Learning Guide
Edit a Photogrammetry Model's Geometry Using Blender

Introduction

Blender is an open source 3D creation suite that allows users to complete a variety of functions, including creating and editing 3D models. For the purpose of this Guide, you can use Blender to remove extraneous background captured on photogrammetry models created with Polycam. Blender allows you to remove extraneous background of any shape through the removal of vertices, which can result in a cleaner, more photorealistic model.

If you wish to remove extraneous areas from a 3D model using Blender, you can do so by importing the model into Blender and making your adjustments, and then importing it into another 3D creation tool to create a 3D experience. To learn more about Blender, access Blender's Reference Manual at https://docs.blender.org/manual/en/3.4/

A video Learning Guide for this lesson is available here: https://youtu.be/A6howgPgqc8

Prior Knowledge Check

In order to successfully complete this lesson, you should already have Blender installed on your computer and have created a photogrammetry model with a Polycam. If you need assistance with creating a photogrammetry model, you can follow the "Create a 3D Model Using Polycam" lesson on CreateAccess.org's Microcourses Hub.

Step 1: Import your model into Blender

Preview

To edit your photogrammetry model's geometry in Blender, you will need to import it into Blender.

Explore

Follow these steps to import your model into Blender.

EXPORT YOUR MODEL FROM POLYCAM

Launch Polycam on your mobile device.

Click on the desired model in Polycam (if you are on the Captures screen, first click the "X" in the top right corner to access your captures library).

Click the down arrow in the upper right corner of the screen. The list of available export file types should appear.

Use the Mesh GLTF export option. Click "GLTF."
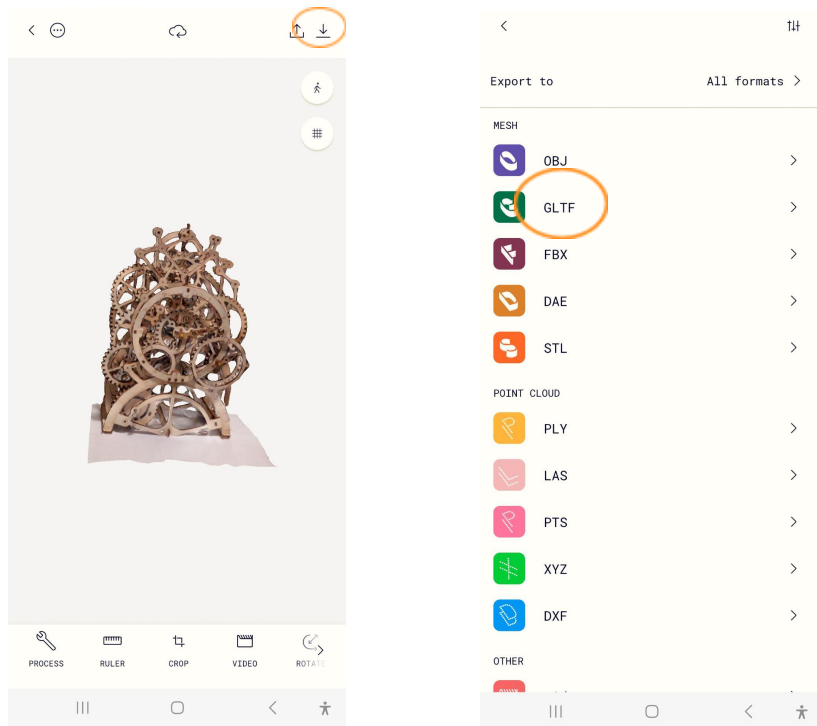
There are many ways to share the file. Try emailing the file to yourself first through your phone's file sharing feature. Then, access your email on your computer, and download and save the file to a known location. You will need to remember this location to import it into Blender. Coming from Android, the file will likely be a .zip file. Coming from iPhone, the file will likely be a .glb.

On your computer, navigate to the location of the file. If your file is a .zip, extract the zipped files into a known location (usually done by double clicking on the .zip file and clicking "Extract All"). Choose the destination for the extracted files. You will need to remember this location to import the model into Blender. This step is not necessary if the file is already in .glb format.
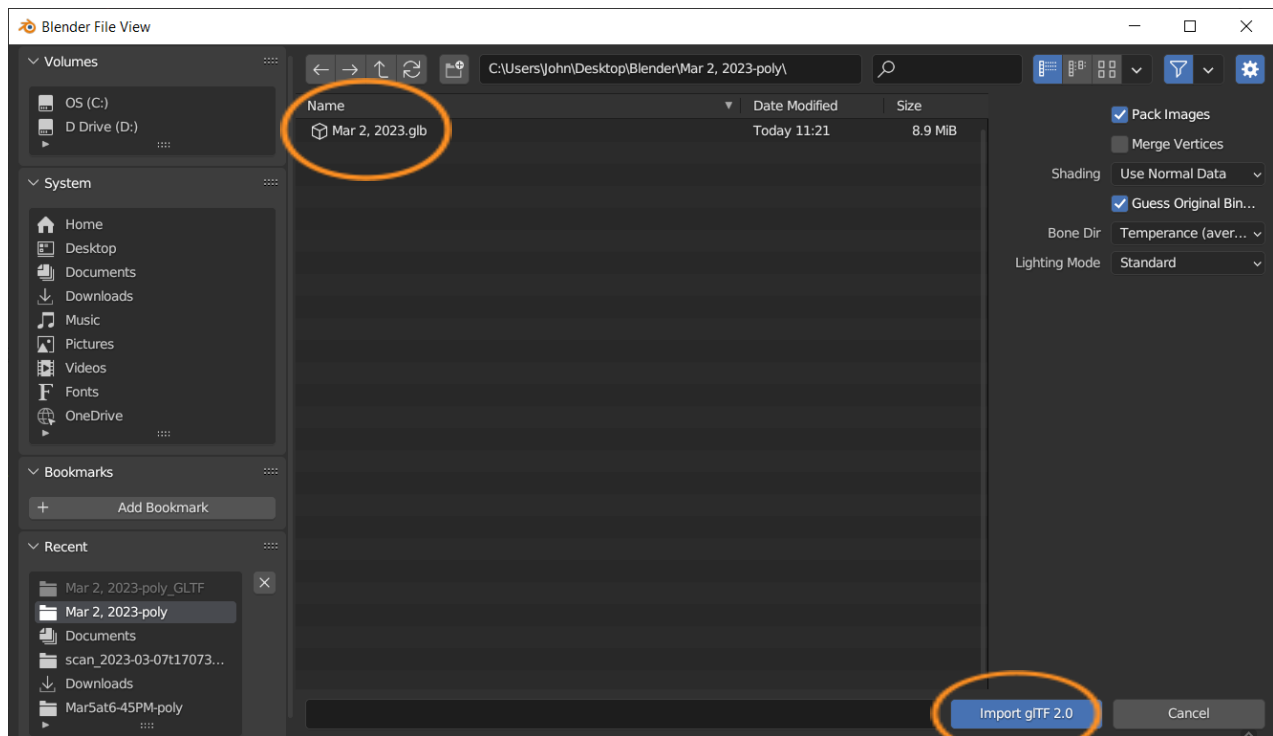
IMPORT YOUR MODEL INTO BLENDER

Launch Blender.

In Blender, Click File → Import → glTF 2.0 (.glb/.gltf).
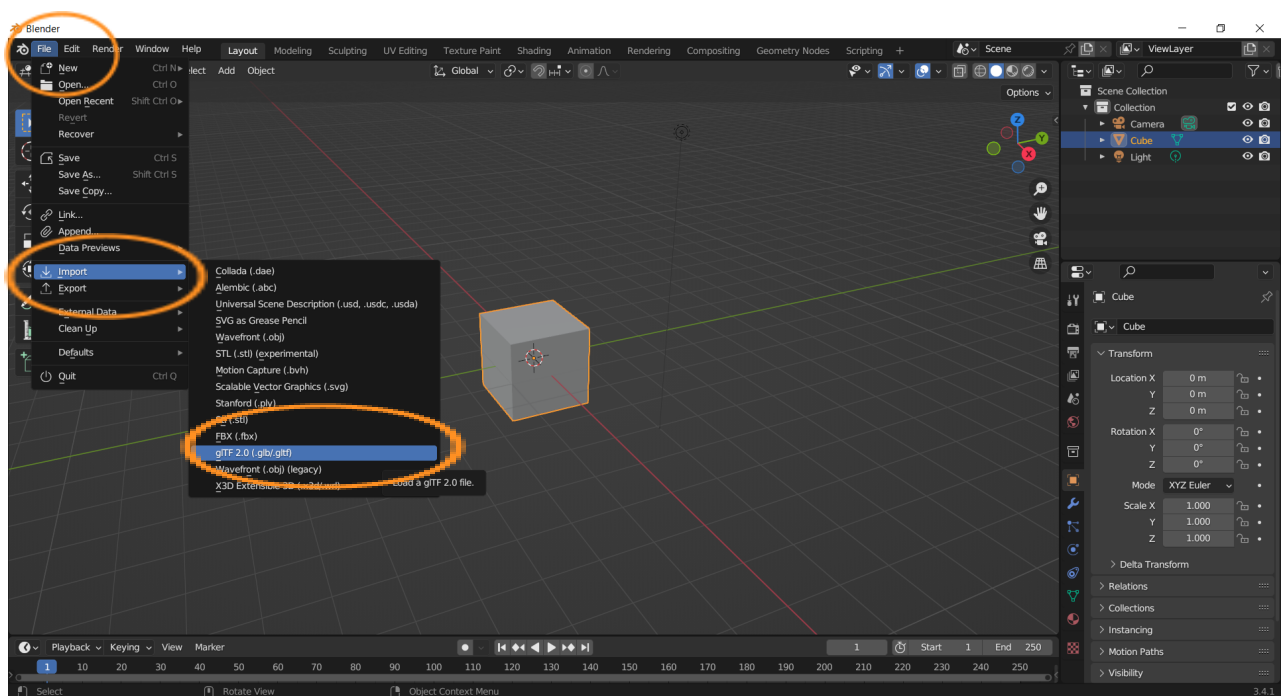
When you click on glTF, a dialog box will open that will allow you to browse to the location on your computer where the .glb file is located. Select the .glb file, then click Import glTF 2.0.

Self Check

Were you able to export your model from Polycam and save it to your computer?

Were you able to import your model into Blender?

Step 2: Prepare your model for editing

Preview

There are a few steps you can take to make it easier to edit your photogrammetry model, including changing its relative size (scale) and rotating it. This section provides tips for preparing your model for an easier editing process.

Explore

MAKE YOUR MODEL EASIER TO SEE

When you first import your model into Blender, it will likely appear very small and will be inside a cube by default. You can delete the cube by clicking anywhere on the cube with your mouse, then right-clicking and selecting "Delete" from the dropdown menu. You should see a small rendering of your model and no cube.
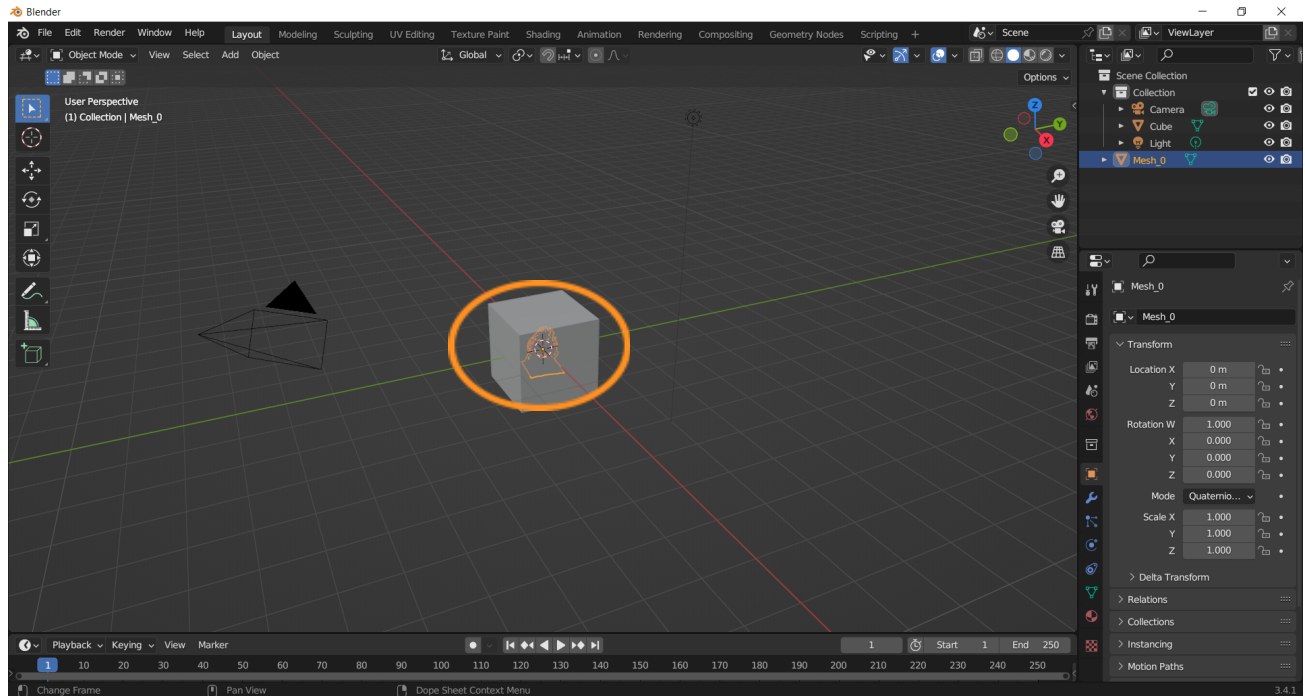
Click on your model and look to the right side of the screen. You will see three Scale boxes: X, Y, and Z. They will all probably be set at 1.0. If you wish to get a better view of your model, you can change all three scale values to something larger, making all three the same number to preserve the model's proportions. The value chosen may require experimentation to get the best results. Start with 10.0, and adjust as needed. You can also get a closer view of your model by using the scroll wheel on your mouse to zoom in and out.
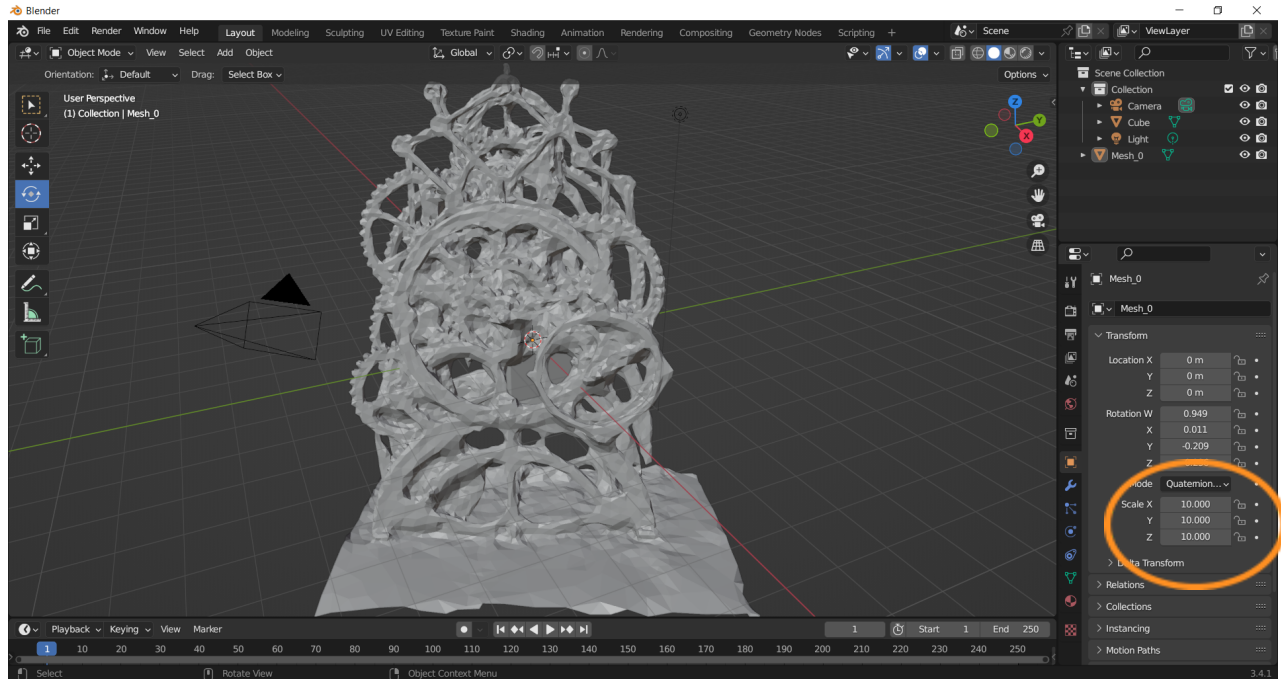
ROTATE YOUR MODEL

In order to remove extraneous geometry on different sides of your model, you will most likely need to rotate it during the editing process. Click on your model so it is outlined in orange. Access the Rotate tool on the vertical toolbar on the left side of the screen. Hover over your model with your mouse, and left click and drag to rotate the model so that one of the sections to be removed is "head on" and preferably oriented parallel to one of the viewport edges. You may need to experiment with the rotation tool a bit before you get your model positioned where you want it.
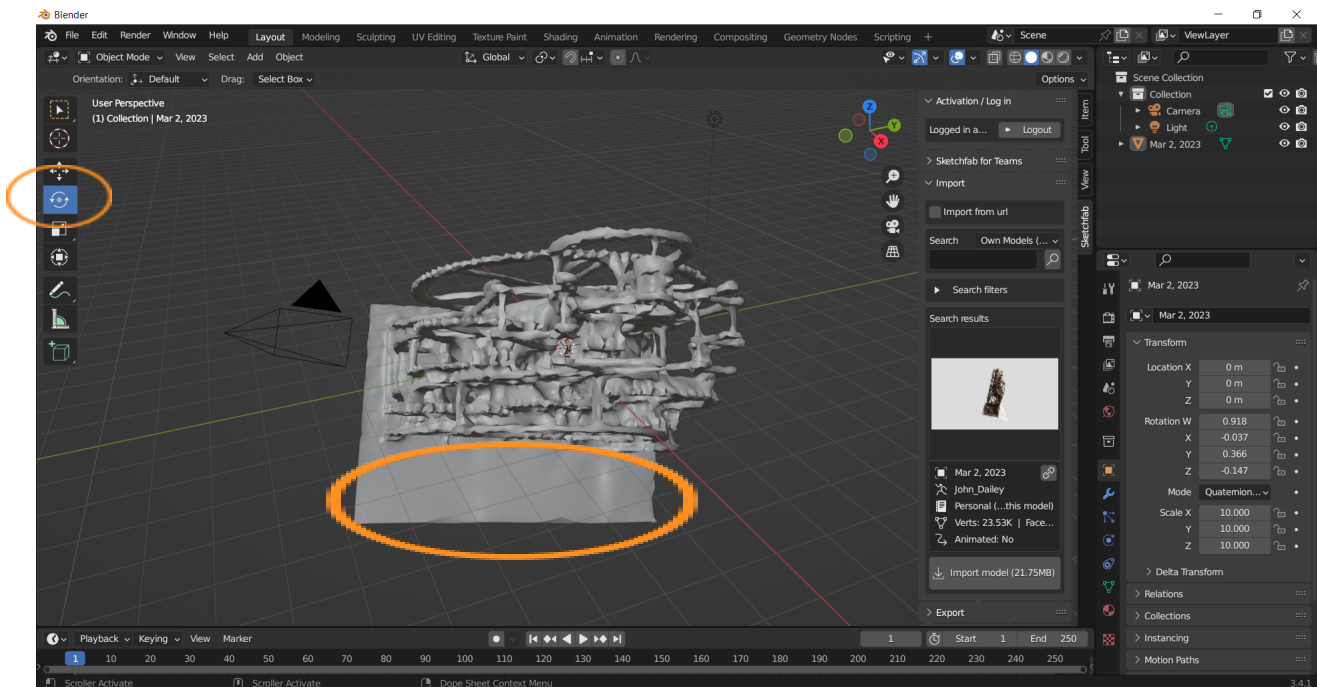
Self Check

Were you able to resize and rotate your model in Blender as you'd like so that you can begin editing?

# Step 3: Remove extraneous geometry from your model

Preview

Blender offers many different tools and approaches for editing 3D models. One set of approaches involves selecting individual vertices or groups of vertices and deleting them. This section provides information about three selection options that can help you select and delete vertices: Box Select, Circle Select, and Lasso Select. Which of these you will use for any given edit will depend on the shape and size of the area on your model you are trying to remove.

Explore

Follow these steps to use the Box Select, Circle Select, and Lasso Select tools to remove unwanted geometry from your model. You can use these functions in as many combinations and as many times as needed in order to achieve the outcome you want.

ACCESS EDIT MODE AND VIEW YOUR MODEL'S MESH

Near the top of the Viewport is a dropdown that is in "Object Mode" by default. It needs to be in this mode in order to rotate or move a model. However, to edit your model, the "Edit Mode" must be selected. From the dropdown, select "Edit Mode." Be sure that you are selecting "Edit Mode" from the dropdown menu, and NOT the "Edit" function next to "File."
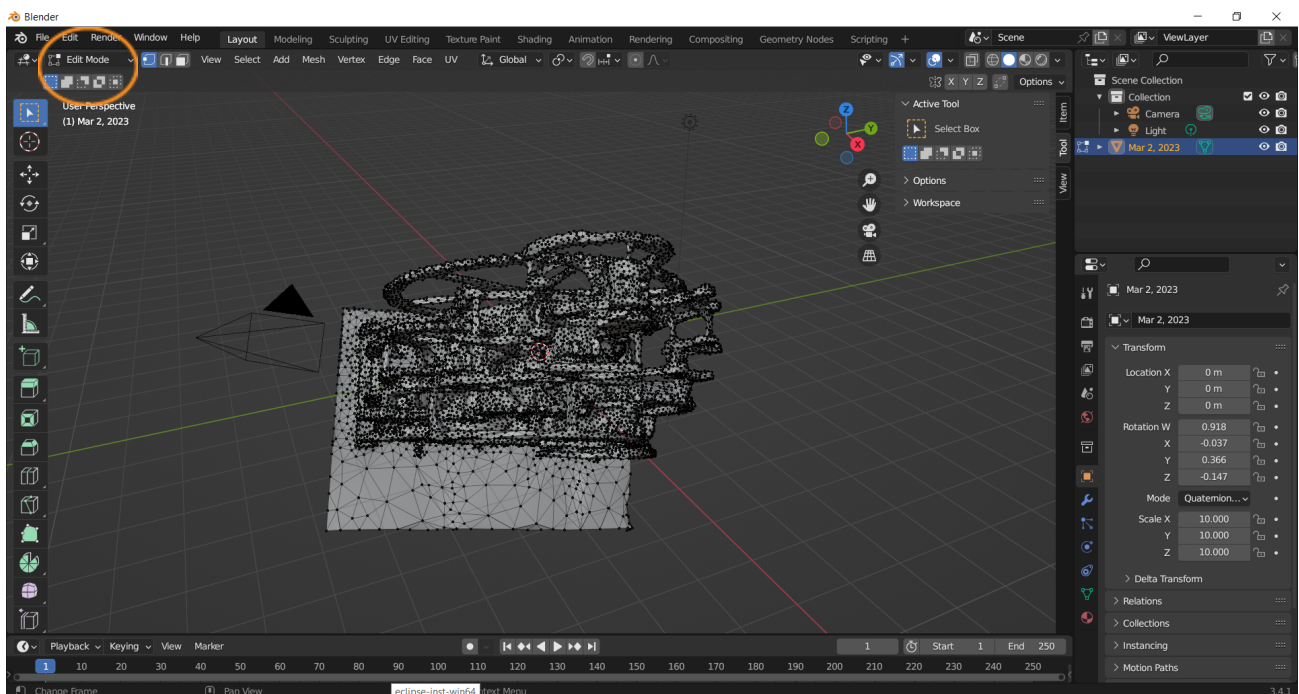
The model will now display hundreds of dots (called "vertices") and lines (called "edges") - together called the model's "mesh." The goal is to select the vertices and edges of the unwanted areas and delete them. Toward the top edge of the viewport, locate the Select dropdown. Note the Box Select, Circle Select, and Lasso Select options in the dropdown menu.
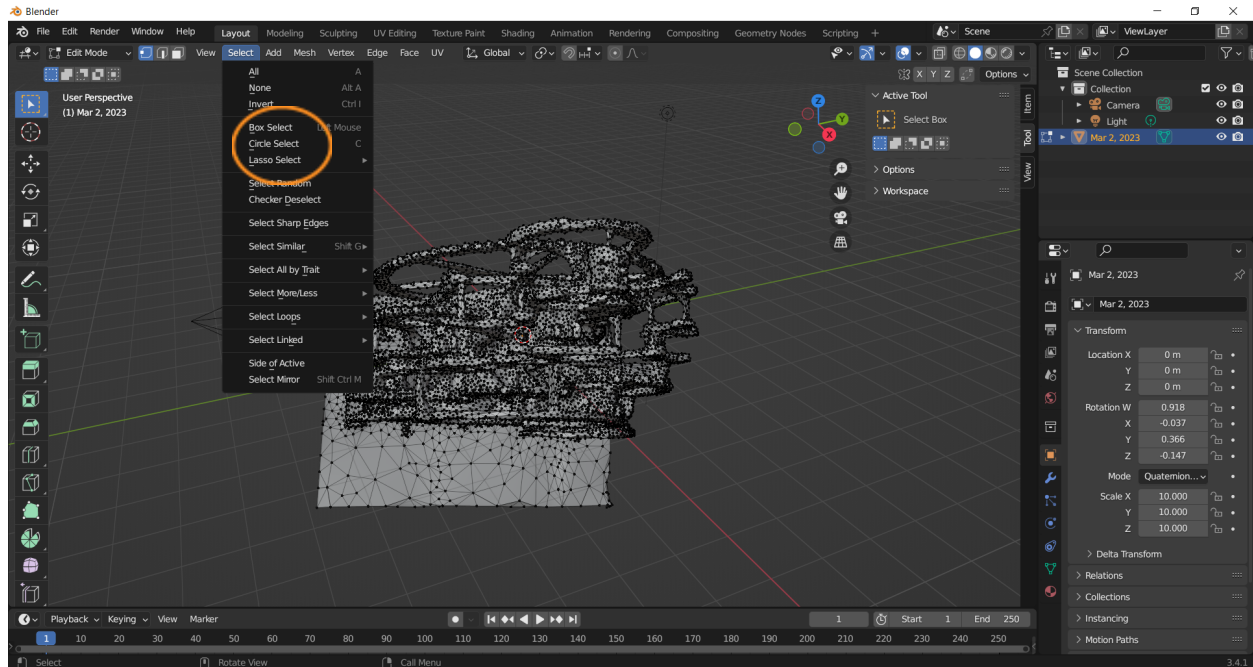
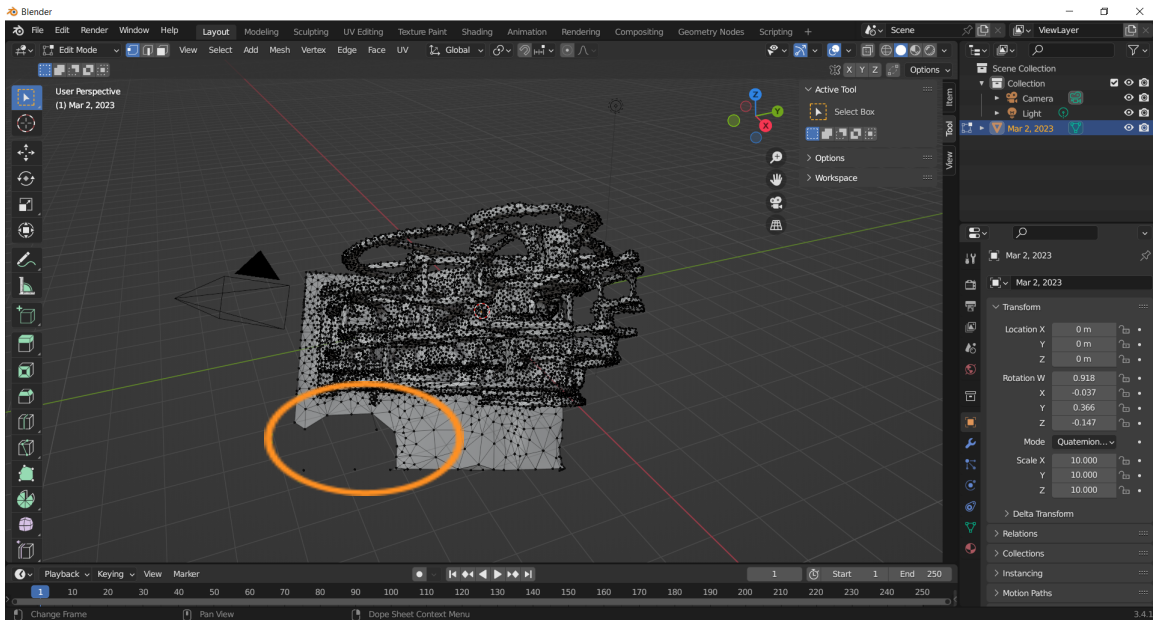# SELECT AND REMOVE UNWANTED GEOMETRY USING BOX SELECT

To use Box Select to select unwanted vertices, choose "Box Select" from the "Select" dropdown menu. Click and drag using your mouse to create a box around the desired area for deletion. Release the mouse button. The vertices and edges in the selected area should turn orange.
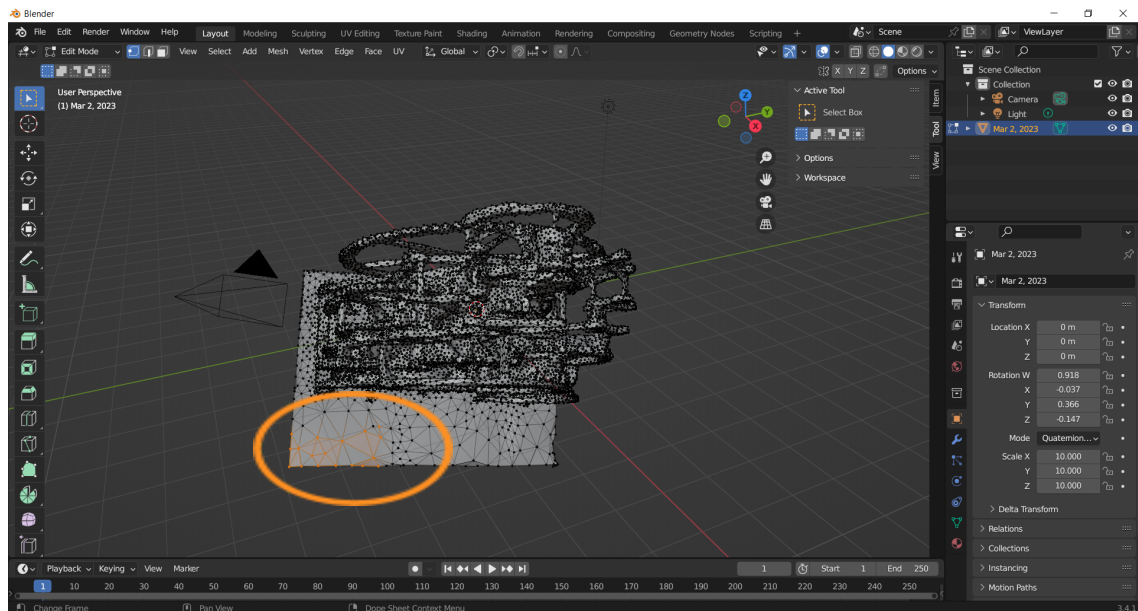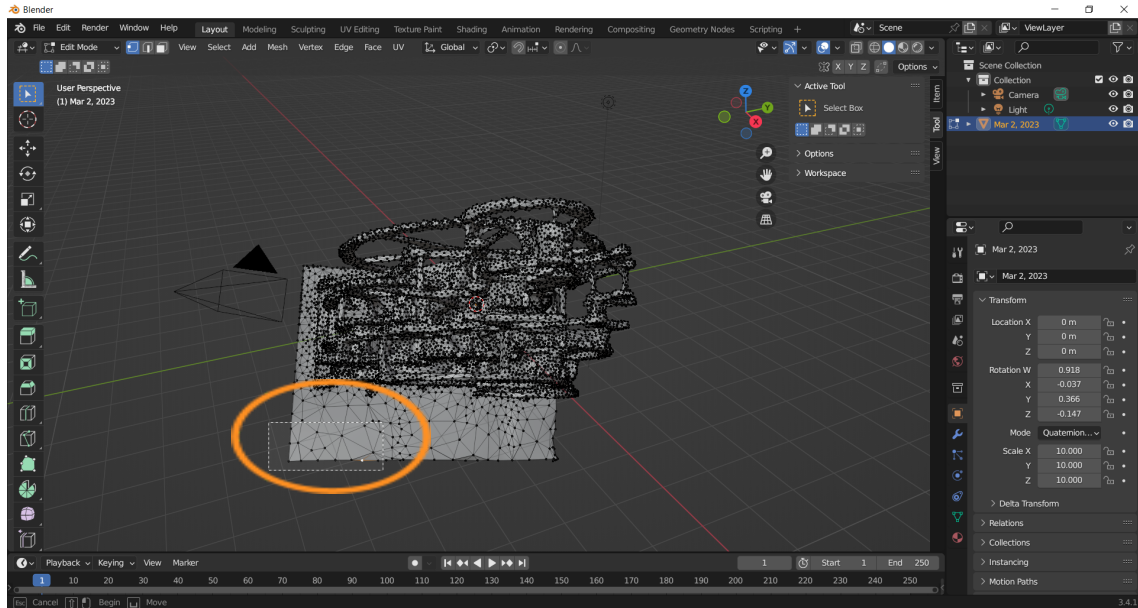
Right click in an unpopulated area of the viewport. You should see a dropdown that has a "Delete Vertices" selection at the bottom.
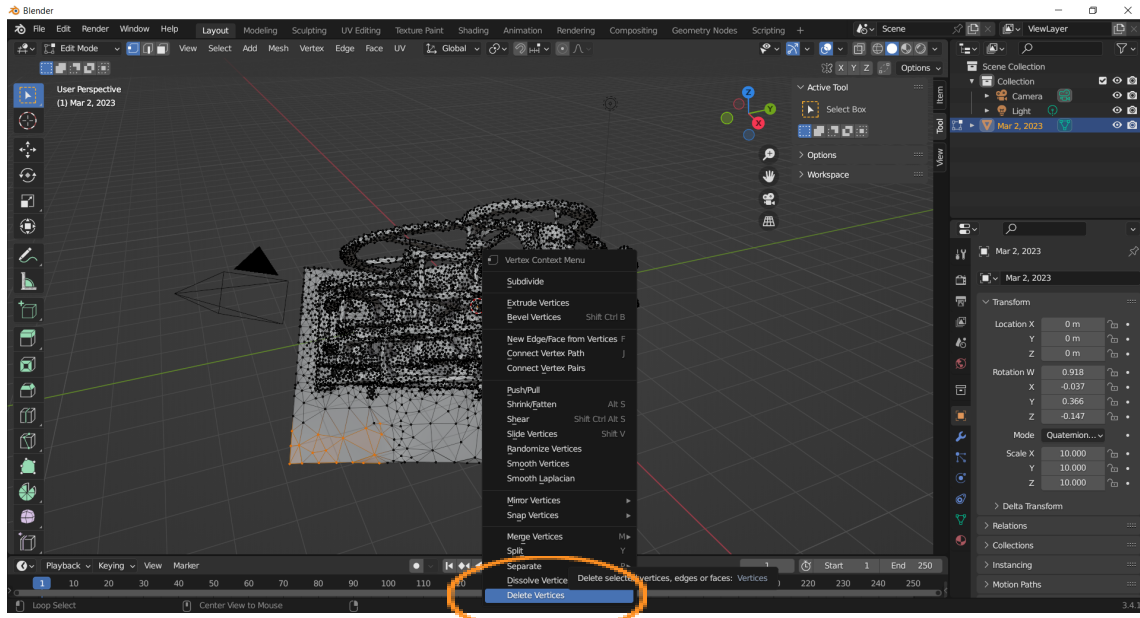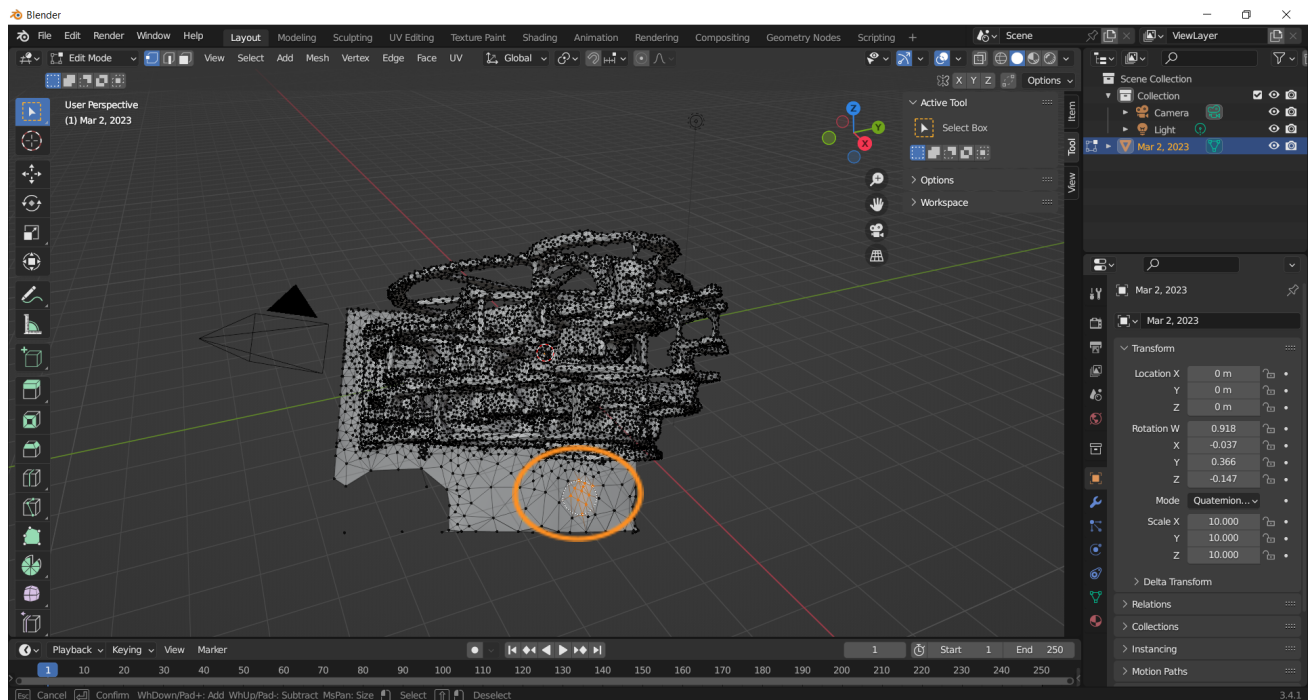

Click "Delete Vertices," and the selected area should disappear. Note that some areas may have "stacked" vertices - multiple vertices that occupy the same space. To get rid of these, simply reselect the area that they occupy and perform the "Delete Vertices" procedure again.
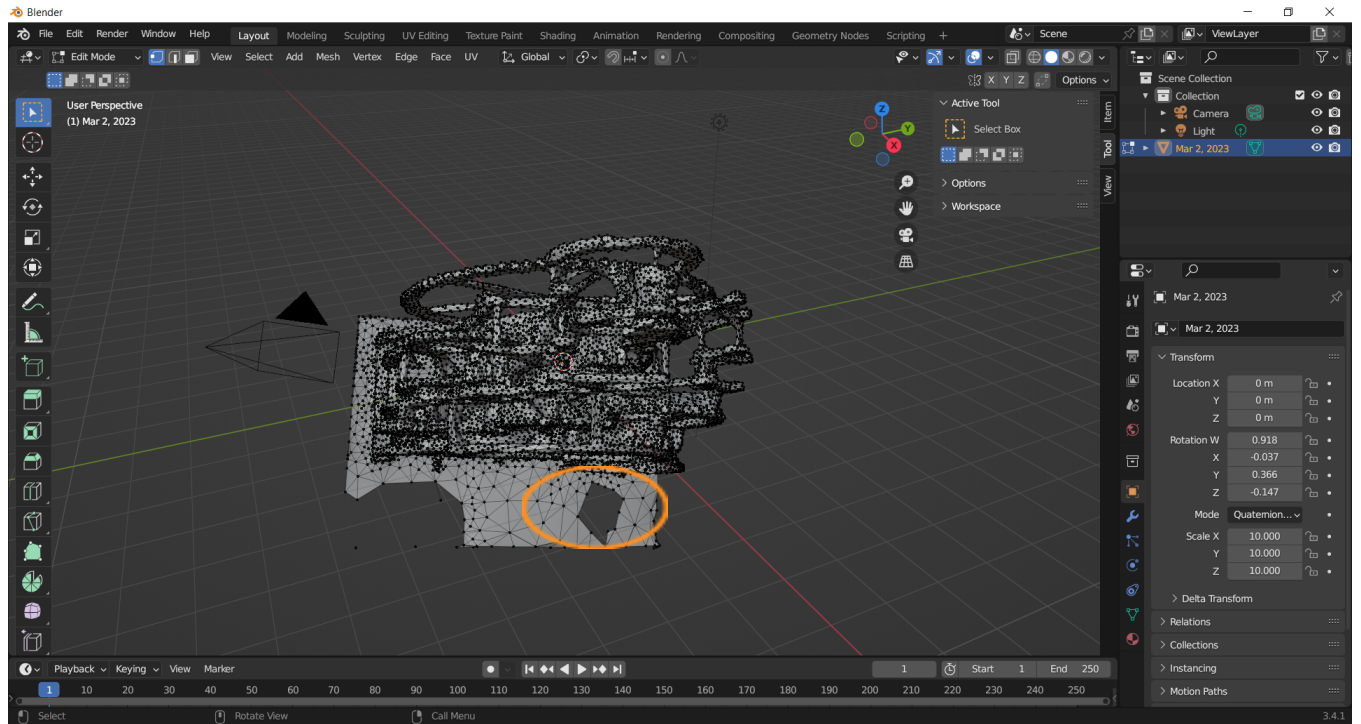
SELECT AND REMOVE UNWANTED GEOMETRY USING CIRCLE SELECT

The Circle Select tool will allow you to select areas of the model that you wish to delete in the shape of a circle. To use Circle Select to delete unwanted vertices, choose "Circle Select" from the Select dropdown menu. Highlight as much of the area on your model as you wish to delete using the Circle Select tool by clicking and dragging with your mouse. You can edit very small areas by overlapping them with only small portions of the circle, or you can change the size of the circle using the scroll wheel on your mouse.
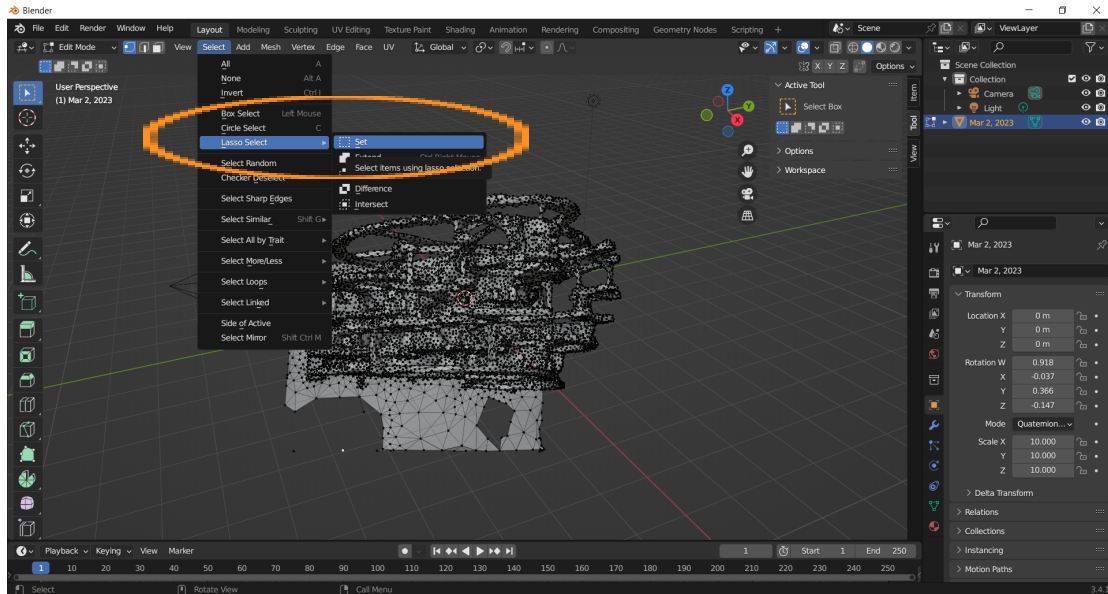
When you've selected the area you wish to remove, right click in an unpopulated area of the viewport and select "Delete Vertices." You should see the selected vertices disappear.

SELECT AND REMOVE UNWANTED GEOMETRY USING LASSO SELECT

Lasso Select is a freeform selection tool that allows you to select and delete irregularly-shaped areas on your model. Lasso Select is helpful for selecting areas close to a curved edge on a model. It has additional settings that the Box Select and Circle Select tools don't have. For the purpose of this Guide, just use the "Set" option. Choose it from the Select dropdown menu.
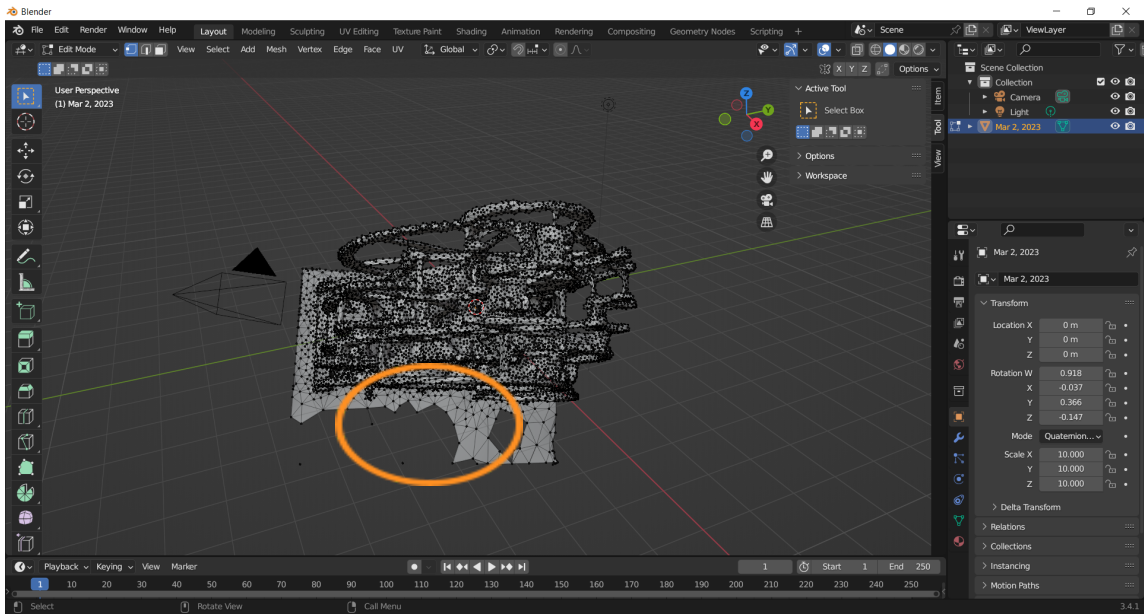

Click and drag using your mouse to select a desired area to be removed, which will be highlighted in orange when you release the mouse button.
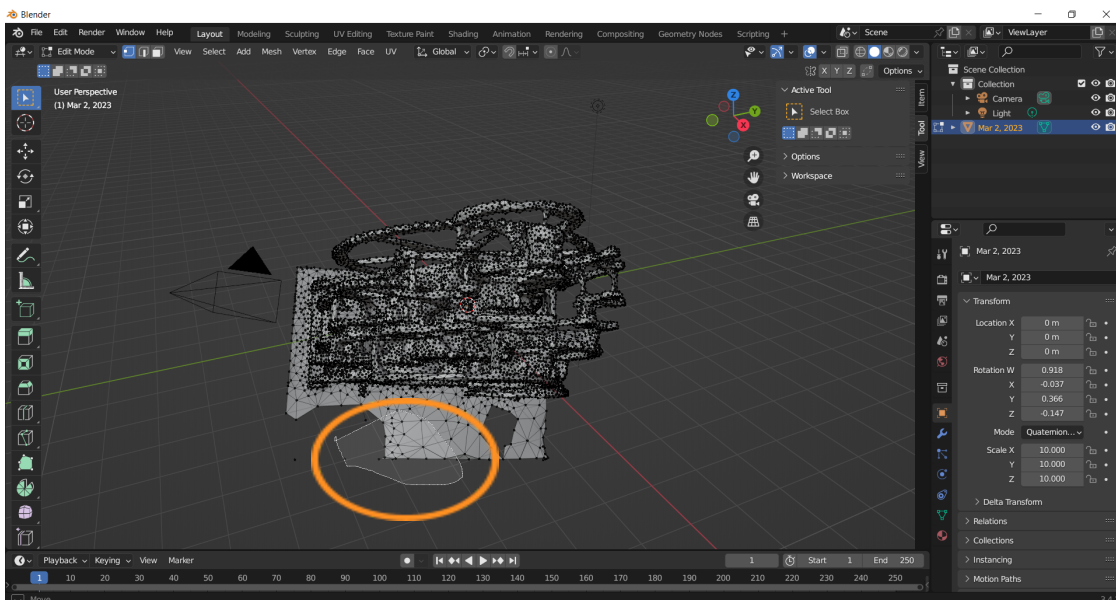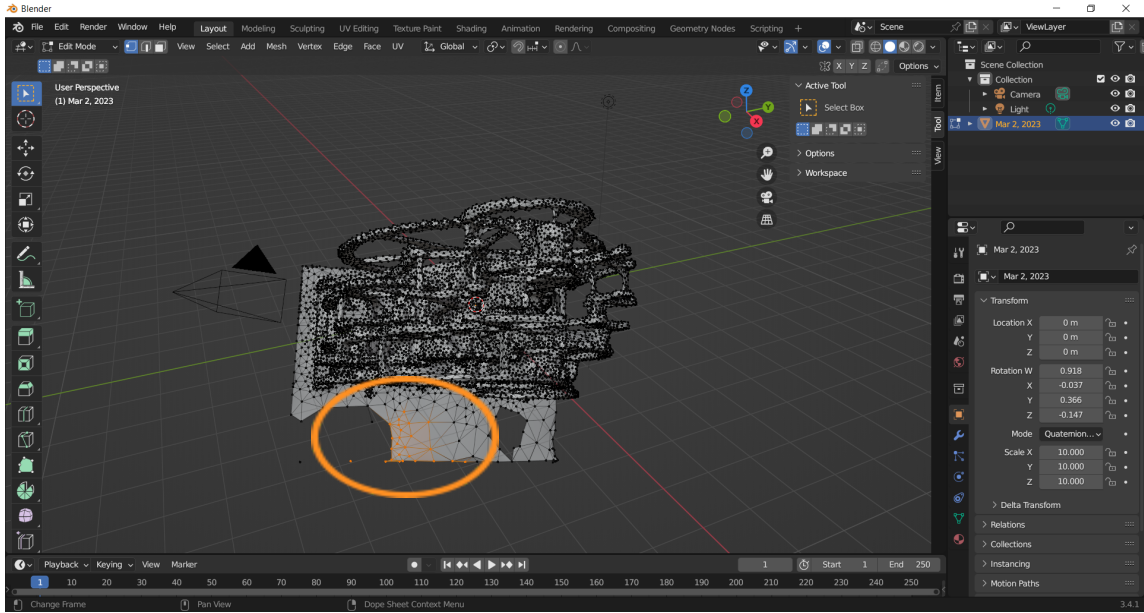
Right click in an unpopulated area and select "Delete Vertices." You should see the selected vertices disappear.

FINALIZE YOUR EDITS

If you wish to delete a very small area on your model, you can select an individual vertex in "Edit Mode" to delete the vertex and all attached edges. Click on the vertex to select it, and it will be highlighted in orange. Right click outside of the model and select "Delete Vertices." Note that you can select more than one individual vertex at the same time by holding down the CTRL key as you click on each one.

Use the "Rotate" tool to rotate the model to make any additional deletions that are needed. When you are done rotating and want to resume selecting areas to delete, click the "Select Box" button at the top of the vertical toolbar on the left side of the screen and make sure you are in Edit Mode. Then resume with selecting areas to delete as described above.
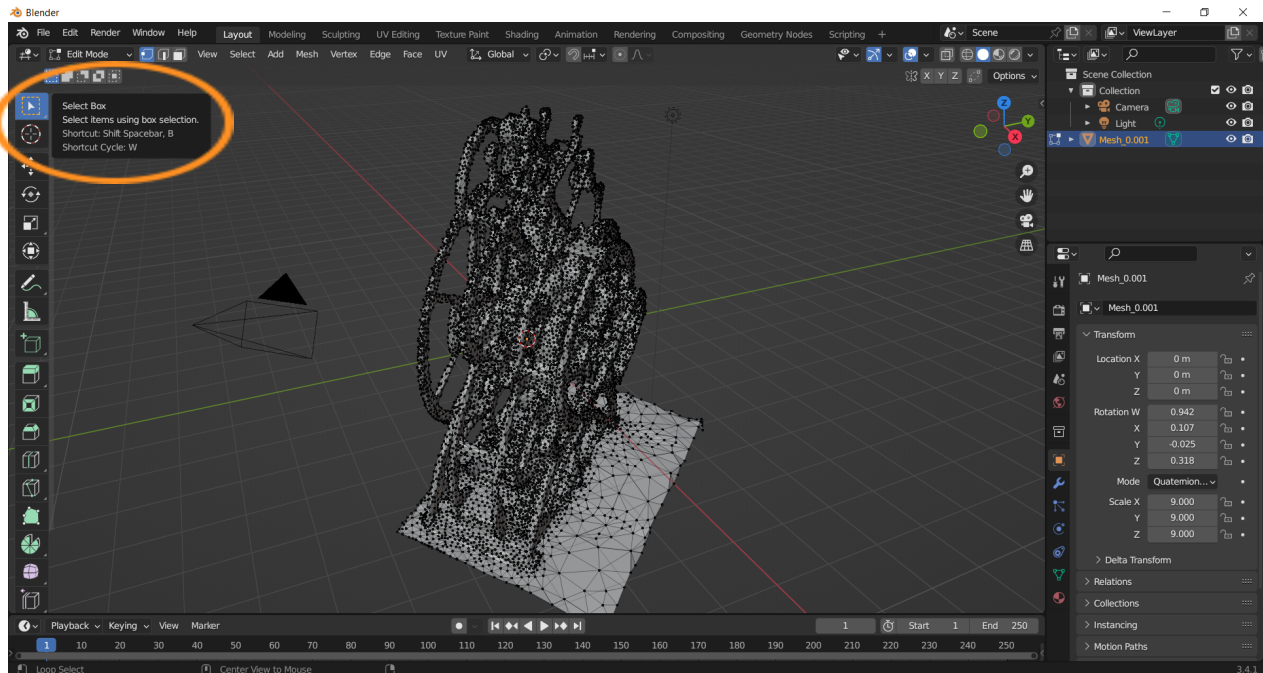
If you have inadvertently made changes to your model that you wish to undo, click "CTRL + Z" (on a PC) or "Command + Z" (on a Mac) to undo your most recent action. You can also use the "Undo" tool by clicking "Edit" → "Undo" at the top of the viewport. If you don't wish to preserve any of your edits, simply exit Blender without saving the model.

When finished, return to Object mode from Edit mode to view the edited model.

SAVE AND RETURN TO YOUR MODEL

If you wish to work on a model in Blender, but do not complete it in one session, you can save your draft model as a .blend file on your computer. Go to File → Save As. This will open a window that will allow you to browse your computer's file system. Browse to the desired target location for your file. At the bottom of the browser window enter the desired file name (which will have a .blend file extension by default), then click the blue "Save As" button. When you wish to continue editing your draft, launch Blender, go to File → Open, and access your file from its location on your computer. It may be a good idea to set up a dedicated folder in which to store your model files ahead of time so you can access them easily.

If you wish to export your model for use in another platform (for example, Unreal Editor for Fortnite), you can use Blender's Export function by clicking File → Export. Select the file type (.glb is suggested), name your file, and select a location on your computer where you will save the file.

Self Check
Were you able to use a combination of selection tools to remove all the extraneous geometry you wanted to remove?

Lesson Closure

Demonstration of Learning
You were able to open Blender, prepare a photogrammetry model for editing by changing its scale and rotating it, and remove the extraneous geometry from your model using a combination of selection tools.

Exploration Opportunities
Now that you have a more refined and photorealistic photogrammetry model, you can use it to build a variety of 3D experiences. For example, you can import it into a Fortnite island using Unreal Editor for Fortnite. You can learn how to import a photogrammetry model into a Fortnite island in the lesson "Import 3D Models into a Fortnite Island Using UEFN," available on CreateAccess.org's Microcourses Hub.