

Secrets of Skulls: 3D Scanning Tips and Tricks

Skull Modelling Tips



Geometric Skull



Human Skull

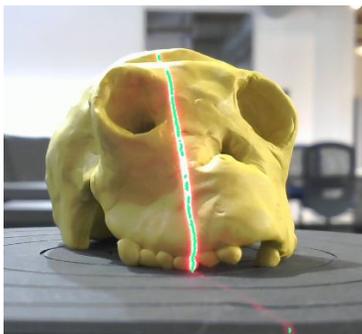


Early Hominid Skull

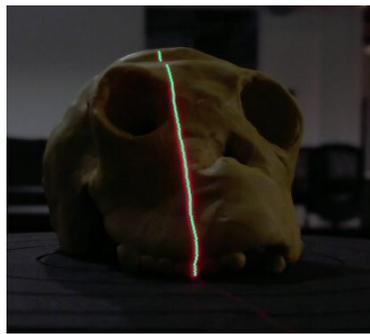
- Try to keep size within 3-4" in all dimensions.
- Use a butter knife to cut shapes.
- Model braincases as solid balls to improve scanability.
- A slightly larger model will be easier for teeth construction.

Scanning Tips

1. Click **New Project** on the MFStudio homepage. Enter a **Filename**, select a **Save to:** location, then click **Continue**.
2. Click **+new scan** in the Scan Setup window.
3. Place your skull upright in the center of the scan bed.
4. Choose the **+Quickscan** tab at the top of the left-side toolbar.
5. Move to Geometry Settings slider to set an exposure for the laser where the green overlay represents a sharp, nearly solid laser line.



Noisy laser line with gaps.



A good laser line.

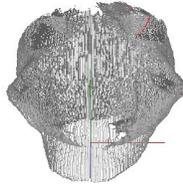


4. Adjust the vertical slider in the Scan Path toolbox to restrict scanning to only one or two passes, if your sculpture is under 3" high.

5. Click **Scan**.

The Scan Progress window will open and display the 3D points as they are captured.

Click the **X** by the progress bar if you want to stop the scan and load it into the Project Editor as-is.



To SPIN: Click and drag anywhere in the view window.

To ZOOM: Use the mouse wheel, or scroll, to zoom in and out.

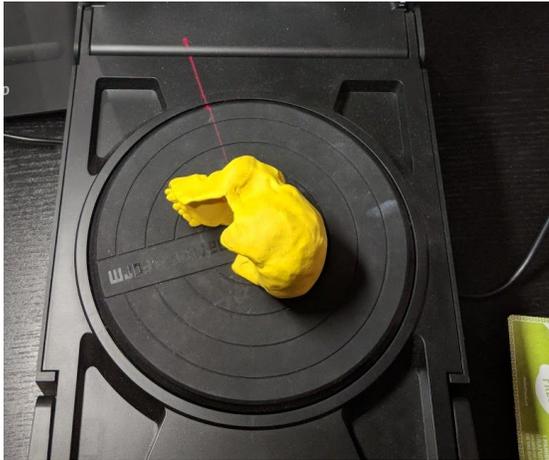
To PAN: Right click and drag.

To RESET VIEW: After clicking the view window, press the "c" on your keyboard.

When the first scan is complete, it will load in the Project Editor window as layer 'Scan_1' in the Point Cloud Control toolbox.

7. Click the **+ New Scan** button to capture your second scan.

8. This time, place your skull on it's side for scanning:



9. Click **Scan**.

When the second scan is complete, it will load in the Project Editor as layer 'Scan_2' in the Point Cloud Control toolbox.

Cleaning, Meshing and Saving Scans

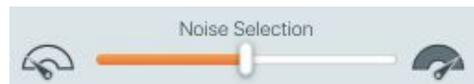
In the Point Cloud Control toolbox you can:

-  Click to turn on/off visibility. Scans must be visible to clean, align, or mesh them.
-  Click to delete a scan from the project.
-  Click to turn on/off alignment. Scans will align to the first scan selected.

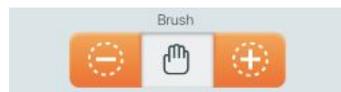
Clean both scans

There are often extra or 'noisy' points captured during scanning that need to be removed, or 'cleaned', before meshing. Clean noise points from each scan layer separately by turning off the visibility of the other scan.

Select and points for cleaning by highlighting them red using the three cleaning tools in the Project Editor. Click **Clean** to delete the highlighted points, or **Deselect** to keep them. **Undo**, in the Edit menu, restores points that have been cleaned.



The **Noise Selection** tool automatically highlights points for cleaning. Move the slider to choose how aggressive the selection will be.



The **Brush** tool manually selects (+) or deselects (-) points. Control the brush size using the square bracket tools] and [. The hand button returns regular mouse functionality.



The **Crop** tool removes all points outside an area you specify. Use the sliders to choose points from the top down, the bottom up, or moving towards the center.

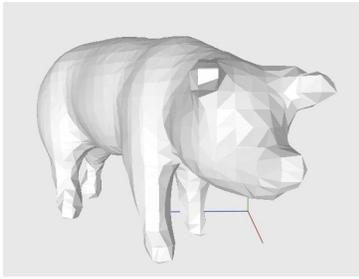
Aligning Scans

Once you've cleaned your point clouds, click **A** on a the point cloud in your final desired orientation for the object. This scan will be used as the reference for the next scan's alignment. Clicking **A** on subsequent scans will use all previously aligned scans as their reference.

Alignment may take a few seconds depending on the size and complexity of the point clouds.

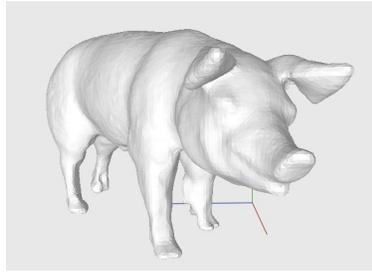
Meshing

On the Mesh tab, move the Mesh Options slider and click **Mesh** to find the best level of mesh detail for your object (it can vary): further to the right meshes with lots of detail, to the left with lower detail. Click **Mesh**.



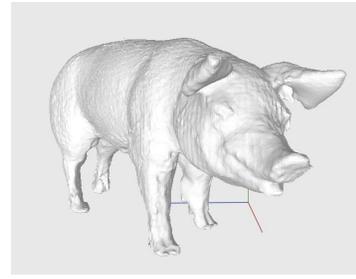
Detail level 6

Low detail results in fewer, larger polygons.



Detail level 8

Surface is smooth and detail is accurate.



Detail level 9

High detail yields dense polygons that may appear rough.

Saving Your Project

To save the project file, select **Save** from the File menu. Files are saved with the **.mfproj** file extension. **.mfproj** files can only be opened with MFStudio. The **.mfproj** file format is proprietary to Matter and Form and is the quickest and easiest file format for the software to use.

Exporting for 3D Printing

To export your project in an OBJ or STL file format for 3D printing, select **Export** from the File menu when you are on the Mesh tab of the Project Editor.

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