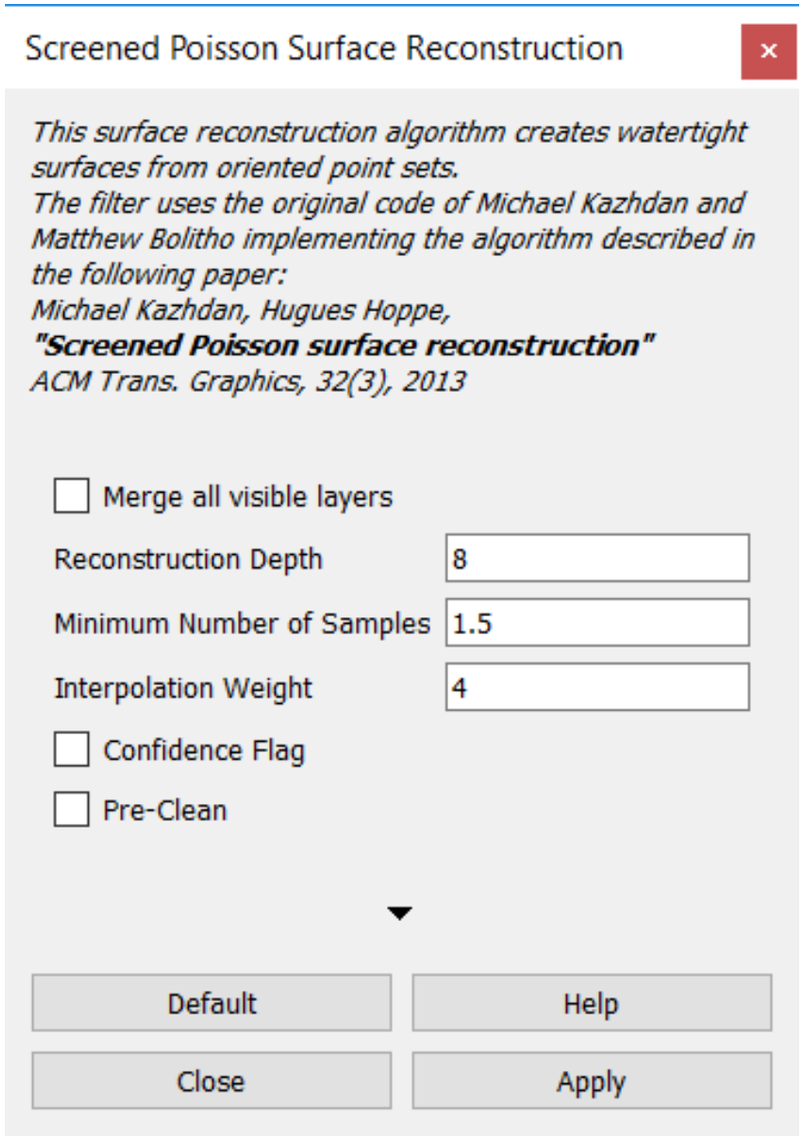


3D Reconstruction

- Screened Poisson Surface Reconstruction
  Filter → Remeshing,Simplification, Reconstruction → Screened Poisson Surface reconstruction

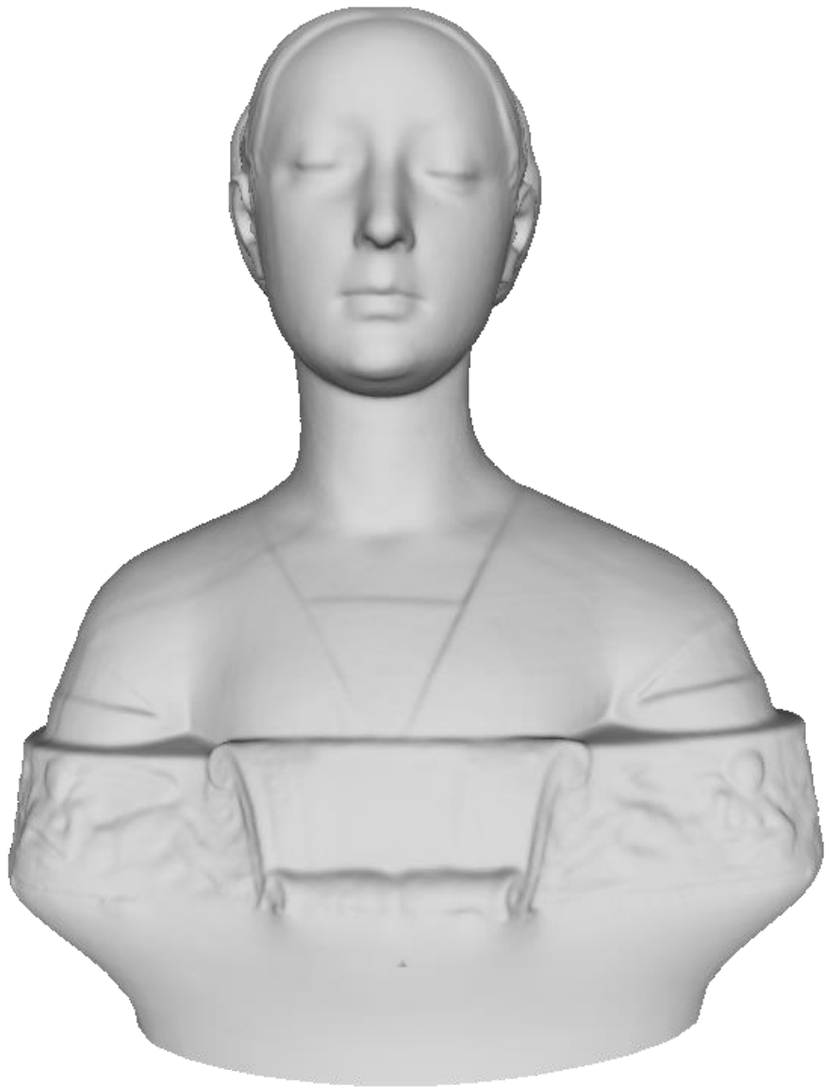
- If “Iterpolation Weight” is zero then Classical Poisson reconstruction

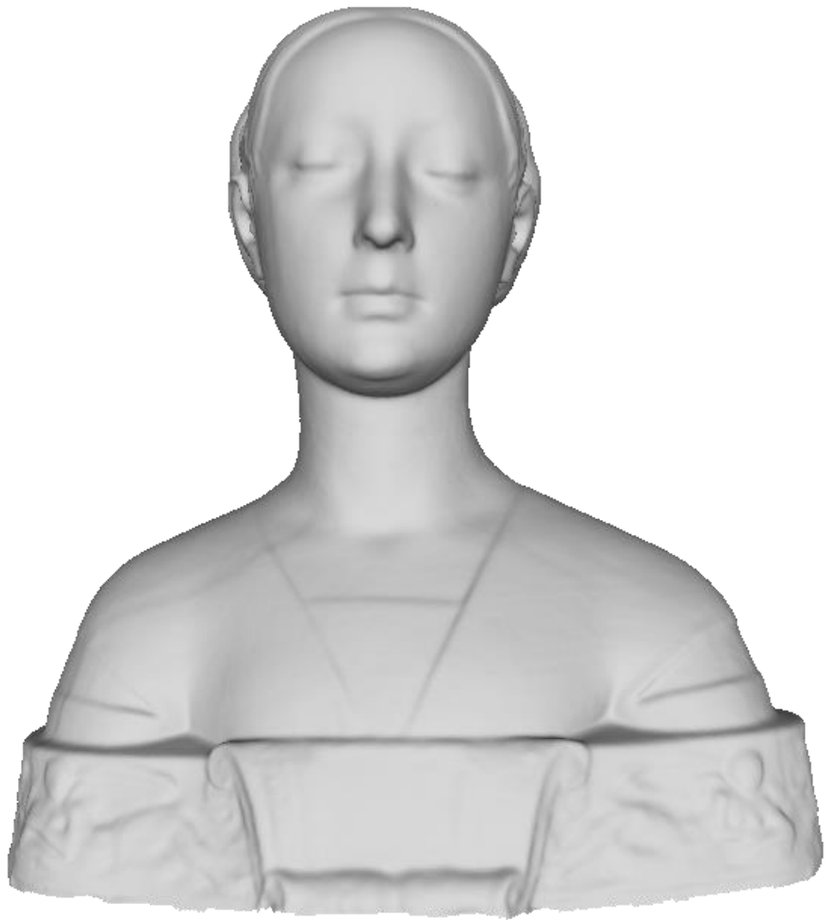
- “Reconstruction Depth”, maximum level of the octree



Cleaning Poisson Reconstruction

- Filter → Selection→ Selection by vertex quality





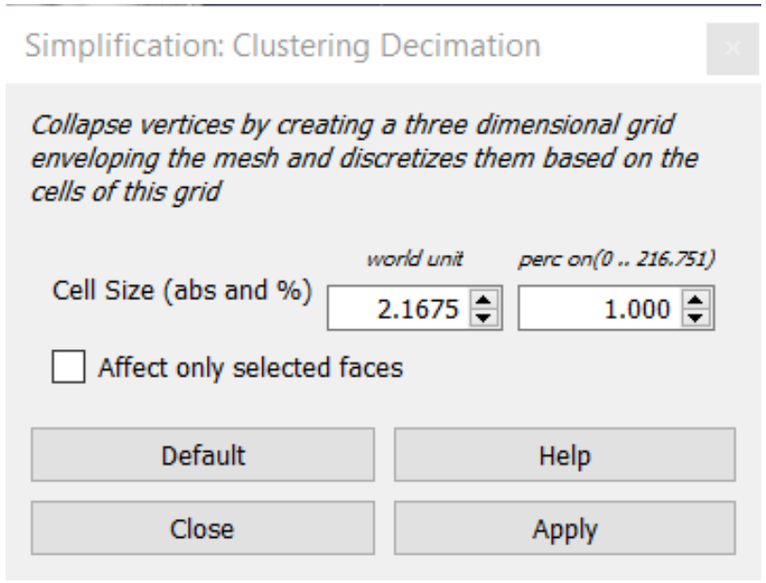
Cleaning and Repairing

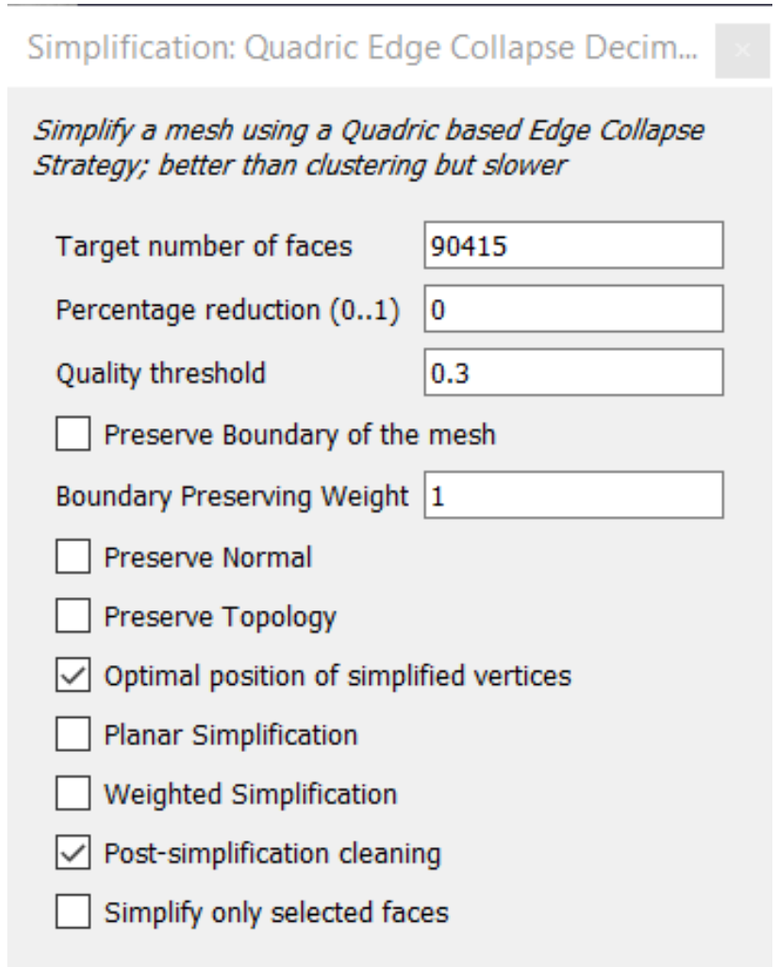
- Filter → Cleaning and Repairing

- Filter → Selection

Simplification

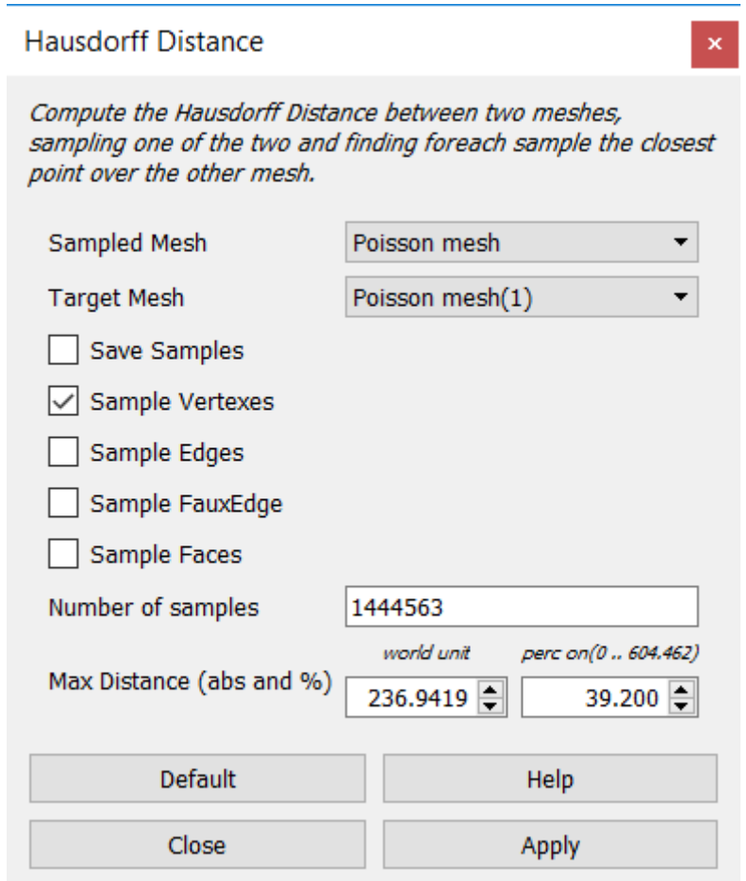
- Filter → Remeshing,Simplification, Reconstruction → Simplification: Clustering Decimation
- Filter → Remeshing,Simplification, Reconstruction → Simplification: Quadric Edge Collapse





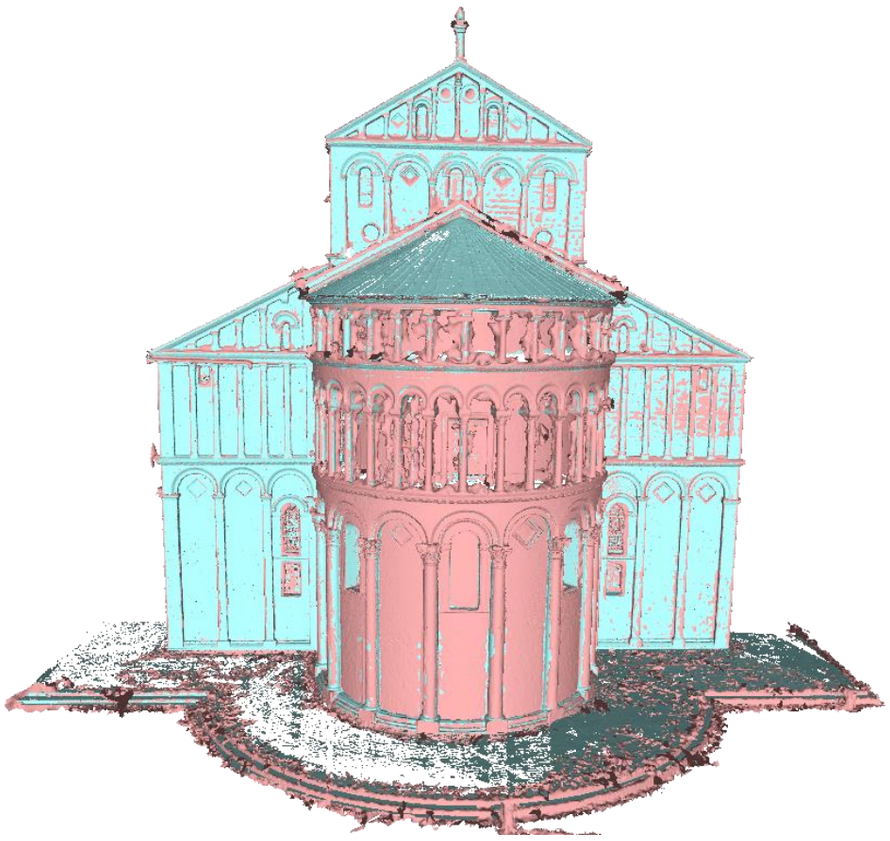
Surface Comparison

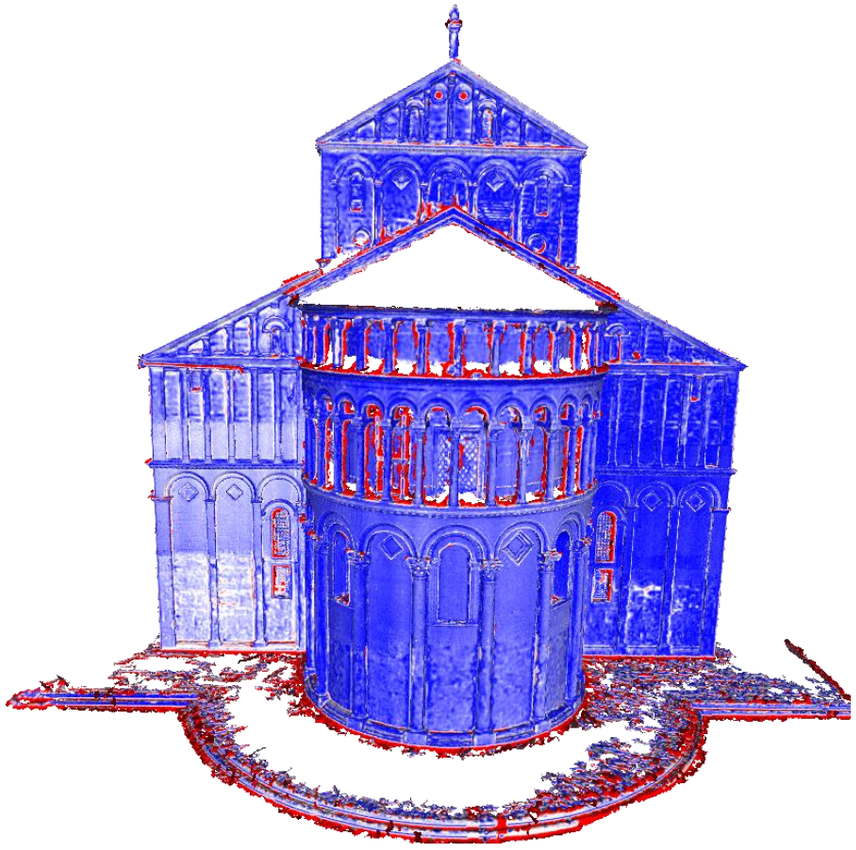
- Hausdorff distance – Measure distance between two meshes
  Filter → Sampling→ Hausdorff Distance



Quality Mapper

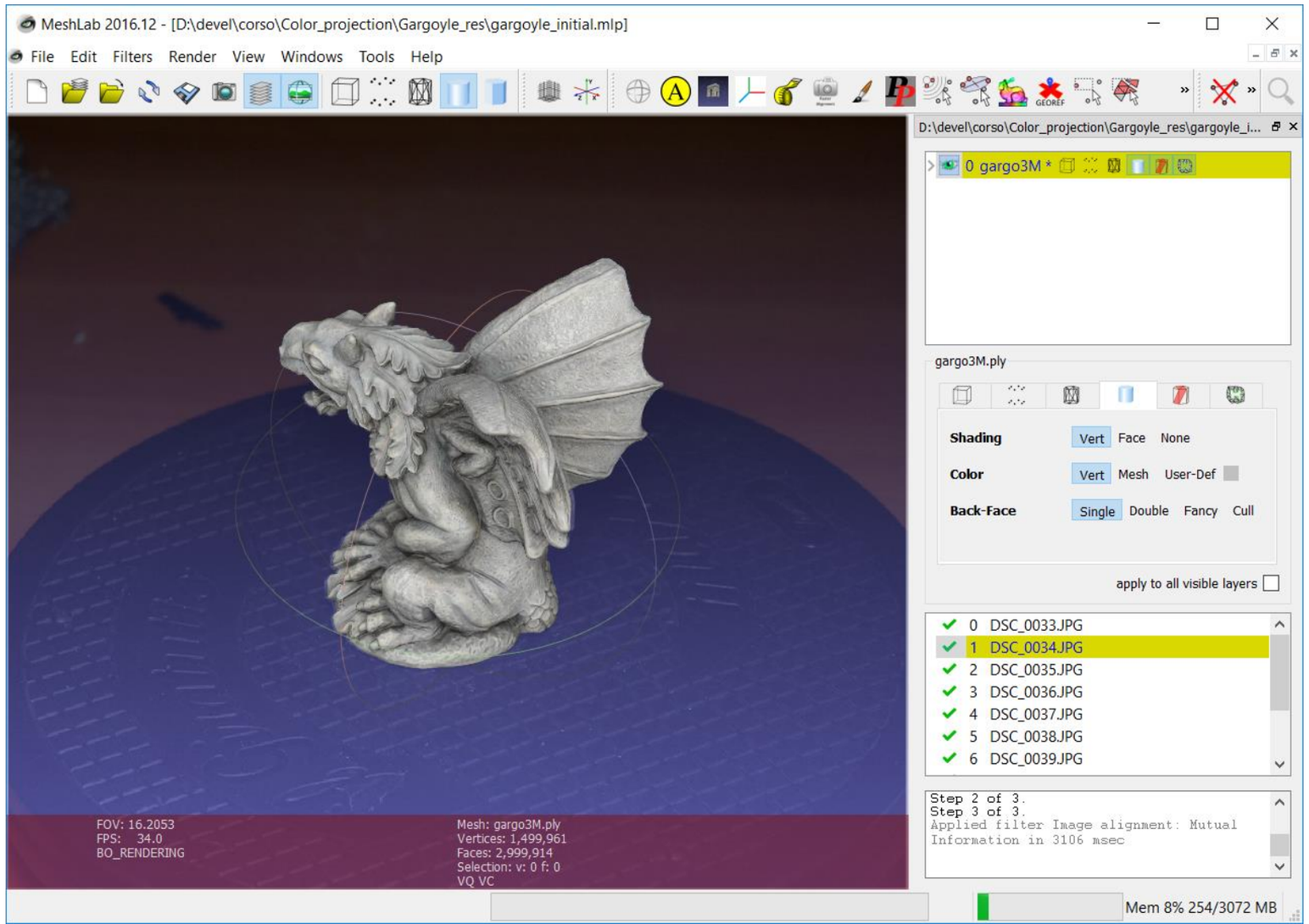
- Colorize the mesh according the quality value





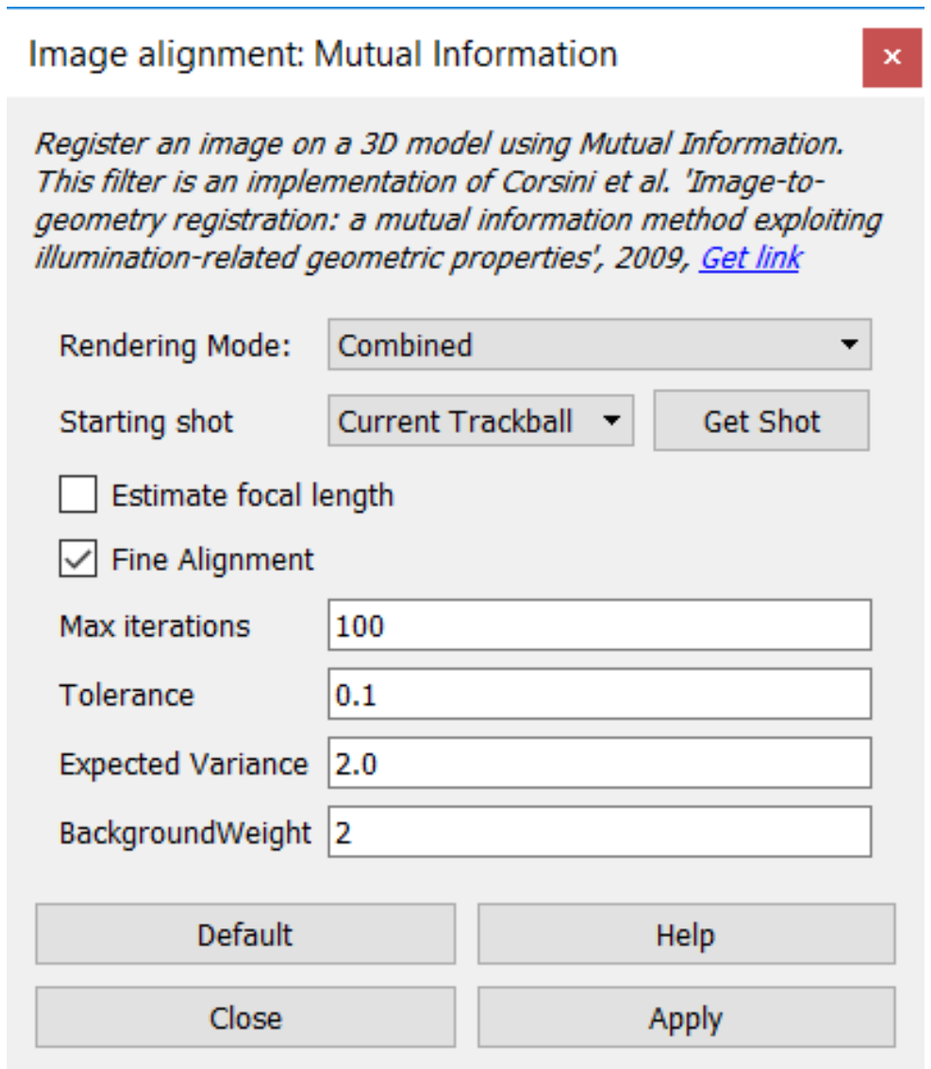
Camera Calibration

- Raster Layers
- View mesh from the point of view of the current raster



Camera Calibration

- Filter → Camera→ Image Alignment: Mutual Information

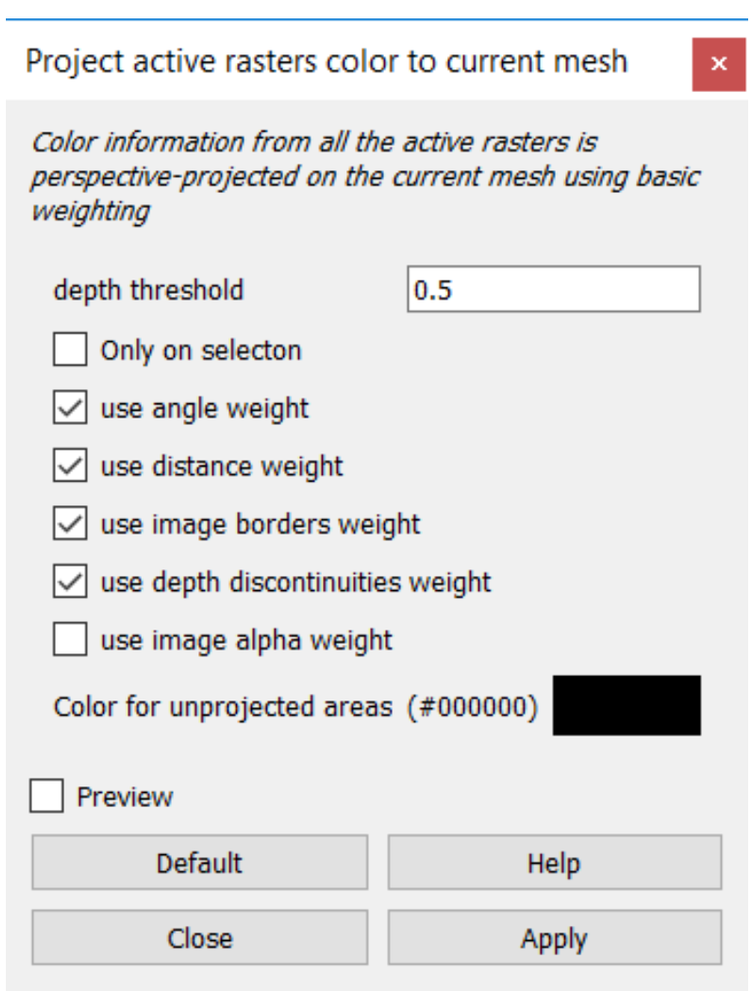


Color Projection

- Render → Raster-to-Geometry projection

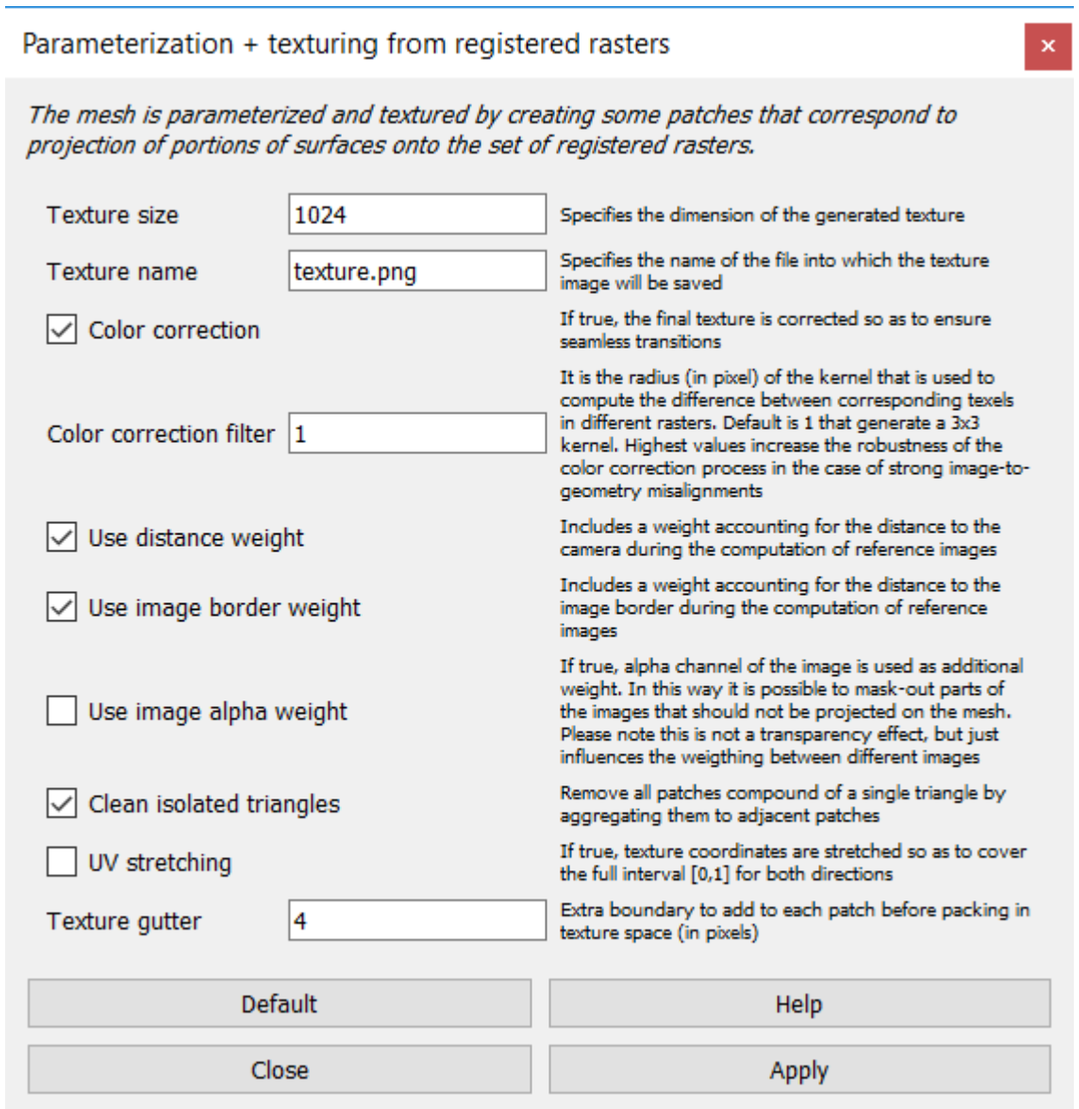
Color Projection

- Per-vertex color
- Filter → Camera → Project active raster color to current mesh



Color Projection

- Texture
- Filter → Texture → Parametrization + texturing from registered rasters



Texture

- Render → Show UV Tex Param