3D Scanning at University City Public Library

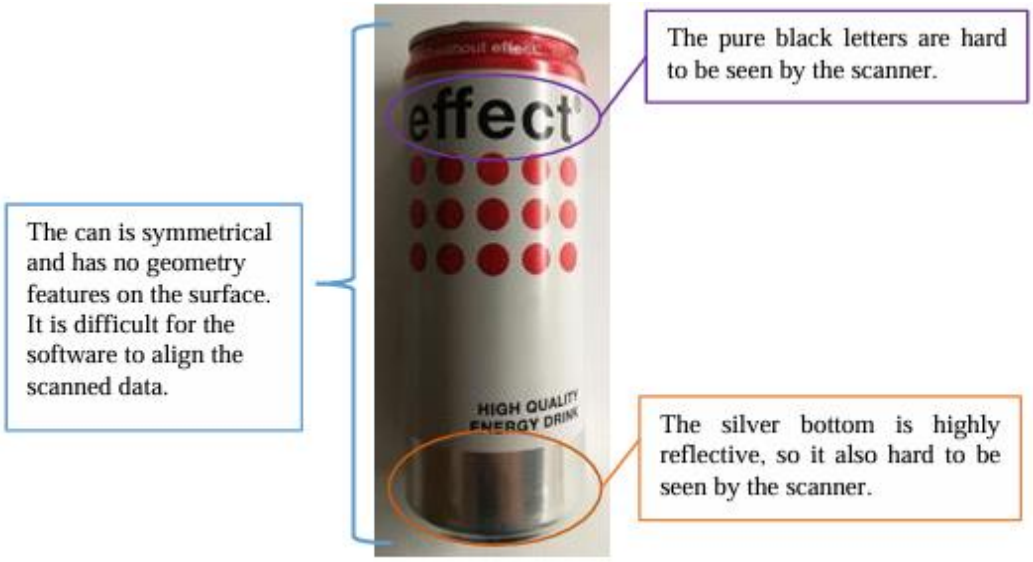
The intention of all 3D scanners is to generate a virtual model (texture and/or mesh) of a physical object within the scanning requirements. Once a model has been generated, a 3D editing software, such as Blender or TinkerCad, is used to finalize the model for use in other applications or printing. The 3D scanner at University City Public Library is the desktop "Einscan-SP V2" by Shining 3D.

Notes and Preparation before Scanning

Minimum turntable scanning size is 30x30x30 mm (or 1.2 x 1.2 x 1.2 inches)
Maximum turntable scanning size is 200x200x200 mm (or 7.8 x 7.8 x 7.8 inches)

Objects that contain the following characteristics are not recommended (see example below):

- Moving or vibrating objects
- Soft material (fuzzy) objects
- Lattice structures with many small deep holes



Example of object that is difficult to scan

For objects that are difficult to scan, use stick markers or pieces of clay on the surface of scanned objects to create extra "features". When using stick markers, follow these guidelines:

- Apply at least 4 markers in each frame (one scanning field of view in the camera).
- Markers should be stuck on the flat surface area and keep the marker surface flat.
- Stick markers in a random, non-linear pattern (see example below).

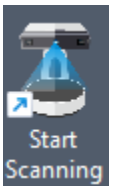
Object with markers

For transparent, highly reflective and black objects, spray white powder on the surface.

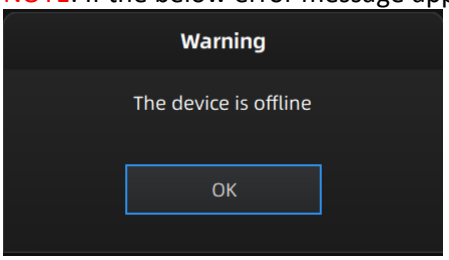
Using the scanner

If not already powered on, press the **Power** button located on the back-right side of the scanner.

Double-click the "Start Scanning" icon on the desktop (icon shown below)



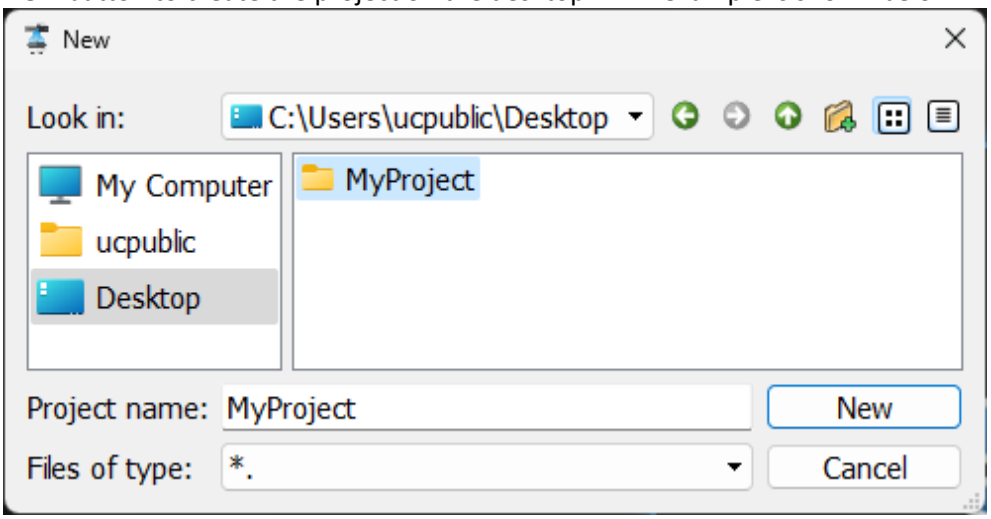
NOTE: If the below error message appears,



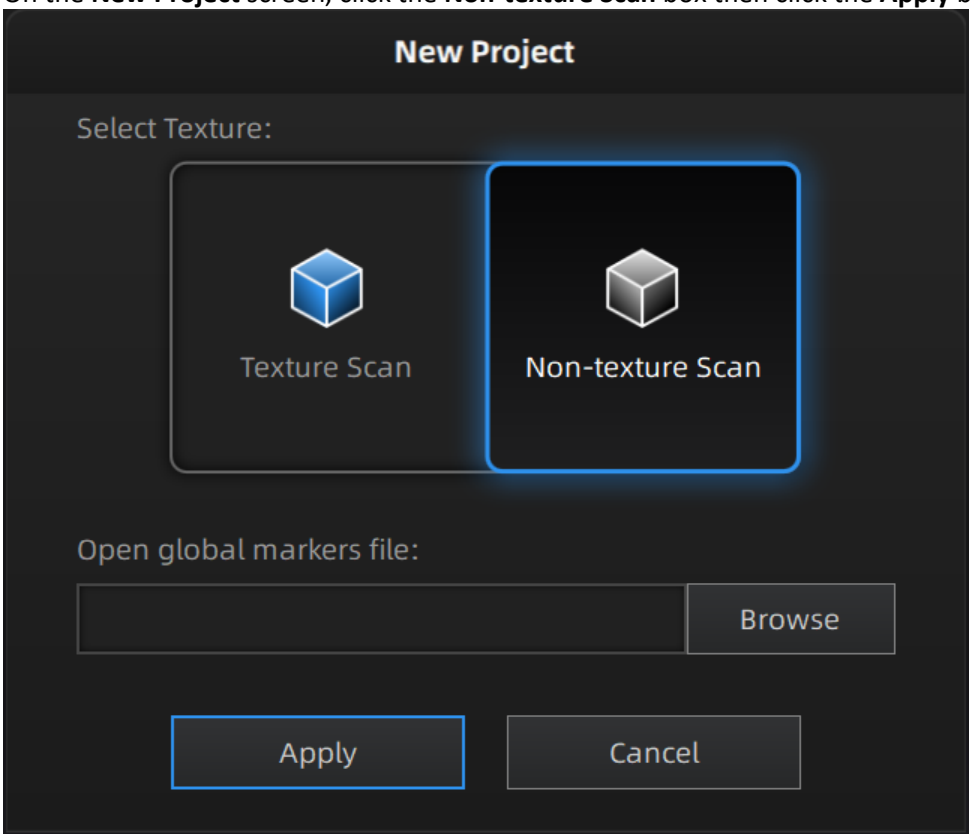
close the software by clicking the **X** in the upper-right corner of the screen. Verify the scanner has been turned on and try starting the software once again.

Once the software loads, click on the **New Work** box.

Once the "New" window appears, click **Desktop**, and enter a desired name in the “Project name:” field. Last, click the **New** button to create the project on the desktop. An example is shown below:

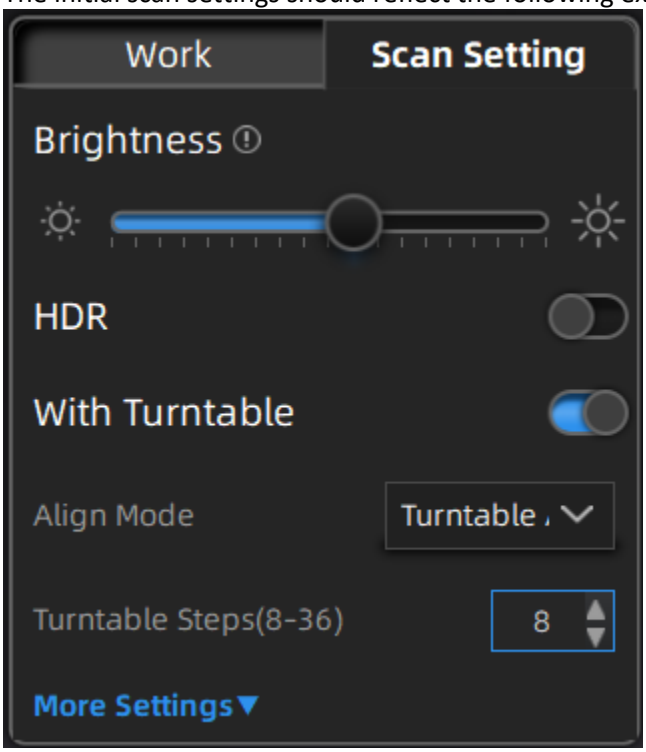


On the **New Project** screen, click the **Non-texture Scan** box then click the **Apply** button.



The scanner's camera will illuminate and the model should appear in the camera window at the top-left of the screen. Ensure the object is centered in the camera.

The initial scan settings should reflect the following example:



There are a couple of items to note on this screen. The brightness scale can be adjusted for room lighting and object texture. To scan an object with a high contrasting texture, such as something white and black, use HDR instead. If the object displays a large amount of red in the camera view, adjust the brightness scale accordingly so that a minimum amount of red is visible.

The "**With Turntable**" option should always be enabled and "**Align Mode**" should already be set to "Turntable Aligned". Turntable Steps(8-36) should be at the default setting of "8".
Note: Using more turntable steps will help scan more complete data in some angles, but NOT more accurate.

Click the "**Play**" **triangle** button () in the upper-right to begin scanning.

Once scanning has finished, click the "**Apply Edit**" **checkmark** button on right side ()

Perform a second scan by repeating the two previous steps.

Click "**Global Optimization**" **square** button ()

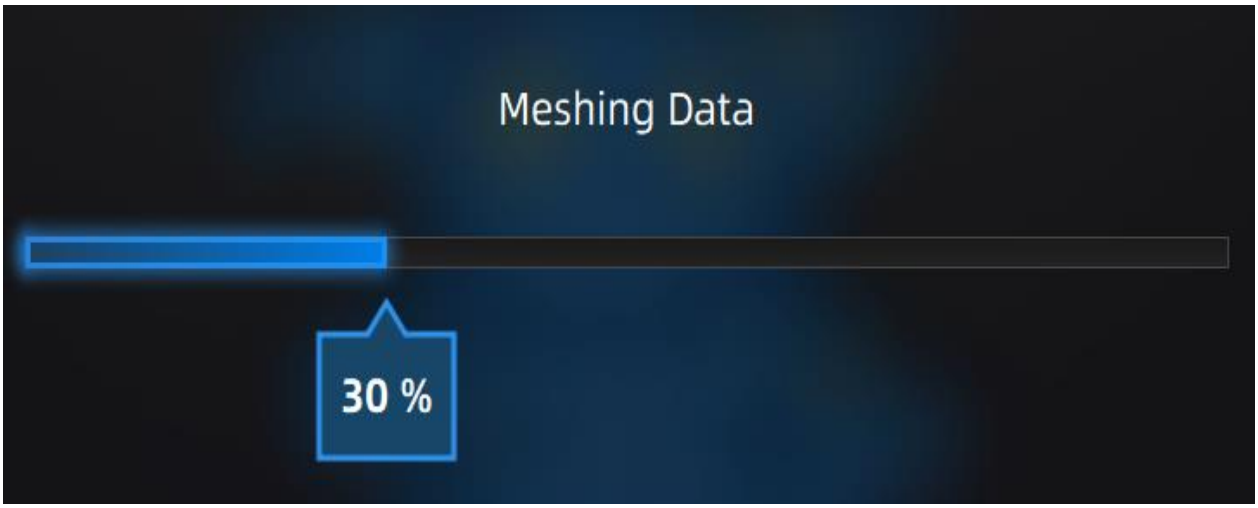
Click "**Confirm**" **checkmark** button ()

Click "**Mesh Model**" **triangle** button () at the lower-right of the screen.

Click "**Watertight Model**" box

Click the desired detail level, either ***High Detail***, ***Medium Detail***, or ***Low Detail***.

The software will begin "Meshing Data" (as shown below). Depending on complexity, *this may take a few minutes.*



Once completed, the model will be presented onscreen. There are a couple of post-meshing operations that can be performed, such as sharpening, smoothing, and simplifying the model (to reduce file size).

Once satisfied, click the "**Save Your Scan**" **save** button () and then click **Apply** button.

By default, the model file will be saved in STL format and placed on the Desktop. The 3D model can be manipulated using any 3D editing software, such as Blender (installed on this computer) or TinkerCad (an online editor, not accessible from this computer). NOTE: Tinkercad limits upload file sizes to 25 MB and meshes to 300,000 triangles. If the model exceeds these values, the model will require simplification.

If desiring to 3D print the model, it must be converted into the MakerBot file format using the MakerBot Print software (installed on this computer).

IMPORTANT: Copy your model file to your USB drive **before** shutting down or rebooting the PC. After each reboot, the computer will automatically clear and revert back to its prior state. Any uncopied files will be lost!

A copy of these instructions is located on the Desktop, along with detailed scanner documentation as provided by Shining 3D.